



R3M

**Remote Rail
Asset Monitoring**

rail.trimble.com

 **Trimble** Rail



Contents

4 Transforming the Way the World Works

5 Trimble Rail

6 R3M Remote Rail Asset Monitoring

10 Important Events

Transforming the Way the World Works

Trimble® industrial technology solutions connect the physical and digital worlds to help solve complex industry challenges around the world.

Trimble Core technologies encompass positioning, modeling, connectivity, and data analytics. These technologies empower customers to enhance productivity, quality, safety, and sustainability. Trimble offers a range of software, hardware, and services, including purpose-built products and enterprise life-cycle solutions. These offerings are revolutionising industries such as agriculture, construction, geospatial, transportation, and logistics.

Trimble is an industrial technology company that serves customers in more than 150 countries. With employees located in over 40 countries and a strong network of dealers and distribution partners, we provide efficient and effective support to our customers all around the world.

For more than four decades, Trimble has been at the forefront of developing innovative solutions that empower customers to expand their businesses. With a portfolio of over 2,000 patents and research development centers spanning across 15 countries, Trimble combines its organic product development with strategic acquisitions to bring cutting-edge technologies to a broader market.

At Trimble, our job is not just work; it's our life's purpose. We are dedicated to helping you and empowering our customers to excel in their life's work. Our focus is on enabling you to perform at your best and supporting you in achieving your goals.

Our extensive range of solutions covers a diverse array of tasks, ranging from transportation supplies to planting and harvesting crops, mapping the world around us, managing water and natural resources, and constructing and maintaining infrastructure. Trimble is revolutionising the work process by seamlessly connecting the vital data you require with the precise tools needed to achieve results.

We are proud of being a part of the bigger picture by supporting our customers, and playing a part in the ecosystem that is the world's livelihood—helping you to bring, build, construct, create, and grow the essentials we need to live every day and build future communities.

Life is always moving forward, and so is Trimble. Working to help you work, better.

**Trimble. Transforming
the way the world works.**

Trimble Rail

Your customers are drawn to your company due to its commitment to safety, punctuality, and the provision of a superior product. However, it is the tireless dedication, unwavering expertise, and relentless hard work demonstrated behind the scenes, every minute of every day, that upholds these exceptional standards.

We firmly believe in improving, simplifying, and enhancing the accuracy of your work. As experts in the rail industry, we understand

the complexities involved and recognise that safe, reliable, and easy-to-use technology along with accurate information are indispensable for achieving success in this demanding field.

With a rail operation to run, you can confidently leave the data acquisition and presentation to us. Our expertise in this area ensures that you can rely on us to manage these aspects effectively, allowing you to focus on the core operations of your business.

R3M

Remote Rail Asset Monitoring

Safety, punctuality, and customer service are the pillars on which every rail operation around the world is built. Regardless of whether your core business involves passenger transportation or freight logistics, it is vital to monitor the activities and conditions of each individual rail asset.

This is what we do.



Capture



Enrich



Store



Monitor real time



Maintain performance

Pulling together over two decades of rail industry experience, our R3M remote rail asset monitoring solution processes vast quantities of raw data from your on-board systems in real-time.

Are you seeking real-time updates on the current status of your assets? Our comprehensive platform provides you with an extensive range of tools to access and analyse your data by utilising dynamic charts, informative graphs, detailed tables, and immersive cab views.

We also provide you with access to historical data, leveraging cloud storage technology. Your valuable information is securely stored, ensuring you have a record of your asset's past performances.

With our platform, you have the ability to create customised geofences tailored to your specific needs. Whether it's around stations, depots, yards, or distance markers, you have the flexibility to define geofences in any shape, offering you unparalleled control and insight.

Keeping you informed in real time is our top priority. By allowing you to define your own criteria, we ensure that you receive instant notifications when important events occur. Whether it's receiving detailed emails, accessing downloads of raw data, or CCTV footage, we have the capabilities to meet your specific requirements.

Data capture

Knowledge empowers us to make informed decisions that drive safety, punctuality, and exceptional customer service.

To capture this information we utilise specialised rail safety-compliant solutions that are completely isolated from your systems, ensuring utmost security.

We can extract data from thousands of channels using various protocols. Whether you possess a single locomotive, vehicle, or multiple units, we can process them all seamlessly.

If your assets are out of range of 4G/5G and Wi-Fi networks, we store your data on board until a connection is re-established, ensuring a continuous flow of knowledge without any gaps.

Data enrichment

Effective communication is fundamental in businesses, industries, and everyday life. It is well understood that systems operate using their own specialised language which is often unreadable.

We convert raw data to make it readable, by combining multiple channels to provide comprehensive information in a simplified manner. For instance “#0A” becomes “Loco in reverse, speed step 2”.

Our solutions prioritise simplicity and precision, facilitating effective communication across all facets of your operations.

Data storage

Real-time understanding and trend analysis are crucial for informed predictions and plans in asset maintenance and management. We employ up-to-date protocols to ensure the security of your information, accessible only by authorised individuals. Retrieving information from two minutes, two days, or two months ago is only a few clicks away.

Monitor real time

Building upon a successful lineage of rail monitoring products, we have incorporated valuable customer feedback into R3M. The result is a feature-rich product with a modern and user-friendly interface that is easy to implement, and is scalable, secure, and robust.

As standard practice, we capture your asset data every second, ensuring comprehensive monitoring. For real-time information, we update the on-screen display every five seconds, providing up-to-date insights. Additionally, important information and emails are promptly updated and sent to you and your teams.

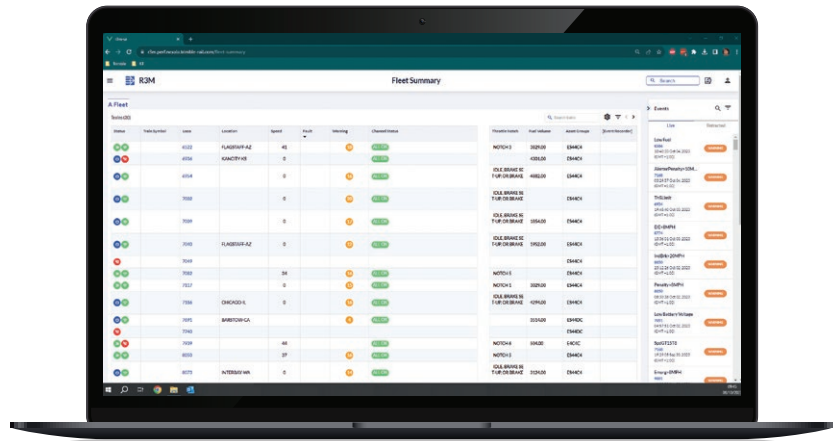
Let's discover the benefits that R3M offers and explore some practical examples of how it enhances your work process.

Fleet summary page

The main page of R3M has been crafted to provide you with clear understanding of your asset status. With real-time visualisation of multiple fleets across different tabs, this page offers detailed insights for each asset including:

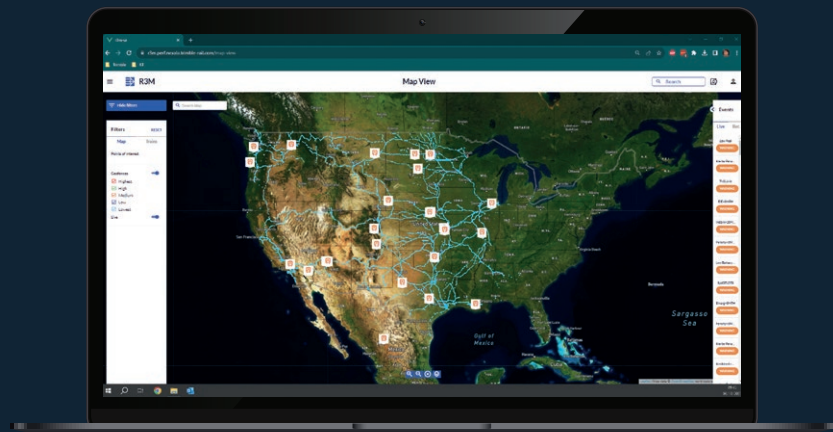
- Shut down, stationary, and moving status
- Data reception status and last received date/time
- Assets and train identifiers
- Last known location
- Speed
- Number of important live events on the asset
- Overall status of channel information from the asset
- Important channel values

You have the ability to search for specific assets or trains, apply multiple filters to display desired data, sort any column, and drill down to access detailed information on trains, assets, and important on-board events all in real-time.



Map view

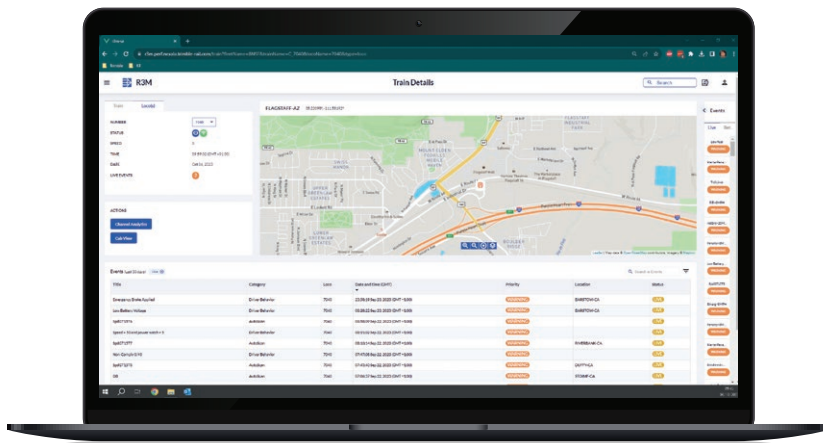
Easily track the current and past locations of your assets. Apply multiple filters to focus on the specific assets and trains that matter to you. Choose between map view or satellite view, and freely zoom and pan as you desire. For more detailed information, simply click on the train icon to access further insights.



Train details

If you require more information, easily access a detailed view of the train or asset of your choice.

In real-time you have the option to rescale and move the map and jump to channel analytics, or cab view. Search or apply filters to focus on specific important events, or sort the column headings as required.



We also provide terrain map view, a more comprehensive understanding of the landscape, allowing users to navigate with enhanced accuracy.

Channel analytics

You have the flexibility to visualise your channel data in single or multiple graphs for one or more assets, giving you control over what is displayed. Whether you prefer live or historical dates, you can select time spans ranging from 5 seconds to 48 hours.

The interactive graphs enhance your experience. Simply hover your mouse over the graphs to view precise values. You can slide the X and Y axis limits to zoom in and examine the specific data you want to see in detail.

You have the convenience of easily downloading both data and graphs, which can be added to reports or presentations. You can also store selected channels to be accessed and utilised at a later date.



Important Events

R3M Events allow you to see instantly when things are not running smoothly. Based on criteria that you create and define, events can encompass anything you consider important and wish to act upon and analyse.

These events are integrated throughout R3M providing widespread visibility. You can also send detailed emails to multiple recipients and initiate downloads of your assets' event recorders or CCTV footage.

To generate the criteria for events, we offer a user-friendly guided editor that allows you to create rules. These rules can be as simple or intricate as you require, offering flexibility and customisation.

Here are some examples of rules crafted by our valued R3M customers:

Train overspeed

Create an event called 'Train Overspeed' when a train exceeds a speed of 225km/h.

Critical operations error

Create an event called 'Critical Ops Error' when both the left and right-hand doors of a passenger asset are open simultaneously, and the train is not in a depot.

Automatic train protection system, multiple events

Create an event called 'ATP train stop' when the Automatic Train Protection system halts a train.

Create an event called 'ATP right side failure' when the Automatic Train Protection system is activated, but the train was not speeding, approaching a caution or stop signal, or activated by the driver.

Create an event called 'ATP wrong side failure' when the train was speeding, failed to slow down approaching a caution signal, the driver did not respond to the ATP system within two seconds, and the ATP system did not activate to stop the train.

A right-side failure occurs when the system has experienced a malfunction but still maintains safety protocols.

A wrong-side failure arises when the system malfunctions and compromises safety measures.

We are dedicated to supporting you throughout the entire process of event and rule creation. Our comprehensive training programs are tailored to meet your individual needs, enabling you to explore the extensive capabilities of R3M Event Rules.

Event analytics

Whether you are dealing with monthly or weekly maintenance routines or making daily operational decisions, the ability to visualise and understand trends is invaluable. With R3M, you gain the power to plan with confidence and make informed choices.

You can strategise maintenance schedules by analysing overheating motor events on your assets. For efficiently managing contaminated tracks, R3M enables you to direct operations to address areas with an increasing number of wheel slip events. Need an engineer for a specific door on a particular vehicle? R3M allows you to identify such requirements by tracking a rising number of slow-closing door events.

When it comes to planning maintenance during winter, R3M helps you consider internal carriage temperatures to ensure passenger comfort. Furthermore, by detecting a high frequency of instances where caution or stop signals are approached too quickly, R3M can prompt the initiation of driver behavior training programs.

Experience the power of R3M, providing you with comprehensive knowledge to make well-informed decisions both now and in the future.

So, what does an Event look like?

Event details

The Event, known as 'Loco idle for an extended period', belongs to the Category of 'Driver Behaviour'.

Priority

The Priority assigned to this Event is 'Warning', indicating that it is important to capture the occurrence but does not require an immediate response.

Status

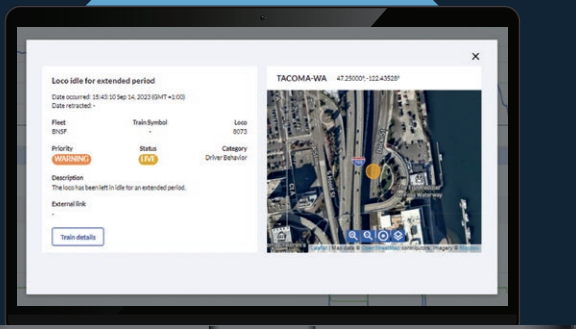
Currently, the Status of this Event is 'Live' as the criteria for activation are still ongoing. However, once these conditions are no longer met, the Status will be changed to 'Retracted'.

External link

By clicking on the external link, you can access a variety of resources such as documents, images, or any URL of your choice.

Map display

The provided map displays the precise location where the Event transitioned into the 'Live' state.



R3M

Remote Rail Asset Monitoring

The power to help you run your rail operations safely, on time, and with customer satisfaction.

For further information about R3M, to explore our range of Trimble Rail products, or to schedule a demonstration, please get in touch with us at Trimblerrailsales@trimble.com