

# URSULA V3.0

## A Revolutionary New Ultrasonic Under-Rail Monitoring System



### Impacts for Industry

This rapidly deployable measurement system is installed under the rail and gathers unique data-sets with every wheel-pass that can be used to inform real world maintenance, operational and safety critical decisions. These include:

- Maximising safe vehicle operating speeds and optimising scheduling.
- Optimising maintenance programmes and minimising boots on ballast.
- Pre-emptively identifying issues, utilising real-time risk alerts and preventing derailment.

### The Problem & Solution

Manual inspection/boots on ballast is costly, prone to human error and poses risks to staff. Existing wayside sensors either provide indirect measurements of vibration and displacement, which can be difficult to interpret, or they are based on strain gauges which are costly, fragile, and time consuming to install.


This unique condition monitoring solution delivers real-time insights into the dynamic vehicle-track interaction, including direct measurements of wheel-rail contact and normal/lateral loading conditions. This characterises the status of each individual wheel that passes and reports and overall health of the infrastructure.



### Contact Details

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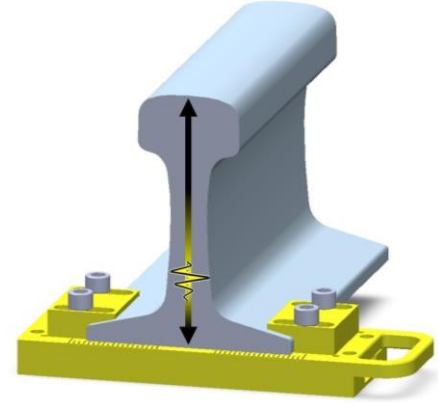
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## How it Works

The under-rail clamp can be installed in under 15 minutes and contains active ultrasonic transducers which pulse high frequency ultrasonic waves that travel up through the rail web and reflect off the interface. These waves are then received by the same transducer. The reflected waves contain valuable information about the contact interface and the stress within the rail as each wheelset passes over the sensor clamp.

The sensor converts the ultrasonic measurements into real-world parameters at the edge, which are then reported to stakeholders to support strategic decision making. Custom alarm threshold levels can be set for real-time risk reporting for immediate action to prevent damage or failure.



## URSULA Measurement Outputs

### Rail stress & wheel/axle load – tonnage and impact loads

- Rolling stock tonnage over time
- Overloaded/imbalanced vehicles/wagons/wheelsets
- Problem/outlier wheelsets – flats, out-of-round

### Lateral loads (LM)

- Cornering forces, friction/traction, and stress on infrastructure
- Issues with infrastructure – gauge, camber, ballast disruption etc

### Precise position and shape of wheel contact on the rail

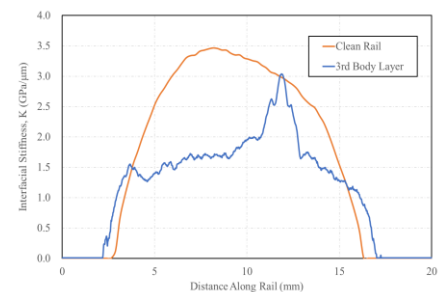
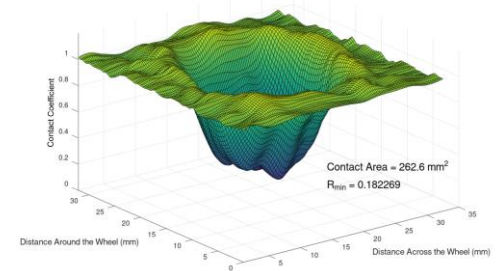
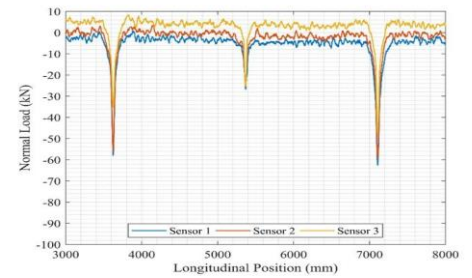
- Problem/outlier wheelsets – hunting, yaw/angle-of-attack, worn/hollow profiles
- Confirms infrastructure setup – particularly after groundworks
- Provides validation of total system health to minimise wheel/track wear/rolling contact fatigue

### Flange contact

- Informs safe cornering speed
- Provides real-time alerts to wheel-climb and derailment risk

### Interfacial stiffness and third-body layer detection including lubricant films and leaf layers

- Identifies risk locations on the network
- Informs friction management strategies




*Contact us to find out more or arrange a track demo*

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