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Satellite imagery pivotal to Russian Federation forest inventory

The Russian Federation is the world's largest country in total land area with vast forests that make up 20 percent of the world's woodland. The timber industry is an important driver of the Russian economy, estimated to generate more than $20 billion per year. Monitoring illegal logging activities, classifying parcels and determining ownership over millions of square kilometers is a formidable task for the Ministry of Natural Resources and its mapping agency, Roslesinforg.

Managing the country's natural resources

The Ministry of Natural Resources and Environment is responsible for the study, use, renewal and conservation of the country's natural resources, including its vast forest land. As part of its land management program, the agency oversees more than four million square kilometers of forest.

"With rising timber values and increases in illegal logging activities, the Ministry has made it a high priority to maintain a current inventory of forest land," says Olga Kolesnikova, head of the complex project department for DigitalGlobe partner Sovzond JSC. "Given the vast size of the area, the task would be impossible to complete without high-resolution satellite imagery."

A comprehensive inventory

Timber prices are rising rapidly in Russia leading to an increase in illegal logging. The World Wildlife Foundation estimates that these illegal practices make up 30 percent of Russia's overall logging activity and threaten some endangered species. Determining land ownership and classification in a free market economy is another of the agency's significant challenges.

In 2011, through its civic arm, Roslesinforg, Sovzond was tasked with surveying 1.3 million square kilometers of state forest. The following year Sovzond was tasked with surveying an additional two million square kilometers.

"Given the large area of forest and the high-resolution required for proper vegetative analysis, DigitalGlobe imagery is the ideal choice," Kolesnikova says. "The project would not be possible without this highly-accurate and efficient remote sensing technology."

Company information

Sovzond JSC is a private sector enterprise founded in 1992 specializing in satellite imagery distribution, software distribution and technical support, consultation services, imagery processing, creation of value-added products and more.

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Comparative analysis critical

The initial goal of the survey was to develop a technological solution for ongoing automatic detection of changes in the country's forest reserves. The survey needed to be cost-effective, scalable and repeatable with minimized use of ground operations to continually monitor change over a large area.

"Our task was to develop an automatic topical image processing technology for detection of all types of changes in the forest reserves such as clean and selective felling and cutting to meet legal construction needs, and changes in the infrastructure like new logging roads," Kolesnikova explains. "Of equal importance is the ability to identify those areas where illegal activities were taking place."

A yearly task

The project's scope calls for data collection of about one million square kilometers each year on an ongoing basis, including use of both archived and tasked imagery components, creating a rotating system whereby data for the entire four million square kilometers will continuously be current and changes to the landscape easily monitored.

"The availability of current data to use as a baseline to monitor changes to the forest gives officials the information they need to intervene before significant harm can be done. Change detection in the forest is more important than ever given the value of the timber and the negative impact illegal activities have on both the economy and the environment."

OLGA KOLESNIKOVA, DIRECTOR-COMPLEX PROJECT DEPARTMENT SOVZOND JSC

INDUSTRIES

» Environmental Services
» Forestry
» Government

USES

» Illegal Logging Monitoring
» Change Detection
» Land Classification
» Feature Extraction
» Taxation
» Forest Inventories

Challenge Develop a technology solution to monitor and automatically detect change in managed forest land to curb illegal logging, determine rightful ownership of land and parcel classification.

Solution Over two years, Sovzond JSC provided high-resolution imagery for 2.3 million square kilometers of forest reserves that, in combination with archived imagery, provides a scalable ongoing monitoring solution.

Results With ongoing data collection of the managed forest, officials have a highly accurate, cost-effective solution to detect all types of changes in the forest reserves, including illegal logging.

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