COLLISION AVOIDANCE SAFETY SYSTEM (ACASS):

The Optimum Safety Solution for heavy vehicles operating in harsh and extreme environmental conditions

From 1970 to 2008 there were 39 fatalities involving vehicles in Western Australian surface mining operations, -and numerous near misses and injuries. In addition to loss of life and serious injury, significant costs are incurred through lost production, vehicle repair, and establishing the cause of the incident. In the USA, there is an average of 20 serious accidents and three fatalities each year in surface mining involving haulage equipment and smaller vehicles and workers.

One common cause of these accidents is failure of the operator to detect a vehicle or person in close proximity.

Figure 1: Heavy vehicle driver could not see truck in front/along side

Similar accidents occur as a result of adverse weather conditions, speed, micro-sleeps and obstructions.

Figure 2: Challenging environmental conditions

Safety is currently managed in mining operations through administrative controls. Despite these rules, accidents and near misses are at a record high. Some technologies use cameras and lasers, however none of these avoidance technologies actually determine the threat for the operator and they false alarm.

Fortunately a new proximity system created at Sydney University is now available:

The Acumine Collision Avoidance Safety System (ACASS)

Trials of ACASS establish improved safety in haul truck operations. This is due to the fact that it provides a 360° view surrounding the truck, and uniquely provides an assessment of any risk in the proximity of the truck.

In addition, an effective proximity system requires an audible alarm which prompts the operator to check the display, and determine what corrective action is required.

ACASS automatically determines the risk and tells the operator what needs to do be done, as shown below:

Figure 3 – Example of ACASS Operator Interface

The above image demonstrates how the operator's view can be obscured by dust, but they are still provided with complete awareness of the situation through the ACASS: i.e.: the truck behind the berm (red), both vehicles approaching the intersection, and the icon on the right shows the operator is too close to the truck in front and that he is over speed limit.

To effectively deliver safety for haulage, a proximity system must:

- Never fail and must work throughout the whole mine all the time, i.e. must have in-built redundancy;
- 3600 view for the operator
- Avoid false alarms;
- Identify a risk, and alarm the operator in time for them to take avoidance action;
- Manage operator fatigue and increase operator awareness;
- Record performance and track for analysis of incidents identify risk hazards, speeding and training requirements.
- Map roads and upgrade new safety rules and new contexts.

The ACASS technology is the only known proximity system in the world today that meets each and every one of the aforementioned criteria. The ACASS technology is unique and protected by international patents.

The need to improve safety is ultimately driven by the necessity to reduce deaths and injuries that keep recurring at mining operations world wide.

Clearly, the ACASS system addresses this need, however it surpasses its competitors with the addition of the following features:

1. **Decentralised Operation of the System**
This means that the system can be deployed without having to install backbone equipment. The reliability of the system is also greatly enhanced due to elimination of delays and dropouts from vehicle-to-base-station/ satellite. Total detection and full functionality throughout the entire mine is also provided.

2. **Enhanced reliability of the system**
This is assured by two independent radio networks operating at different frequencies and the two networks ensure vision through blind spots, obstructions and adverse conditions such as fog and dust

3. **Audible Alerts**
Enabling operators to easily identify when they need to look at the display and graphical icons to show relevant information quickly.

4. **Road Map and Context Areas**
Having these features on the display assist operators during darkness and periods of low visibility.

5. **Logging facilities**
- Such as truck trajectory, velocity, and positioning of all the trucks, that can be played back at any time.
- Risks and speeding can be identified, reasons for incidents and over wear on tyres can be assessed.
- Congestion and back up of vehicles waiting in queues can be avoided by better planning.
- All information can then be viewed using the "Safety Central" software developed by AcuMine as illustrated in Figure 4.

6. **Ease of installation and maintenance**
At a relatively inexpensive cost.

7. **Fleet Management capabilities**
Appealing to small to medium mines.

ACASS has been trialled at Bracalba Quarry in Brisbane and is operational at Brockman (W.A.), Andina (Chile) and Grasberg.

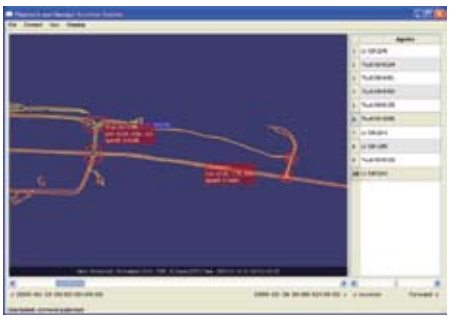

Figure 4 - Safety Central Playback Software