



SURVEILLANCE AND INTELLIGENCE

# Life of Mine: Production

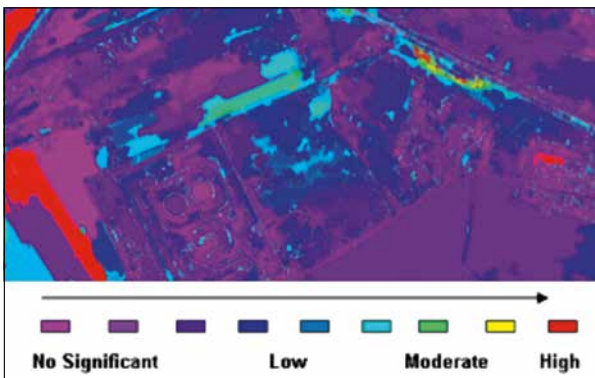
MDA delivers a suite of information products that include Interferometric Synthetic Aperture Radar (InSAR) analysis to detect and measure surface movement, surface change detection, vegetation monitoring, and weather services.

### Surface Asset Monitoring

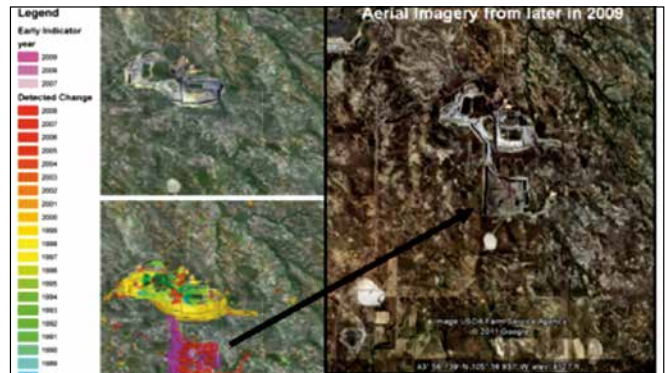
MDA exploits the power of remote sensing satellites to provide mine operators with monitoring programs and accurate information that support operations.

Surface Asset Monitoring (SAM) using InSAR is a means of detecting millimetre-level changes in surface deformation that could represent safety and operational issues at the mine site, and areas surrounding the operations. InSAR is also valuable for monitoring Tailings Storage Facilities (TSF) to detect potentially unstable situations well in advance without risk to personnel or the environment.

MDA's Life of Mine (LOM) suite of products and services include two industry-leading surface change solutions: A patented two-date change product and Persistent Change Monitoring (PCM™). Two-date change uses high-resolution imagery to evaluate changes that may have occurred over time. PCM™ is a multi-date 5 m or 30 m change product that eliminates most false positives. Together, these information products address site encroachment and cover change that can impact a mine or indicate concerns during its operational phase.



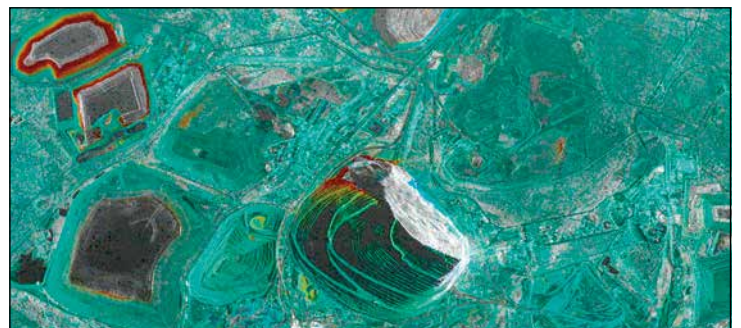
Two-date change products show the location and the probability of change. The red areas in this figure show where the highest chance of change has occurred.



Multi-date change assessment: Imagery on the upper left is from ESRI 2D in mid-2009 and it did not show the area of early indicator change detected from Landsat imagery analysis shown on the lower left. Aerial imagery on the right, in 2009, showed that a change in 2009 did occur.

### Accurate Information

InSAR accurately detects and measures surface movement at the millimetre-level and is an effective stand-alone or complementary monitoring solution to existing methods. It has been proven as a vital resource for managing and operating open pit and underground mines, and supporting tailings management and mine infrastructure health assessment and reporting. Inaccurate or insufficient monitoring creates the potential to miss critical risk factors that, in turn, can result in losses due to temporary shutdown.

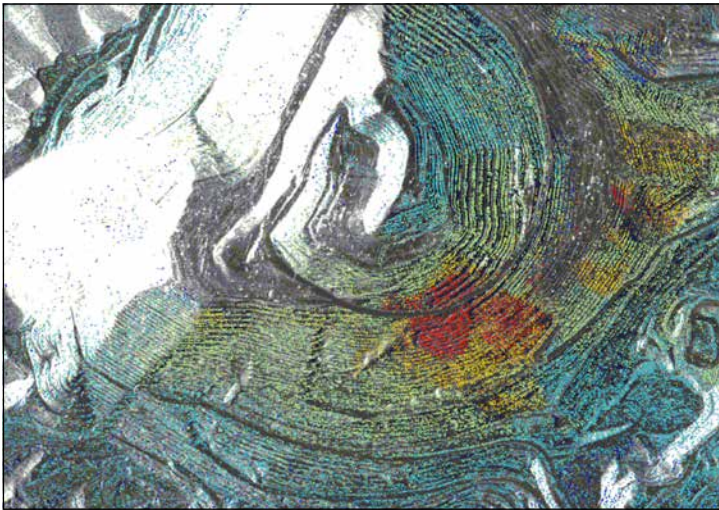


MDA InSAR-detected elevation change at a large open-pit mine operation. Areas in yellow, orange, and red visually indicate locations with the greatest amount of surface elevation change, providing intuitive information for response programs.

## Cost-effective Strategy

InSAR delivers very large numbers of data points over broad areas, typically in the tens of thousands, for a single image product. More data points equates to greater accuracy of measurement across an entire operation and its surrounding environment. InSAR data coverage can reach up to 300 square kilometres, and with a data archive dating to 1995, generating products to analyze historical surface changes as well as current movement trends is fast and cost-effective.

The density of data contained in a single InSAR image product is very cost-effective when compared to acquiring a similar amount of information using traditional data collection methods, which still don't yield the level of accuracy derived from using MDA's routine InSAR monitoring products.



MDA's monitoring solutions deliver accurate millimetre-level measurements of surface change as shown in the image above. Red indicates movement and green is stable.

## Environmental Compliance

MDA's InSAR products are used to help understand and monitor environmental impacts occurring in and around the mine during its operational lifespan. Environmental remediation requirements can be met during mine closure by using an image product of the pre-operational site as a baseline. Evidence of meeting environmental compliance can be verified with MDA's pre- and post-operations in InSAR image products.

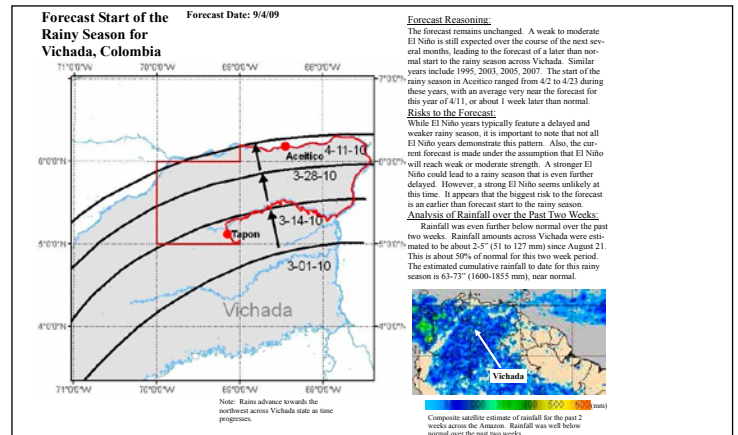
## Global Operations

Coming to terms with a myriad of regulatory frameworks and environmental standards requires a common baseline of information on each operation, regardless of its location. InSAR monitoring enables regular, dependable information for multiple operations that can be used to support companies, as well as asset management, liability reduction, and risk mitigation.

## Weather

MDA's global weather forecasting service supports more than 400 business clients, providing short-term and long-term forecasts, as well as weather impact assessments that allow clients to plan in advance when weather may affect operations or transport of product or materials.

MDA can also provide cleaned historical weather data needed for operations and transportation planning, especially along severe weather prone transportation routes.



Weather products can be customized as needed. This example shows a long-term forecast for the start of the rainy season in Vichada, Colombia, and contains a discussion (at right) regarding the factors that could affect this forecast over time.

## CUSTOMER SATISFACTION

For more than four decades, MDA has worked with its worldwide customer base to provide information solutions that leverage advanced technologies and improve business efficiency.

For more information, contact us at:

MDA

13800 Commerce Parkway, Richmond, BC, Canada V6V 2J3

Telephone 604-278-3411

energy@mdacorporation.com | www.mdacorporation.com

RESTRICTION ON USE, PUBLICATION OR DISCLOSURE OF PROPRIETARY INFORMATION AND IMAGES

This document contains information proprietary to Maxar Technologies Ltd. ("Maxar"), to its subsidiaries, affiliates or to a third party to whom Maxar may have a legal obligation to protect such information from unauthorized disclosure, transfer, export, use, reproduction or duplication. Any disclosure, transfer, export, use, reproduction or duplication of this document, or of any of the information or images contained herein, other than for the specific purpose for which it was disclosed is expressly prohibited, except as Maxar or such appropriate third party may expressly agree to in writing.

COPYRIGHT © 2018 Maxar Technologies Ltd., and third parties whose content has been used by permission. All rights reserved.