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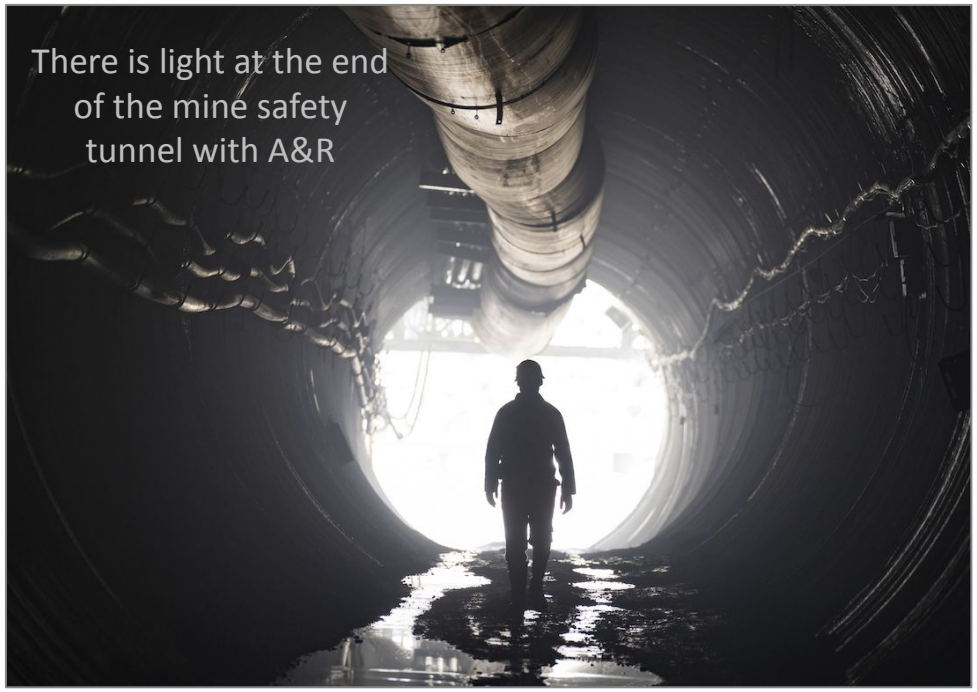
SAFETY THROUGH INNOVATION

Development and Impact of the Missing Person Locator System in South African Mines

Presentation Overview

- Introduction
- A&R Group MPL Solution
- MPL System
- Reporting and dashboarding
- Closing



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Introduction

Protecting lives in the mining industry requires effective emergency procedures.

A key aspect of emergency preparedness and response is to locate and rescue missing persons after a major incident.

Technology that enables the rapid location of missing persons is critical to the success of the rescue efforts.

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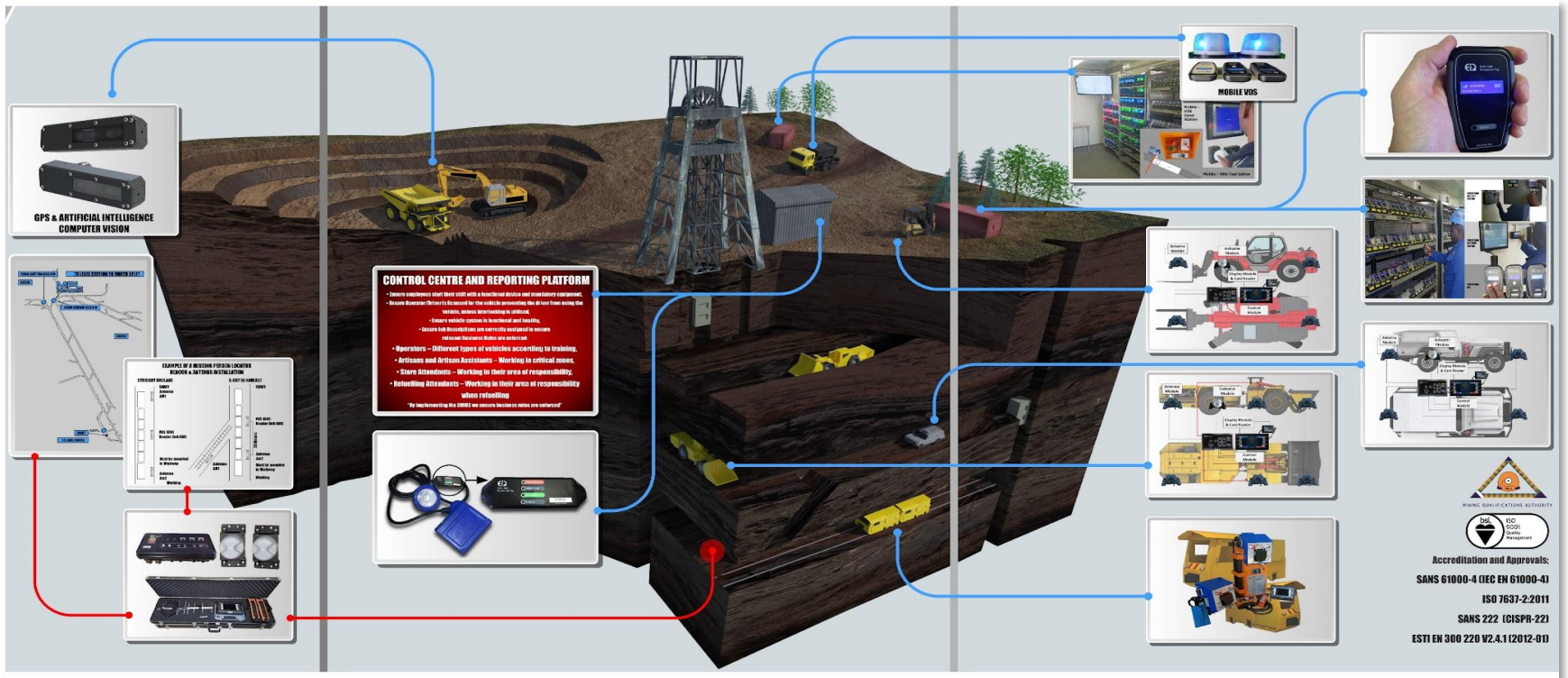
A&R Group Background

- A&R Group founded in 1978
- Main focus: Rail-bound technology

- Progressed to creating advanced, integrated solutions for comprehensive mine management.



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Background - Missing Person Locator system

- Major challenge in Mining: Locating individuals after a catastrophic incident.
  - > Limited timeframe to locate victims
  - > Danger to Proto Teams' lives
  - > Extensive search & Rescue operations
- Mine Health and Safety Act Regulation 16.7
  - > Legal Requirement

Image credit: safetowork.com.au/

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A&R Group MPL Solution

- A solution that meets the regulatory standards.
- Rigorously tested, refined, and proven in the field.
- A proven track record: Significant improvement in survival rates in emergency situations.

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A&R Group MPL Solution

- 2009 Mine fire
  - > 85 Lives lost
  - > inability to locate individuals in dense smoke

- The A&R Group's development of the MPL system, fuelled by:
  - > Experience in the mining industry
  - > A passion for people
  - > Partners at the forefront in electronic design

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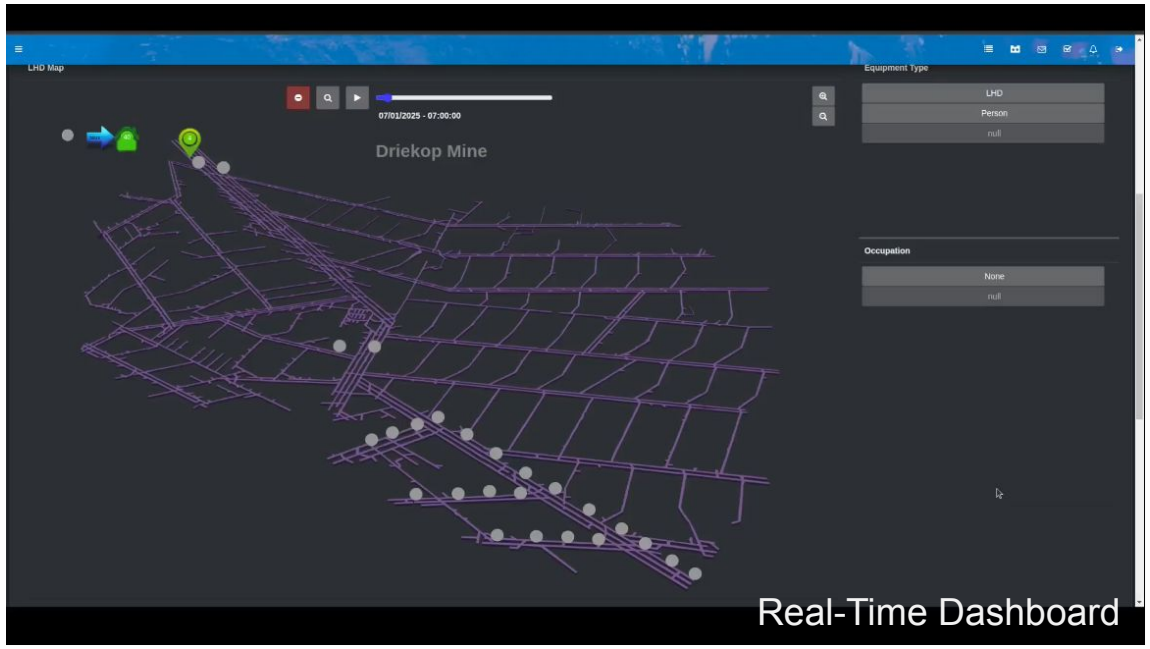
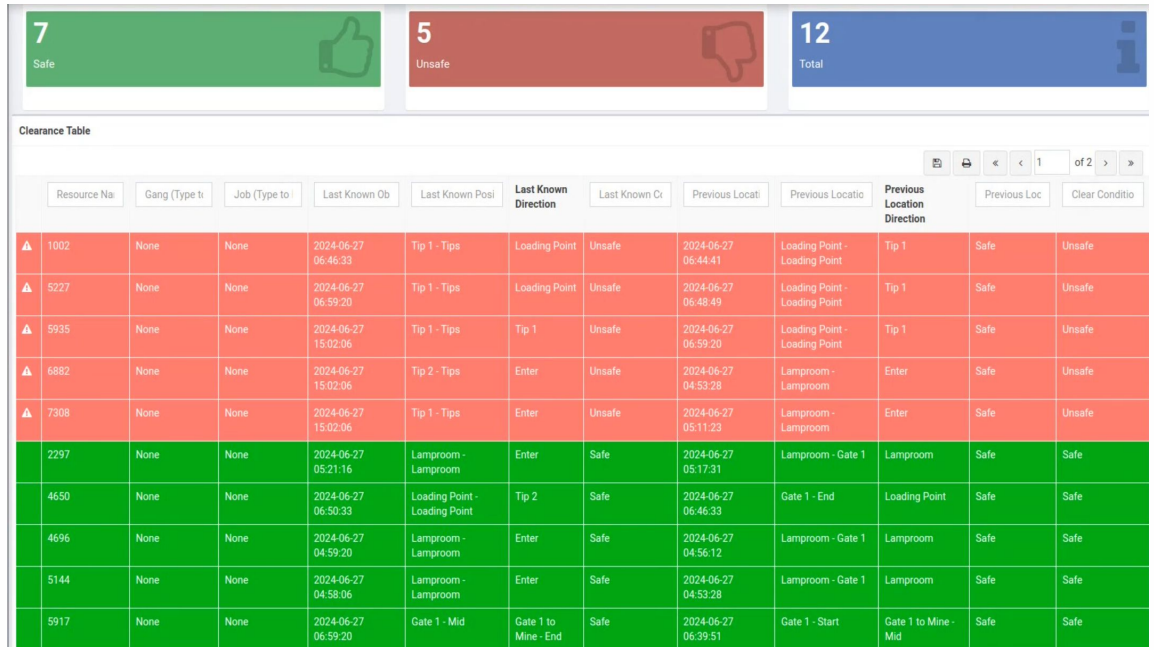
MPL Solution Requirements

- Identify which individuals are missing
- Narrow down potential location
- Pinpoint individuals in volatile environments



Real-Time Dashboard



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⚠	5227	None	None	2024-06-27 06:59:20	Tip 1 - Tips	Loading Point	Unsafe	2024-06-27 05:48:49	Loading Point - Loading Point	Tip 1	Safe	Unsafe
⚠	5935	None	None	2024-06-27 15:02:06	Tip 1 - Tips	Tip 1	Unsafe	2024-06-27 06:59:20	Loading Point - Loading Point	Tip 1	Safe	Unsafe
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⚠	7308	None	None	2024-06-27 15:02:06	Tip 1 - Tips	Enter	Unsafe	2024-06-27 05:11:23	Lamproom - Lamproom	Enter	Safe	Unsafe
	2297	None	None	2024-06-27 05:21:16	Lamproom - Lamproom	Enter	Safe	2024-06-27 05:17:31	Lamproom - Gate 1	Lamproom	Safe	Safe
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	4696	None	None	2024-06-27 04:59:20	Lamproom - Lamproom	Enter	Safe	2024-06-27 04:56:12	Lamproom - Gate 1	Lamproom	Safe	Safe
	5144	None	None	2024-06-27 04:58:06	Lamproom - Lamproom	Enter	Safe	2024-06-27 04:53:28	Lamproom - Gate 1	Lamproom	Safe	Safe
	5917	None	None	2024-06-27 06:59:20	Gate 1 - Mid	Gate 1 to Mine - End	Safe	2024-06-27 06:39:51	Gate 1 - Start	Gate 1 to Mine - Mid	Safe	Safe

Zone Clearance Dashboard

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Progress - Missing Person Locator system

- 2017 Harmony MPL
- Mining personnel tracked every day - ±75 000
- TMM, Loco and asset tracking 2023
- Live maps – 2023

- Advanced tracking technology
  - > Rapid location identification
  - > Even in hazardous conditions

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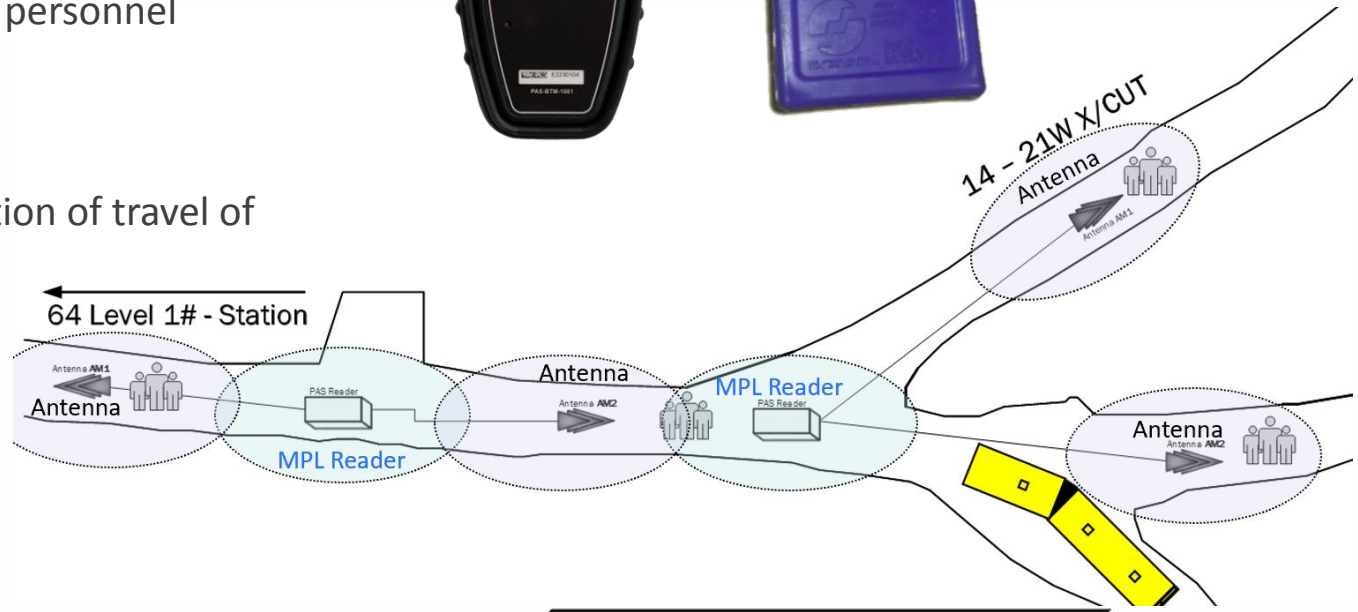
Components & Functionality

- Personal device
  - > Intrinsically safe
  - > Robust for the harsh environment
  - > Individual carries on them
- Tracking devices installed in the mine:
  - > Detect location & direction of travel of personnel
  - > Linked to the mine plan
- Online functionality of the tracking devices
  - > Real-time data on the location & direction of travel of detected individuals



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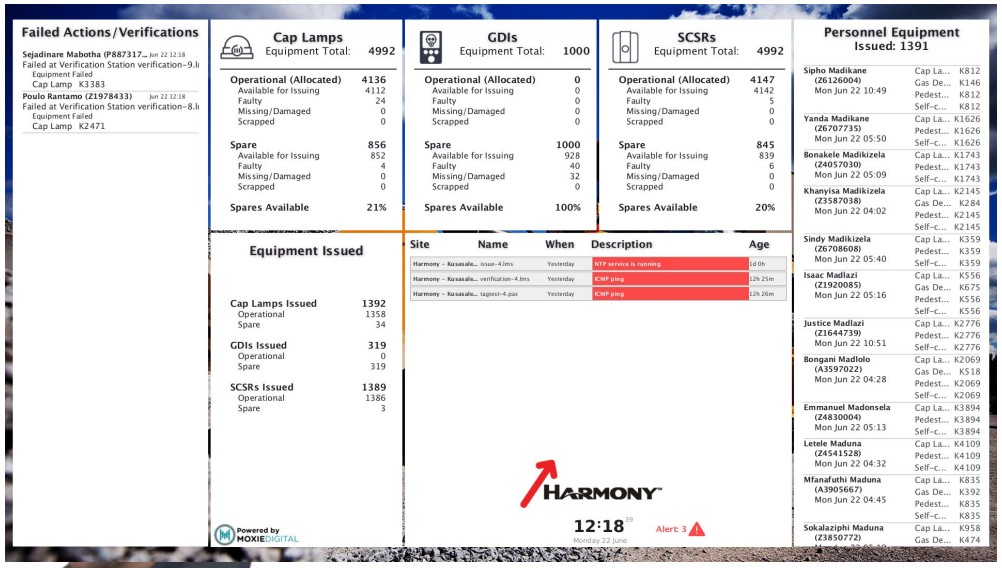
Components & Functionality

- A management system
  - > Integrate **allocation** of devices to individuals
  - > Provide **real-time** location visibility (last known location)
- The management system provides information on
  - > Individuals accounted for (**safe**)
  - > Individuals **missing** (i.e., has not come out from underground / the mining area).
- **Hand-held** and **easy-to-use** locating devices for the Proto Team
  - > To detect personal devices of missing individuals

- Incorporation of the **locating procedure** (use of the technology) in the mine's **emergency preparedness and response strategy**.



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Lessons learned - Missing Person Locator system

- Config management
- Naming convention and beacon placement (Map)
- Quarterly walkthrough – system test
- Annual PROTO training
- MPL Locator calibration

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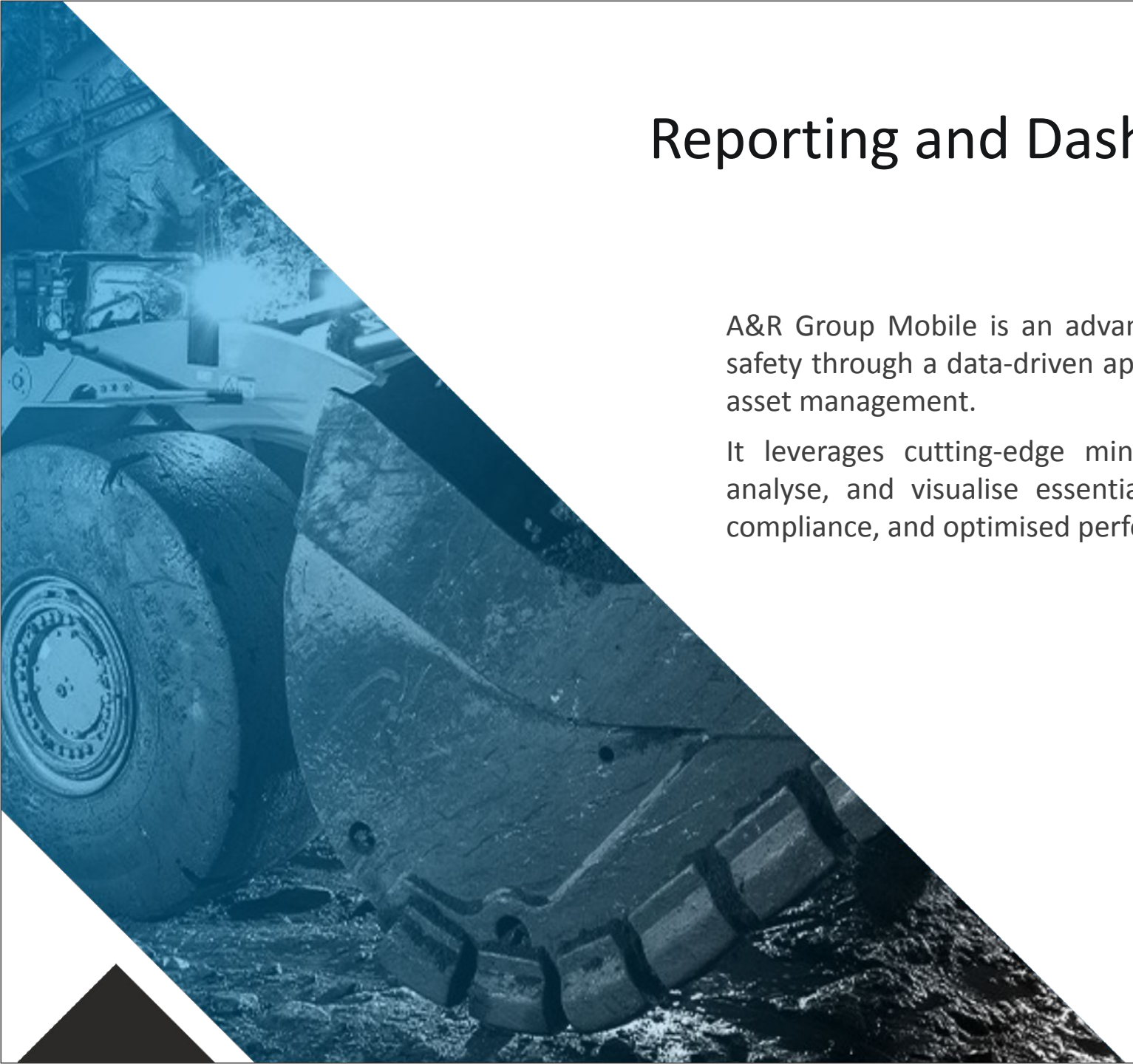

Reporting and Dashboarding (ARMobile)

A&R Group Mobile is an advanced framework that enhances mine operations and safety through a data-driven approach for efficient decision-making, integration, and asset management.

It leverages cutting-edge mining and industry-standard technology to connect, analyse, and visualise essential operational data. This ensures safety, efficiency, compliance, and optimised performance.

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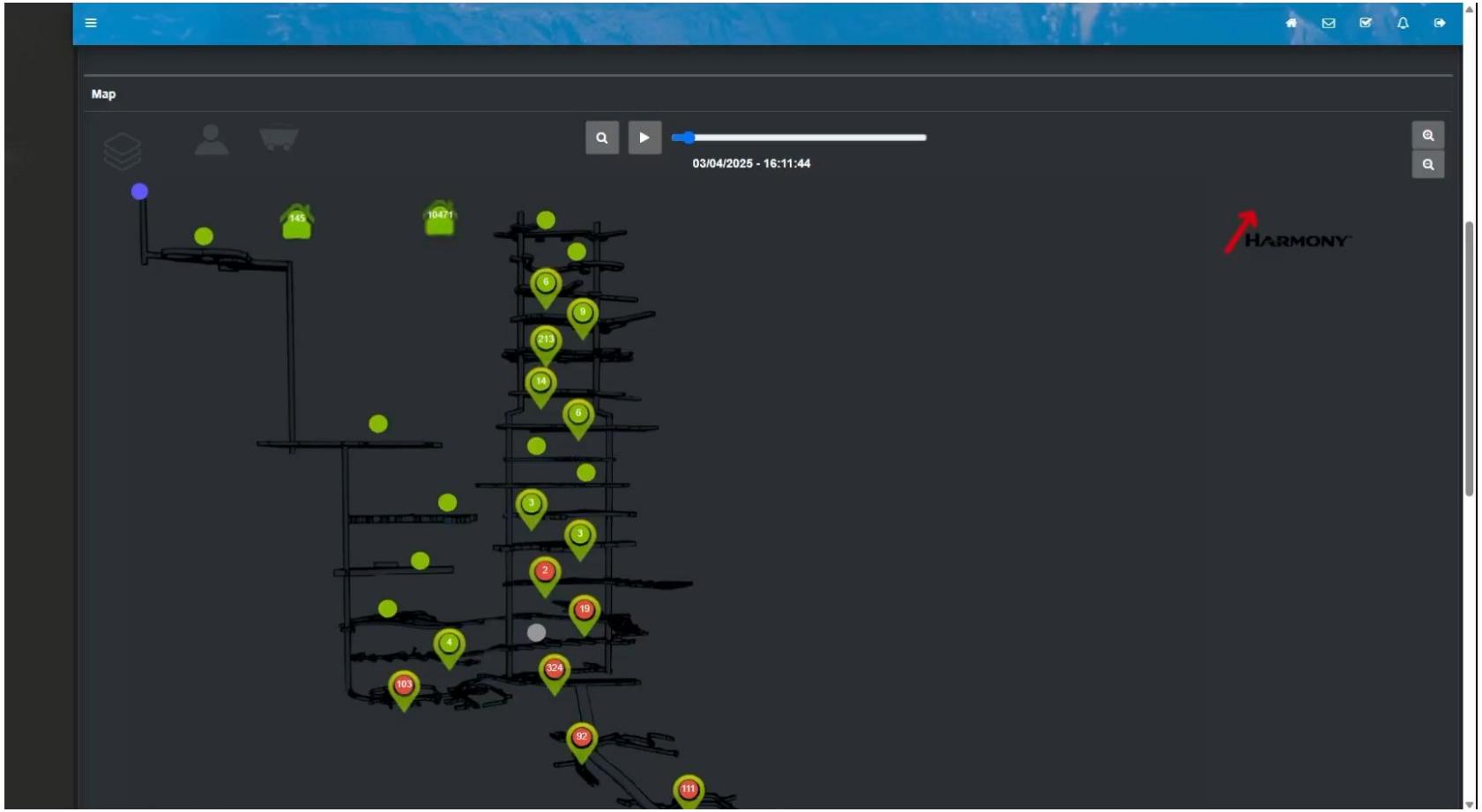
Missing Person Locator system (Live Demo)



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Closing

In a high-risk industry, the MPL ensures no life is lost due to being unlocatable, setting the stage for a safer future.

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Questions

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THANK YOU

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