



Survey  
Spring 2010



## Technology 'gold' for Alaska mine project



Phil Simpler, Kinross engineering technician with the IS Imaging Station.

Combine Alaska's vast spaces and the high walls and large excavation and hauling equipment movement inherent in mining, and you don't exactly have a surveyor's optimal working environment. A leading gold-mining company recently adopted surveying and digital imaging technology that is allowing surveyors to track material inventories across those vast spaces. The result is major improvements in surveying productivity and safety.

The Fort Knox open pit mine, located near Fairbanks, Alaska, produces about 330,000 ounces of gold annually and is one of the largest gold-producing areas in the state.

Toronto-based Kinross Gold Corp. acquired the mine in 1998 and in February 2008, the company's board of directors approved the construction of a 'heap leach' facility and expansion of the open pit mine in order to extend the life of the mine from 2012 to 2018. More importantly, the expansion was projected to double the remaining life-of-mine production to 2.9 million gold ounces with the heap leach facility adding about 65,000 ounces per year.

To track the volume of material extracted

**Company:** Kinross Gold Corp.

**Location:** Toronto, Ontario, Canada

**Project:** Fort Knox open pit mine surveying

**Location:** Fairbanks, Alaska

**Scope:** Surveyors track material extraction safely and productively from a distance. The mine's remaining capacity is 2.9 million gold ounces; a new heap leach pad will cover about 310 acres with a total capacity of 161 million tons (about 145 million metric tons).

**Topcon Products:**

IS Imaging Station

**Topcon Dealer:**

GPS Alaska  
Eagle River, Alaska  
[www.gpsalaska.com](http://www.gpsalaska.com)

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# AT WORK

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'We...have an instrument that allows us to stay far away and still survey the area accurately, it's a huge improvement.' – Cliff Russell, engineer-technician, Kinross Excavating

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from the mine while boosting the productivity and safety of its surveyors, Kinross is using a Topcon IS Imaging Station, purchased through GPS Alaska, that provides both long-range surveying and scanning. The instrument does reflectorless long-range surveying in addition to integrated digital imaging and three-dimensional modeling.

Kinross needs to keep track of the volume of material extracted from the pit and survey the dig faces. Cliff Russell, engineer-technician for Kinross, notes that crestlines and toes are surveyed. He points out that the mine can be a hazardous environment for surveying work, though. "It's an open-pit mine and we've got a lot of really large equipment moving around, so the farther back we can stay from work areas and not be right in the middle of the mix of equipment running around, and if we can have an instrument that allows us to stay far away and still survey the area accurately, it's a huge improvement," he said.

The new technology, which has replaced a Global Navigation Satellite System (GNSS) rover and a conventional total station, allows surveying across longer distances of up to 6,500 feet, or 1.2 miles. At the Fort Knox mine, the instrument

is typically used for surveying at distances of 1,000–3,000 feet.

David Quandt, chief mine engineer for Kinross, reports that the mine has experienced major increases in productivity and safety since adopting the new technology. He estimates that surveying time has decreased by about one-third because fewer redeployments of the instrument are needed.

Quandt illustrates the less-productive method of surveying the mine the old way. "Our surveyors would have to physically walk the area from crestline and toeline, stop and take a shot every 50 or 100 feet," he says. "If you were using the conventional total station, you would have a man at the gun and a rod man with a prism doing the same thing: stopping and taking a shot every 50 feet."

One capability that Kinross eventually may utilize more is controlling the instrument wirelessly. The ImageMaster IS software's functionality includes WLAN control of the instrument, working in conjunction with a wireless network card. Taking advantage of this functionality would give management the ability to control the instrument using a desktop or laptop computer.



Surveyors at an Alaska gold mine track material extraction safely and productively from a distance using the IS imaging, scanning and robotic total station.

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## Topcon's IS Imaging Station

**The new image of surveying. Scanning, robotic, reflectorless imaging total station.**



Topcon's IS combines the best of two worlds, advanced imaging and high-accuracy surveying, incorporating real-time field imagery with spatial data. The IS's powerful functionality is controlled using Topcon's exclusive ImageMaster software that produces "photography with dimension", a revolutionary and cost effective alternative to laser scanning. Reality captured for results unimaginable.