CASE STUDY
Product solution for: Konkan Irrigation Development Corporation

DigitalGlobe imagery speeds design of irrigation project in India

Maharashtra, with Mumbai as its capital, is the second most populous state in India, and it is growing fast. It is India’s most prosperous state, contributing nearly 15% of the country’s GDP. The River Vashishti is one of the larger rivers on the Konkan coast of Maharashtra. About three dozen villages line its shore, as does the town of Chiplun, a small city of about 50,000.

“A key objective of the project was to find a solution for the scarcity of drinking water along the river’s banks,” said Mr. G.G. Babar, Executive Director, Konkan Irrigation Development Corporation (KIDC). “We were also looking for ways to improve agro-economic development of the basin to promote farming, tourism, and other industry that would bring more jobs and commerce to the region.”

DigitalGlobe ideally suited to the task

To complete the detailed survey required for the lift irrigation project, KIDC found the ideal solution in DigitalGlobe’s satellite imagery. A total of 19 stereo image pairs, comprising an area of 2,327 square kilometers of the Vashishti River basin were procured through the National Remote Sensing Center in Hyderabad.

DigitalGlobe’s advanced systems and processing capabilities provide high-capacity, half-meter resolution imagery. Each day, DigitalGlobe collects 2 million km² of imagery which is added to its growing ImageLibrary for customer applications and solutions.

A three-part methodology

A three-part methodology was devised to complete the project: mapping, surveying and discovery, and data preparation and reporting. After the base map was prepared, administrative boundaries such as districts, village parcels, and towns and cities were taken from revenue maps. Irrigation projects and landmarks such as historical sites, vegetation, and reserved forest were taken from topographic maps. And features like roads, buildings, bridges, and existing canals and culverts were extracted from the satellite images.
The second phase of the project was survey activity, which used Differential Global Position System (DGPS) data to establish a network of 160 ground control points. Satellite data sources were then triangulated to create stereo models to compile the information. Using the Leica Photogrammetry Suite, a digital terrain model of the entire basin was created within two meter contours, extracting characteristics such as drainage, hydro features, and road features.

“The process enabled us to generate smooth contours within acceptable limits with fewer kinks,” said Mr. GG Babar, Executive Director, KIDC. “More simply, it allowed us to conduct our analysis with far greater accuracy and control.”

A number of other advanced technologies were used to complete the process. Photogrammetric data was georeferenced with respect to cadastral maps to align canals to parcel maps. Using GIS applications, landowner information along the entire path of the canal was also extracted.

Creating a role model basin

The Vashishti River basin project represents the first of what could be many sophisticated GIS-based irrigation projects in India. Advances in photogrammetry, along with other developments in India’s space technology sector, is helping to lower the cost of such projects. These projects are becoming even more vital as India’s development continues at a rapid pace, and shows no sign of letting up.

“The availability of sophisticated satellite imagery, photogrammetry, GIS solutions and other emerging technologies are helping us to dramatically reduce the cost of these studies which are critical to India’s development. Our expectation is that the end result of the Vashishti River basin project and others moving forward is the continuing development of ‘role model’ basins that will be both environmentally and economically sustainable.”

Mr. GG Babar, Executive Director, KIDC

Challenge
Design a lift irrigation and canal alignment scheme for 36 villages in the Chiplun Taluka region of Maharashtra, a state located in West India.

Solution
KIDC, India, using DigitalGlobe satellite imagery in an advanced digital photogrammetry environment, developed a three-part methodology to design a lift irrigation scheme for the 2,327 km² area.

Results
In just six months and well under budget, KIDC, in partnership with a number of public and private sector entities, completed the irrigation study, a first-of-its-kind undertaking in India.

INDUSTRY
» Water resource management

USES
» Administration/management
» Cadastre
» Planning

PRODUCTS USED
» QuickBird 60 cm, natural color imagery