

# STANDARD OPERATING PROCEDURE

*SVAMITVA SCHEME*

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# 1 Introduction

The scheme aims to provide an integrated property validation solution for rural India. The demarcation of inhabitant (Abadi) land in rural areas would be done using Drone Surveying technology, with the collaborative efforts of the Ministry of Panchayati Raj, State Panchayati Raj Department, State Revenue Department and Survey of India. This would enable village household owners, to use their homes as a financial asset for taking loans and other financial benefits and provides the record of rights for inhabited rural areas in villages, create geo-tagging of each property and update property and asset register to strengthen the tax collection and demand assessment process of Gram Panchayats, so that the legal record of property holders are available with the State and State can issue Property Cards to household owners which would enable monetization of rural residential assets for the purchase of credit and other financial services. There is an additional benefit of clear determination of property tax, which would accrue to the GPs directly in States where it is devolved or else, add to the State exchequer.

## 2 Document Overview

This document details the Step by Step procedure with role and responsibility of different stakeholders.

## 3 Key Stakeholders

Refer Chapter 6 of the Framework for implementation of SVAMITVA scheme.

## 4 Pre-Requisites

- i. State Revenue Department and Survey of India (Sol) shall sign the Memorandum of Understanding (MoU) for drone-based surveying of rural inhabited areas (*if not already signed*).
- ii. The State Revenue Department need to check the extent of activities that can be undertaken to conduct Drone survey for demarcation of rural inhabited areas in the State Revenue Act. *If required*, State may need to seek an amendment in the State Revenue Act to undertake drone and survey of properties.

- iii. The State Revenue Department need to ensure that for issuance of property card to villagers, whether the prescribed form of property card need to modify/update / or any amendment in State Revenue Codes with respect to Drone Survey methodology. *If required*, State may need to seek necessary amendments.
- iv. Survey of India shall take requisite permission for flying Drones from Directorate General of Civil Aviation/ Ministry of Defence.

## 5 Procedure

### 5.1 Establishment of Continuous Reference Operating System (CORS) Network

*(Applicable for Rajasthan and Punjab State only for the pilot phase of SVAMITVA scheme)*

Continuously Operating Reference Stations is a network of reference stations that provide a virtual base station that allows access long-range high-accuracy Network RTK corrections. The RTK networks extend the use of RTK to a larger area containing a network of reference stations. Accuracy is increased in a CORS network, because more than one station helps ensure correct positioning and guards against a false initialization of a single base station. Real-time kinematic (RTK) positioning is a satellite navigation technique used to enhance the precision of position data derived from satellite-based positioning systems. Hence CORS Network supports in establishing Ground Control Points, which is an important activity for accurate Geo-referencing, ground truthing and demarcation of Lands.

- i. State Revenue Department shall facilitate field survey activities with support from local authorities for
  - a. CORS site selection, in discussion with Survey of India
  - b. Provide Area/ site for CORS network installation
  - c. Provide electricity, physical security and facilitation for establishing the CORS equipment
  - d. Facilitate hiring of field vehicles, hiring of local labours, accommodation for field teams etc.

- ii. The Survey of India shall perform the establishment of CORS Network, preparation Geoid Model and ensure operation and maintenance of CORS network stations and provision of CORS network services for 5 years
- iii. The CORS network shall be available to State and Central Government any other department on licence basis without any charges or very nominal charges. This would facilitate use of CORS network for any survey related activities like road construction and Irrigation works etc.

## **5.2 Preparatory Activities**

- i. The regional revenue office takes requisite permissions to conduct the survey. The Collector/ Competent authority notifies the survey area through a public notice.
- ii. State Panchayati Raj Department invites the residents of the village for Gram Sabha to inform them about the schedule of the survey and to sensitize about the surveying methodology and its benefits.
- iii. Demarcation of Abadi area by issuing notices by Revenue office to the adjacent landholders.
- iv. Officials from State Revenue Department along with Gram Panchayat officials and property owner identifies individual properties, government assets, gram sabha land parcels, roads, open plots etc. and mark the property boundaries with Chunna lines for the areas to be surveyed.
- v. Gram Sevak / Gram Panchayat shall update Property Register (*wherever applicable*)
- vi. State Revenue Department shall provide scanned copy of the available rural inhabited maps to Survey of India officials. (*if available*)
- vii. Sol shall prepare the mission plan for drone flying using available maps/satellite imagery, in consultation with State Revenue Officials and Gram Panchayat.

## **5.3 Provision of Control and Check points**

Survey of India shall establish Ground Control Points (GCPs) viz. Horizontal and Vertical Control points. The location, sketches, description and ids of all control

points need to be maintained in GIS (Geographical Information System) and co-ordinate list needs to be maintained in both system of (latitude/longitude and WGS 84(World Geodetic System 1984) and UTM (Universal Transverse Mercator) Coordinate System zone) via CORS network

#### **5.4 Drone Flying and Data Acquisition**

- i. On the scheduled date, as per the mission plan, the Drone /Unmanned vehicle shall fly.
- ii. Each Drone/ Unmanned Aerial Vehicle flying team (Sol team, Gram Panchayat Officials) shall be accompanied by at least one employee from Revenue Department and, if necessary, one official from Police Department
- iii. Acquisition of Aerial images using Professional Survey Grade Unmanned Aerial Vehicle/ Drone for Large Scale Mapping of village
- iv. The images captured through Drone would be processed by Survey of India in its Geographic Information System lab.

#### **5.5 Post Survey Data Processing**

- i. Post Survey Data Processing shall be done Survey of India. The Sol shall use their hardware, software and their GIS Lab for data Processing.
- ii. Survey of India shall generate following spatial data by processing the images captured through Drone Survey.
  - a. Generation of DEM & Ortho Rectified Images
  - b. Extraction of 2D topographical features from Ortho-rectified images
  - c. Generation of Land Parcel maps at a scale of 1:500 - The Land Parcel Maps product shall comprise of base map overlain by different layers of topographical features, man-made structures, land parcel information, district/tehsil/village boundaries information, etc. along with alike attributes as per the requirement of State Revenue Department
  - d. Creation of boundaries of villages
  - e. Creation of Spatial Database. It shall comprise of Seamless digital database for all the layers, data dictionary for latitude, longitude, sketch control-point along with data feature code, feature type (line, point and polygon), spatial and non-spatial data along with metadata of features.

The Spatial Database shall be Open Geospatial Consortium (OGC) complaint.

- iii. The attributes collected/provided by State Government shall be linked with their respective features, thereby Sol shall create a digital spatial library of all the features and their respective information. The data entry in the attributes table shall be carried out by Survey of India in coordination with State Programme Management Unit.
- iv. Sol shall number the properties / structures within rural inhabited (abadi)/Lal dora /area as per numbering system provided by the State Government.

### **5.6 Data Validation and Verification**

- i. Sol shall undertake QA (Quality Assurance)/QC (Quality Control) work.
- ii. Ground-truthing and validation of Land Parcel Maps:
  - a. Sol shall perform ground-truthing and validation of topographical features as derived from Ortho-rectified images.
  - b. State Revenue Department shall perform ground-truthing and validation of Land Parcel maps and layers pertaining to feature list as per requirement of State.
- iii. Land Parcel Maps/ Boundaries corrections (if required)
  - a. Sol shall perform corrections in maps and boundaries as per ground truthing.
  - b. State Revenue Department and Sol shall jointly reconcile\* the survey data with the available records and finalize the dimensions of each land parcel.

*\* Reconciliation process and correction formula shall be defined as per respective State Government rules and policies*

- iv. Post correction of maps and boundaries. Sol shall generate land Parcel maps with integration of textual details (Records of Rights).

### **5.7 Inquiry and Dispute Resolution**

- i. Inquiry Process for Ownership adjudication: The process is initiated, where

survey officials verify ownership of the land parcels, with the help of gram sabha, landowners, and review the existing documents

- ii. State Revenue Department shall issue notification for Joint verification of ownership to the villagers.
- iii. The Inquiry Officer/ competent officer (from the Survey Department) re-verifies the ownership and resolves any post survey objections received from property owners. These may be related to correction in owner name, property boundaries, joint holding etc. For unresolved objections / disputes, the final decision shall rest with the District Magistrate / Collector/ competent authority as per State Revenue law.
- iv. Gram Panchayat helps in resolving the post survey objections received from property owners.
- v. State Revenue Department shall issue second notification to provide the results after resolution of objections at Gram Panchayat

## **5.8 Generation of Final Maps/ Digital Data**

- i. Sol shall generate final
  - a. Ortho-Rectified Image (ORI) of better than  $\pm 5$  cm GSD
  - b. GIS data base prepared on 1:500 scale on UTM projection and WGS-84 datum
  - c. DEM/DSM of better than  $\pm 20$  cm accuracy
  - d. Hard copy maps on 1:500 scale (04 No's each) for a village on good quality 90 GSM paper along-with pdf copy
  - e. Integration of Spatial and Textual data: Occupant data from the available records, including Gram Panchayat records, shall be integrated with LPMs generated.

## **5.9 Generation of Property Card (Records of Right)**

- i. State Revenue Department shall prepare and issue property cards to the villagers

### **5.10 Updation of property Tax and asset register State**

- i. Gram Panchayat shall update property tax (Tax would accrue to the GPs directly in States where it is devolved, or else, add to the State exchequer) and asset register of Gram Panchayat

### **5.11 Training and Capacity**

- ii. Sol shall provide training to nominated officials from State Revenue Department
- iii. Sol shall also train State Revenue Department officials on the operations and usage of various applications and technologies for map data updation.

### **5.12 Officials involved (Indicative list)**

<b>S.no</b>	<b>Officials Involved</b>	<b>Department</b>
1	<ol style="list-style-type: none"><li>i. Collector</li><li>ii. Deputy Superintendent of Land Records</li><li>iii. Patwari</li><li>iv. District Revenue Officer</li><li>v. Deputy Director of Land Records</li><li>vi. District Superintendent of Land Records</li><li>vii. Settlement Commissioner and Director of Land Records</li><li>viii. State Programme Management Unit</li><li>ix. Other Programme Management units at Taulka, District level etc</li></ol>	State Revenue Department
2	<ol style="list-style-type: none"><li>i. Deputy Surveyor General of India</li><li>ii. Director, GDC</li><li>iii. State Nodal officer</li></ol>	Survey of India

3	<ul style="list-style-type: none"> <li>i. Sarpanch</li> <li>ii. Panchayat Secretary</li> <li>iii. Gram Sewak</li> </ul>	State Panchayati Raj Department
4	<ul style="list-style-type: none"> <li>i. National Project Management Unit</li> </ul>	Ministry of Panchayati Raj

*\*State Revenue Department officials hierarchy may vary from State to state.*

*States may allocate duties to different revenue officials as per their manpower availability*

**Sample Appraisal Format for States**

<b>Appraisal Plan for States</b>			
<b>STATE NAME</b> <input style="width: 90%;" type="text"/>			
Year <input style="width: 200px;" type="text"/>		Time Period <input style="width: 200px;" type="text"/>	
<b>COMPONENTS</b>			
<b>COMPONENT 1 - Establishment of State Programme Management Unit (SPMU)</b>			
Is SPMU established <input type="radio"/> Yes <input type="radio"/> No			
<i>If (Yes)</i>			
1 No.of State Coordinators functional		<input style="width: 150px;" type="text"/>	
2 SPMU functional since ( MM/YY)		<input style="width: 150px;" type="text"/>	
<b>COMPONENT 2 - IEC</b>			
#	Nature of IEC Activities	Planned (Count)	Completed (Count)
1	Visual Media		
2	Audio		
3	Social Media		
4	Mela		
5	Campaigns/Programmes/Functions		
6	Cultural Events		
7	Workshops		
8	Others		
Is IEC Activities converged from any Central/State Scheme <input type="radio"/> Yes <input type="radio"/> No			
<i>If Yes (Specify details below)</i>			
<input style="width: 100%; height: 100%;" type="text"/>			
<b>SUBMITTED BY :</b>		<b>VERIFIED BY :</b>	
Signature (with Official Stamp) :		Signature (with Official Stamp) :	
Name :		Name:	
Designation:		Designation:	
Date:		Date:	

**Sample Appraisal Format for Survey of India**

<b>Appraisal Plan for Survey of India</b>	
<b>STATE NAME</b>	<input style="width: 95%;" type="text"/>
Year	<input style="width: 80%;" type="text"/>
Month	<input style="width: 80%;" type="text"/>
<b>STATE PROFILE</b>	
1 Total Geographical Area ( in Sq Km)	<input style="width: 95%;" type="text"/>
2 Total Rural Area (in Sq Km)	<input style="width: 95%;" type="text"/>
3 Total Rural Abadi Area (in Sq Km)	<input style="width: 95%;" type="text"/>
No. of Villages selected for Large Scale Mapping using Drone Survey	<input style="width: 80%;" type="text"/>
<b>COMPONENTS</b>	
<b>COMPONENT 1 - Establishment of CORS Network</b>	
Is CORS Establishment Planned	<input type="radio"/> Yes <input type="radio"/> No
<b>If (Yes)</b>	
1 Total CORS Network Planned	<input style="width: 80%;" type="text"/>
2 No. of CORS network Functional	<input style="width: 80%;" type="text"/>
<b>COMPONENT 2 - Large Scale Mapping using Unmanned Aerial Vehicle/Drone</b>	
Is Drone Survey Planned	<input type="radio"/> Yes <input type="radio"/> No
<b>If (Yes)</b>	
1 No. of Villages planned for Drone Survey	<input style="width: 80%;" type="text"/>
2 No. of villages where Drone Survey Completed	<input style="width: 80%;" type="text"/>
3 No. of villages for which data processing completed	<input style="width: 80%;" type="text"/>
4 No. of Villages for which interim maps generated	<input style="width: 80%;" type="text"/>
5 No. of villages for which final maps generated	<input style="width: 80%;" type="text"/>
6 No. of villages for which GIS database has been prepared	<input style="width: 80%;" type="text"/>
7 Planned trainings and capacity building of Government officials completed	<input type="radio"/> Yes <input type="radio"/> No
<b>SUBMITTED BY :</b>	
Signature (with Official Stamp) :	
Name :	
Designation:	
Date:	
<b>VERIFIED BY :</b>	
Signature (with Official Stamp) :	
Name:	
Designation:	
Date:	