



The railroad is being transformed with real time connectivity for safety (PTC), remote diagnostics, business operations, and enhanced driver and passenger services. The connectivity requirement spans across locomotives, passenger cars, wayside and other infrastructure. As one of the most important assets in the railroad's maintenance-of-way (MOW) fleet, the hi-rail can help you optimize your operations and boost productivity with real time connectivity.

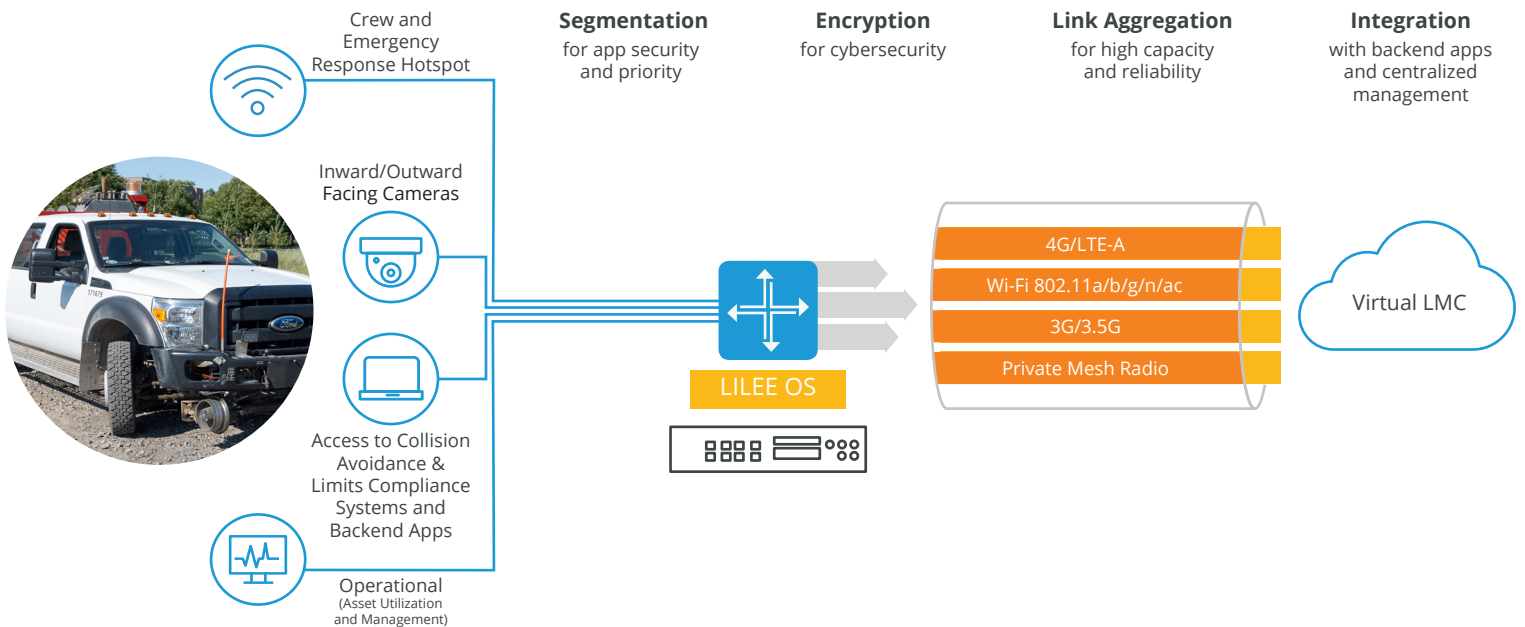
Connected Hi-Rail solution by LILEE provides:

- 
Always on Connectivity
 For multiple users, onboard devices, roadside sensors and applications like touch screens, computers, cameras, vehicle diagnostics, computer-aided dispatch (CAD), and crew members' devices with back-office systems
- 
Open, Robust, and Secure Edge Computing Platform
 Directly onboard the vehicle, perfect for hosting third-party applications such as limits compliance and collision avoidance systems
- 
Wi-Fi Hotspot
 Provides robust Wi-Fi hotspot using aggregated bandwidth across multiple service providers to deliver high throughput connectivity

- 
Intelligent Management
 Of the bandwidth requirements of onboard devices by segmenting and prioritizing critical applications
- 
A Platform to Monitor and Improve Driver Behavior
 With reports targeting sudden acceleration, sharp turns, excessive braking, and over speeding
- 
Improved Utilization of Your Fleet
 With remote diagnostics of the vehicle and connectivity while on a highway and on rail

The Connected Hi-Rail by LILEE Systems

You can transform your MOW fleet into a connected fleet with LILEE's Connected Hi-Rail solution. The comprehensive solution features powerful edge computing and communications gateways for the vehicles with a cloud-based management and analytics platform in the back office.



Unified Connectivity Gateway to Your Back-office

LILEE's solution provides enterprise class wireless connectivity to all onboard devices like touch screens, computers, cameras, vehicle diagnostics, CAD, and Wi-Fi devices. As a powerful centralized gateway, we can help you to eliminate unnecessary hardware and duplicate antenna infrastructure. Network policies can be in place to restrict and prioritize data traffic.

Compute Platform for Software Applications

Our onboard edge computing gateways feature Intel X86 embedded processors and expandable storage to host Windows, Linux, and Android software applications. By effectively delivering a server directly onboard the hi-rail vehicle, third-party applications such as limits compliance and collision avoidance systems, track geometry and survey applications can be hosted within the same physical platform.

Multi-path, Always-on Connectivity

Aggregates multiple links (LTE cellular, Wi-Fi, and private radio) for high capacity, and provides up to 99.999% uptime. The solution dynamically balances loads across multiple service providers thus maximizing link usage even when one link may be degraded. Hi-rail vehicles can maintain more than one communications path to the back office anywhere on the network.

Emergency Assistance

Hi-rail vehicles can act as hotspots that provide Internet access to maintenance crews, first responders, and other railroad personnel, that need a reliable connection to systems or databases during a derail or other emergencies.

Cloud-based Management and Analytics

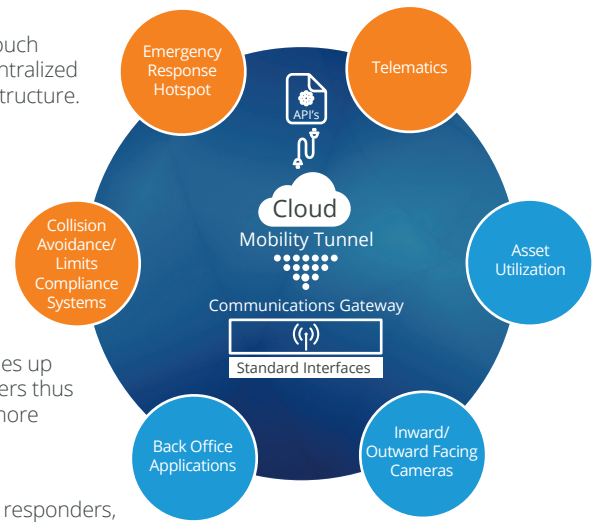
Provides an intuitive web-based user interface to manage configuration and remotely monitor connectivity. The solution includes auto-onboarding of gateways, alerting and reporting of events and connectivity, and user analytics.

Turn Key Solution

LILEE's Connected Hi-Rail solution provides future-proof connectivity, storage and compute, to existing and new onboard sensors and applications, and connects these applications to the cloud. LILEE provides installation, deployment, support and maintenance, and fully managed data plans.

Cybersecurity

The solution uses security technologies such as IPsec, DTLS & AES 256 to authenticate and encrypt communication between the hi-rail and the back-office. This helps secure against eavesdropping and man-in-the-middle attacks. Layer 2 tunneling technology is used to transmit data from the end device to the back-office applications. These tunnels shield the end devices from malicious attackers in the Internet.



Methodical Approach to Lower Cellular Data Cost

LILEE Connected Hi-Rail solution uses enterprise-class algorithms to lower cellular data cost for each vehicle.

1

Selects the **best available, least cost** link based on predefined criteria – data transmission cost, latency, jitter, throughput, and more

2

Processes vehicle **operational and security data locally**, and intelligently determines what data to send to the back-office in real time

3

Enables the **prioritization of critical applications** such as train control information over less critical ones like browsing the Internet

4

Provides controls to **throttle data usage** by bandwidth hungry applications and users, and blocks unwanted content

Cloud Based Analytics

LILEE's Connected Hi-Rail solution provides connectivity and fleet analytics for real time monitoring and historical analysis. They are available for each vehicle in LILEE's T-Cloud.



Connectivity

Total cellular data used per vehicle, cellular quality index based on provider technology in use (CDMA, 2G, 2.5G, 3G or 4G), latency and throughput



Fleet Management

Real time vehicle location, snail trail on Google maps, 6-point driver behavior based on sharp turns, sudden braking, and vehicle diagnostics



MOW Crew

Number of devices connected to the network, most accessed applications and websites, and Wi-Fi bandwidth usage per device

Conclusion

As the **industry's first to offer** full link aggregation and dynamic weighted load balancing, LILEE Systems can partner with you to help achieve greater value from your hi-rail vehicles while lowering costs.

Contact LILEE Systems at sales@lileesystems.com to discuss your onboard connectivity needs for your hi-rail fleet. To learn more, please visit www.lileesystems.com