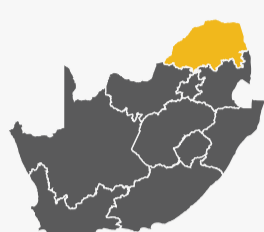




ANGLO AMERICAN AMANDELBULT SPOT POC



MINE/PROJECT LOCATION:
Amandelbult Tumela Mine, South Africa

YEAR OF PROJECT:
2022

CLIENT:
Anglo American

END CLIENT
Anglo American Amandelbult Complex

PROJECT FOCUS:
Engineering, Automation, Health & Safety

COMMODITY:
Platinum

DWYKA MINING SERVICES SOLUTION:
Boston Dynamics Spot x Emesent Hovermap x Maestro Digital Mine Gas Sensor

YOUTUBE LINK
https://youtu.be/HDFvN_CXnHk



PROBLEM:

Anglo American was looking for a solution that will limit exposure of resources to harsh and unsafe environments which is notably a growing concern within the mining industry. To achieve this, a solution would need to be proposed to ensure the safe access of employees into recently blasted areas, with real time visualization of air quality data and structural data.

Additionally, there was a need for repeatable, accurate and consistent monitoring of infrastructure (railway tracks; pipes; panels etc.), roof bolt detection and mapping tightly healed joints.

Accurate visualization of existing geological features, safe declaration: gas clearance, geo-structural integrity were amongst some of the other issues brought forward.

SOLUTION:

Boston Dynamic's Spot Enterprise is a quadruped robotic platform that will reduce the exposure of mining staff to harsh and hazardous underground environments. The proof of concept (POC) included the operation of a Spot, operated manually and autonomously underground to collect data as it moved into predefined mining sections.

Spot was "walked" underground to test the mobility and stability of the platform and various devices "payloads" to collect data. Different functions were evaluated such as trained walking with no assistance by an operator known as an "autowalk", teleremote operation (sending instruction over network) using telemetry data on a connected tablet.

The Emesent Hovermap payload is a SLAM LiDAR scanning solution that makes use of SLAM technology to allow for immediate 3D reconstruction of the surrounding environment. As part of the trial a Gas detection instrument was included. This was to allow for monitoring of Occupational Hygiene by simulating a blast re-entry examination.

RESULT:

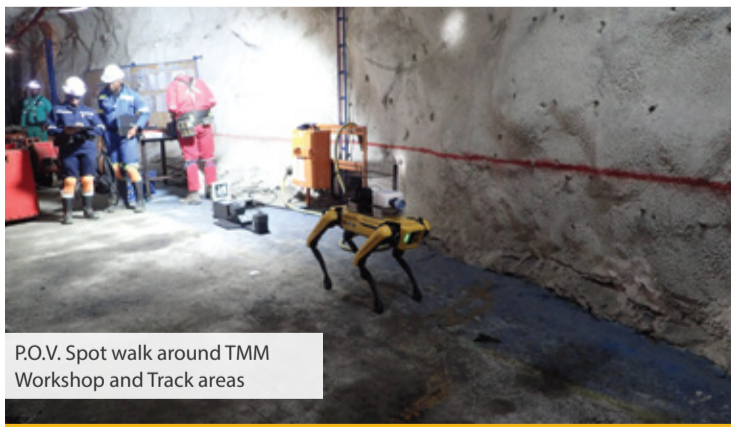
Safety:
Boston Dynamics Spot has the potential to reduce the risks that resources are exposed to daily, therefore improving the safety conditions. Spot has proven that it can be exposed to high risk underground conditions, without the need on physical human intervention. This removes people from hazardous environments and enables tasks like re-entry examination, by assessing overall underground conditions prior to production entering the area.

Production:
Routine inspections such as the monitoring of structural integrity of rail tracks, can be conducted by Spot with the Hovermap as a payload. Additionally, the robot does not need to adhere to blast re-entry times, and can be deployed in less than half of time to perform a blast progression scan using the Hovermap.

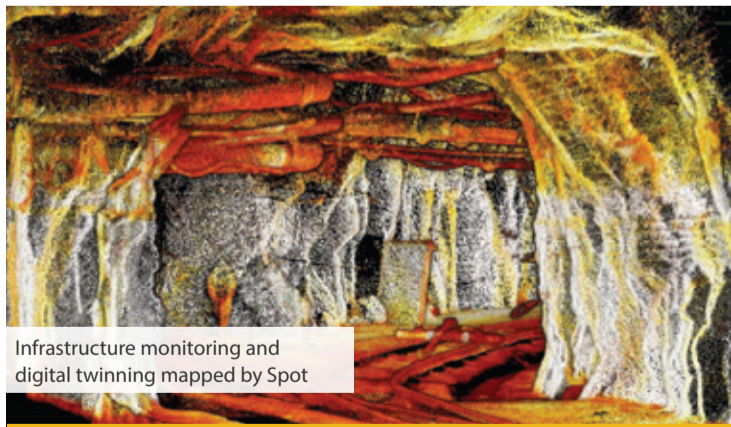
Rail track play an important role in the transportation of the ore and other essential resources, with Spot the tracks were successfully scanned using the Emesent Hovermap. Providing data that can be used for track condition monitoring and predictive maintenance.

KEY TAKEAWAYS:

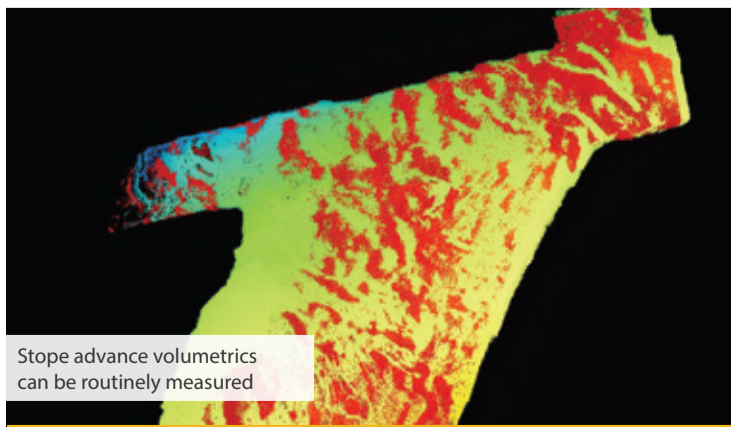
- ✔ Spot can access hazardous unsupported areas with loose ground
- ✔ Multiple datasets for multiple departments from a single mission
- ✔ Robotic workforce can be used during no-entry times (pre/post blast)
- ✔ Spot performed the longest underground autowalk at a mine to date
- ✔ Automated inspection of mine facilities over network is possible
- ✔ Docking station for charging and remote data offload operational
- ✔ Multi-payload functionality across multiple devices proven to work



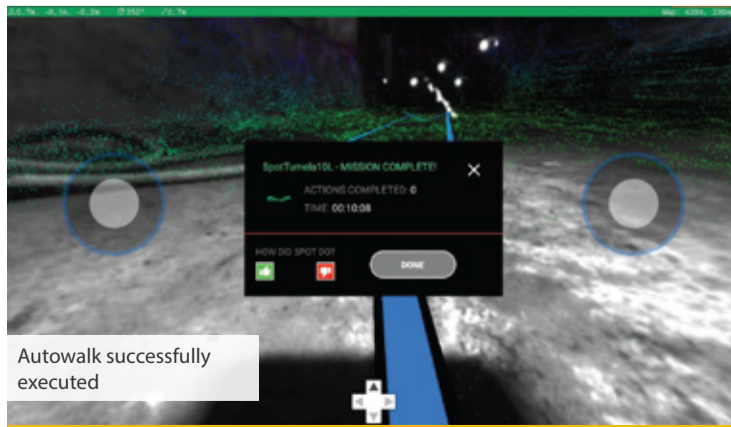
P.O.V. Spot walk around TMM Workshop and Track areas



Infrastructure monitoring and digital twinning mapped by Spot



Stope advance volumetrics can be routinely measured



Autowalk successfully executed

For more information on this case study and/or general info on Dwyka Mining Services, send us an email, or visit our website.

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