

Enabling Autonomous Mining



In rugged terrain, modern mining companies trust Applanix

- Accurately and safely guiding self-driving trucks
- Pinpoint positioning, orientation, perception, and localization for the most extreme environments, above and below the ground
- Hands-on approach to customized solutions
- Huge install base, including the biggest mines, operating 24/7/365

Keep your business driving forward

- ▶ Open pit and underground mines
- ▶ Inertial technology to generate stable, reliable, and repeatable positioning solutions for land-based vehicle applications
- ▶ Real-time SLAM engine
- ▶ Operates under the most difficult GNSS conditions
- ▶ Proprietary multi-sensor integration
- ▶ OEM kits for seamless integration
- ▶ Industry-leading customer support

Learn more at:

www.applanix.com/products/poslv.htm

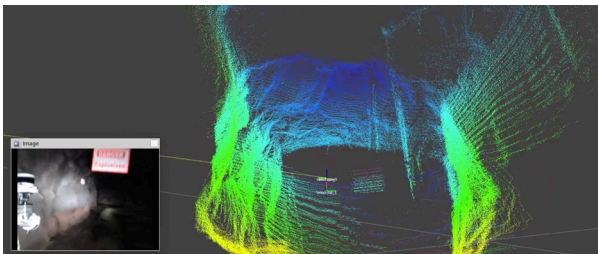
Customization for any mine, any mission

APPLANIX DELIVERS LIDAR-BASED LOCALIZATION SOLUTION FOR MINING

Underground mining tunnels pose unique navigational challenges due to the total obstruction of GNSS signals, and challenging light and environmental conditions such as dust and dirt.

The core of Applanix's LiDAR navigation system is a real-time simultaneous localization and mapping (SLAM) engine that estimates a vehicle's trajectory while concurrently building a map of its immediate surroundings from accumulated LiDAR data. Combining LiDAR and inertial sensors ensures that the system's estimated vehicle trajectories and navigation maps are metrically consistent at the local scale (on the order of the LiDAR sensors' range), and topologically consistent on the global scale.

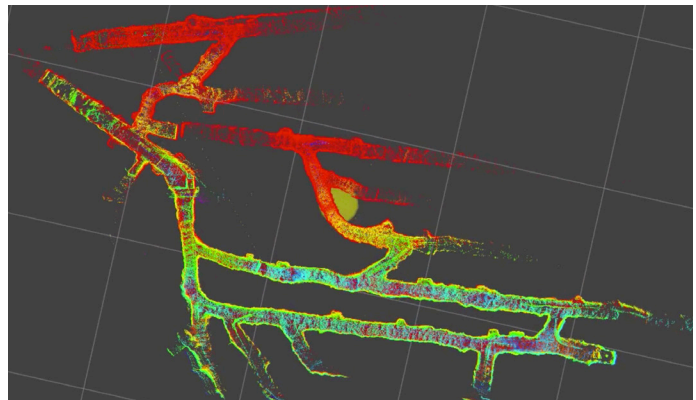
Applanix' system is tolerant of vibrations typical with subterranean vehicles, and the vehicle does not need to remain stationary to perform static LiDAR scans. Maps generated from SLAM can also be re-used for localization – or, navigation without mapping – in otherwise static environments.



A point cloud map generated by Applanix' LiDAR SLAM system, which can be re-used for localization.



The Applanix navigation system on a subterranean transport vehicle, with front- and back-facing LiDAR to mitigate self-occlusion, and vertically-mounted LiDAR for mapping. The integrated POS LV provides inertial measurements and time-synchronization between all sensors.



A point cloud map generated by Applanix' LiDAR SLAM system, which can be re-used for localization.

APPLANIX ENABLES AUTONOMOUS VEHICLES IN OPEN-PIT MINING

Applanix has over a decade of experience creating bespoke, innovative solutions for autonomous mining vehicles. Our systems are designed to achieve reliable and consistent high-level accuracy, even in the most operationally complex environments such as deep open pit mines. And with a huge install base that operates around the clock, often in very remote and inhospitable environments, Applanix solutions are trusted by some of the biggest names of the industry, all over the world.

Applanix meticulously scopes out each on-site project to determine the exact conditions and requirements of the operating environment. Then, our trained specialists tweak the systems accordingly, to continuously refine their performance. As a result, each Applanix box will contain highly customized code, despite having similar casing and appearance. This approach applies to both our turnkey POS LV and POS LVX products, which are shipped ready to go with a simple hookup, and our AP and APX board sets that are geared primarily towards OEMs.

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