

Photogrammetry and Remote Sensing in Sri Lanka

1.0 Introduction

Photogrammetry and Remote Sensing were introduced to Sri Lanka through the Survey Department, the National Mapping Agency of Sri Lanka, which was engaged in map production by conventional terrestrial methods since its establishment in 1800 A.D. As a responsibility by the nation, the Survey Department was regularly updating and maintaining the maps by similar conventional methods until the middle of the last century. Aerial Survey Method was first introduced in 1956 for topographical map production work in the department and later, in 1980s, the Satellite Remote Sensing Technique was incorporated through a joint project of Sri Lankan and Swiss Governments to produce a Land Use Map series. To date, the department remains as the only photogrammetric agency in the country and the National Focal point for any international contacts for Remote Sensing.

1.1 Survey Department

The department has a 1500 plus strong work force belonging to different groups of Professionals and Technicians, specialised in Survey and Mapping related activities. It is well organised to operate all over the country through a system of offices comprising of Surveyor General's Office in the capital city, 08 provincial offices, 22 district offices, 84 divisional offices and a training institute.

1.2 Photogrammetry

As a pre-requisite to the new system Sri Lanka was completely air photographed at the scale of 1: 40,000 in 1956 by a foreign agency before the department acquired an aircraft. Later, the departmental aircraft was used for such programmes carried out to photograph the country at the scales of 1: 10,000, 1: 20,000 and 1: 40,000 at different occasions. For photogrammetric data capturing from photographs, the department has a few early models of plotting machines that are now upgraded as semi-analytical plotters with digital encoders, and two analytical plotters. In 1999 the department introduced Geodetic type GPS receivers to determine ground control points and the proposals are ready for conversion to Digital photogrammetry in the near future.

1.3 Remote Sensing

During the last two decades, with the assistance of Sri Lanka /Swiss Remote Sensing project department acquired SPOT, LANDSAT and IRS imagery, and image processing software to keep pace with the latest developments in the art of using satellite data for map production.

1.4 Resources

Air Survey technology adopted till 1992 was the contemporary practice of analogue photogrammetric methods. With the change of time these Analogue photogrammetric instruments were upgraded with digital encoders in 1992 and the Microstation software was used to produce digital topographic data thereafter. Arrangements are now being made to strengthen the process of data capturing by introducing softcopy photogrammetry. Much required training has been already acquired and the production will be started at full gear when purchasing of precise scanner, software, computers and other necessary equipment are completed before the end of current year

1.5 Infrastructure

Average accuracy of the old control network was around the order of 1: 40,000 and hence the need for a new Geodetic Control Net for the entire country was felt in recent past. Accordingly, programmes were drawn to make use of Global Positioning Systems that is widely adopted all over the world nowadays. Adjustments made to the old system has improved the numerical accuracy of the network in use to around 1: 750,000 which is adequate to maintain the current standards in mapping and cadastral surveys.

1.6 Programmes

During last 3 years the country has seen the successful completion of a few ambitious Mapping projects within a very short period of time; some of which were launched to supply topographic data (using photogrammetric methods) for road designing, irrigation system designing, town planning and tourism infrastructure planning etc. etc. The department made use of GPS technology for these programmes in order to determine the coordinate values of the Ground Control Points involved in these Surveys. However the department is yet to introduce Geodetic type Kinematic GPS for Aerial Photographic missions for deciding the coordinate values of the Position of Camera.

1.7 Other Agencies

It must be mentioned here that there are few government agencies that use Remote Sensing applications in small scale for the purposes of Meteorology, Forestry and Land Use Planning. However, the private sector involvement is totally absent.

2.0 Mapping

At the beginning of the last century the Survey Department established a proper Geodetic network for the country by using triangulation method and thereafter launched a mapping programme to cover the entire land area.

2.1 Topographical Maps

Topographical map series consisting of 72 sheets was completed using the plane table methods and the map was produced at the scale of one inch to one mile. During the period from 1980 to 1990, nearly a century after the publication, this series was replaced by a metric substitute produced at the scale of 1: 50,000 and the technique used was Photogrammetry. At present the department is engaged in the production of a new metric series on the scale of 1: 10,000 using the same photogrammetric methods. Out of 1834 sheets in this series only 400 were printed and issued so far, and another 300 are in the various stages of the production line.

2.2 Land Use Maps

The most prominent application of Remote Sensing is the Land Use and the department has combined both Aerial Photography and Satellite Imagery to prepare a Land Use Map Series on the Scale of 1: 100 000 to cover the entire country. At present the action is being taken to produce a digital Land Use Map on the scale of 1: 50 000 using the same sources of data used for the former map series.

2.3 Image Maps

In respect of Image mapping which exclusively uses the satellite data the department has an on-going programme to produce a series of maps identified on district basis. The progress made so far is the completion of 6 maps out of the total of 25 in the programme.

2.4 Digital Maps

In addition to above mentioned paper maps the following digital data sets are available in the department for the users.

<i>Scale</i>	<i>Countrywide Coverage as a percentage</i>
1 : 250,000	100%
1 : 50,000 (Topographic)	25%
1 : 10,000 (Topographic)	10%
1 : 5000	20% of the urban area (24 towns out of 125 urban centers.)
1 : 50,000 (Land use)	25%

2.5 Geographic Information Systems

Wider use of Geographic Information Systems is gaining grounds in the country at a rapid rate and at present there are large number of organisations, both in the State and the Private sectors, which have established GIS units. However, as indicated in the paragraph

immediately above, the main problem that confront them is to acquire base data for the geographical areas of their choice, at the scale they need and particularly as and when they need those. Identifying this customer need, and to overcome this problem the, department recently established a GIS unit with few officers and equipment totally committed for the task of converting hard copy maps into digital data within a prescribed period. The selected software for these purposes is Arcinfo and plans are afoot to seek foreign assistance to expand the unit and produce digital data from the following maps within next four years.

<i>Scale</i>	<i>Expected Coverage</i>
1 : 50,000	For entire island
1 : 10,000	50% of the Island
1 : 5000	For all urban areas
1 : 1000	City of Colombo and Suburbs

2.6 Users

The department has identified that the habit of using map data for planning purposes is not so prevalent among the planners in the country. In order to attract them into this useful practice the department launched the Planning Support Project with the assistance of Zurich University, Switzerland. Under this pilot project, department established sample GIS for two medium size administrative units, Divisional Secretary Areas, in the country. (Coverage 400km²)It is noticed that the idea is becoming popular, however, this programme had to be terminated with the completion of the said project.

3.0 Conclusion

Although Photogrammetry and Remote Sensing activities are providing valuable contributions for the development programmes of the country, needs is there for support to acquire up to date satellite data and state of the art expertise on the subject. The assistance of developed countries and international organisations has become necessary to achieve these goals.