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GEOINFORMATICS FOR PROMOTING TOURISM IN JHARKHAND STATE

JEYASEELAN A.T.
Jharkhand Space Applications Center,
Department of Information Technology, Government of Jharkhand

ABSTRACT

In recent times, the Tourism, Eco-Tourism and Tourism industries are increasingly use remote sensed satellite imagery, aerial photography, Light Detection and Ranging (LIDAR, a remote sensing system used to collect topographic data) and Geographic Information System (GIS) for new presentation and proposal strategies that will maximize the promotional appeal of tourism and their main assets, which include a unique landscape and scenery, an impressive cultural heritage and a wide range of sports facilities and other tourist amenities. Resort, hotel, property owners, tour guides and travel agents use satellite images, GIS mapping and 3D visualization for tourists to acquire any information on their desired location.

This paper mainly describes the geoinformatics applications to tourism and in particular the use of WebGIS developed for resource monitoring in Jharkhand state for promotion of tourism. The information on various resources, facilities and infrastructure available over Jharkhand state in webGIS platform can be used by anyone, anywhere at anytime through navigational facilities such as roaming, zooming, querying helps for promotion of tourism in Jharkhand. Further, the future directions on tourism atlas and eTourism for tourism development in Jharkhand are also discussed.

KEYWORDS: Tourism, Eco tourism, Geoinformatics, Jharkhand, Ranchi

INTRODUCTION

The concept of tourism combines adventure, ecotourism and cultural aspects of a discovery tour. Tourism aims to combine recreation, education and bring benefits to both the tourist as well as to the tourist place. Additionally it also includes some aspects of cultural tours and academic and scientific expeditions. Action or Adventure tourism, which involves many sports activities like mountaineering, cross country rally, speed boat riding, bungee jumping and extreme sports offers exciting

experiences that are physical demanding. Adventure travel is a personal accomplishment through the thrills of dominating dangerous environments. Ecotourism is responsible travel to natural areas that conserves the environment and sustains the well being of local people.

The study for promotion of tourism should include the study related to tourism destinations, tourism research, tourism statistics and public relations, tourism publicity and information technology. Further for promotion of tourism also needs tourism planning, defining tourism policy, creating infrastructure facilities for travel markets and tourism industry, identifying ecotourism resources, assessing impacts of ecotourism on wildlife, environment, ecological, social and cultural aspects, regional growth, cultural threats, etc.,

Geoinformatics which includes Remote Sensing and Geographic Information System (RS&GIS), Global Positioning System (GPS) and telecommunication is increasingly being used by tourism industry in recent times. Few examples of geoinformatics application to tourism are: 1.Assessing the resources requirement for wildlife conservation, such as monitoring the water resources and conservation of land, water and forest and also for evaluating impact of social and cultural aspect of tourism.

REMOTE SENSING SATELLITES

During the 1970's and 80's, the coarse spatial resolution multispectral data from foreign satellites like LANDSAT, NOAA, and SPOT etc. were used for limited applications. After the launch of India's first civilian remote sensing satellite IRS-1A in March 1988, marked the beginning of a successful journey of remote sensing applications in India. The two Linear Image Self Scanning sensors of LISS-I with 72 m and LISS-II with 36m spatial resolution aboard Indian Remote Sensing Satellite IRS-1A beamed down valuable data that aided in large scale mapping applications. Subsequently, IRS-1B, having similar sensors, was launched in August 1991, and together, they provided better repetivity. The LISS-III with 23 m resolution, panchromatic (PAN) with 6 m and wide image field sensor (WiFS) with 188m spatial resolution on IRS-1C (December 1995) and IRS-1D (September 1997) further strengthened the scope of remote sensing, with increased coverage and foray into application areas like resources survey and management, urban planning, forest studies, disaster monitoring and environmental studies. Subsequently, IRS-P3 and IRS-P4 satellites were launched with WiFS and Ocean Color Monitor (OCM) sensors for

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large area coverage with 774 km and 1200 km swath(www.nrsa.gov.in).

The launch of IRS-P6 (Resourcesat-1) in October 2003 provided an excellent opportunity to obtain high resolution multi-spectral data of LISS-IV with 5.8 m spatial resolution and moderate resolution advanced WiFS (AWiFS) with 56m spatial resolution data in 10-bits radiometric resolution, IRS-P5 (Cartosat-1), launched on May 5, 2005, provided satellite based stereo data from Panchromatic sensor (PAN) with 2.5 m spatial resolution helped for large scale mapping and terrain modeling applications. Recently the Cartosat 2 satellite's PAN data with better than 1 m resolution is available for large scale mapping. Apart from Indian Remote Sensing Satellites, data from a number of foreign satellites such as NOAA-17, NOAA-18, TERRA, AQUA, ERS, RADARSAT, IKONOS, QUICKBIRD, ORBIMAGE and ENVISAT are also available in varied spatial resolutions. All these data are increasingly being used for Tourist information

GLOBAL POSITION SYSTEM

The Global Positioning System (GPS) is a United States of America (USA) based space based radio navigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis — freely available to all. For anyone with a GPS receiver, the system will provide location and time. GPS provides accurate location and time information for an unlimited number of people in all weather, day and night, anywhere in the world.

The GPS is made up of three parts: satellites orbiting the Earth; control and monitoring stations on Earth; and the GPS receivers owned by users. GPS satellites broadcast signals from space that are picked up and identified by GPS receivers. Each GPS receiver then provides three-dimensional location (latitude, longitude, and altitude) plus the time.

Individuals may purchase GPS handsets that are readily available through commercial retailers. Equipped with these GPS receivers, users can accurately locate where they are and easily navigate to where they want to go, whether walking, driving, flying, or boating. GPS has become a mainstay of transportation systems worldwide, providing navigation for aviation, ground, and maritime operations.

The Global Positioning System (GPS) has eliminated many of the hazards associated with common recreational activities by providing a capability to determine a precise location. GPS receivers have also broadened

the scope and enjoyment of outdoor activities by simplifying many of the traditional problems, such as staying on the "correct trail" or returning to the best fishing spot. Outdoor exploration carries with it many intrinsic dangers, one of the most important of which is the potential for getting lost in unfamiliar or unsafe territory. Hikers, bicyclists, and outdoor adventurers are increasingly relying on GPS instead of traditional paper maps, compasses, or landmarks. Paper maps are often outdated, and compasses and landmarks may not provide the precise location information necessary to avoid venturing into unfamiliar areas. In addition, darkness and adverse weather conditions may also contribute to imprecise navigation results.

GPS technology coupled with electronic mapping has helped to overcome much of the traditional hardships associated with unbounded exploration. GPS handsets allow users to safely traverse trails with the confidence of knowing precisely where they are at all times, as well as how to return to their starting point. One of the benefits is the ability to record and return to waypoints. Similarly, fishermen typically use GPS signals as a means to continually stay apprised of location, heading, bearing, speed, distance-to-go, time-to-go, chart plotting functions, and most importantly, returning to a location where the fish are plentiful. An advantage in newer GPS receivers is the capability to transfer data to and from a computer. Outdoor enthusiasts can download waypoints from an exciting adventure and share them. Other applications include skiing, as well as recreational aviation and boating (www.gps.gov).

PRESENT TREND IN GEOINFORMATICS FOR TOURISM

Space agencies are now promoting space tourism and developing suborbital tourism. Satellite navigation constellations (such as the U.S. NavStar Global Positioning System or GPS) are operated by the United States, Russia, and China, with others being developed by Europe and Japan. New offerings by satellite radio providers and mobile television services operators in Japan and South Korea are broadening the definition of satellite services-including television programming beamed from space to cell phone-sized mobile handsets in these markets. Similar services are being considered in India and other countries. In the United States, DIRECTV now offers its Total Choice Mobile Package for in-vehicle entertainment systems.

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Inmarsat began offering new services through its satellite-based Broadband Global Access Network (BGAN)-the first global, mobile broadband network for satellite Radio

Positioning GPS chipsets are becoming smaller, more affordable, and increasingly versatile. More and more, GPS technology is being integrated into other products (such as cell phones) and new products use GPS receivers for in-vehicle navigation, inventory tracking, emergency vehicle dispatch, precision agriculture and mining, and more. New GPS applications continue to emerge with no apparent limit.

Satellite functions are increasingly blended with terrestrial services, and the distinctions between them are blurred. Data is carried over phone and cable television lines, voice traffic is carried over the Internet, satellite video is pushed to cell phones, and navigation data is integrated with communications capabilities and imagery. Precision timing signals from GPS satellites power the networks that enable it all. New terms continually are being coined for emerging space applications. Among the more useful are (a) converged media, encompassing satellite services such as video, voice, data communication, and radio, and (b) geoinformatics, encompassing imagery and Positioning, Navigation, and Timing (PNT). Even within these categories, there is crossover of navigation data integrated with communications capabilities.

TOURISM IN JHARKHAND

Jharkhand - "The Land of Forest" is one of the newly established States of Indian Union carved out of the State of Bihar in November 2000. It comprises the Chotanagpur Plateau, which forms a part of Deccan bio-geographic province. It is a hilly undulating plateau characterized by tropical forests and tribal settlements with abundant natural resources which needs to be conserved and utilized in a sustainable manner for overall development of the state.

There is perhaps no other state in India is as rich as Jharkhand in terms of biodiversity and mineral resources. Nature here is adorned not only with rich flora and fauna but also with vast mineral reserves in its womb. A visit to Jharkhand is very much a pilgrim's privilege for nature lovers. Nature and people, here amalgamates in perfect harmony. To put forth the rich value and diverse eco system of Jharkhand's booty, the forest department envisaged the concept of eco tourism. It involves studying appreciating, enjoying floral and fauna and above all coming

to terms with the refreshing and enlightening power of nature. With its natural bounties, largely unspoilt, the Mother Nature harmonizes the innate natural existence with industrial activities. This is what makes, Jharkhand a dream destinations for tourists who are interested in traveling, exploring, enjoying the forests, wild life, the majestic hills, rivers, rivulets, diverse and serene climate. Though moving in only direction in Jharkhand is a lifetime memorable experience, an attempt has been made to list some important eco-tourism destinations, some of which are explored and some yet to be fully explored.

The tourism department, Government of Jharkhand has given information on wild & beautiful tourist places, list of religious places, state tourism map, major cities of Jharkhand and list of hotels in the cities, address of tourist Information centers and tamed & untamed waters in Jharkhand in the website (www.jharkhand.gov.in/depts/touri/).

GEOINFORMATICS APPLICATION FOR PROMOTION OF TOURISM

The new state has ample opportunity to develop and progress where space based technology plays an important role. Realizing the potential of such innovative technology and its role, Jharkhand Space Applications Center (JSAC) was established in the year 2003 with its space application activities taking the lead and initiative for the overall development of the State.

Space technology based applications and solutions are being adopted systematically in giving value-added services in various sectors like agriculture, forestry, mines & geology, soil, urban planning, drinking water, etc., and thus focusing on the issues like environmental impact of mining, deforestation, drought, unplanned growth of settlements, traffic congestion, tourism etc., in the state. In case of tourism development in Jharkhand, JSAC has prepared Tourism map of Jharkhand (Figure 1) and Ranchi City Guide map indicating geographic locations of tourist places, it's connectivity by road and rail networks with administrative boundary. Further, the geoinformatics applications in the following projects of Geo Jharkhand, village information system, village profile and Ranchi utility information system also helps for promotion of tourism industries in Jharkhand. As the results of the above applications are made available webGIS environment any one who have the internet facility can access the required information at any time and anywhere.

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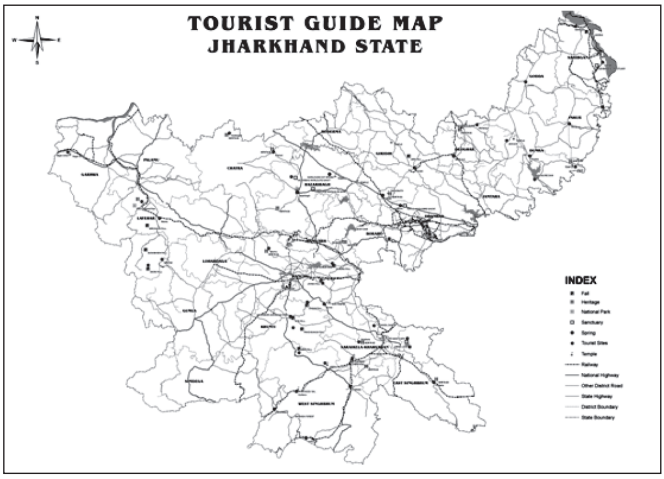

Figure 1. *Tourist Guide map of Jharkhand*

GEO JHARKHAND

The satellite derived natural resources maps at 1:250,000 scale are provided in the webGIS environment. The information included in this system is Geology, Geomorphology, Forest, Soils, Ground Water Prospects, Transport Network, Water Resources, Administrative information, etc. The Geo-Jharkhand (http://210.212.20.94/state/jgis) (Figure 2) provides thematic layers such as settlements, road, rail connectivity, elevation and other natural resources related to tourism in the GIS environment so that one can view and get the information from state to village level by roaming and zooming operations as well as through query.

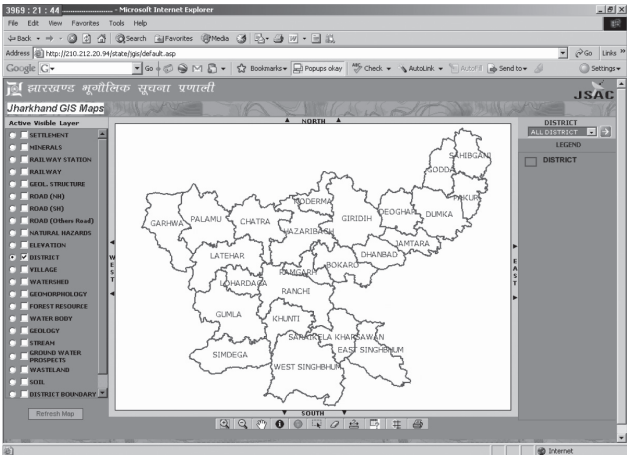

Figure 2. *The Geo Jharkhand webGIS application for tourism*

JHARKHAND VILLAGE PROFILE

The village/block/district/state census data related to demography, infrastructure, amenities and facilities are linked with corresponding village, district and state in webGIS environment (http://210.212.20.94/cmcvp/) so that one can view the details of database along with the location of the administrative unit (Figure 3). This will help the tourist to know the facilities available over the required places.

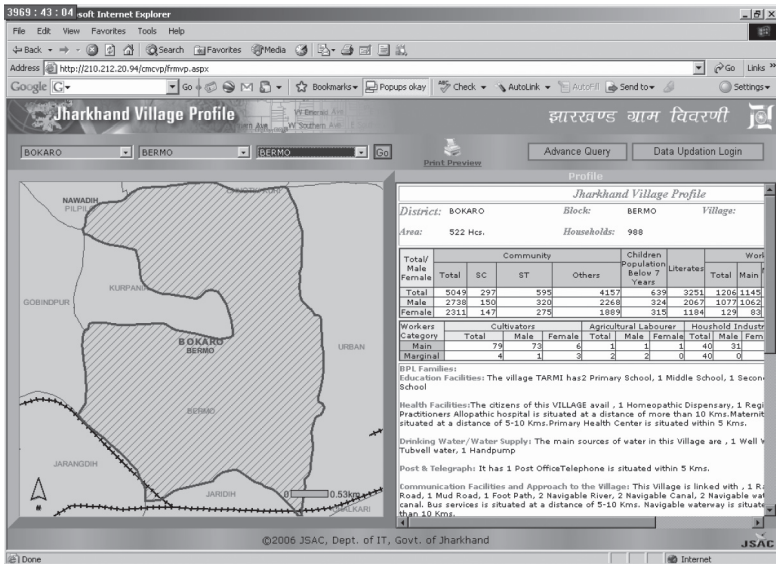

Figure 3. *The Village profile webGIS application for tourism*

RANCHI UTILITY INFORMATION SYSTEM (RUIS)

Utility mapping of major cities of Jharkhand state at 1:10,000 scale has been initiated major cities of Jharkhand namely Ranchi, Jamshedpur, Bokaro, Hazaribag and Dhanbad at JSAC using high spatial resolution satellite data from Indian Remote Sensing (IRS) satellite series such as Cartosat-1 and Cartosat-2 with 1 meter and 2.5 meter spatial resolution respectively and from QuickBird satellite data with 65 cm spatial resolution. This project generates updated land use and comprehensive information of each building and roads to integrate the utilities and services for the town. For Ranchi city, the utility mapping was completed using Quickbird data. Extensive survey was made to identify each buildings and the number of floors. Using average height of 3 meters for each floor three dimensional utility mapping of Ranchi city has been prepared (Figure 4)

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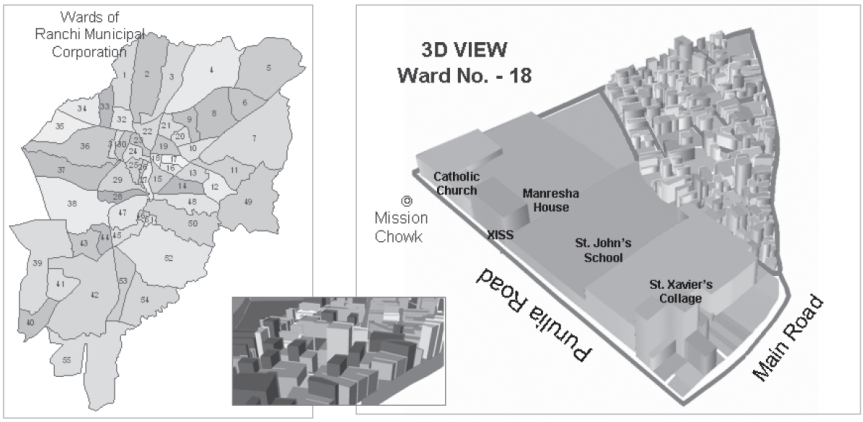

Figure 4 *Ranchi city utility mapping with 3D-GIS for Tourism*

FUTURE DIRECTIONS FOR PROMOTING TOURISM IN JHARKHAND

For promotion of tourism in Jharkhand, the large scale map over the tourist places need to be generated with all relevant tourist information. The geoinformatics based cultural atlas and tourist information system or eTourism in Jharkhand will help promoting Tourism in Jhakhand.

CULTURAL ATLAS PROJECT

The generation of cultural atlas aims to promote tourism in the state. The atlas will have various themes along with pre-historic & historical places and archeological sites like physical and environmental features in brief, population composition and demographic characteristics, historical evaluation of the state with historical migration, current migration pattern in the state, language, religion, ethnicity (core regions of individual tribal communities), education, inter-district levels of socio-economic development, other tourist places including wild life sanctuaries and parks, centers of art and crafts, religious places, etc over the administrative boundaries through illustrative maps, pictures and sketches. It could be of interest to planners, historians, archeologists, academicians, researchers, students and public in general. It will also be made online through customized web enabled software. It will give access and information of cultural heritage of the state through customized web enabled software.

TOURISM INFORMATION SYSTEM (TIS) OR ETOURISM

Tourism Information System (TIS) or eTourism need to be developed to faiclitate national and international tourists by providing query based geoinformation for better, efficient and user friendly tourism management with spatial information and interactive maps with virtual flythrough capability like Google earth. TIS is an interactive-web-query based interactive query based support system intended for International and National tourists showing geographical location (the latitude and longitude), accessibility, mode of travel, medical & emergency contacts, etc. on GIS platform. This system intends to provide information on historical & archeological sites, centers of arts and culture, parks and sanctuaries, waterfalls, rivers, dams and reservoirs, picnic spots, etc. Also physical, culture and economic setting along with flora and fauna will be incorporated. It also provides information on medical & emergency contacts, services & facilities and facility for online booking.

CONCLUSION

As Jharkhand state is a dream destinations for tourists who are interested in traveling, exploring, enjoying the forests, wild life, the majestic hills, rivers, rivulets, diverse and serene climate. With its natural bounties, largely unspoilt, nature's innate natural existence harmonizes with industrial activities Jharkhand has good potential for tourism development. The advancement in geoinformatics can help to promote tourism by providing tourist information by eTourism, webGIS based tourist atlas.

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