



Concept Note-CORS

Best practices



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Overview of CORS Technology

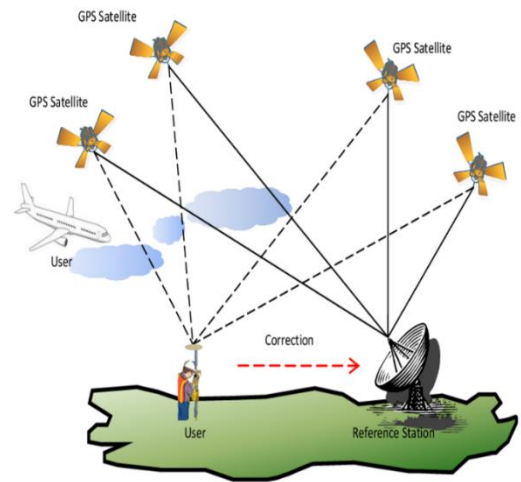
Continuously Operating Reference Station (CORS)

The networked CORS stations (or GNSS receivers) are permanent installations and continuously stream satellite observations to a central server. It is a network of reference stations that provide a virtual base station that allows access to long-range high accuracy Network Real-Time Kinematic (RTK) corrections. The entire setup of Reference Stations and Central Server is known as a Continuous Operating Reference Station (CORS) Network. It Supports in establishing Ground Control Points (GCP) for aerial survey, Ground truthing and Demarcation of Lands, etc. This Geospatial Infrastructure will facilitate location information of +/-5-centimetre (cm) level accuracy in real-time across the country. The CORS network supports the establishment of Ground Control Points, which is an important activity for accurate geo-referencing, ground truthing, and demarcation of lands. It will facilitate in accurately determining the longitude & latitude of a land parcels through better precision.

Further, CORS applications in sectors of Disaster Management and Emergency Response, Transport Sector, Power Sector, Irrigation, Agriculture, Surveying, Accurate asset management, Land use change, Machine Guidance, Data collection, Meteorology could be explored by State departments for their work activities.



(CORS) improves the accuracy of a rover's position data.



Establishment of CORS by Survey of India

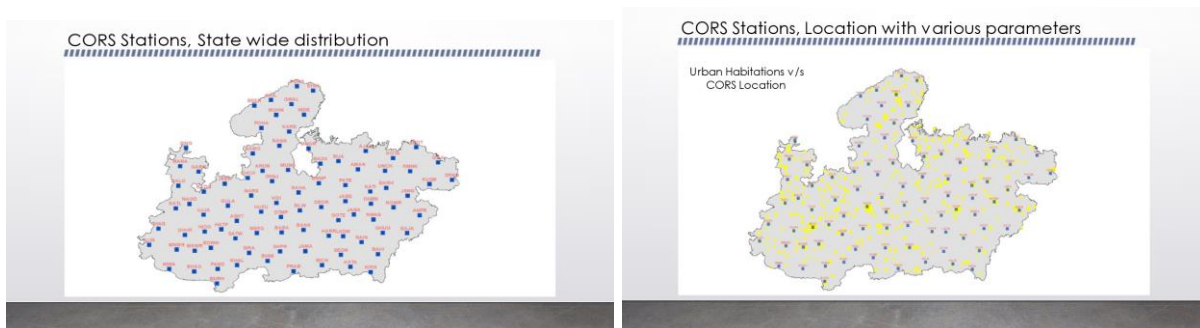
Survey of India has established and operationalized National CORS Network of 1018 CORS Stations across the country (State -wise CORS details are attached as Annexure-I). The operationalized CORS Infrastructure can be used by any state agency or department viz. Revenue Department, Gram Panchayat (GP), Public Works Department, Rural Development Department, Agriculture, Drainage & Canal, Education, Electricity, Water, Health, etc. for the survey and implementation and use of GIS-based applications. This would facilitate development work in Gram Panchayats like road construction, irrigation, and infrastructure etc.

The Standard operating procedure for using the CORS is available on the Survey of India website (cors.surveyofindia.gov.in) and on the CORS portal itself. To provide further assistance, few instructional videos have also been uploaded on the CORS portal.

Best Practice Adopted by States

The States of Madhya Pradesh, Maharashtra and Haryana has initiated in adopting CORS Infrastructure and technology in their work activities and has shared the following practices undertaken in their respective States with the Ministry:

A) Madhya Pradesh: 90 CORS Stations are operationalized and integrated with Central Control Center at MPSeDC Bhopal along with Dehradun Control Center to process the data collected by all 90 CORS stations. Most of the CORS stations are commissioned at Tehsil office premises to ensure locational accuracy & security of the machines.



- Madhya Pradesh has already procured 60 rovers with the deployment of 1 rover per district. The State has also set up its dedicated command & control center for CORS for utilization by concerned departments or agency for various purposes. Moving forward, the State is willing to

form data monetization policy of CORS feeds to private players and has envisaged to onboard all land related department on the same platform ie T&CP, Urban Administration Dept, Rural Development Dept, Water Resource Dept, etc.

Following are some of the envisaged benefits of Integration of CORS with Central Control & Command Centre as shared by the State-

- Various survey works accuracy can be controlled uniformly and centrally.
- Post processing, data can be provided for Gray mobile network areas.
- End to end computerization of Demarcation & Survey works and analysis of the latencies like demarcation, spatial mutations etc.
- Urban Administrative department can utilize for Urban surveys in Plot measurements and mapping, Survey for Sewerage line laying, cut fill profile, Water supply line head calculation, L-section survey for Road construction etc.
- It could benefit in Relief management i.e Flood Area marking (MFL can be marked on ground accurately) and damage analysis.
- Water resource department could conduct the surveys and construction works with high accuracy and precision.
- CORS infrastructure could be used by for forest boundaries survey (to remove the boundaries conflict), Contour trenching, forest plantation area calculation.
- T&CP Department could make use of CORS in Colony layout marking using CORS based system along with ground validation.

B) Maharashtra: Maharashtra Land Records department has taken the opportunity accorded by SVAMITVA Scheme to enhance CORS capability of its surveyors staff by imparting continuous training to new recruits and mid-career training to senior staff on Rovers, CORS and GIS at Land Records Training Academy, Aurangabad. Training by trained staff has been organized at district level for surveyors. A test for testing basic competency in use of ROVERs has been designed for surveyors.

C) Haryana: The State of Haryana has trained the patwaris of various districts on use of Rovers and use of CORS technology with help of Survey of India. They have been trained in demarcation with help of Rovers, using digital revenue maps on ground. Ground level personnel in districts of Karnal, Sonipat and Panipat have been trained and they had updated the old village revenue

maps (Musavvis) as per current RoR in digital revenue land records. The state has also taken an initiative to procure 300 Rovers for utilization by field staff-Patwaris and Kanoongos.

Further, The State of Haryana has set up Drone imaging and Information Services Ltd for Haryana (DRIISHYA) is using CORS network to provide various services to stakeholders of Revenue, town & country planning, agriculture, Mining, Disaster Management and Police departments.

CORS Training: States may approach the Survey of India training institute i.e., NIGST (Hyderabad), State Revenue Training Institutes, Drone Pilot Training Institutes for training of State officials (Master Trainer) on specifically designed course modules covering Drone & CORS technology, and its usage with practical exercises.

Annexure-I

NAME OF THE STATE	No. OF CORS STATIONS	LIVE DATE
A&N ISLANDS	16	Aug-23
*ANDHRA PRADESH	70	
ARUNACHAL PRADESH	34	Aug-23
ASSAM	34	Aug-23
BIHAR	35	Aug-23
CHHATTISGARH	32	Aug-23
GOA	3	Feb-23
GUJARAT	55	Aug-23
HARYANA	19	Jun-22
HIMACHAL PRADESH	11	Mar-23
JAMMU AND KASHMIR	15	Aug-23
JHARKHAND	28	Aug-23
KARNATAKA	49	Jun-22
KERALA	28	Aug-23
LADAKH	11	Aug-23
LAKSHADWEEP	5	Aug-23
MADHYA PRADESH	90	Jun-22
MAHARASHTRA	77	Jun-22
MANIPUR	11	Aug-23
MEGHALAYA	13	Aug-23
MIZORAM	12	Aug-23
NAGALAND	10	Aug-23
ODISHA	48	Aug-23
PUNJAB	16	Jun-22
RAJASTHAN	85	Aug-23
SIKKIM	4	Aug-23
*TAMIL NADU	45	
TELANGANA	35	Feb-23
TRIPURA	8	Aug-23
UP & UK	81	Jun-22
WEST BENGAL	38	Aug-23
TOTAL	1018	

**Andhra Pradesh and Tamil Nadu CORS Network is established by the State itself and its operational (yet to be integrated with Survey of India)*