



DEPARTMENT OF SURVEY, MAPPING AND
GEOGRAPHIC INFORMATION OF VIET NAM

CORS PROJECT OF VIETNAM



1. GENERAL INFORMATION OF PROJECT



STATUS OF CORSTATION BEFORE PROJECT

- Department of Survey Mapping and Geo-information of VN (Ministry of Resources and Environment) has finished establishment National Coordinate System and National Control Network, covering whole territory, used GPS technology.
- Setted up 6 permanent DGPS stations, located along Vietnam seaside for survey and navigation on the sea.
- Participate to APRGP (Asia-Pacific Regional Geodetic Project (UN-GGIM-AP) with 10 control network points,
- This CORS Project will connect all current and new-built CORS stations in unified system for multi-purpose.



GENERAL INFORMATION

- **PROJECT FUNDED:** by Government
- **PROJECT MANAGED:** by Ministry of Natural Resources and Environment (MONRE)
- **PROJECT OPERATED:** by Department of Survey, Mapping and Geographic Information of Viet Nam (DOSMVN)
- **PERIOD:** From 2016 to 2019
- **LOCATION:** Whole Vietnam Territory



PUPOSE OF PROJECT:

- **Modernizing** the infrastructure of survey and mapping, promote the application of new technologies, contributing to labor productivity growth in surveying and mapping, building up the frame of dynamic Coordinate System, participate in the International Geodetic Network like APRGP, IGS.
- **Formed GNSS CORS** network: Integrated GPS single stations, formed unified system based on GNSS CORS Network.
- **Provide real-time correction signal:** Provide real-time correction signal with accuracy of cm level for popular use.
- **Provide raw data for static survey:** Provide raw data at start points for static GNSS survey, post-processing GNSS survey
- **Provide data for scientific research :** Determine the earth surface moving, provide information for other study fields
- **To encourage** participation in the National CORS network: Building standards guide and encourage the participation in the National CORS network and data exploitation.



2. MAIN CONTENTS OF PROJECT:



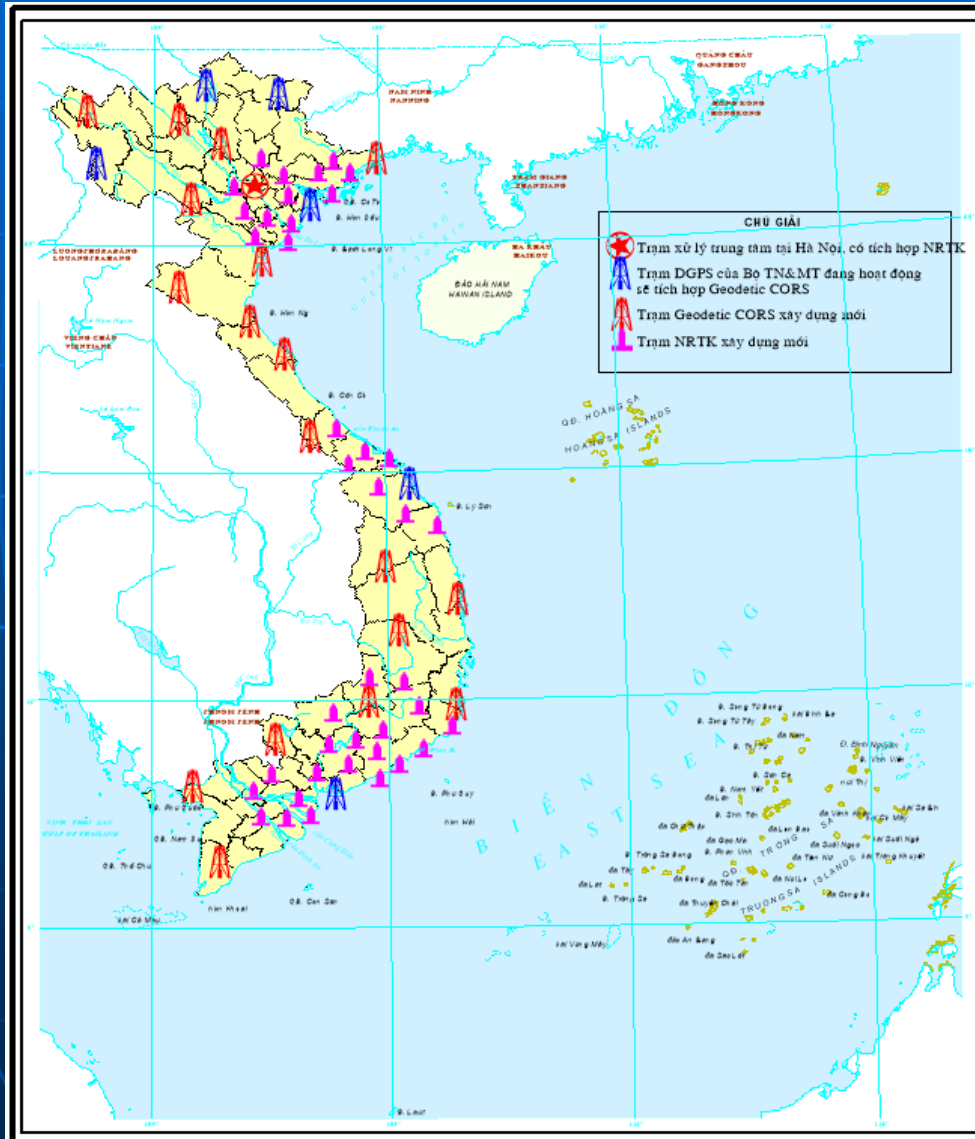
MAIN CONTENTS:

- **Build up National CORS Network with 65 CORS Stations, including:**
- **24 Geodetic CORS stations:** Build up 24 stations to establish Geodetic Network with space of 150–200Km per station.
- **NRTK CORS Stations:** Build up 41 stations (14 stations in North Part, 7 stations in Middle Part, 20 stations in South Part, make NRTK Networks with space of 50-70Km per station.
- **Processing and Control Center:** Location in Hanoi for monitoring, receiving, processing, providing data.
- **Building Standards Guide** of participation in the National CORS network and data exploitation.
- **Compiled guidelines, principles** and methods used services from CORS System.



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DESIGNED CORS NETWORK





GENERAL REQUIREMENTS

Technology: The selection of technology solutions to ensure the criteria included the latest technology, the most modern for Project.

About suppliers Technology: Make sure to select suppliers with the most experience and ensure the integration, exploitation and use of the current system infrastructure as well as equipment and GPS/GNSS is now in Vietnam.

About lifetime: Technology and equipment are modern, open and meet the requirements of Natural Resources and Environment, maintain stably operation in 2030.

About application: This is a multi-service projects, the approach should be closely coordinated with other fields to guide and develop applications to serve the economic development objectives; and generate revenue to operating costs of the system. Ensure the transmission of data as well as links from the user to application data of the System.



REQUIREMENT FOR THE LOCATION AND MONUMENT

- Location selection for monument with high stability, in long time, not affected by geological activity, construction, traffic. The system must be integrated with meteorological observation stations.
- CORS Geodetic monuments locations are based on the analysis result of geology tectonic activity of Vietnam territory.
- Monument location in open area; signal transmission to antenna are not affected, unaffected by Electromagnetic-waves stations in the area.
- Monument must be built with deep drilled mold body to a stable floor, to ensure the observation of the smallest shift, ensure the possibility of construction with practical conditions in Vietnam.
- Limiting the impact of multipath transmission.



Requirements of GNSS equipment :

Antenna:

- Synchronized with the GNSS receiver.
- Support the collection of signals from existing GNSS systems
- Minimize factors affect antenna.
- Withstand the harsh working conditions.
- Antenna phase center is identified.
- Choke Ring Antenna.

Receiver:

- Synchronized with the Antenna.
- Supports multi-system , multi-channel, multi- signal.
- Support connection according to standard TCP / IP, can be configured by remote control.
- Withstand the harsh working conditions.
- There is enough storage memory, and receive the signals with a frequency of at least 1 second/1 epoch.
- Low energy consumption.



DEPLOYMENT PLAN

- The project implemented from 2016 to the end of 2019. After 2019 will be in the period increased socialization, increased CORS stations on demands.
- The project deployment plan as following:
 - **In 2016, the project targets is defined as:**
 - Technical Design, documents up for bidding
 - **In 2017, the project targets will be:**
 - Construction monuments for NRTK CORS stations;
 - Construction the Processing and Control Center.
 - Installation of equipment for 17 CORS stations,



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➤ In 2018, the project targets is defined as:

- Installation of equipment for all CORS stations.
- Measurement to determine the coordinates in Vietnam coordinate, elevation Systems for CORS stations.
- Complete infrastructure connection in the entire net CORS stations and Processing and Control Center.
- Perform a trial operation systems , products services, formed the service delivery model.
- Building a legal framework as a basis to guide the State units and private organizations to participate in the National CORS networks.

➤ In 2019, the project targets will be:

- Training, operation and technology transfer.
- Complete all the documents and reports related to the project.
- Proposals some Geodetic CORS stations to participate in the International networks.
- **From 2020, the target will be:** Additional construction NRTK CORS stations at remaining areas to increase the CORS network stations up to 120-150; maintain safe operation and reliability of the entire NRTK CORS system,



3. SOME PICTURES OF PROJECT

DRILLING FOR MONUMENT



PREPARING FOR MONUMENT



INSTALLING MONUMENT



INSTALLED MONUMENT



MONUMENT NAME AND MARK



**THANK FOR
YOUR ATTENTION!**