

MEMORANDUM OF UNDERSTANDING (MoU)

Between

SURVEY OF INDIA, GOVT OF INDIA

And

GOVT OF ASSAM

And

BODOLAND TERRITORIAL COUNCIL

For

**DRONE BASED LARGE SCALE MAPPING OF RURAL
HABITAT AREAS IN THE BODOLAND TERRITORIAL
COUNCIL**

Signed on 28th December 2021

**Memorandum of Understanding between Bodoland Territorial,
Government of Assam and Survey of India (Sol), Government of
India**

The **Memorandum of Understanding** is made and entered into on the 28th December of the year 2021

Between

The **President of India**, acting through Surveyor General of India, Sol, Ministry of Science and Technology, Govt. of India having Office at Hathibarkala Estate, Dehradun-248001; hereinafter referred to as SOI (which expression shall, unless excluded by or repugnant to the context, be deemed to include his successors in Office and assignee) of the **First Party**.

And

The **Governor of Assam**, acting through Principal Secretary, Bodoland Territorial Council having office at Kokrajhar, hereinafter referred to as (which expression shall, unless excluded by or repugnant to the context, be deemed to include his/her successors in Office and assignee) of the **Second Party**.

WHEREAS the Survey of India is the National Mapping Agency engaged in Surveying and Mapping of whole country including Towns, Villages, Cities and States and in publishing topographical and general-purpose maps in analogue and digital form.

AND WHEREAS, Survey of India is the owner of its analogue and digital map data.

AND WHEREAS BTC has approved to undertake the work as per SVAMITVA scheme by SOI to supply updated large scale topographical Maps of the rural abadi areas with no cadastral and individuals records of rights(as limited to the scope of work under SVAMITVA Scheme) of villages in the Bodoland Territorial Council in analogue and digital GIS form containing Spatial and non-spatial data

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1. BACKGROUND

Large scale mapping on 1:500 scale of the rural abadi areas with no cadastral/revenue records as per the scope of work prescribed under SVAMITVA Scheme using Professional Survey Grade UAV/Drone is to be undertaken by the BTC.

Survey of India (herein after referred to as 'SOI') has agreed to generate up-to-date digital topographical maps (GIS data) of rural abadi area with no cadastral and individual records of rights. Records of villages as per SVAMITVA scheme guidelines using Professional Survey Grade UAV/ Drones .Geodetic infrastructure comprising Continuous Operating Reference System (CORS) Network and Geoid model will also be established.

GIS data comprising rural abadi property boundaries, topographical features, attributes collected from ground shall be prepared by Sol as per SVAMITVA scheme guidelines. The non-spatial attribute data shall be provided by BTC preferably in digital format

The nodal Department for this project is Land Revenue Department, BTC

2. SCOPE OF THE WORK

2.1. Establishment of Continuous Operating Reference System (CORS) Network (wherever applicable as per approved EFC proposal): SOI will procure and establish CORS Network in the BTC including operations and maintenance for next 05 years from the date of Commissioning.

Following work stages will be completed by Sol:

- 2.1.1. Completion of the tendering process for outsourcing
- 2.1.2. Site selection & Recce for CORS stations
- 2.1.3. Civil construction work by outsourced agency
- 2.1.4. Installation & commissioning of CORS stations by outsourced agency
- 2.1.5. Establishment of Control Centre & DR in Sol premises
- 2.1.6. Operation and Maintenance of CORS Network for 05 years from the date of commencing.

2.2. Notification for Drone Survey in the target areas by BTC

2.3. Marking of property boundaries with Chuna lines or any suitable alternative as mutually agreed by BTC before the drone flying in the area.

2.4. Acquisition of Aerial images using Professional survey grade drone/ Unmanned Aerial Vehicle (UAVs) by SOI. Following work stages will be completed by SOI:-

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- 2.4.1. Procurement of Drones, Drone Flying of rural abadi areas with no cadastral records as per the scope of work prescribed under SVAMITVA Scheme.
- 2.4.2. Drone data acquisition at better than 5 cm Ground Sample Distance (GSD).
- 2.4.3. Drone data Processing involving Block Adjustment & AT (Aerial Triangulation), Ortho Rectified Image (ORI) generation, DEM (Digital Elevation Model)/DTM (Digital Terrain Model) generation.
- 2.5. Extraction of 2D features and generation of digital spatial data as per SVAMITVA scheme guidelines by SOI.
- 2.6. Attribute linkage of all attribute data provided in digital form by BTC as per jointly finalised scheme by BTC & Sol.
- 2.7. Numbering of properties will be entered as per numbering system provided by BTC.
- 2.8. Ownership data collection and Ground validation of property ownership boundaries will be done by BTC
- 2.9. Ground-Truthing and validation of topographical features shall be carried out by Sol.
- 2.10. Generation of final LPM & GIS data.
- 2.11. Training of BTC technical staff by SOI, as per the list submitted by BTC.
- 2.12. **Study Area:** The project under SVAMITVA Scheme shall be carried out in Bodoland Territorial Council for rural abadi areas with no revenue records as per the scope of work prescribed under SVAMITVA Scheme.
- 2.13. **Ownership of Data:** All the ORI and processed data products and the final data products generated will be jointly owned by SOI and BTC. Both agencies (SOI and BTC) shall have the rights to use the data generated under this project for their internal applications. For any 3rd party usage / sharing of data by any of the two agencies, the modalities shall be decided, subsequently by SOI and BTC.

3. METHODOLOGY

- 3.1. All clearances for drone flying will be taken by Sol .[Responsibility: Survey of India]
- 3.2. Horizontal and Vertical Ground Control Points
 - 3.2.1. Identification, Establishment, Densification and Utilisation of Ground Control Points (GCPs) using Sol GCP library points. In areas covered with CORS Network GCPs shall be carried out using CORS Network rovers.
 - a. CORS Network shall be established by Sol in State under SVAMITVA scheme. [Responsibility: Survey of India]
 - b. Area / site for CORS stations installation shall be provided by BTC. These stations should have electricity supply and physical security to be ensured by BTC. [Responsibility: BTC]

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- c. The Sol shall be responsible for operation and maintenance of CORS network stations and to provide CORS network services to BTC for next five years. [Responsibility: Survey of India]
- 3.2.2. Existing Geodetic BMs (Benchmark) of Sol shall be utilised for vertical ground control point extension and geoid model development. [Responsibility: Survey of India]
- 3.3. Property boundaries will be marked with Chuna lines or any suitable alternative as mutually agreed by BTC before the drone flying in the area. BTC will organise the Gram Sabha or such appropriate village level forum to intimate the schedule of the survey and to sensitize the villagers about the project work and its intended benefits. [Responsibility: BTC]
- 3.4. Extent of the rural abadi area as with no cadastral records as per the scope of work prescribed under SVAMITVA Scheme) for drone based mapping will be provided in digital form or with co-ordinates or as kml file for mission planning for drone flying. [Responsibility: BTC]
- 3.5. Acquisition of Aerial images using drone shall be carried out by the Sol for the extent of area given in SI 3.4. [Responsibility: BTC and SOI]
- 3.6. Drone data Processing will be carried out by Sol involving Block Adjustment & AT (Aerial Triangulation), ORI generation, DEM /DTM generation. [Responsibility: SOI]
- 3.7. 2D Feature Extraction (FE)**
- 3.7.1. The ORI shall be used as base image layer to extract the topographical features as per jointly finalised schema by State BTC & Sol. [Responsibility: SOI]
- 3.8. Attribute Data Collection**
- 3.8.1. Attributes data shall be provided by BTC as per feature/ wish list. A standardized data collection format shall be provided as an effort to simplify and speed up the process. The correctness of attribute data shall be the responsibility of BTC. [Responsibility: BTC]
- 3.8.2. The attributes collected/provided (as in point 3.8.1) shall then be linked with their respective features, thereby creating a digital spatial library of all the features and their respective information.
- 3.9. Boundaries of properties within village abadi area will be as per numbering system provided by BTC.**
[Responsibility: Survey of India]

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3.10. Generation of updated Land Parcel Maps (LPM) in suitable soft copy formats and in printing formats. GIS data prepared shall comprise base map overlaid with layers of topographical features, land parcel information with attributes as provided by the BTC.

[Responsibility: Survey of India]

3.11 Ownership data collection and Ground validation of property ownership boundaries will be done by BTC.

3.11.1 Ground validation of topographical features as derived from ORI shall be carried out by Sol. [Responsibility: Survey of India]

3.11.2 Inquiry process for finalising the objections shall be carried out by respective authorities under BTC [Responsibility: BTC]

4 DELIVERABLES

Following shall be output of the entire project covering entire consolidated Feature list:

- 4.1 CORS Network RTK service of ≤ 5 cm horizontal accuracy for five (05) years from the date of commissioning. (Applicable if this component for a state is funded under SVAMITVA Scheme as per EFC)
- 4.2 Maps of rural abadi areas with no cadastral records (as per the scope of work prescribed under SVAMITVA Scheme) and LPM on 1:500 Scale (hard Copy) with ± 10 cm Horizontal accuracy (Plain areas).
- 4.3 DEM of ± 20 cm vertical accuracy for areas of plain terrain and DEM of ± 100 cm vertical accuracy for areas of hilly terrain as generated automatically while drone data processing.
- 4.4 Hard copy maps on 1:500 scale, (04 No's for abadi area)
- 4.5 Training courses for technical staff of BTC as identified by BTC at various levels in National Institute for Geo- Informatics Science and Technology, Hyderabad.

5 ROLES AND RESPONSIBILITIES

5.1 Survey of India (Sol)

- a. Project shall be executed in SOI premises. Workspace to the 3rd party or modernisation of available space in terms of computers/peripherals/servers/data centre shall be provided or looked after by SOI
- b. Responsibility for activities will be as given in item No. 3 (Methodology).



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- c. Sol shall be responsible for Project planning, Execution and monitoring of activities.
- d. For outsourcing of any activity under the project, Sol will be responsible for preparation of RFPs/Bids, Processing of bids, Award of work, Supervision, Quality checking and Work execution as per contract agreement as per the norms laid down by Government of India.
- e. The Sol shall use their software and their GIS Lab for data Processing and production.

5.2 BODOLAND TERRITORIAL Council

- a. Responsibility for activities will be as given in item number 3. (Methodology).
- b. Security of Sol teams shall be ensured by state govt. Each Drone flying team shall be accompanied by at least one employee from Revenue Department and one employee from Police Department. BTC shall provide the Site/land for CORS station at the sites mutually decided as per technical requirement such as cellular network coverage. BTC shall provide for electric supply of atleast 2KV, maintenance of Uninterruptible power supply (UPS) beyond maintenance period and feature for physical security of equipment such as CCTV coverage etc. Security of CORS shall be the responsibility of BTC and state govt.
- c. To finalise the scheme for feature layers as per functional requirement in consultation with Sol.
- d. The BT shall be responsible for the accuracy and correctness of attributes data provided to Sol. The attribute data shall be provided by in the digital format.
- e. Store (Hard Copy, digital data and GIS data), Host and update (as per requirement) the data created under the Drone Pilot Phase.
- f. Finalisation of the revenue records duly following the inquiry process & dispute resolution (if any) for issuance of property cards or ownership rights will be the responsibility of BTC.
- g. To complete the inquiry process & dispute resolution
- h. Updation of Property data and maps – The BTC shall be responsible for any future updation of Rural abadi property data.

5.3 Training

- a. Expenses towards travelling, lodging, boarding of BTC's personnel for training at NIGST, Hyderabad will be borne by BTC. Expenses towards tuition fee, training material, External expert faculty etc will be borne by SOL.

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6 MONITORING & IMPLEMENTATION COMMITTEE

6.1 Sol will establish a separate Project Cell with one dedicated Nodal Officer.

6.2 The SSC may also include the members of the administrative authorities under sixth schedule areas, viz, Bodoland Territorial Region, BODOLAND TERRITORIAL COUNCIL & Karbi Anglong (East & West). Project will be monitored under the supervision of the SSC constituted by State Revenue Department, comprising of officials from State Panchayati Raj department, State Revenue department, representative of Finance Department, Sol (State Representative), MoPR official not below the rank of Under Secretary. SSC shall have the authority to co-opt additional members. The SSC shall have oversight and monitoring functions and shall provide guidance for the smooth operation of the scheme in the respective state. The structure and terms of reference may be defined on mutual agreement with all the parties. Project Management Unit (PMU) will be constituted at BTC level

6.3 **District-level Monitoring and Review Committee (DMRC)** would be constituted by the BTC comprising of officials dealing with land revenue matters, Panchayat Raj matters, registration matters and any other officials as deemed fit. Representative from Sol may be involved, as per the need, as special invitees. The Committee will review the progress of implementation of the Programme at least once a quarter or as prescribed in the SVAMITVA Scheme Guidelines Also, the committee would monitor/ oversee the use of IEC funds.

6.4 SVAMITVA scheme will be implemented through the regular departmental mechanisms which will be assisted by Programme Management Unit at the State levels.

6.5 Online monitoring and reporting system for SVAMITVA Scheme to be put into place.

6.6 Transaction based PFMS to be introduced for release and tracking of SVAMITVA Scheme funds.



7 UPDATION OF PROPERTY DATA & MAPS

The BTC shall be responsible for future update on of rural abadi property data.

The mechanism and surveying agency shall be decided by BTC for future update of Property data and maps.

8 TIME SCHEDULE

The entire project will be completed within the stipulated time period (2021-2025) as provided in guideline of SVAMITVA scheme.

9 FINANCIAL TERMS AND CONDITIONS

A. Cost:

The total per village mapping cost shall be as per SVAMITVA scheme. Both the parties understand and do agree that the actual cost of the project will be calculated on the basis of no. of villages surveyed & mapped after the completion of the work.

As per the guidelines of SVAMITVA Scheme issued by Ministry of Panchayati Raj, the cost of following components would be borne by Ministry of Panchayati Raj.

- i. Establishment of CORS network, including maintenance upto 5 years from the date of commissioning.
- ii. Large Scale Mapping of rural abadi area/ laldora abadi area using Drone survey technique.
- iii. IEC
- iv. State project Management Unit.
- v. Any other cost would be borne by BTC as per mutual agreement with Sol.

B. Release of Payment

Payment to above mentioned component would be released as per Guidelines of SVAMITVA Scheme issued by Ministry of Panchayati Raj.



10 OTHER ASPECTS OF MOU

10.1 Arbitration

Sole Arbitrator shall be referred by the Secretary Govt of India Ministry of Law and Justice including one member i.e. Secretary to the Govt. of India Ministry of Science and Technology.

The Arbitration and Conciliation Act 2015 (as amended) shall be applicable to arbitration under this clause and abide by party. The Award of arbitrator shall be binding upon the Parties

10.2 Indemnity

Each party shall indemnify and hold harmless the other party and its trustees, officers, employees from and against any claims, actions, damages, expenses (including reasonable fees and costs), liabilities and costs arising from or relating to the services of either party under this Agreement.

10.3 Relationship - Principal to Principal

All dealings between SOI and BTC shall be as Principal to Principal. This MoU does not in any way create, establish or deem to imply the relationship of principal and Agent or partnership between Sol and BTC

10.4 Force Majeure

Neither party shall be held responsible for non-fulfillment of its respective obligations under this MoU to the exigency of one or more of the force majeure events lying beyond the responsible control of affected Party, such as but not limited to, Acts of God, War, Flood, Earthquakes, Epidemics, Riots, Civil commodities etc. provided on the occurrence and cessation of any such events, the party affected thereby shall send a notice in writing to this effect to the other party immediately after, but not later than one month of such occurrence and/or cessation. The period between the occurrences and cessation of such events will be excluded while calculating the period during which the party has to perform its obligations under this MoU. If the force majeure conditions continue beyond six months, the parties shall then mutually decide about the future course of action.



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10.5 Governing Law and Jurisdiction

This MoU shall be governed by and constructed in accordance with Indian laws.

IN WITNESS WHEREOF the Parties hereto have duly executed this MoU as on date above written

Bodoland Territorial Council

By signing this MoU, I also confirm that I am authorized to sign on behalf of, BTC

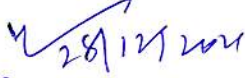
Signature:

 28/12/21

Name: Shantanu P. Gotmare, IAS
Title: Principal Secretary, BTC
Date: 28-12-2021

Witness

1.

 28/12/2021

2.

 28/12/21

Survey of India

By signing this MoU, I also confirm that I am authorized to sign on behalf of Survey of India

Signature:

 28/12/21

Name: Ch. Venkateswara Rao
Title: Director, Survey of India
Date: 28-12-2021

Witness

1

 28/12/21

2.


 Prasantha K. Sen



Government of Assam

By signing this MoU, I also confirm that I am authorized to sign on behalf of, Govt. of Assam

Signature:

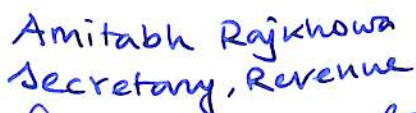
 28/12/2021

Name: Gyanendra Dev Tripathi, IAS
Title: DLR&S, Assam
Date: 28-12-2021



Witness

1.

 Amitabh Rajkhowa
Secretary, Revenue

2.

 Pawanaj Eda
i/c Joint Director Survey