Satellite Remote Sensing as Mapping Tool

Multi-Purpose planning, inventory, and management of land resources and environmental monitoring we need the 'current situation' of the land resources. To meet these needs successive mapping at appropriate time intervals is necessary. At present approximately 40% of the earth's total land surface, remains to be mapped at scale ranging from 1:40,000 to 1: 125,000. In addition 20% of the earth's land surface has not yet been mapped at a scale greater than 1:140,000. Further, there is an increased need for digital base maps as input in geocoded land information systems. The present update rate for the 1:50,000 map is only 2.3% and that of a 1:25,000 maps is 4.9%. Thus the average age of a map is 25 years. Again, the developing countries have much smaller update rates than Europe or North America. It becomes clear that the existing map technology based on aerial photography and ground methods is too slow to provide the required data sets. As Satellite remote sensing is capable of satisfying this requirement it is necessary to ensure an accelerated and improved application of satellite remote sensing technology in mapping.

Remote sensing as we know if today is the technique of collecting information from the distance, i.e., obtaining information about object or phenomena with out being physical contact with them. The science of remote sensing provides the instruments and theory to understand how object and phenomena can be detected. Every feature or surface in nature is unique in its distribution of reflected or emitted radiation. Consequently, information about physical (i.e., size, shape, area and etc.) and chemical properties of these surface can be extracted from electro magnetic radiation of the affected from them. This is done through measurements of intensity, phase of polarization of the affected radiation, using special sensors. The data collected using remote sensing technique is termed remotely sensed data. The principle steps used to analyses all remotely sensed data are definition of information needs, collection of data using remote sensing and other techniques, data analysis, reporting results to those who will use the information and taking action based on the information.

The advantages in relation to conventional methods are; feasibility of data on inaccessible areas, such as islands, sea and ocean regions. Repetitive imaging, offering seasonal enhancement of features, multi-spectral response in digital form with increased versatility of application, reduced requirement for skilled manpower in data acquisition, cost effectiveness, timeliness, often implying acquisition of data covering large area almost in real time, consistency of data acquisition and providing uniform presentation of data.

Geo-stationary (they maintain a stationary position relative to the earth) low resolution satellites such as GMS, Insat, Goes and Meteosat offer images of the earth's surface every 30

minutes at 5 km ground pixels. NOAA satellite offers 1km resolution at least twice per day. Such data are ideal for global monitoring. Resources satellites such as LANDSAT, SPOT and IRS 1A and 1B offer medium resolution data between 10 km and 30 km ground pixels several times per year. The latest developments are high-resolution satellite such as IRS-IC and MOMS with about 5 m ground pixels.

There will be many more satellite systems available in the near future by many nations. All these are to enable scientists to develop better models for climate, atmosphere and mapping, which could help to explain gaps in scientific understanding. Satellite imaging and processing capabilities may become a serious competitor to the traditional aerial survey industry unless the two approaches are merged and used in supplementation.