

Defining Requirements for Implementing Autonomous Systems Underground

Workshop Summary of Input - 2022-08-09

Summary: The overall outcome of this workshop indicates some minor considerations only, concentrated in the Operational Readiness and Deployment section.

Health and Safety: Minimal recommendations about underground specifics for this section, some specific nuances mentioned included underground drones and radio frequency approvals.

Regulations: Minimal recommendations about underground specifics for this section, there might be some specific nuance around following existing regulations in an underground context.

Workforce, Community, and Social Impact: Minimal recommendations about underground specifics for this section, some areas that might have some additional underground nuances. Some underground-specific case studies and examples would be useful.

Operational Readiness and Deployment

Some specifics noted:

- Consider human monitoring needs
- Physical mine design: Environmental conditions such as rock properties and their affect on communications, underground-specific layout considerations such as tunnel size.
- System infrastructure: Consideration on how remote operations are dependent on communications infrastructure, additional nuances on redundancy, scalability, and compatibility.
- Process planning: illustrative examples recommended, maintenance considerations .
- Engineering design management: what to do in event of a breakdown, differences underground in terms of how design incorporates limitations imposed by environmental conditions. Might be some nuances around safety system calibration and system uplifts. Challenges might need to be reworked in the future as more are foreseen.
- For future work: how does electrification complement autonomous implementation?