



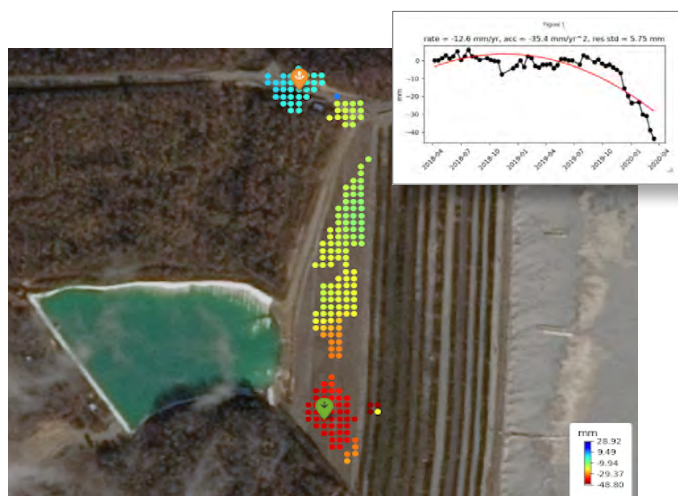
Global Deformation System (GDS)

Increase safety and reduce cost with scalable deformation & velocity measurements

Contact us:
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Descartes Labs Government is a geospatial intelligence company with science and technology at its core. Launching out of Los Alamos National Laboratory in 2014, we build models of the earth to power the analysis of the world's largest physical systems.

The world's first automated, global subsidence and deformation monitoring system

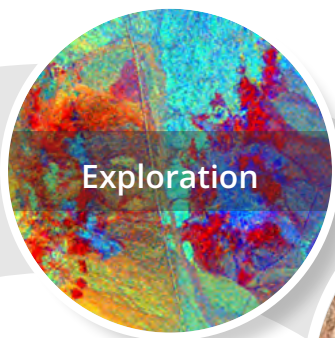


Yichun Luming Mining North: Prior to the event on March 28, 2020 we saw accelerating deformation at the southern edge of the northern TSF in the months leading up to the failure. Optical imagery did not show any obvious issue.

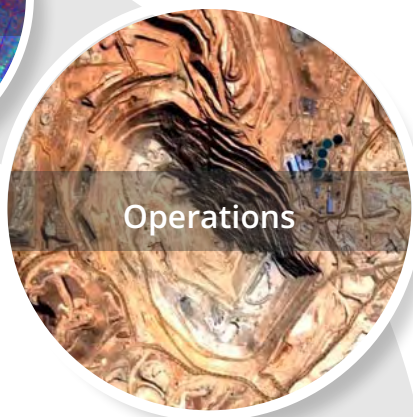
The risk from surface deformation and movement presents significant challenges for mining companies, especially when operating in remote areas without reliable access to survey crews. Diverse assets with aging infrastructure, including unstable pit walls and insecure tailings dams, can quickly generate "tail-risk" that has the potential to change the economics of modern-day materials supply chains.

Our approach combines automated Sentinel-1 satellite monitoring, measurement, and visualization using our world-leading InSAR product, updated globally every 12 days and delivered with full transparency of the analysis in less than 24 hours from data collection. Optional customizations include the addition of sub-meter high-resolution SAR imagery, LiDAR, or data from ground-based sensors such as piezometers, accelerometers, tensiometers, etc.

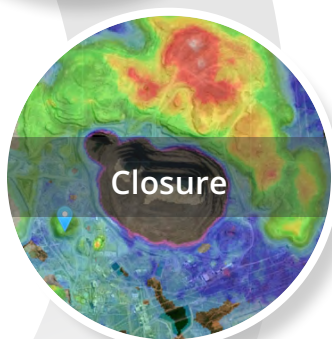
These integrated data sources allow for rapid prototyping and provide a scalable solution to monitor all assets consistently, and acts as a tip-and-cue mechanism for more resource intensive monitoring.



Exploration



Operations



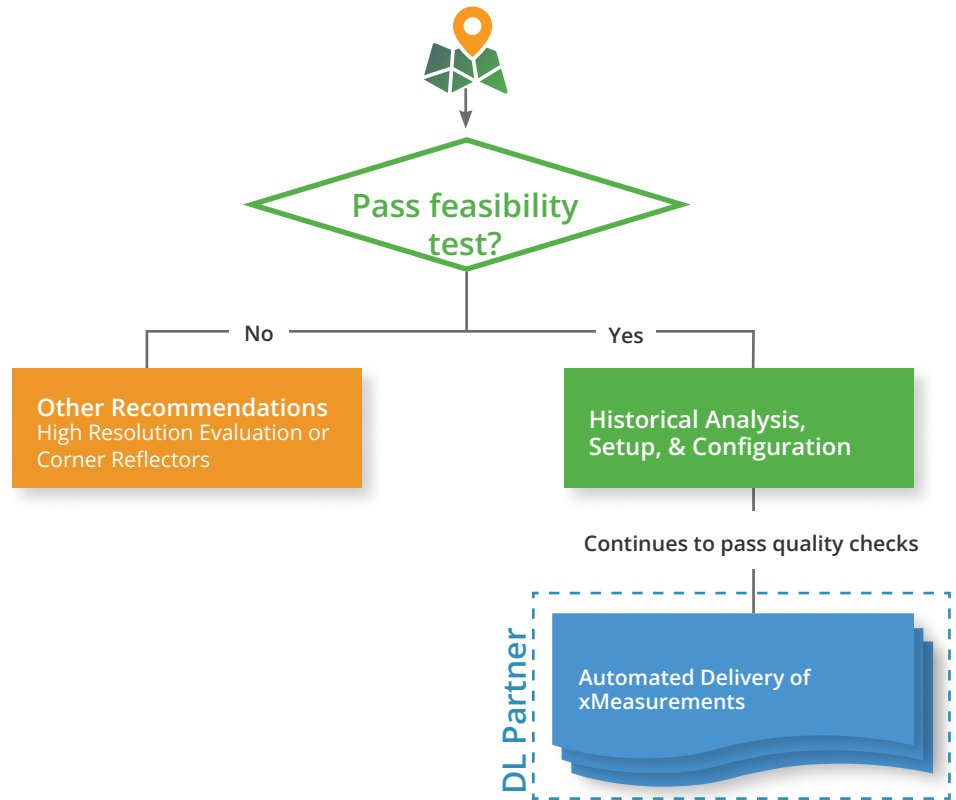
Closure

Descartes Labs capabilities span all major phases of the mining life cycle



High Resolution Integration

Using our space-based optimization workflow, we identify and ingest all tailings facilities of interest- managed, or unmanaged- into the Descartes Labs geoprocessing platform. We assign different levels of feasibility to each site to determine if they are candidates for our automated medium-resolution deformation monitoring using our Sentinel-1 InSAR pipeline, or better suited to high-resolution monitoring.



Individual targets for automated Sentinel-1 satellite monitoring are assessed based on the need for corner reflectors and general visibility regarding satellite collection angles or vegetation.

Phased customization process

At each phase, clients receive CSV and/or PDF reports of subsidence measurements along with interactive visualization of modeling results using the Descartes Labs Platform.

Phase 1: Automated Sentinel-1 InSAR Monitoring

- Selection, geocoding, and ingestion of global targets into the Descartes Labs Platform
- Initial analysis with guidance on the need for corner reflector placement
- Automated monitoring with updates every 12 days/approx. 30 updates per year, along with historical baseline (2-4 years)

Phase 2: High Resolution Radar Data Integration

- Defined "tip and queue" satellite requirements to activate new high resolution collects
- Feasibility assessments for each selected target
- Approved targets enter monitoring program
- Conduct corner reflector and alternative data evaluation for low feasibility targets
- High resolution data is licensed and acquired by either Descartes Labs or the client

Phase 3: Multimodal Data Integration

- Evaluation of individual data sets including historic satellite and/or ground-based data baselines using accelerometers, bathymetry, piezometers, or drone-based LiDAR
- Integration of datasets on the Descartes Labs Platform and definition of overall anomaly detection system requirements



How Descartes Labs is different

Affordable

Our automated processes and continuous access to data decreases costs, resulting in **75% savings** compared to traditional orbital radar programs.

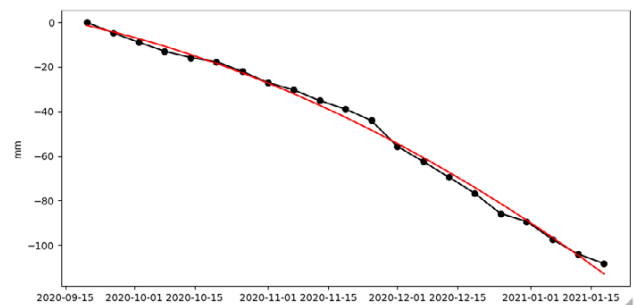
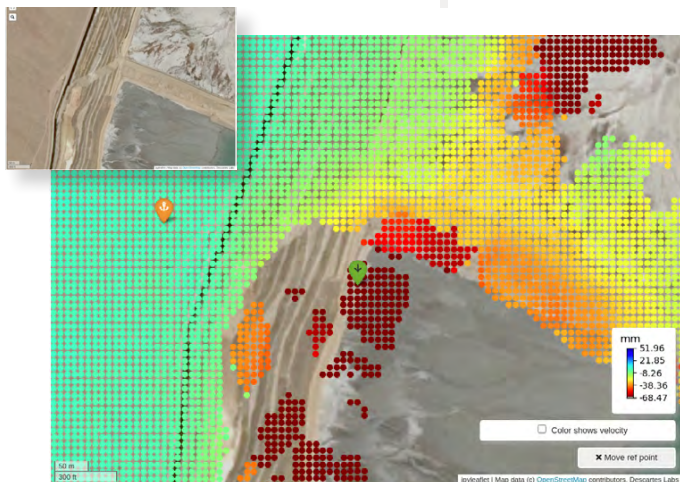
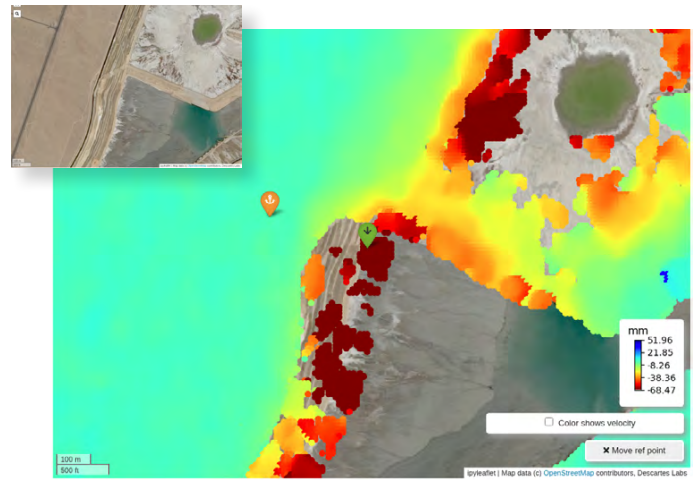
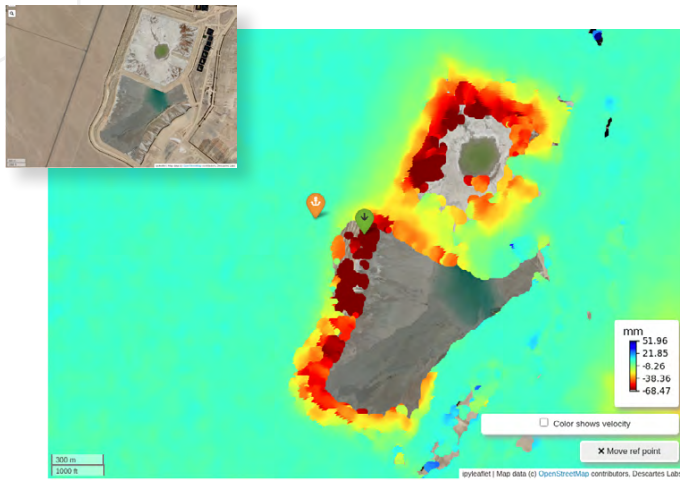
Fast

Customers receive measurements within **hours of analysis** — timely delivery of results reduces risk and enables quick responses.

Transparent

The analysis is **fully transparent** and can be made available for programmatic and geotechnical interpretation and interrogation in real time.

Deformation analysis example



These images show a deformation analysis using Sentinel-1 at various scales (optical imagery inset). A deformation trend is visible on the west TSF wall. The above plot shows the deformation of the green marker relative to the orange marker over time.

By combining deformation modeling and data science expertise with the power of the Descartes Labs geospatial analytics platform, stakeholders can produce actionable insights tailored for mining safety, engineering, and/or assurance roles. [Get in touch](#) with us today to learn more.