Technology Integration Enhancing Safety & Productivity

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GOLD FIELDS

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In particular, the forward looking statements in this document include among others those relating to the Damang Exploration Target Statement; the Far Southeast Exploration Target Statement; commodity prices; demand for gold and other metals and minerals; interest rate expectations; exploration and production costs; levels of expected production; Gold Fields’ growth pipeline; levels and expected benefits of current and planned capital expenditures; future reserve, resource and other mineralisation levels; and the extent of cost efficiencies and savings to be achieved. Such forward looking statements involve known and unknown risks, uncertainties and other important factors that could cause the actual results, performance or achievements of the company to be materially different from the future results, performance or achievements expressed or implied by such forward looking statements. Such risks, uncertainties and other important factors include among others: economic, business and political conditions in South Africa, Ghana, Australia, Peru and elsewhere; the ability to achieve anticipated efficiencies and other cost savings in connection with past and future acquisitions, exploration and development activities; decreases in the market price of gold and/or copper; hazards associated with underground and surface gold mining; labour disruptions; availability terms and deployment of capital or credit; changes in government regulations, particularly taxation and environmental regulations; and new legislation affecting mining and mineral rights; changes in exchange rates; currency devaluations; the availability and cost of raw and finished materials; the cost of energy and water; inflation and other macro-economic factors, industrial action, temporary stoppages of mines for safety and unplanned maintenance reasons; and the impact of the AIDS and other occupational health risks experienced by Gold Fields’ employees.

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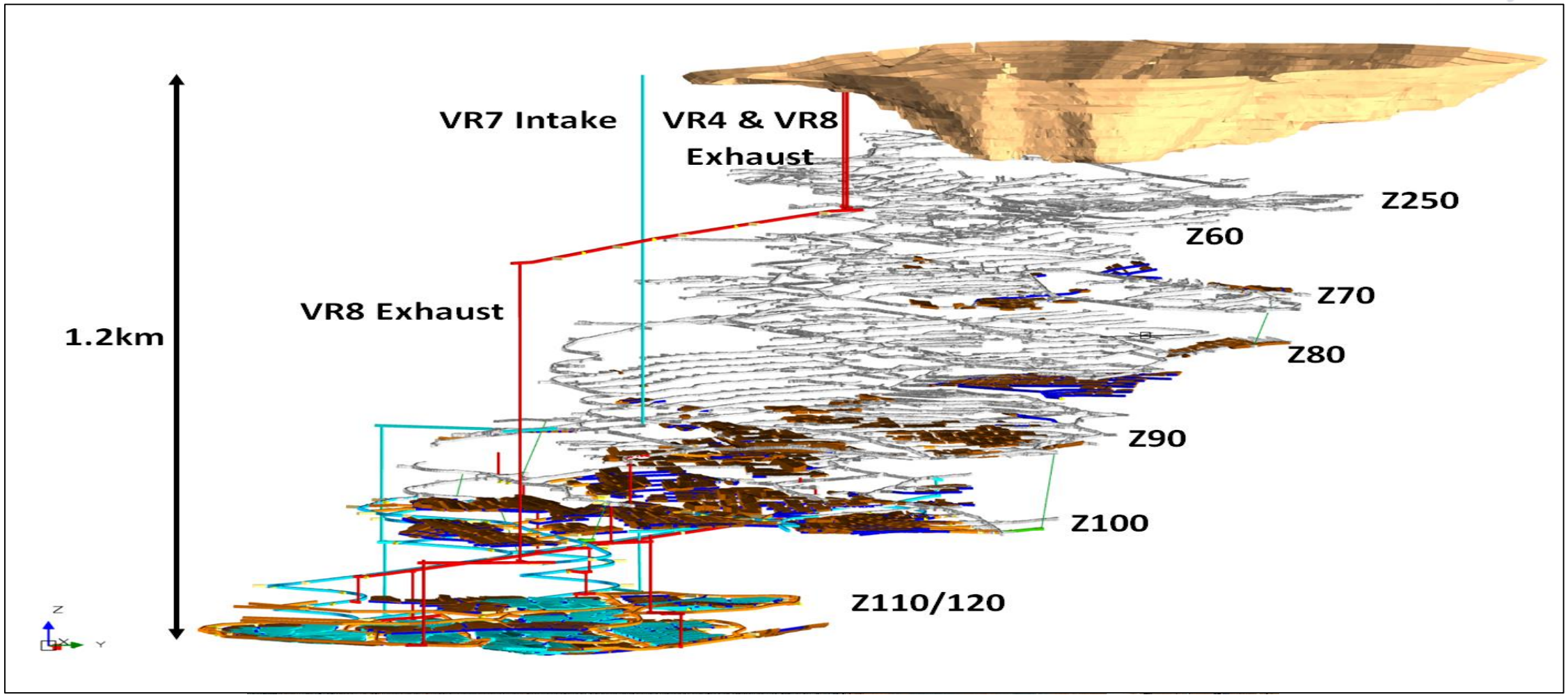
Granny Smith Gold Mine Overview

Large scale underground mine



Mining Challenges Drive Innovation & Technology

WHY do we need to Innovate and Integrate Technology?

Add Value

Society

Economics

Environment

HOW do we add Value?

PEOPLE
Intensity

MINING
Intensity

CAPITAL
Intensity

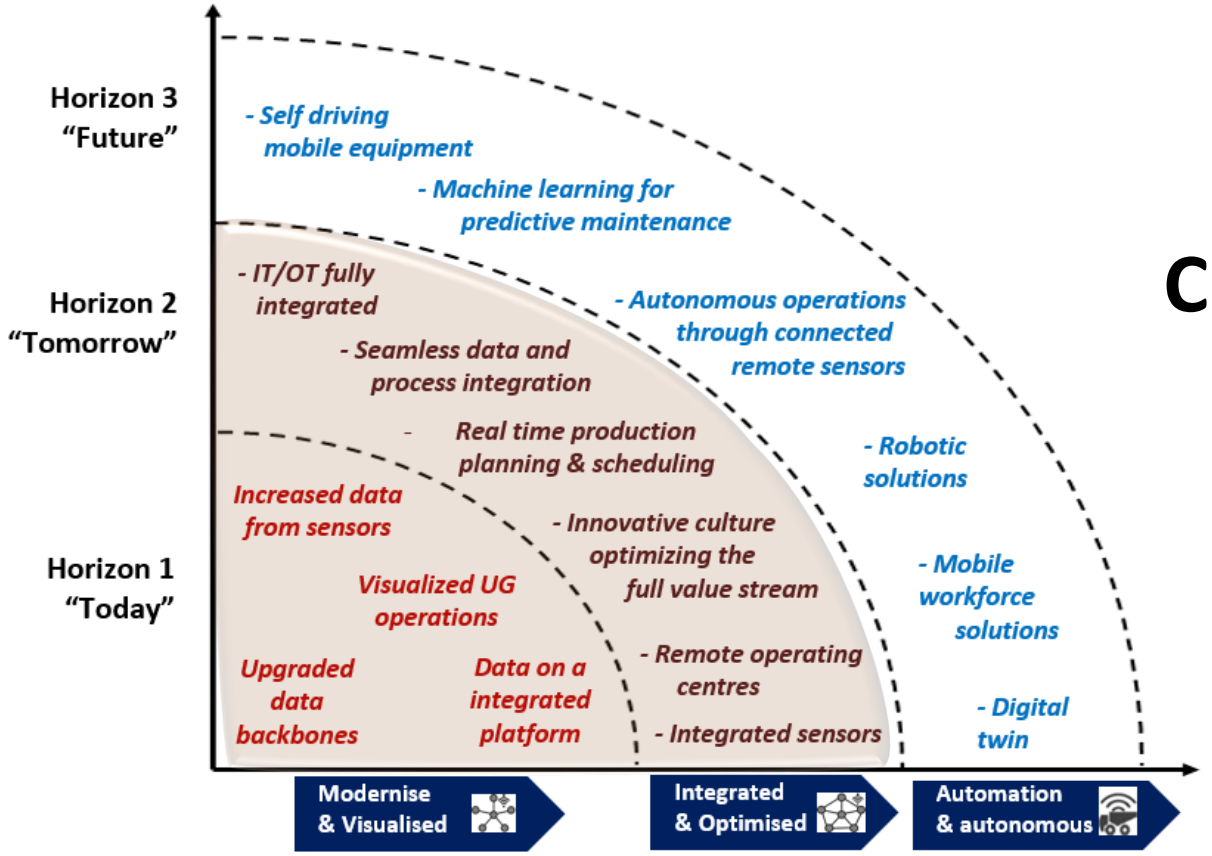
CASH
Profitability

ENERGY
Intensity

Technology Roadmap

WHAT ARE WE DOING TO ADD VALUE?

The three key focus pillars are: Technology, Culture & Lean

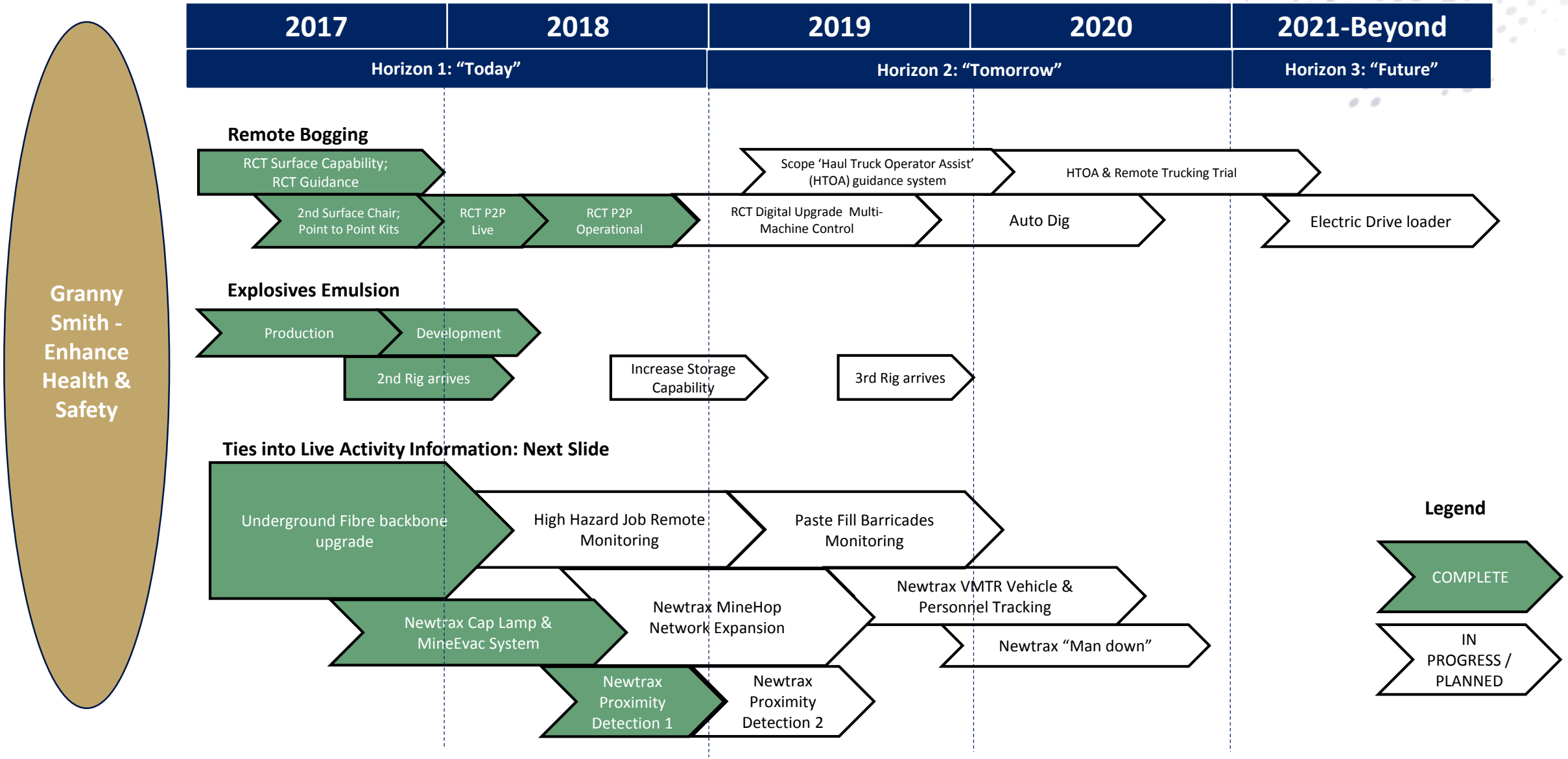


Current focus

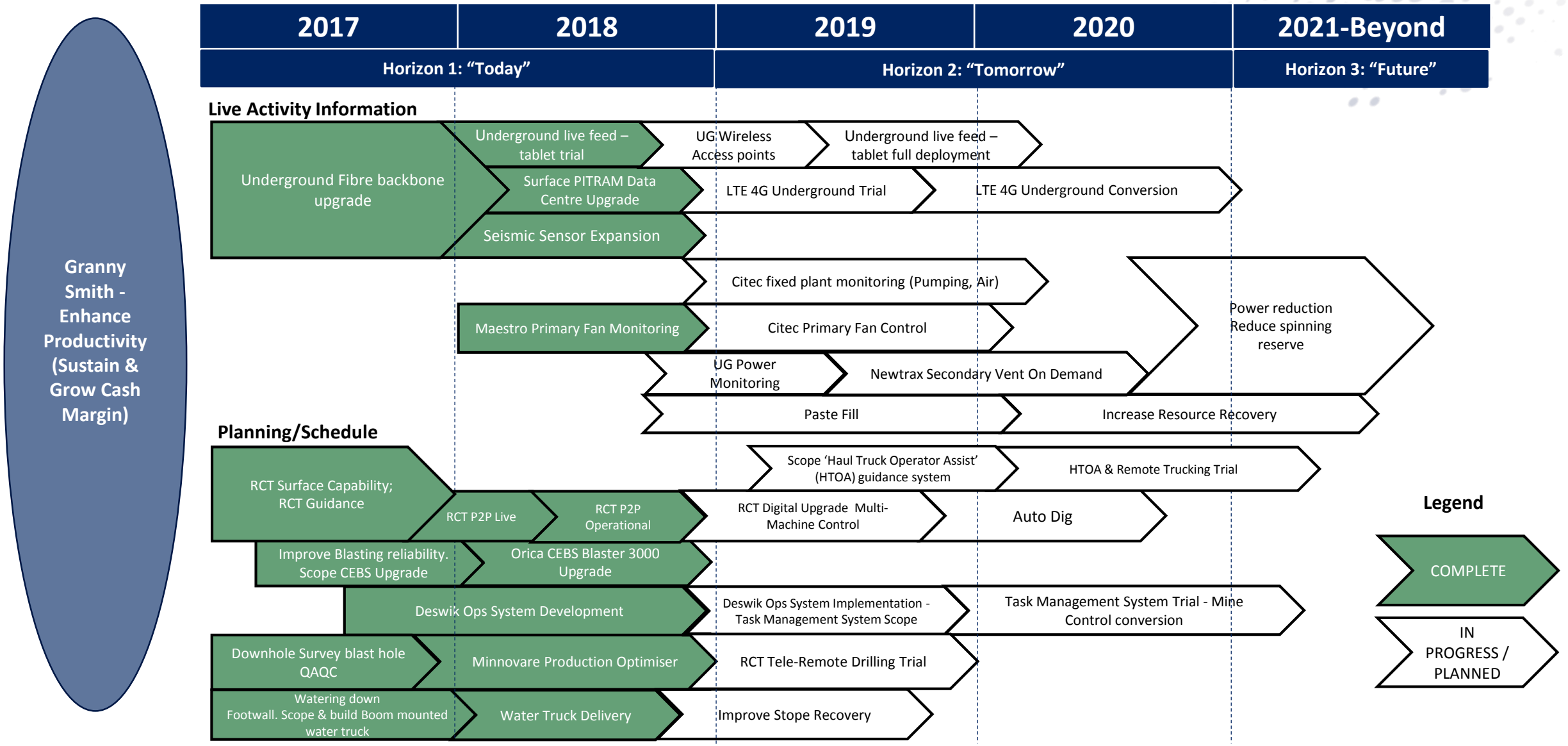
H1 & H2

The goal is consistency – You can't automate something that varies a lot.
Automation is a destination, don't skip the journey

Technology Integration Framework



Technology Integration Framework



Digital Communication Underground (Data Highway)

Granny Smith Case Studies

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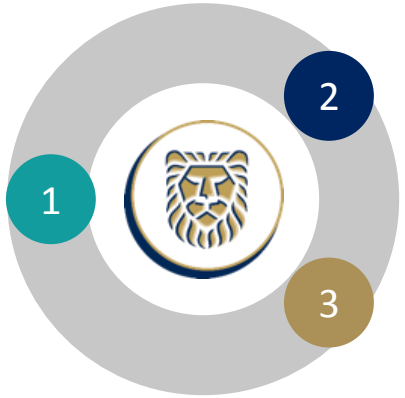
Digital Communication Underground

Enhance Safety & Productivity, Sustain & Grow Cash Margin

Digital Backbone

1. Fibre Network Upgrade
2. Breakout Port's Upgrade



Digital Network

1. Digital remote loader capability
2. Wireless Access Points in operating levels

LTE Network

1. LTE and VHF voice communications

Digital Communication Underground

Current Digital Backbone Underground

WHY?

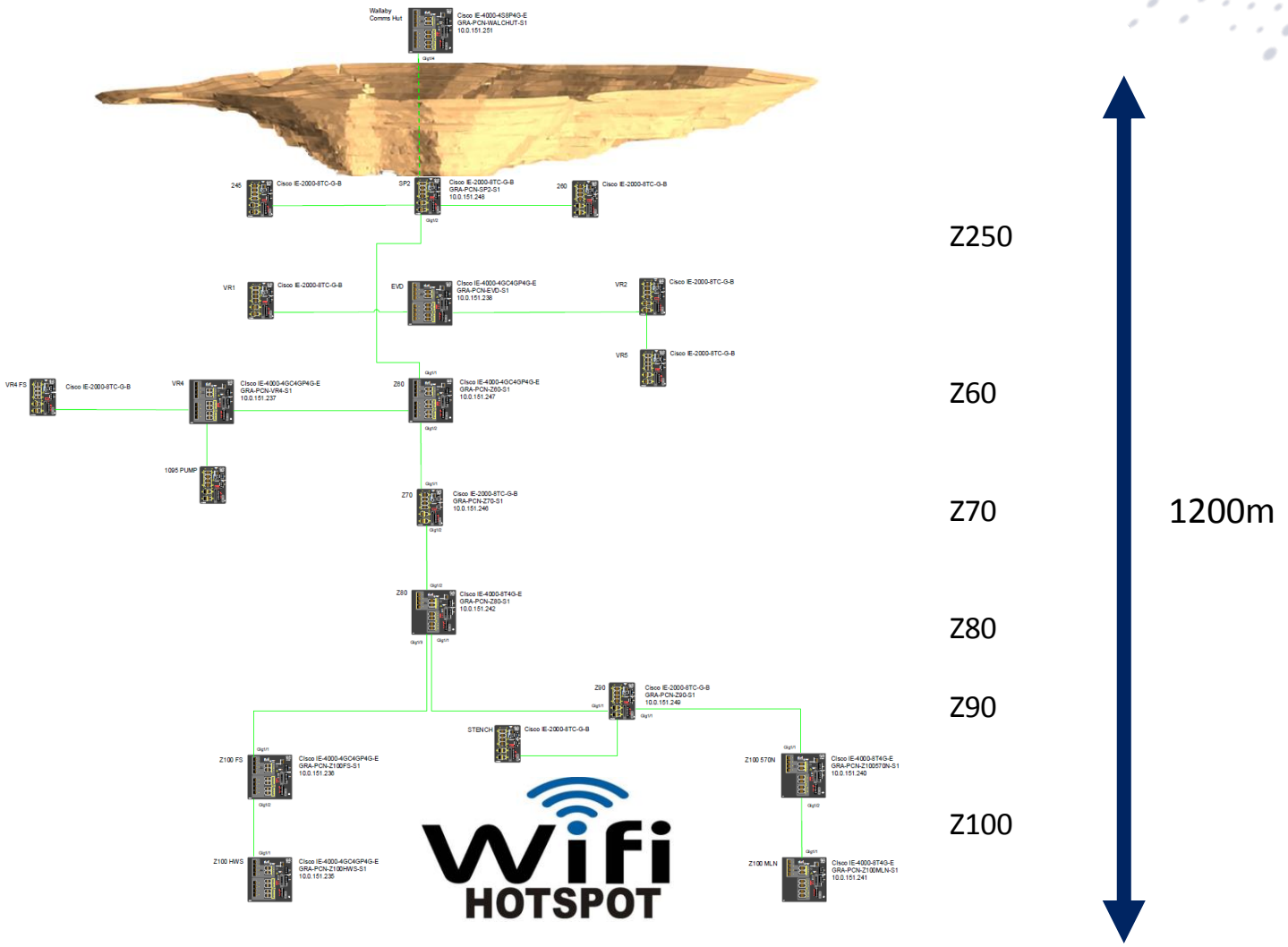
Lift the lid from underground mining enhancing Safety & Productivity

HOW?

Integration of technology communications from UG to Surface

WHAT?

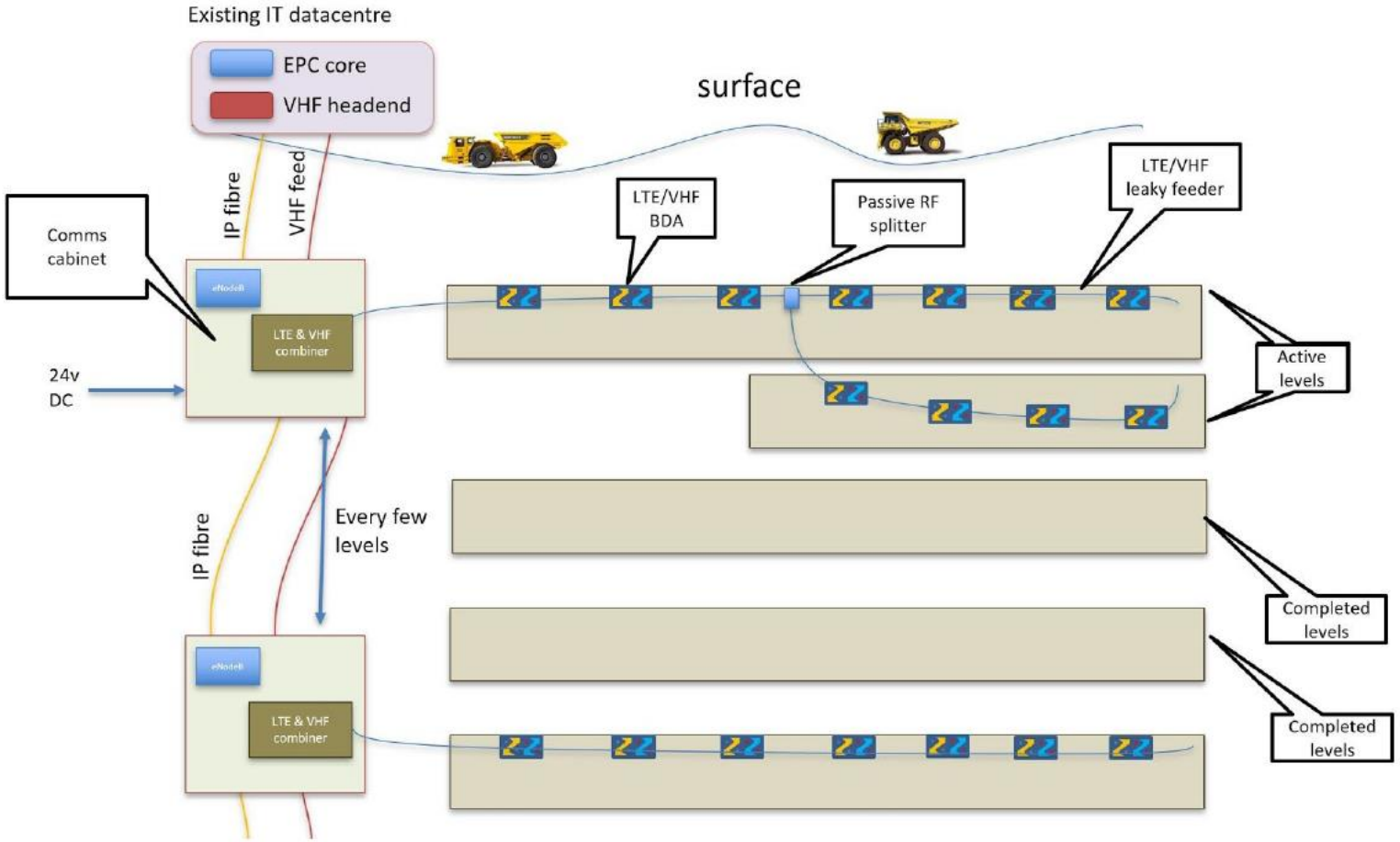
24 Core Fibre Backbone & Fibre Switches



Digital Communication Underground

LTE Network Underground

Proof of Concept planned for late 2018



Seamlessly integrate people & vehicles from above to below ground without losing connection

Enhancing Health & Safety through the use of Technology

Granny Smith Case Studies

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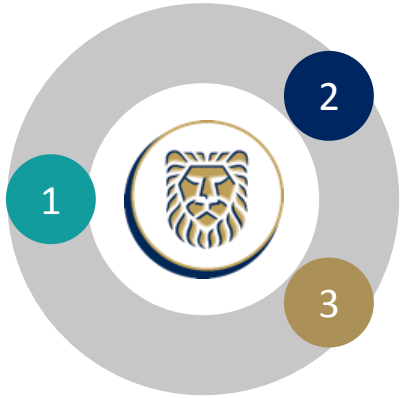
Phase 1 of the Newtrax system at Granny Smith is the Safety System

Lone Worker Safety

1. Emergency Assistance Request
2. “Man Down” Function



Evacuation & Rescue

1. Mine-Wide Evacuation Notification
2. Tracking of Personnel
3. Post-Incident Data

Proximity Warning System

1. Personnel – Vehicle
2. Vehicle – Vehicle

NEWTRAX

NEWTRAX

Lone Worker Safety – Newtrax Enabled Cap Lamps

Deployed at Granny Smith in 2018

MAIN FEATURES

- Electronic Display
- Emergency Warning
- ID Pairing
- Electronic Tag Board

  Know who is in the mine and their location via their Cap Lamp.

Evacuation & Rescue – Mine Evacuation (MineEvac) Over Leaky Feeder

Deployed at Granny Smith in 2018

Granny Smith has over 80km of tunnels UG & more than 100 people UG at any one time

NEWTRAX

Proximity Warning System

Deployed in 2018 – Main Heavy Equipment - Phase 1

Planned for 2019 - Remainder Heavy Equipment & Light Vehicles - Phase 2

MAIN FEATURES

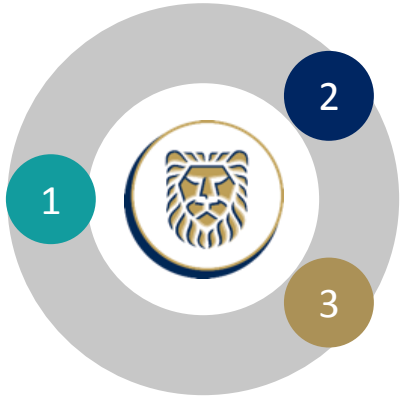
- Proximity Awareness
- Emergency Stop
- Fixed Hazards

Remote Control Technology Pty Ltd

Safety

Surface Operating Room (SOR)

1. Removing Personnel from the face
2. Increased Safety & Efficiency



Guidance

1. Dependent Guidance
2. Independent Guidance (Point to Point)

Multi-Machine Control

1. Digital Network
2. Real time information (G-Dash)

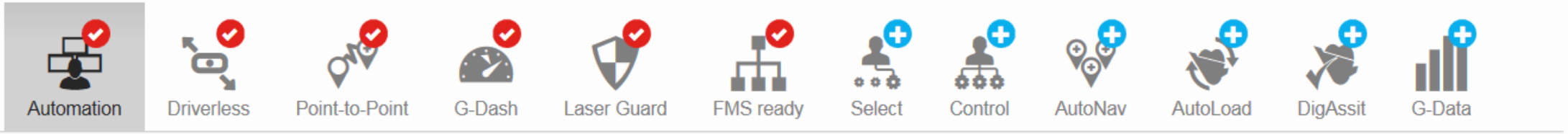
Surface Tele-remote Bogging

Independent Guidance (Point to Point) Tele-remote Bogging (Semi-autonomous loader)

Combined with Multi-Machine Control through a digital network

MAIN FEATURES

- Surface Operating Room (SOR)
- Independent Guidance (Point to Point)
- Multi-Machine Control
- G-Dash – Real Time Information



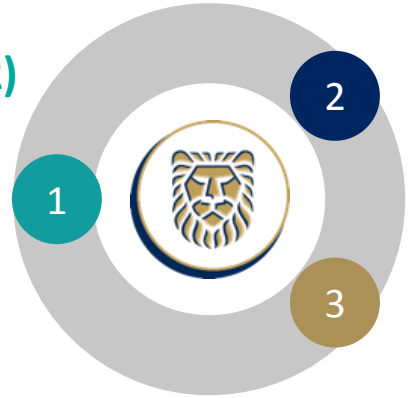
Enhancing Productivity through the use of Technology

Granny Smith Case Studies

Phase 2 – Enhance Productivity, Sustain & Grow Cash Margin

Vehicle Monitoring Tracking Reports (VMTR)

1. Live Vehicle Tracking
2. Location Reporting
3. Cycle Data



Mobile Equipment Telemetry (MET) System (ISAAC)

1. Live OEM Agnostic & Data Capture

Ventilation On Demand (VOD) & Atmospheric Monitoring System (AMS)

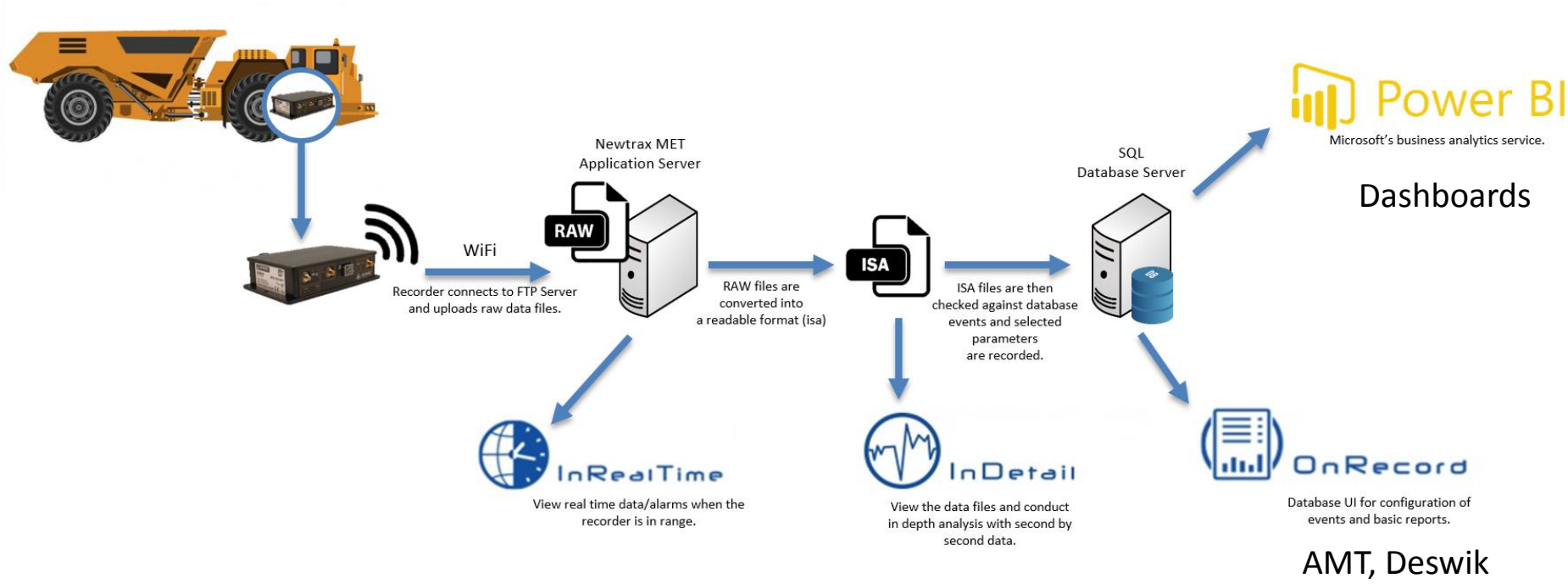
1. Automatic Secondary Fan Control
2. Real time air quality monitoring

NEWTRAX

Vehicle Monitoring Tracking Reports (VMTR) & Mobile Equipment Telemetry (MET) System (ISAAC)

Trial Deployed in 2018 – Currently being undertaken

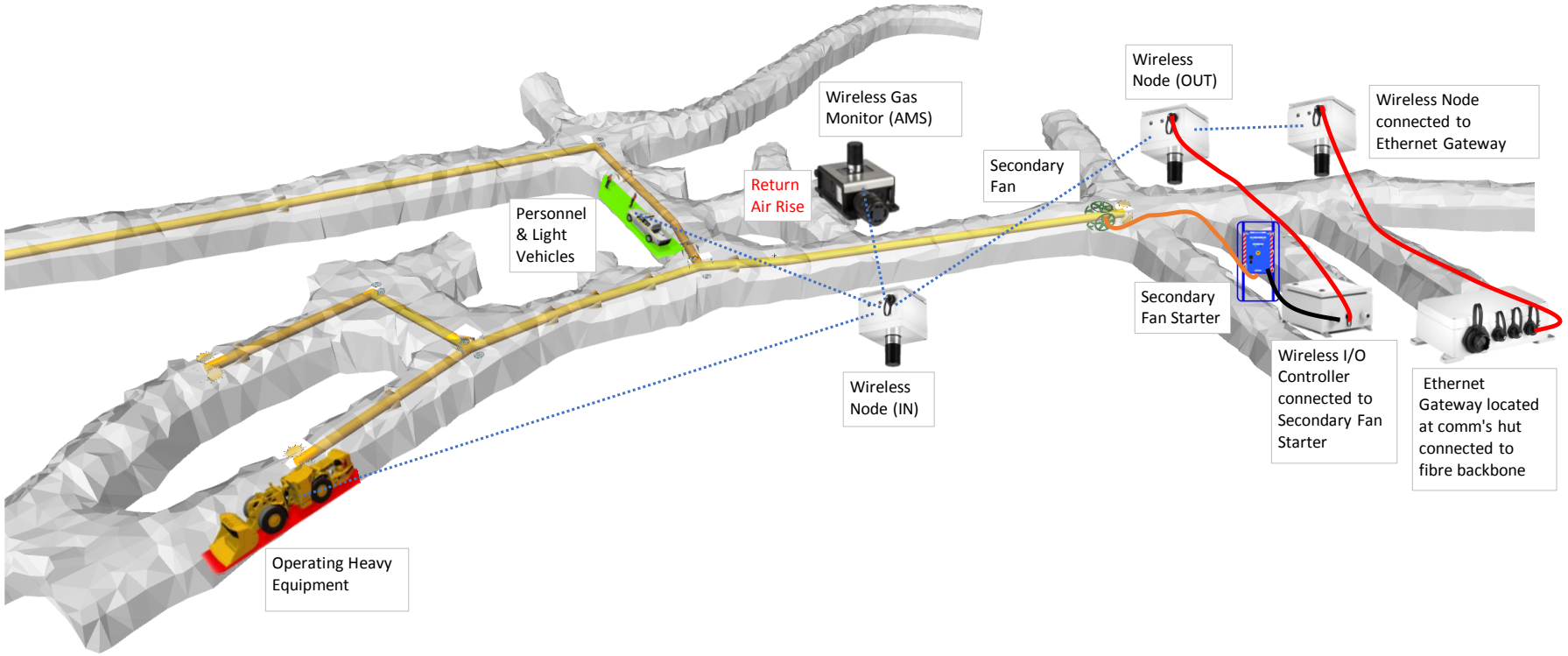
Planned for 2019 – Remainder Main Heavy Equipment



Primary Goal – Maintenance Management Standard for UG heavy machinery using ISAAC data

Reducing maintenance costs through real-time vehicle health monitoring & tracking

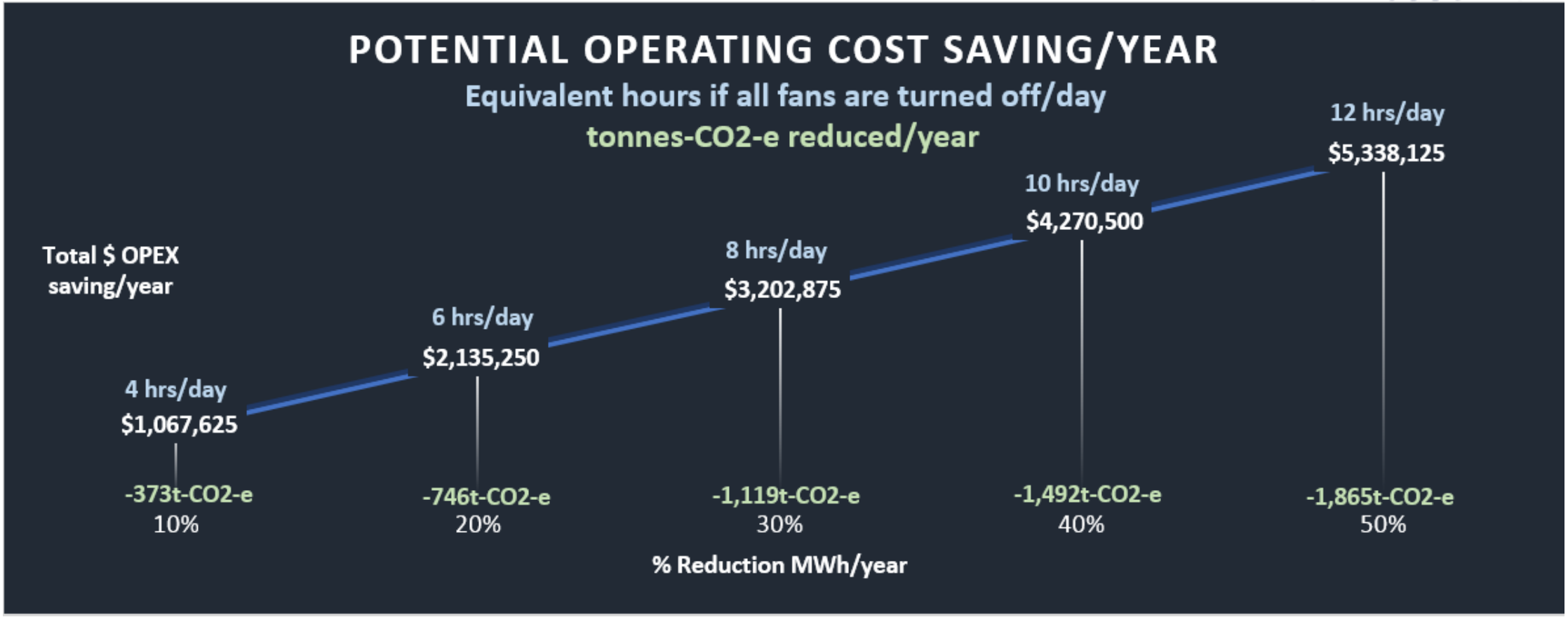
Ventilation On Demand (VOD) &
Atmospheric Monitoring System (AMS)
Planned for 2019



Ventilation can account for 35-50% of an underground mine's energy consumption.

Granny Smith spends in excess of $10M/year on power to run secondary ventilation fans.

Ventilation On Demand (VOD) Cost Saving Example



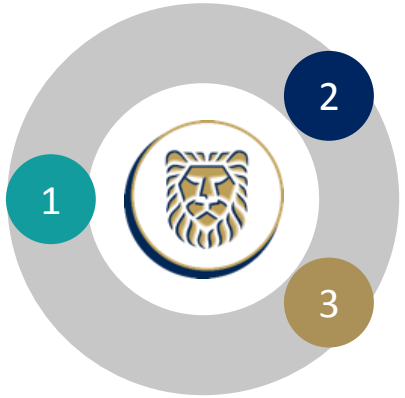
Potential savings could translate up to more than $3.2M/year through VOD.

PRODUCTION™ OPTIMISER

Enhance Productivity, Sustain & Grow Cash Margin

Downhole Survey

1. QAQC of production blast hole accuracy



Production Optimiser

1. The Opti-Box
2. Smart Collar
3. Online Reporting Engine

Reduce Deviation, Reduce Dilution, Increase Recovery

1. Enhance Productivity, Sustain & Grow Cash Margin

In 2 years Gold Fields Australia spent ~$2.5M on in-hole survey

PRODUCTION™ OPTIMISER

Reduce blast hole deviation,

Reduce over-break/under-break and secondary drill and blasts

MAIN FEATURES

OPTI™ Box

SMART™ Collar

Minnovare™ Core

DIGI Plan™

DIGI PLOD™

These systems combined create the Production Optimiser™

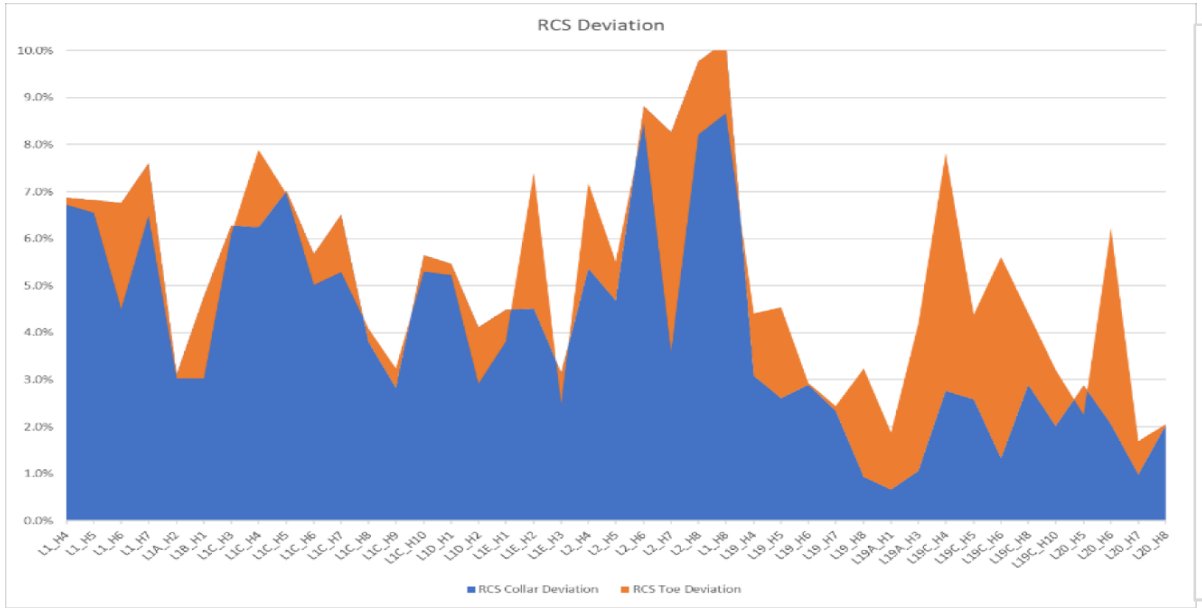
PRODUCTION™ OPTIMISER

Performance Comparison

Proven to deliver more reliable set up and improved drilling effectiveness

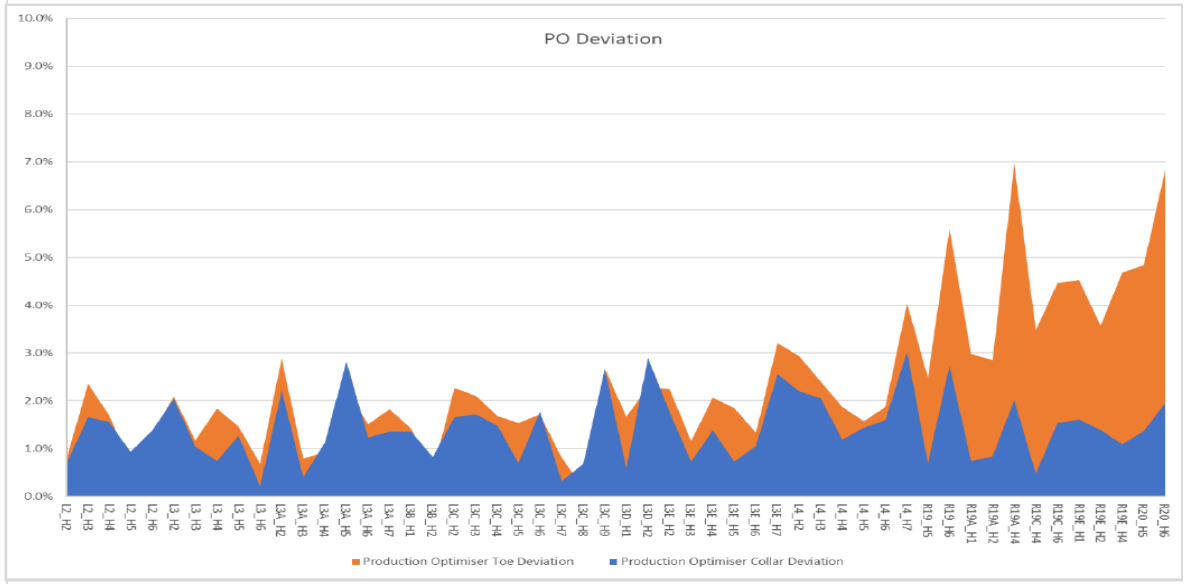
QAQC Data Captured from OEM RCS

- Average collar deviation **4.4%**
- Average toe deviation **4.9%**



QAQC Data Captured from Production Optimiser

- Average collar deviation **1.5%**
- Average toe deviation **2.5%**

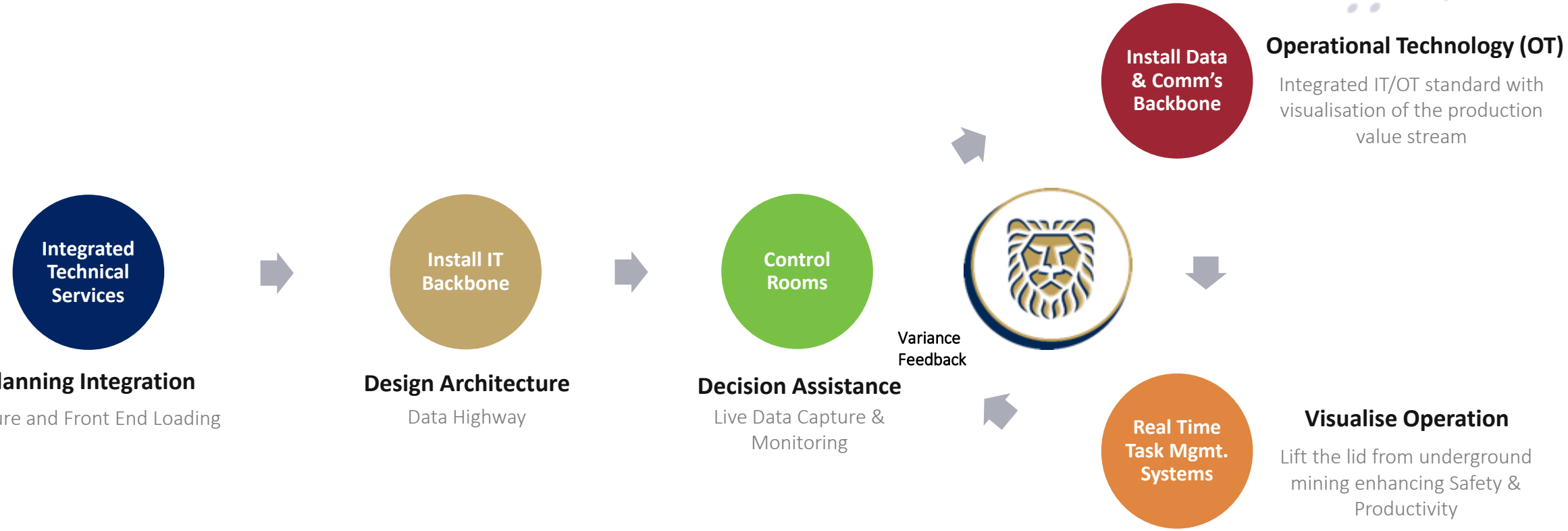


Overall Result - 68% decrease in collar deviation and **51%** decrease in toe deviation

Conclusion

At the end of the day, goals are simple: Enhance Safety and Productivity

An Innovation and Technology Strategy is Key



Key Learning: It seems we are often in the R&D space, and this takes an enormous amount of resources and time.

Research what's promised by suppliers prior to implementation.

Thank you

QUESTIONS AND ANSWERS

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