ABSTRACT

This Thesis addresses some of the Strategies required for the management of the Indian Earth Observation System (IEOS) for the coming 25 years. The IEOS of today has most of the characteristics that are akin to a high technology business enterprise and further, it has additional complexities and risks intrinsic to a space system. IEOS has a dual role of fulfilling the national imperative needs, while harnessing the commercial market to become a self-sustaining entity.

Based on the potential of the Indian EO Satellites and the resource management information needs of the country, a wide spectrum of 200 applications have been identified. The Current Scenario of IEOS has been assessed using five parameters *viz.*, (i) potential of IEOS data to substitute the conventional surveys, (ii) the maturity of operationalization, (iii) the level of awareness among the User community, (iv) utility and (v) efficacy. Further, a SWOT analysis of IEOS has been carried out. The complex and dynamic environment of IEOS has been scanned. The predetermined elements and the determinants of the future IEOS have been identified. The interrelatedness and level of influence of the different driving forces and 'Actors' on the IEOS of the past, the present and the future have been studied.

The Future Scenarios have been generated for IEOS. In the Near Future (*i.e.*, 2000 - 2005), IEOS would have a constellation of state-of-art Satellites and a ground segment to deliver the data to the Users around the globe. The demand for IEOS data is expected to grow at the rate of 25 to 30 percent annually upto 2000 AD and atleast by 10 percent per year beyond 2000 AD. The market for value-added services is expected to grow exponentially if the potential of EO data is harnessed for a variety of new and novel applications for the private Users. In the Far-Future (*i.e.*, 2005 - 2025), IEOS would have an optimized mix of EO Satellites in polar and geostationary orbits providing (i) high resolution (0.5 to 2.5 m) panchromatic imaging with stereo capability, (ii) multi-spectral imaging with spatial resolution of 20 to 50 m, (iii) continuous imaging with a spatial resolution of 250 to 500 m with multi-spectral capability and a microwave imaging component as well as Small Satellite systems of 10 to 100 Kg for specific applications.

The Strategies for management of IEOS have been formulated. The IEOS Space Segment would need to be subsidized by the Government, atleast in the Near Future, as a 'public good'. The Generic Strategies recommended are (i) Institutionalization of IEOS applications for the national imperative needs, (ii) Commercialization of IEOS applications, (iii) Cost-effectiveness for IEOS Space segment and Ground segment and (iv) Self-sustenance drive for the Institutions providing EO data and value-added services under the ambit of IEOS. 25 Strategies have been recommended under four broad directions *viz.*, (i) Technology - related Strategies, (ii) Product - related Strategies, (iii) Market - oriented Strategies and (iv) Institution - oriented Strategies. The methods and actions required to realize these strategies have been discussed *viz.*, (i) Effective utilization of EO data for Watershed development and (ii) Self-sustenance of National Remote Sensing Agency. Implementation of these Strategies has to be done by DOS, which is the nodal agency for IEOS.

Two new analytical methods were devised as part of the study *i.e.*, a Potential - Maturity Matrix for portfolio analysis of IEOS and a Hurdle - Race Model for identifying the specific nature and extent of strategic actions.