

RioTinto

# Vehicle Fatality Elimination

Strengthening the Foundations

February 2023



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Rio Tinto acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community.

We pay our respect to their Elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today and into the future.

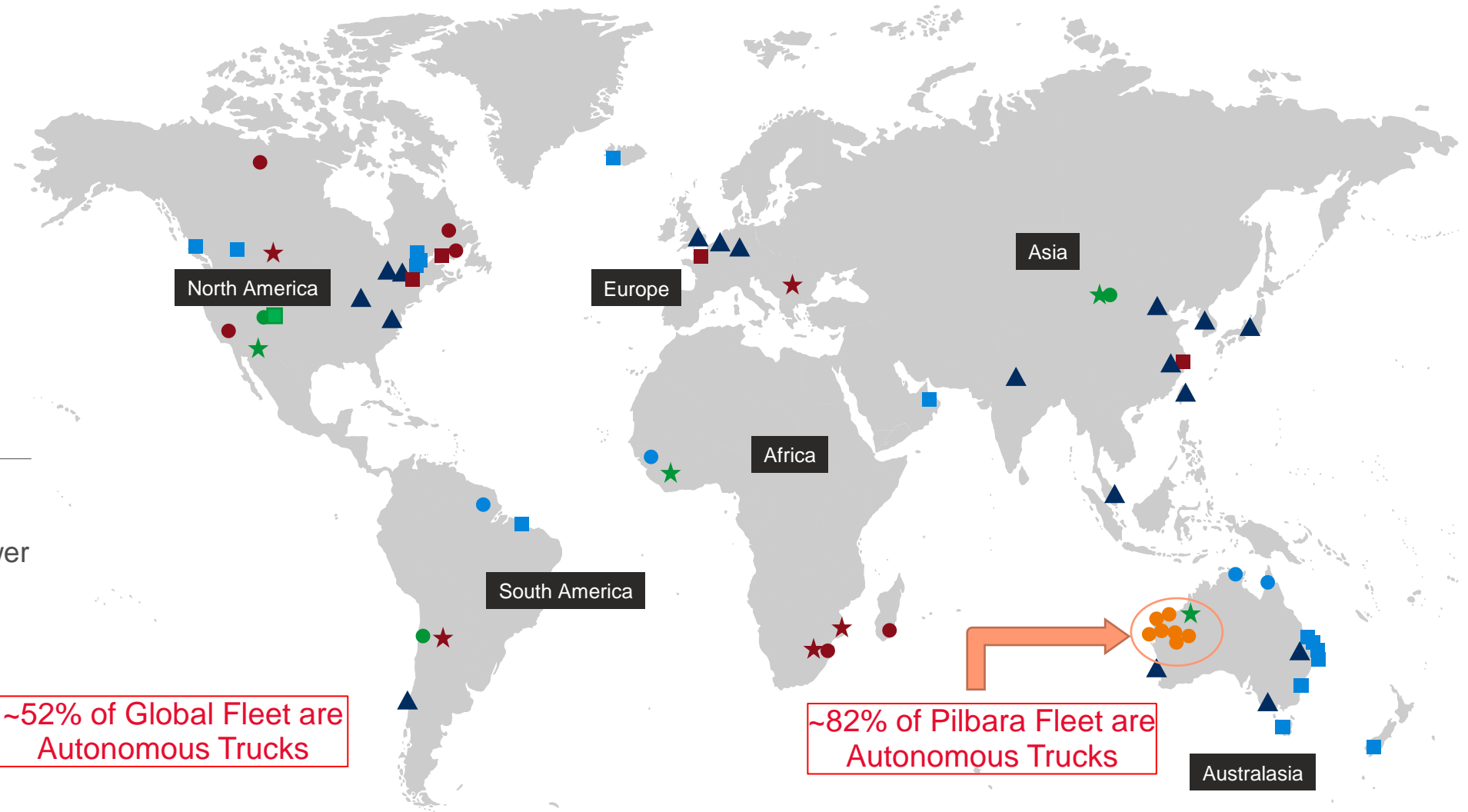


# Where we operate

Aluminium  
Copper  
Iron Ore  
Minerals

## Key

- Mines
- Smelters, refineries, power facilities and processing plants remote from mine
- ★ Projects
- ▲ Offices



~52% of Global Fleet are Autonomous Trucks

~82% of Pilbara Fleet are Autonomous Trucks

# Safety

## Our number one priority

- Goal is zero fatalities\*
- Focus is identifying, understanding, managing and eliminating safety and work-related health risks
- Work-life balance
- Mental health awareness

\*Four consecutive years of no fatalities (2019-2022).



# Vehicle Interaction Control Effectiveness (VICE) and Vehicle Interaction Technology Solutions (VITS)

- Rio Tinto follows the EMESRT framework of layered controls to eliminate vehicle interactions.
- Recognizes the importance of Levels 1-6 to serve as the foundations.
- VICE assessments serve to:
  - Verify the health of Level 1-6 controls.
  - Identify where “drift” is occurring weakening the effectiveness of the Level 1-6 controls.
  - Identify where VITS could further reduce the residual risks.
  - Identify if further non-technology solutions can be applied to reduce the residual risk.
- The VICE assessment consists of a rigorous review of the 102 Business Inputs to prevent the 92 Credible Failure Modes from occurring for the 13 required operating states by considering:
  - What is specified?
  - How is it implemented?
  - How is it monitored and verified?

## Vehicle Interaction Control Effectiveness (VICE):

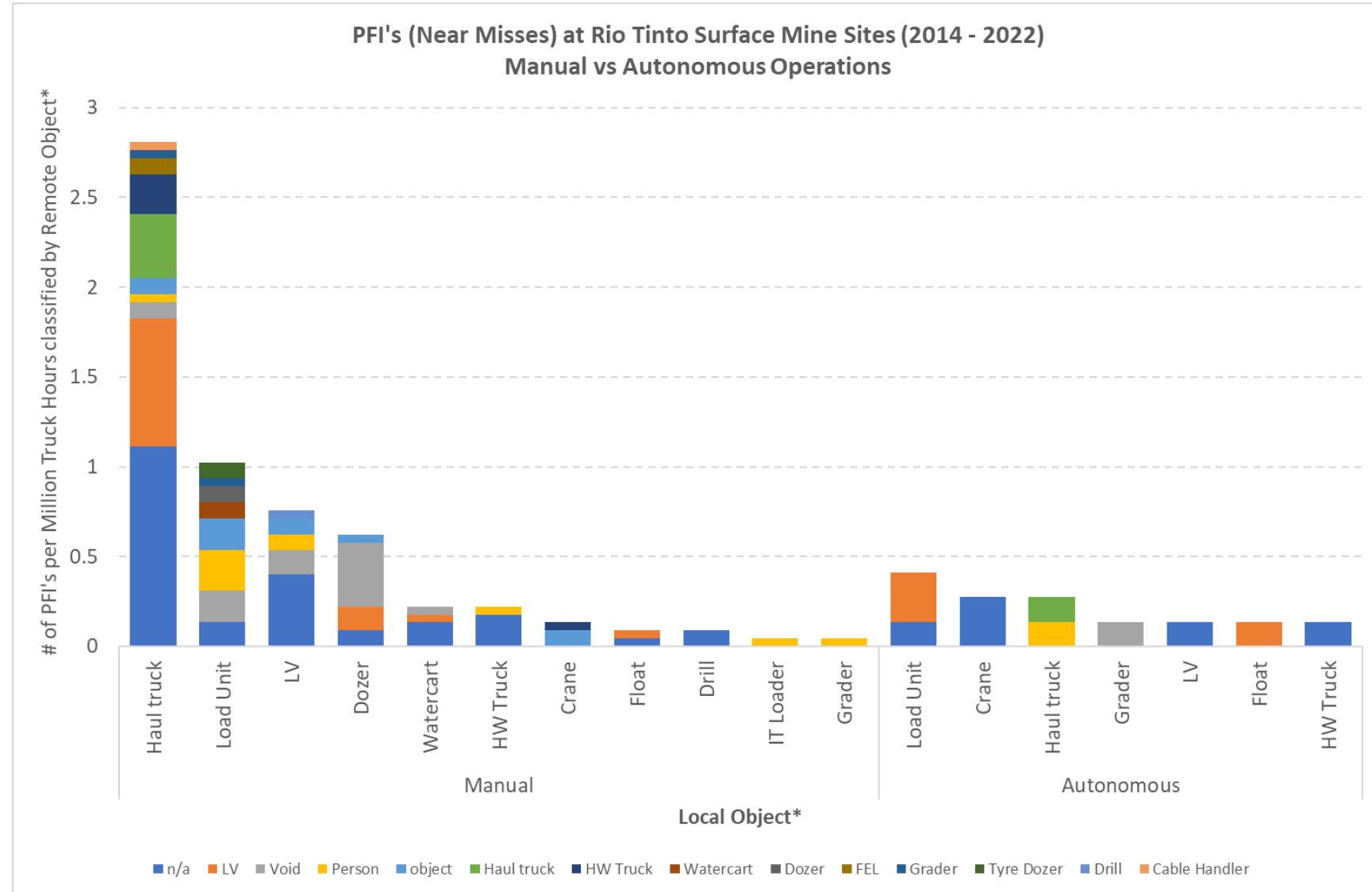


## Vehicle Interaction Technology Solutions (VITS)

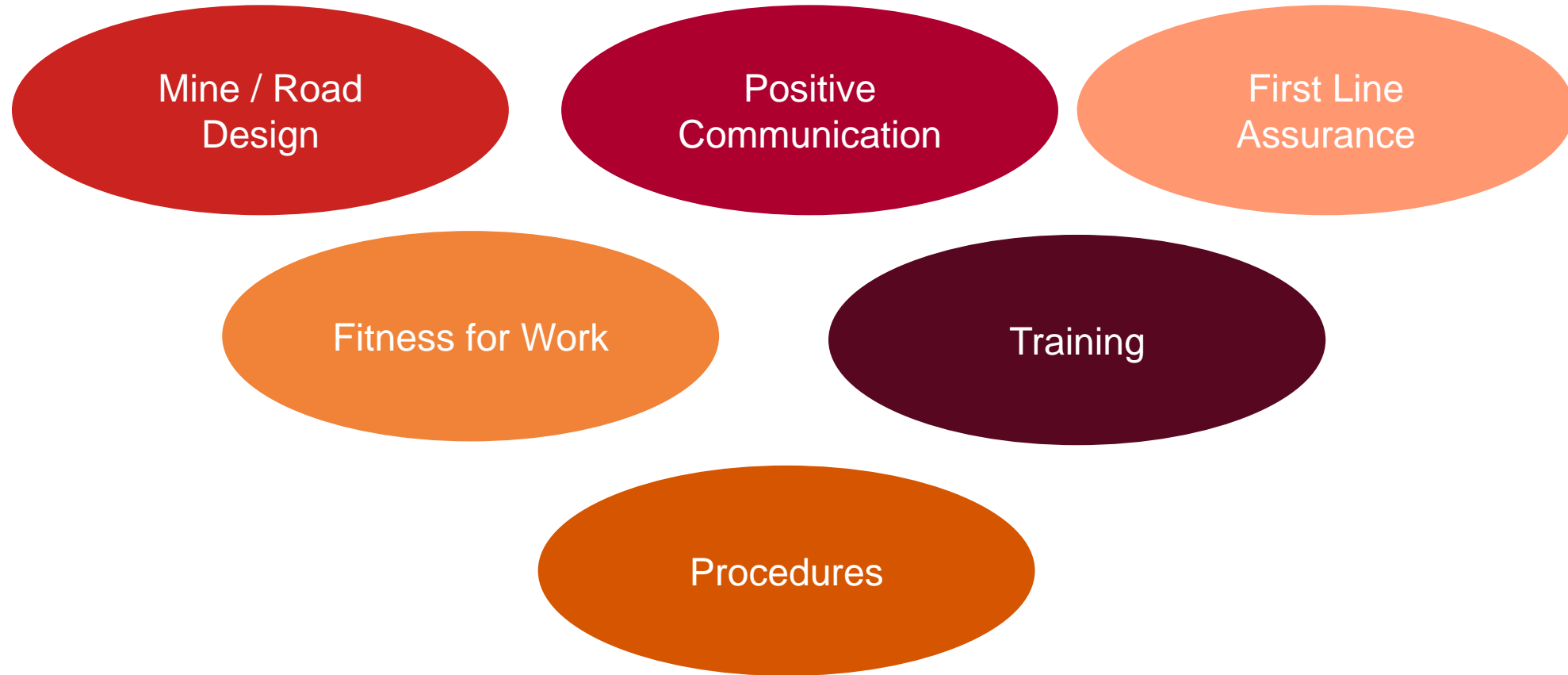


# Taxonomy

- In 2022, Rio Tinto celebrated four years of fatality free operation.
- Automation has changed the frequency and taxonomy of PFIs.
- VITS to be an intermediate step on the road to autonomy.
- Level 1-6 controls continue to be a vital part of the layered protection.
- **How can these be further strengthened?**



# Themes from VICE assessments





# Road Design Controls – Downhill Haulage

Rio Tinto's standard approach to controlling and assuring risks associated with hauling activities down a gradient.

**Group Standard - C3**  
**Group Procedure**  
Management of Downhill  
Haulage



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## It covers:

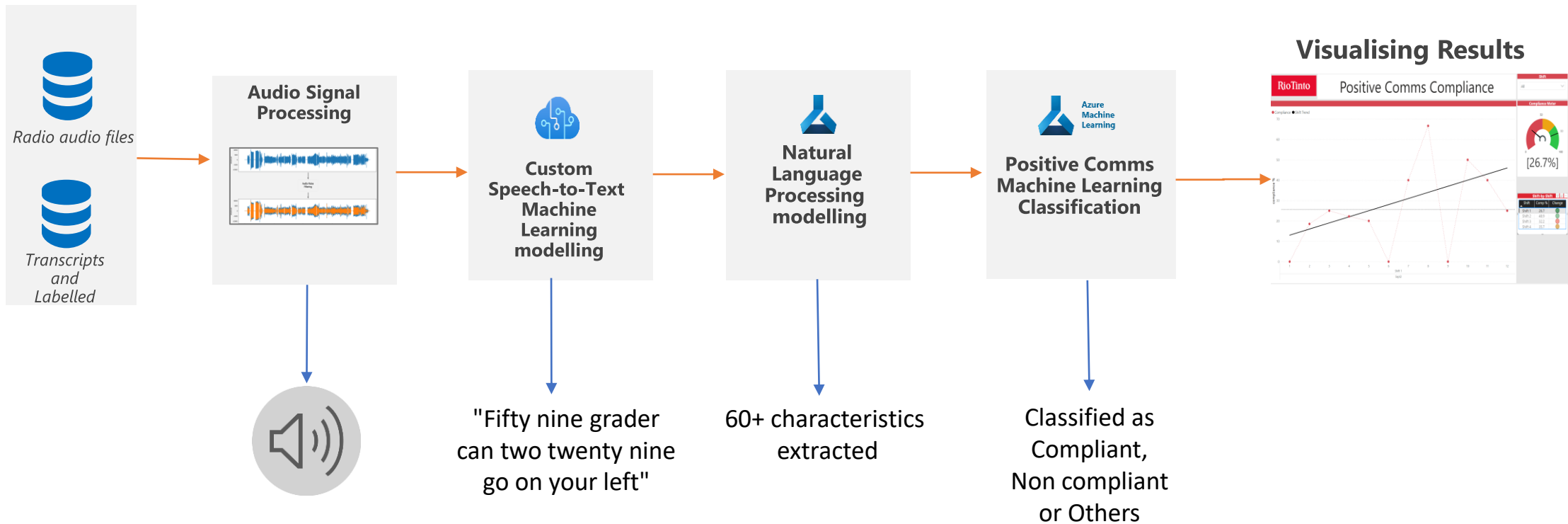
- Accountability
  - Ramp Risk Assessment
  - Ramp Classification
  - Ramp/Crest Speed Control
  - Overloaded Trucks
  - Traffic Management Plan
  - Operations Requirements
  - Mine Design Requirements
-

# Positive Communications

IOC - Proof of Concept



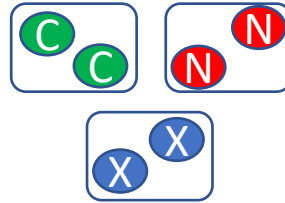
# How it works:



# Outcomes and Findings



Significant boost in transcription accuracy compared with standard services: from **50%**->**75%+** accurate, even higher for important words.



Correctly classify **86%** of the communications.




Inter and intra shift compliance trend analysis dashboard.



Exploration Dashboard for supervisors



# Path to Value

North Star : Gamification & Near Real Time feedback 

The vision is to increase adherence to PC protocols by automated monitoring and providing targeted timely feedback to operators.

Value

**Identification and scoring of Positive Communications conversations**

Integration with Digital Radio  
EvenTide Radio

**Identification of instances where two vehicles pass within 50m and no radio communications occur.**

Integration with Collision Avoidance

**Scale across Rio Tinto Mine sites**

- Identify PosComms compliance trends
- Create feature set for further analysis and insights

- Operationalise Minimum Viable Product Solution (RT Supported)

- Increase Automation
- Increase accuracy of PC compliance assesment
- Coverage of more mine sites
- Higher level insight from radio interactions

Identify individuals or teams that require coaching (if allowed by GDPR and other applicable policy)  
Identify key factors driving Non-Compliance  
Gamification  
Timely Automated Feedback

PoC

Operationalise MVP based on PoC Solution

Improve and Extend Approaches

Time

RioTinto