#MiningWithPurpose

MISSING PERSON LOCATOR (MPL) LEARNINGS

HARMONY™

Carel Oosthuizen

May 2026

Agenda

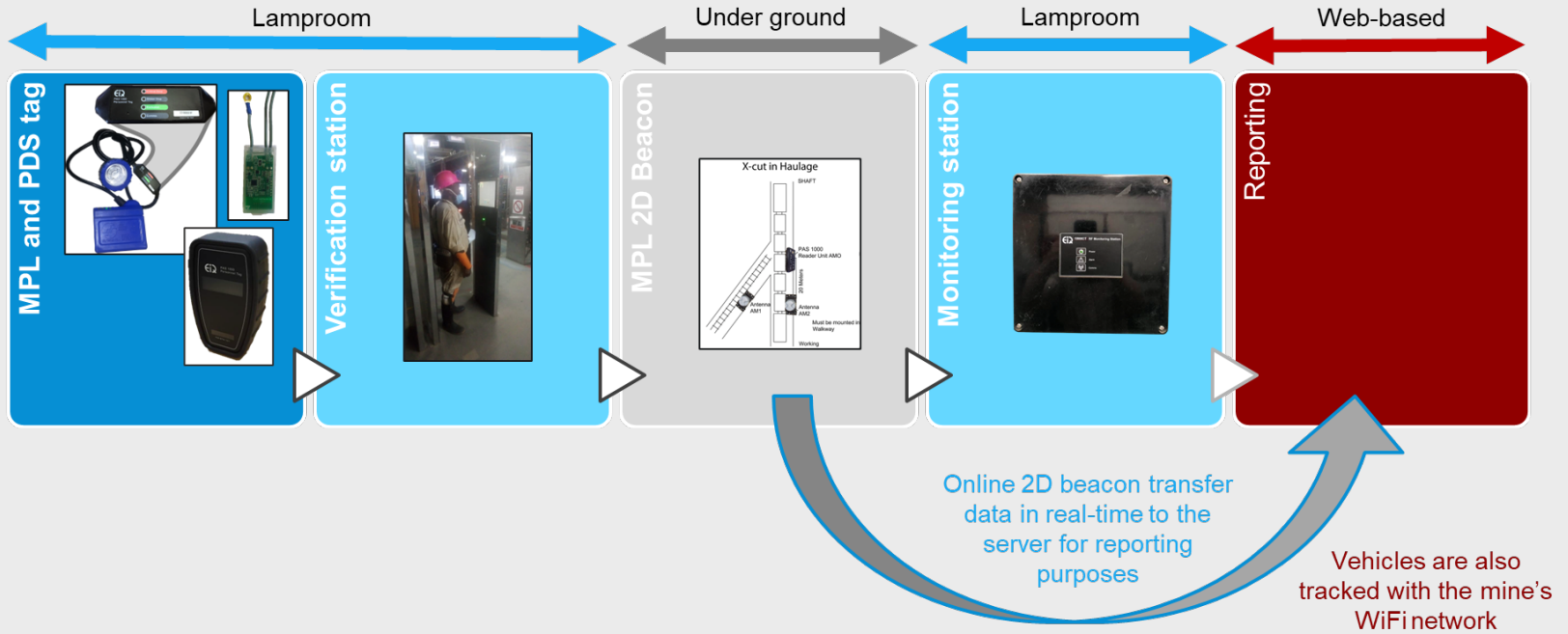
- Introduction
- MPL system
- Key enablers
- Implementing MPL at Harmony Gold
- MPL Learnings
- Post project Ownership and responsibilities
- Conclusion

Introduction

- Installing missing person locator systems at Harmony was strategic decision with a strong safety objective. Harmony embarked on this journey after the Doornkop Shaft fire disaster. The purpose was to improve:
  - Improved emergency response on missing person incidents
  - Reliable monitoring of personnel
  - Optimise safe work practices
  - Enhance accident investigations

The MPL system

- The Missing Person Locator system is a safety innovation designed to locate missing persons in mines. The system consists of tracking beacons installed in pre-determined areas, such as haulages and pedestrian tags, that wirelessly communicate to the beacons to determine the last known location of a person. In case of disasters or blasting operations, this information is critical for Rescue Teams to locate and reach employees quickly and safely.



Key enablers

Lamproom / Control point

- Comprehensive Mine Management System (CMMS) is the control system that lies at the center of the product implementations. The CMMS provides a platform for management information, optimisation and enforce business rules

Effective equipment control and management using the LRMS system

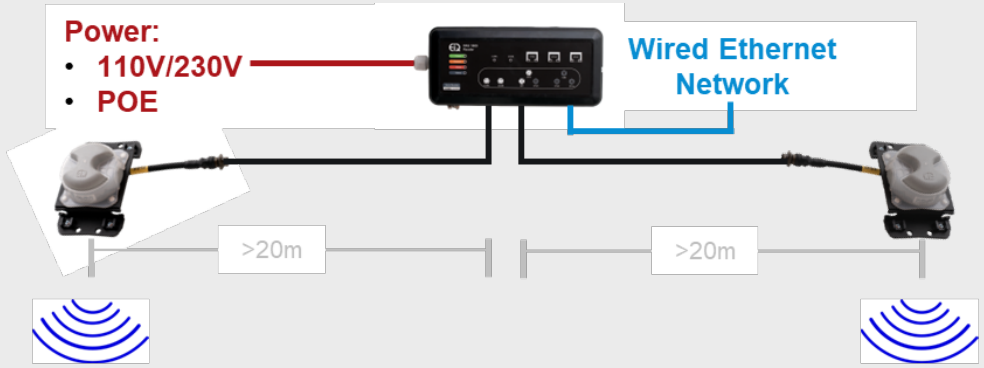
- Electronic personnel records integration with the mine T&A system.
- All equipment fitted with RFID tags.
- All equipment accurately captured in the LRMS system database. (Equipment and tag electronically linked)
- Effective equipment control
- Enforce business rules

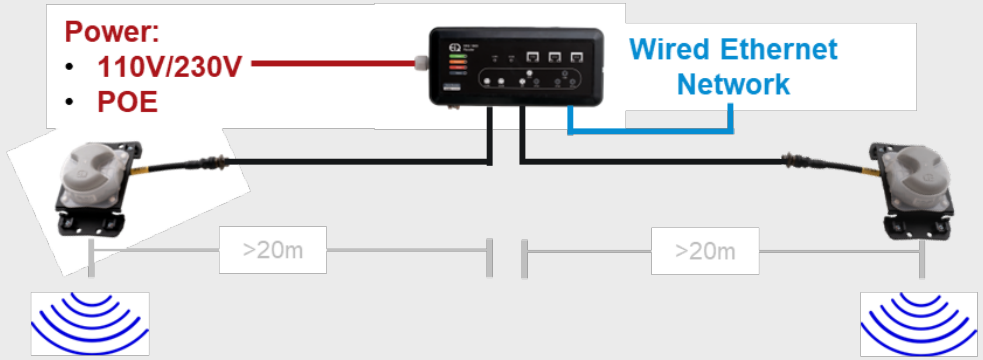
Key enablers

MPL Locator

- The MPL Locator is a crucial component of the Missing Person Locator system. It refers to the mobile devices used by Rescue Teams to navigate and locate missing persons in mines.

MPL Infrastructure





RSSI
868.0to868.6 MHz

Asset

RSSI 868.7to870.2MHz
And / Or
ToF ±4.05Ghz

Loco

RSSI 868.7to870.2MHz
And / Or
ToF ±4.05Ghz

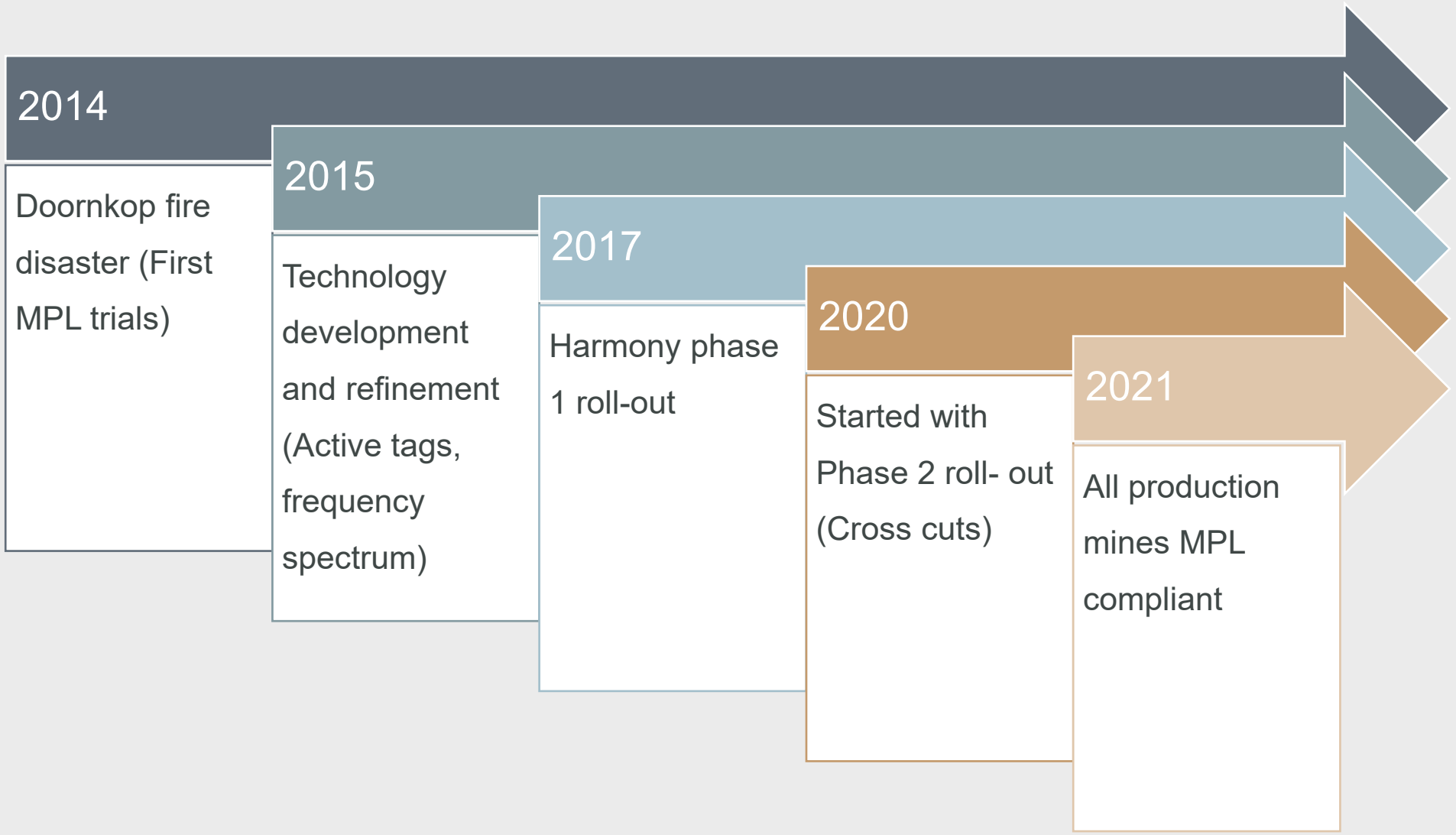
Pedestrian

RSSI 868.7to870.2MHz
And
ToF ±4.05Ghz

RSSI 868.7to870.2MHz
And / Or
ToF ±4.05Ghz

TMM

Timeline


2014
Doornkop fire disaster (First MPL trials)
2015
Technology development and refinement (Active tags, frequency spectrum)
2017
Harmony phase 1 roll-out
2020
Started with Phase 2 roll- out (Cross cuts)
2021
All production mines MPL compliant

Project Learnings

The Challenge	Resolution
Shaft Operational Team not fully informed about the project and the outcomes.	Awareness Sessions
Insufficient Planning	Mine Plan; Position of tracking stations and naming conventions (Present and future expansions)
Infrastructure; Surface	UPS & Dedicated Electrical supply
Underground power	Electrical department to supply a dedicated AC supply specific for MPL Reader installations
Comprehensive mine management system & Mine Integration	Software developers to handle mine integration with the relevant mine personnel
Missing Person and recue team training	Effective training and refresher with practical exercises Quarterly

Project Learnings

The Challenge	Resolution
Equipment Census	Equipment types and models are must be specified
Equipment Allocations	Documentation & records have to be verified
Equipment Numbering	Renumber equipment sequentially
Equipment Maintenance	Burn downs / endurance testing must be performed properly on all equipment.
Equipment padlocks and spare keys	Standardize on a good quality padlock
Equipment Layout and People Flow	Shift Zoning and sufficient tag validation and verification stations.
Personnel competence and skill level	Competent personnel to be employed and constantly trained and assessed.
Personnel buy-in and ownership	All Lamp room personnel to be professionally trained and accessed on the system

Project Learnings

The Challenge	Resolution
LRMS system administration	Post system commissioning, general day to day system administration becomes problematic.
System hardware	Maintenance of system hardware
System integration, setup & commissioning	All relevant and responsible personnel in the IT, Engineering departments to be properly informed of the project and its requirements in its entirety
System standard reporting package	Develop special reporting requirements before implementation
Uncontrolled Entry/Exit	No Uncontrolled Entry/Exit permitted
Poor Visitor Handling	Identity unknown equipment and unknown personnel

Project Learnings

The Challenge	Resolution
Lamp Room Management personnel competency	Certificates and expiry dates; job category
Lamp Room Management personnel sick reporting	Timeous employee status i.e., on training, on leave, sick etc.
Lamp Room Management personnel availability	24/7 availability of competent personnel to manage and maintain the system
Missing Equipment	Proper record keeping
Equipment Hard ware	Consistent compliance to specifications
Equipment Assembly	Equipment must be delivered on shaft assembled ready for installation

Project Learnings

The Challenge	Resolution
MPL reader configuration	MPL readers must have correct naming conventions with testing facilities
Not able to Remotely gain access to PAS Server & Dashboard	Remote Access to PAS Server & Dashboard
Network, power and MPL reader not installed correctly	Survey and Mine Plan depicting installations for equipment
3rd Party Company Installations not done to standard	Quality control plan to check that the hardware in accordance with the signed off mine plan or schematic
Outdated Mine Plan Layout	Update plan
Mine Power and network availability and new installations	Plan new installation in advance

Post Project Ownership and Responsibilities

Project Handover

1) OEM Responsibilities

- Maintain System Integrity (Software)
- Ensure remote mission critical support 24/7
- Monitor Site reader statuses and report to the mine when readers are not tracking.
- Hardware failure replacements and record keeping
- Automated daily/weekly reports sent to be the relevant personnel via email.

2) Mine responsibilities

- Ensure power supply remains stable.
- Ensure Network switches and connections remains stable.
- Investigate any sabotage immediately.
- Service Level Agreement to be in place for an Service provider to provide maintenance and immediate support should a reader not be able to track personnel or equipment for any reason whatsoever.
- Dashboard monitoring in the control room to inspect any readers that goes offline as soon as possible.

Conclusion

- Effective change management and organisational buy-in are critical for the successful implementation and sustainability of the Missing Person Location System.
- The system will significantly enhance emergency response capability and rescue effectiveness.
- Real-time identification of last known positions will reduce response time and improve decision-making during emergencies.
- The initiative will strengthen employee protection and increase the likelihood of survival in missing person incidents.
- Integration with existing mine infrastructure is achievable and operationally beneficial.
- Although the system requires capital investment and ongoing maintenance, the safety benefits materially outweigh the costs.
- The initiative directly supports Harmony’s Zero Harm strategy and proactive risk management approach.
- The implementation of a Missing Person Location System is strongly recommended across underground operations.

#MiningWithPurpose

Thank you