



**MINE SHIFT:** CREATING SAFER  
AND OPERATIONALLY EFFICIENT  
MINES OF THE FUTURE WITH  
**CATALYST INSIGHTS**

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**In our Mine Shift series to date we've used CATALYST InSAR data and satellite imagery to investigate potential signs and moments leading up to infamous catastrophic mining events around the world.**

Events, we now know, could have been prevented or mitigated had owners and authorities been alerted to warning signs months and even years before.

Events like those at the Williamson Diamond Mine, where movements leading to a breach in the eastern wall of the tailings storage facility were detectable a year in advance.

This time, rather than looking back, we're looking ahead to the transformative impact Earth Observation technology can and will have on mining safety, productivity, resourcing, and site selection and closure worldwide.

In this edition, our focus is mine safety and how using InSAR with CATALYST INSIGHTS can:

- Create safer working environments for staff
- Maintain a vigilant watch over key assets, ready to alert teams to potential risks
- Give communities adjacent to major infrastructure assets greater peace of mind that their safety is also being considered



# EO Technology: What is InSAR and how it works

**For several decades, CATALYST has been at the forefront of Earth Observation technology, providing transformative remote sensing solutions tailored specifically to the mining industry's unique needs.**

Harnessing the power of satellite data, machine learning, and data analytics, CATALYST provides mining companies with actionable insights and real-time monitoring capabilities.

CATALYST has developed a user-friendly interface that compiles and analyses vast amounts of earth observation data to deliver critical information in a visual and intuitive manner to produce faster, more informed decisions, increasing operational efficiency while reducing risks to employees and surrounding communities.

## How it works

CATALYST's ground displacement monitoring solution, INSIGHTS leverages InSAR (Interferometric Synthetic Aperture Radar) imagery and its proprietary remote sensing algorithms to detect and measure ground movement with high precision.

Satellites passing over a target area emit radar signals that allow CATALYST to calculate the distance between the satellite and the Earth's surface with millimetre level accuracy.

To measure movement, these signals are captured in separate passes over the same area and the differences between the two radar images are then computed to produce an "interferogram" - a representation of ground displacement captured in the satellite signal when changes occur on the ground.

The sensitivity of these measurements means even the smallest ground movements, down to millimetres can be detected continuously. In fact, one of the most significant advantages of InSAR is its ability to provide continuous monitoring over vast areas without the need for physical on-site presence, reducing operational costs, and ensuring higher levels of health and safety.

This provides real-time and comprehensive data on ground displacements and potential hazards to the mine operators.





# SAFETY: Elevating Mining Safety Through EO Innovative Technology

In 2022, the International Council on Mining and Metals (ICMM) reported a sobering figure of 33 lives tragically lost and an additional 7,126 individuals injured at mines worldwide.

While these statistics reflect a reduction compared to the previous year, they underscore the persisting need for improvements in mining safety.

This pressing concern is one that CATALYST shares with the industry. The use of EO innovation, such as the integration of InSAR technology will make a significant improvement across mining operations globally.

## 1. Proactive Safety Measures

CATALYST INSIGHTS seamlessly integrates into safety and maintenance protocols to enhance safety practices within the mining sector.

By leveraging InSAR, the mining industry can move beyond conventional safety measures, introducing real-time monitoring and early hazard detection mechanisms.

This innovation empowers mining teams with the critical data required to proactively assess risks and make well-informed decisions, ultimately creating a safer environment for all workers.



# SAFETY: Elevating Mining Safety Through EO Innovative Technology

## 2. Early Hazard Detection

The earlier a potential hazard is detected, the more effectively it can be managed or mitigated.

InSAR technology is exceptionally sensitive to even subtle ground deformations, which may be early indicators of impending issues such as slope instability, subsidence, or structural weaknesses.

By identifying these hazards early on, mining companies can take proactive measures to prevent accidents, such as evacuating at-risk areas, reinforcing structures, or altering mining plans to avoid unsafe zones.



[>> See it in action](#)



# SAFETY: Elevating Mining Safety Through EO Innovative Technology

## 3. Real-Time Monitoring

One of the primary advantages of InSAR technology is its ability to provide real-time, high-resolution data.

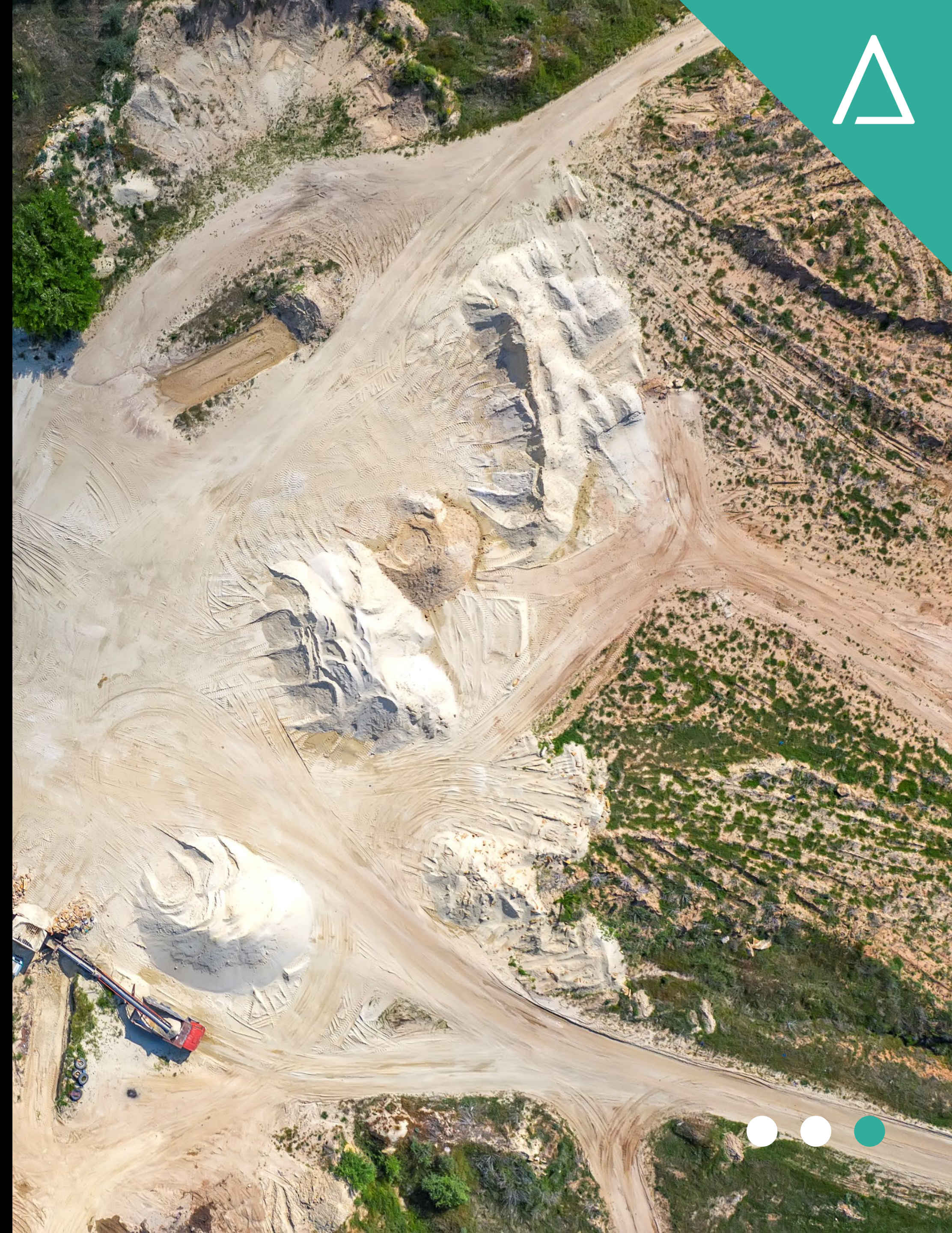
Traditional safety protocols often rely on periodic inspections and manual assessments, leaving room for unforeseen hazards to develop.

CATALYST INSIGHTS constantly scans mine sites to capture precise ground movement data.

This data is then analysed in real-time, allowing for the immediate identification of any abnormal ground movements or shifts that could pose a threat to workers or infrastructure.



[>> See it in action](#)





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# Embracing InSAR for the Mines of the Future: The Role of CATALYST

It is imperative that mine operators continue to embrace technological innovations such as Earth Observation advancements to future-proof responsible, efficient, and sustainable mining practices.

CATALYST INSIGHTS provides solutions that offer unmatched ability to monitor ground stability in near real-time, enabling early hazard detection, optimizing operations, and enhancing safety protocols.

To discover more about how CATALYST can make a difference to an existing or upcoming mining project, get in touch with our team at [hello@catalyst.earth](mailto:hello@catalyst.earth).

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## Conclusion

CATALYST's revolutionary technology has transformed ground displacement monitoring across industries, including mining by providing operators with unprecedented actionable data into the safety and stability of their sites.

As an integral part of CATALYST's Earth Observation solutions, InSAR works in tandem with other cutting-edge technologies to create a safer, more sustainable future for resource extraction industries.

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