



# PROXIMITY DETECTION SOLUTION DETAILS AT HZL

***BY ENIC ENGINEERING SOLUTIONS &  
SHEETAL WIRELESS TECHNOLOGIES***

## [Abstract](#)

This document outlines the basic technical details of proposal for proximity detection from our OEM M/s. Jannatec, The solution is truly industrial grade & designed considering safety requirements & overall operation needs in underground mine areas

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# 1. Purpose

The purpose of this document is to outline in detail Jannatec’s proposal to meet current Proximity Detection needs at Hindustan Zinc. The Jannatec J.A.W.S application is a simple yet extremely effective proximity detection solution that works on a peer to peer basis and requires no additional infrastructure to be installed. We leverage RF signals in the 865-867 MHz frequency range to allow for proximity detection; we did receive confirmation that we can adapt JAWS to work in India’s unlicensed band. The system is based on detection of vehicles and/or personnel in designated detection zones. Each zone alerts the operators with escalating notifications as the asset crosses from the warning zone to the critical zone. The vehicle JAWS tag is housed inside the Jannatec SmartView tablet, while the personnel JAWS tag is contained inside the Jannatec SmartHelmet.

Parts proposed in this document include the following:

- Jannatec SmartHelmet equipped with JAWS
- Jannatec SmartView tablets

# 2. Concept

As mining continues to adopt new technologies and the reliance of IoT devices such as sensory, asset tracking, telemetry, communications, and data acquisitions, Jannatec has been focusing in the last 3 years on developing an interoperable **Mobile Application Platform**. The “MAP” architecture combines multiple capabilities that will resolve your technology challenges from the industry as a whole. The images below depict the conceptual application model and direction of Jannatec’s continuous vision.

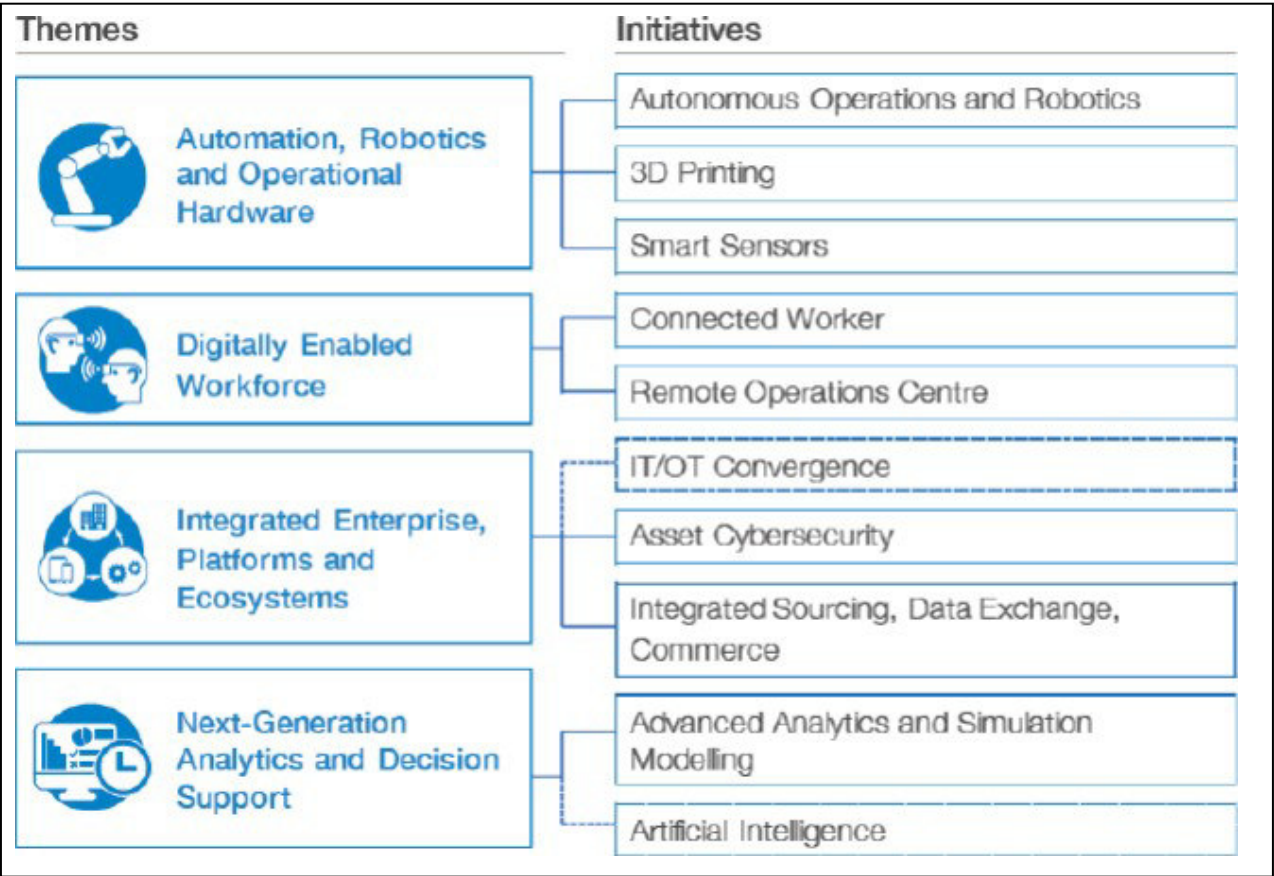


Figure 1-World Economic Forum Digital Transformation Initiative (January, 2017)



Figure 2 - Jannatec MAP

### 3. Proposed Proximity Detection System

#### Smart Helmet (MAP-H)

With built in high visibility lighting and smarts for proximity detection, our platform, placed strategically in the design of a helmet, is tailored to each individual customer in industrious environments providing a variety of capabilities all in one product. The MAP-H is the next generation of wearable solutions to enhance your safety, communications and productivity.



Figure 1 - Jannatec Helmet (MAP-H)

Figure 1 - Jannatec Helmet (MAP-H)

## SmartView – (MAP-V)



*Figure 2 - SmartView Enterprise Vehicle Unit (MAP-V)*

### Value Add:

The base SmartView unit is what is leveraged for our JAWS proximity application. This Android based device will also allow for future use of user defined custom developed applications and can also be used as a tracking device through conventional RFID methodology including Bluetooth reverse tracking.

Additional options that can be leveraged for future use that will be of benefit to the Hindustan Zinc Ltd. operations include but are not limited to:

- TBAC (training-based access control)
- On-board Circle check entry
- Back up camera
- Vehicle Telemetries
- Built in tracking device
- Capabilities of standard android-based applications that can be leveraged for customized apps as different needs are outlined by your operations
- Voice communications
- Text messaging
- Emergency Alerting

### Connectivity:

- Wi-Fi
- Bluetooth 4.0
- NFC
- USB/USB OTG
- 4x GPIO
- CANBUS/J1939
- Audio Output

Note: all the connectivity options are not made part of proposed solution.

### Sensors:

- Gyro
- Accelerometer
- CMOS Camera
- TPMS
- Microphone

## Proximity Detection

The Jannatec J.A.W.S application is a simple yet extremely effective proximity detection solution that works on a peer to peer basis and requires no additional infrastructure to be installed. We leverage RF signals in the 865 to 867 MHz frequency range to allow for proximity detection including:

1. Vehicle to vehicle proximity detection
2. Vehicle to personnel proximity detection
3. Vehicle to fixed asset proximity detection

Note: It is important to note that as installed when a vehicle is turned off it is still picked up by the proximity detection system as a fixed asset. When the vehicle is turned back on it then is re-allocated on the system as the type of asset allocated to the vehicle in question.

The types of assets that can be detected by the system are:

1. Heavy Duty Vehicles (Primary Movers)
2. Light Duty Vehicles (Jeeps/Utility Vehicles)
3. Personnel
4. Fixed Hazards

The Jannatec J.A.W.S application leverages a zone-based system in order to advise vehicle operators of the status of the hazard in question. There are three zones that need to be considered with the system:

### Working Zone

This is considered the 'safe' working zone where no hazards are indicated as proximity is not near enough to warrant warnings or notifications. No action occurs on the system when assets are in this zone.

### Warning Zone

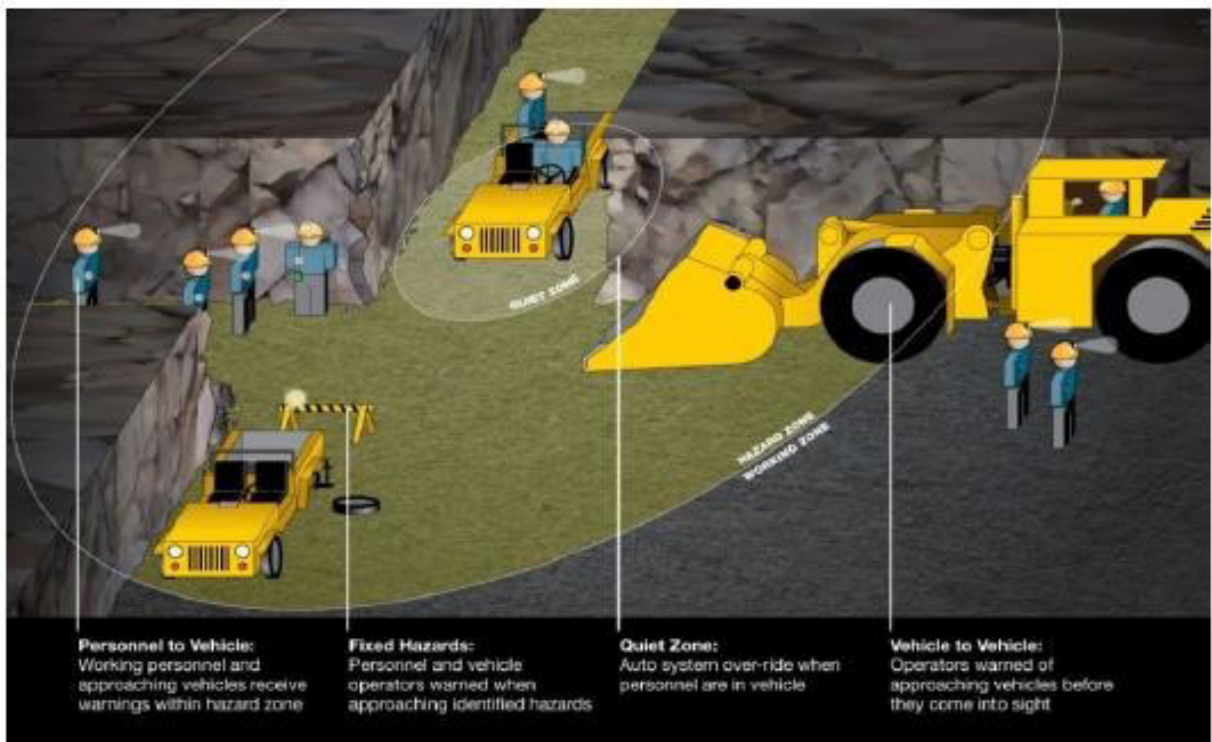
This zone is that for which operators and personnel are notified of potential hazards that they should be aware of. The number of assets within the zone is indicated on the screen so that operators are aware of how many assets they need to be aware of. In addition, when personnel are near a vehicle in this zone they are notified via a high visibility blue LED built into the cap lamp that a vehicle is in close range of them regardless of direction.

### Critical Zone

This zone is that for which operators and personnel are notified of potential hazards that they should be exceptionally aware of as the proximity has entered a potential critical stage. The worker is still advised of the hazard via the blue LED on the cap lamp, however the operator screen has a more vigorous visual notification that advises vehicle operators to be extremely careful due to the very close nature of the proximity situation. In addition to the visual alert, when assets enter the 'critical' zone, there is an audio alert to provide extra notification to the operator. If an asset leaves the critical zone and then returns into the critical zone, the visual and audio alerts both repeat to ensure continued notification regardless of how the assets in range are moving. The number of assets within the zone is indicated on the screen so that operators are aware of how many assets they need to be aware of, and should there be multiple assets in multiple zones, the on-screen indicators will advise of the quantities in question so that operators are aware of the actual count of proximity hazards.

**Note:** it is important to note that exact zone distances cannot be calculated and provided as this is an RF based application. The zones can be adjusted based on percentages from the working zone however due to RF propagation distances are not exact. There is provision however to ensure maximum distances are allocated for.

Figure 3 - J.A.W.S Proximity Zones



For further details please review the video at the following link:

<https://www.youtube.com/watch?v=L7ZpvJ1C6NQ>

## 4. Conclusion

In conclusion, Jannatec Technologies, Sheetal Wireless technologies & ENIC Engineering Solutions believes this is an ideal solution which allows you to leverage future SmartView systems by simply adding modules, like cameras, TBAC (Training Based Access Control), telemetry. We would welcome the opportunity to discuss this with you further at your convenience. Please do not hesitate to contact us at any time.