DigitalGlobe imagery expedites mineral exploration in Africa

In many Sub-Saharan countries mining can account for up to 90 percent of a country’s gross domestic product and provide employment for a significant percentage of the population. Billions are invested yearly in mineral exploration, but traditional survey methods are often inadequate to penetrate the dense vegetation and other adverse environmental conditions that are common to so much of the area.

Modernizing Africa’s Sub-Sahara geological maps

Well known for diamond mining, Sub-Saharan Africa is a treasure trove of natural resources with huge deposits of platinum, nickel, coal, iron ore, copper, and chromite. However, African geological maps are often inadequate for the mineral exploration requirements of major mining concerns. Many are out of date and coarse in scale because they are derived through interpolation of sparse field points. For some areas that are believed to be rich in mineral deposits, geological maps do not exist at all.

Traditional imagery comes up short

Southern Mapping Company (SMC), a DigitalGlobe reseller, has more than 300 resources sector clients across 32 sub-Saharan countries. The company operates three airborne Lidar systems and the only hyperspectral camera on the African continent.

Recently, SMC was tasked to use standard coarse resolution satellite image interpretation analysis to identify areas with a high potential for chromite deposits. Existing geological data, aeromagnetic data, field observations and broad DEM-based structural analysis were combined with spectral analysis using Landsat and Aster imagery. Despite the fact that initial field verification of the satellite-derived geological map showed high correlation with the occurrence of chromite in the field, these technologies were not enough to successfully complete the project. Expansive field verification was necessary but restricted due to adverse political and weather conditions. In addition, the chromite outcrop was too small for detection by the Landsat and Aster systems.

Company information

Established in 2006, DigitalGlobe reseller Southern Mapping Company is an aerial surveying company that provides topographic surveys and mapping for a variety of industries and sectors. These include civil engineering and infrastructure development, mineral explorations and mine management, environmental planning and rehabilitation, and urban and agricultural planning.
CASE STUDY

Southern Mapping Company

“*We believe the enhanced spectral and spatial resolution of the WorldView-3 will revolutionize the remote sensing mineral exploration market. It will render coarse scale geological maps completely obsolete and allow us to deliver unprecedented accuracy to our clients in a rapid, cost-effective manner.*”

ALEX FORTESCUE, REMOTE SENSING AND GIS MANAGER
SOUTHERN MAPPING COMPANY

Satellite imagery ideal for mineral exploration

SMC could go no further on the survey with the existing capabilities and the project was halted until DigitalGlobe’s WorldView-2 satellite was deployed. The high-resolution imagery successfully mapped the chromite outcrop with extreme accuracy, allowing the project to be completed successfully.

“We were at a virtual standstill with the project,” explains Alex Fortescue, SMC’s remote sensing and GIS manager. “DigitalGlobe’s multispectral satellite imagery made it possible to generate spectral reflectance maps which often show more detail than existing geological maps for optimized field exploration. In this case, it proved impossible to complete the survey without DigitalGlobe’s high-resolution imagery.”

Leaving old technology behind

With clients demanding projects be completed faster, more accurately and more cost effectively, Southern Mapping is looking forward to the launch of DigitalGlobe’s WorldView-3 satellite, which will have the eight visible near-infrared bands that are already imaged by WorldView-2 as well as eight short-wave infrared bands at 3.75m resolution.

Challenge

Identify areas with a high potential to host chromite in Sub-Saharan Africa where potentially chromite-rich areas are often covered under dense vegetation and other conditions that impede accuracy.

Solution

WorldView-2 enabled SMC to quickly complete a chromite survey that had stalled due to the limitations of the coarse scale imagery originally deployed for the project.

Results

The chromite outcrop was mapped remotely, enabling the project to be completed despite adverse developments in the political climate, weather conditions and the unique characteristics of this outcrop.

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