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**Survey and Mapping Activities in Vietnam<sup>\*</sup>**

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# COUNTRY REPORT OF VIETNAM

## SURVEY AND MAPPING ACTIVITIES IN VIETNAM

Submitted by Vietnam\*\*

### 1. Introduction

Surveying and mapping of Vietnam has a rather long history and tradition. There are several Survey and Mapping agencies in Vietnam but the National Mapping Organization of Vietnam is the Department of Survey and Mapping Vietnam (DOSMVN) which will celebrate 50<sup>th</sup> anniversary of its foundation in this December 2009.

#### *Main functions and Duties of the DOSMVN*

- To submit to the Minister of Ministry of Natural Resources and Environment (MONRE) bills, ordinances and other legal instruments on survey and mapping; Disseminate, give guideline to different branches, localities, organizations and citizen and control them for keeping surveying-mapping activities in compliance with the legislation;
- To provide master plans of development; main important programs and projects in the field of survey and mapping; To organize and conduct implementation of survey and mapping projects after their seal of approval; To manage, maintenance and protection of benchmarks and other specific survey-mapping constructions; To establish survey - mapping database for GIS (Geographical Information System) and thematic information;
- To issue, extend validity, control and withdraw from circulation licenses of survey and mapping for relevant organizations and personnel;
- To manage, conduct and give guideline for printing, publishing, exchanging, importing, exporting maps and other survey and mapping data;
- To participate in verification of projects concerning surveying and mapping of ministerial level and organizations under Government and Provincial Authorities;

- To manage basic survey and mapping activities, survey and mapping for national and administrative boundaries;
- To be directly responsible for quality of survey-mapping projects and products; Keep as archive and provide survey-mapping data, information to users.
- To organize application of science of science-technological progress in survey and mapping, educate and train survey – mapping staff;
- To take part as representative of Vietnam in international survey and mapping activities.

The DOSMVN has the following belonging units :

1. Center of Survey and Mapping data: Collect, archive data, create database and provide survey and mapping data to users.
2. Center of National and Administrative boundaries: To carry out survey and mapping tasks related to national and administrative boundaries, to conduct and control over representation of national and administrative boundaries on the all kind of maps.
3. Managing board for Survey and mapping projects: To manage and conduct survey and mapping projects implementation after their approval.
4. Center of Survey and Mapping quality control: To assess qualities of survey and mapping products; conduct and manage survey and mapping equipment testing.
5. Center of Survey and mapping technological implementation and development: To carry out application and development of new technology in survey and mapping, provide GPS service to users.
6. Center of Survey and mapping project design and consultancy services: To create survey and mapping projects, giving consultancy services to customers.

## **2. Activities of the DOSMVN**

Since its foundation, the DOSMVN has carried out a significant amount of work.

The basic geodetic framework has been created by the DOSMVN consisted of the following networks:

- NATIONAL COORDINATE CONTROL NETWORK which include 71 points of 0 order, 328 points of I order, 1.177 points of II order and 12.658 points of III order covered whole country.
- NATIONAL HIGH CONTROL NETWORK consisted of 18 original points, 1.181 points of I order 1.100 points of II order
- The first Vietnam Gravimetric network of I, II, III, IV orders was created from 1975 to 1980, adjusted in 1982 and completed in 1988.
- There are 6 GPS base stations in Vietnam located along the coast line and along the Vietnam China border, they are mainly used for sea survey and border demarcation.

The DOSMVN create, gather and store a large amount of survey and mapping data such as satellite images, aerial photos of difference scales captured from French colonial time up to now, topographic maps of difference scales and in difference map projections made by French, army of USA and Vietnam Survey and Mapping agencies.

Current Vietnam topographic maps are making in the Vietnam National Reference system VN-2000, which is base on the international system WGS -84 allocated for Vietnam. All the topographic maps are mapped in digital form. The scales of the maps as follows:

- 1:2000, 1:5000 – taken for all of the cities and towns, these map scales are expected to complete by the end of 2011 for whole Vietnam.
- 1:10000 - taken to cover the whole country – expected also to complete by the end of 2011.
- 1:25000 – this map scale is taken mainly for the midland and economic development areas or where it is needed.

- 1:50000, 1:100000, 1:250000, 1:500000, 1:1000000 – are taken for the whole country and these scales have been already covered whole country from 2004.
- Sea bed topographic mapping at scales 1:10000 and 1:50000 are taken for the whole territorial water, river mouths and sea ports. This work is expected to be completed by 2015.

Besides topographic mapping, DOSMVN also produces other kinds of maps such as Vietnam national atlas, Provincial atlases; administrative maps and atlases etc.

Regarding international relation, Vietnam has participated in the UN geographical name standardization program. In this respect, an important activity is the standardization of geographical names presented on the maps, presently carried out by the DOSMVN. The standardization is taken under the regulation and guidelines issued by the Ministry of Natural resources and Environment (MONRE) based on the principles of the UNGEGN. This is a significant project called: “Creating geographical name information system of Vietnam and of the world for map making”. The first results of implementation of this project is to release for use the concise gazetteer of administrative unit names of all levels of Vietnam and the concise gazetteer of geographical names of the world consisting of about 6000 geographical names, which has been issued for use in 2008. Presently Vietnam continues carrying out standardization of geographical names presented on topographic maps for the whole country, starting from the North - East mountain area of Vietnam. This area includes 11 provinces of Vietnam with total area of 64,025 km<sup>2</sup>, population 9,458,000 inhabitants of 44 ethnic groups. About 300,000 names will be standardized by the end of this year for this area. In coming years Vietnam will continue to standardize geographical names for the West- North mountain area and hopefully by the end of 2011 the geographical names of whole country will be standardized.

Another international cooperation of Vietnam Survey and Mapping is participation in the International Global Mapping Program. Since 1999 the

DOSMVN has participated in this program and the Global Map of Vietnam has been released for use by ISCGM on the internet since March 2007.

The DOSMVN has also participated in the establishment of the Asia Pacific geodetic network of PCGIAP (Working Group 1 - Regional Geodetic Network). Besides that the DOSMVN presently is carrying out the project funded by Vietnam Government to support Cambodia to implement the project of restoring and perfecting Cambodian National Leveling network.

### **3. Strategy, policies and relevant activities**

On the 27<sup>th</sup> February 2008 the Vietnam Prime Minister has signed Decision No. 33/2008/QĐ-TTg to approve the Development Strategy for Vietnam Survey and Mapping up to 2020.

According to this strategy, science and technology are the main solution for development of survey and mapping Vietnam to meet the goal of it's modernization and better services. For achieving the objectives it is indicated that "the Vietnam survey and mapping sector should become one of the basic investigational sector with modern technological and scientific development equal to modern of regional level and gradually approach to the world level", from now to 2010 the survey and mapping sector must complete the system of legislation for survey and mapping; improve organization structure of both central and local levels for optimal mechanism of the state management.

According to this Development Strategy, the DOSM has started implementing the Global Navigation Satellite System (GNSS) project which will be used for multiple applications and will provide an efficient, cost effective infrastructure for survey and mapping within Vietnam. The proposed GNSS network for Vietnam will provide a base framework for survey and mapping which will deliver real time DGPS positioning to support an aggressive mapping program of both land and sea. The proposed GNSS network will also support the vision for an accurate Spatial Data Infrastructure (SDI) for Vietnam. All of the proposed base stations will be accurately coordinated in terms of the International Terrestrial Reference Frame (ITRF) as well as Vietnam National Reference System (VN 2000) and will form the highest order framework for the

geodetic network. The GNSS network will not only serve as a base framework for survey and mapping within Vietnam. In addition this network has the potential to also contribute to international initiatives to improve the understanding of global earth monitoring researches, to contribute to the following social benefit issues affecting everyday life for the global population:

- Natural Disaster – earthquakes, tsunamis, volcanic activity, landslides, subsidence, floods storms.
- Energy Resources – subsidence through natural resource extraction, exploration for new reserves and geothermal research.
- Climate Change – sea level rise, atmospheric conditions, health.
- Water – fresh water resources, subsidence through ground water extraction, monitoring ground water, lakes, river systems, water mass distribution and soil moisture retention.
- Weather – enhanced weather prediction, extreme weather conditions, space weather.
- Ecosystems and the impacts of carbon cycles – deforestation, wetlands, land cover.
- Land Use – impacts of agriculture, irrigation, erosion and urbanisation.

This provides an opportunity for Vietnam to lead the way in establishing a site that will contribute to global geodesy as well as serve the needs of Vietnam.

Another objective of the Development Strategy is necessary to improve the sea bed topographic mapping, especially mapping for the areas of river mouths and seaports which are needed for economic development and essential for monitoring of the local authorities.

It is also mentioned in the Development Strategy, that the earth's surface information acquisition systems such as systems of photo-aerial satellite images, radio wave signals and the national geographical information system which includes image data acquired from satellite, air-plane, cadastral maps and cadastral documents of all over the country need to complete establishment by

the period 2011 - 2015. Afterward in the following years, the survey and mapping sector will accomplish information system based on 3S technology, that is a combination of GPS technology, remote sensing (RS) technology and geographical information system (GIS) technology which should be implemented in a suitable way for Vietnam based on international standards. Apart from that, the survey and mapping sector need also to complete the survey and mapping information infrastructure for organizing a dynamic geographical information system using and sharing multilayer of information. Currently the DOSMVN has been started establishing geographical database for NSDI.

#### **4. Conclusion**

Survey and Mapping Vietnam has done so far rather large amount of work for itself and actively participates in the International and Regional survey and mapping activities. For further development, Vietnam looks forwards to having closer cooperation with other countries within the Region in this field.

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