

iW-RainboW-G261

Rugged Telematics Device Off-Road Construction Machinery

Improve fleet efficiency, driver safety, and simplify asset tracking and management.

Introduction

Off-road vehicle and heavy-duty equipment owners need to remotely monitor their assets on the field while gaining valuable insights from the cloud platform to determine the occurrence of any failure and take preventive actions. These vehicles usually operate in sites that often lack stable network connectivity, making it difficult to transmit real-time data from the machinery to the central monitoring system. This hindered the effectiveness of remote monitoring and data analysis, which are critical for proactive maintenance and operational insights.

Heavy-duty trucks & off-highway vehicles have unique challenges due to their exposure to outdoor conditions such as extreme temperature, vibrations, shock, high humidity, etc. Furthermore, users are impacted by under-utilization of assets, idling time, fuel theft, poor maintenance, stolen off-road equipment, and productivity.

An auto-tech company providing intelligent and effective monitoring solutions for vehicles sought a telematics solution from iWave to simplify asset tracking and management. The client wanted to remotely monitor vehicle performance, track locations, and optimize maintenance schedules in order to increase operational efficiency, reduce downtime, and enhance overall fleet management. To overcome the challenge, the client chose iWave for their specialization in the design and manufacturing of connected [automotive solutions](#).

Challenges

- Rugged enclosure design for
- Limited connectivity options
- Modular architecture with multiple communication interfaces
- Software flexibility to manage diver fleet and assets
- Support for monitoring operations with GPS tracking

Solution Highlights

iWave proposed the [Rugged Telematics Device](#) tailored to meet the unique challenges of implementing telematics in off-road vehicles. The rugged telematics device integrates multiple communication channels and data security features and can operate in extreme temperatures ranging from -40°C to +70°C.

- IP67 protection class
- 3 CAN Ports: CAN FD/HS CAN
- External Antenna Connectors
- Integrated Hardware Secure Element
- LTE Cat 4 / Cat M1, Wi-Fi, and Bluetooth
- RS232, RS485, Ethernet and Analog Input
- GPS/GLONASS/BeiDou/Galileo
- LINUX 5.4 BSP with software flexibility
- Protocols: FMS / J1939



The iWave [rugged telematics device](#) provided a comprehensive solution to the challenges faced in implementing telematics devices in construction machinery. The device is IP67 rated for protection against solids, dust, and water content.

The rugged telematics device supports 3 CAN interfaces to communicate with the vehicle's internal electronic systems, capturing data related to engine performance, vehicle speed, fuel consumption, and more. Real-time data from CAN interfaces enables the customer to identify instances of vehicles being under-utilized or idling excessively and optimize routes, schedules, and usage patterns.

Ethernet interface offers high-speed connectivity and allows the telematics device to communicate with other systems, servers, or databases over local networks or the internet. This connectivity is leveraged for remote diagnostics, software updates, and centralized data storage and analysis. Ethernet also facilitates data exchange with backend systems that can process the collected data for more advanced analytics like assessing the vehicle's usage patterns, identifying inefficiencies, and diagnosing maintenance issues.

Apart from ethernet, the [rugged telematics device](#) is also integrated with cellular 4G support and various other wireless connectivity options such as Wi-Fi and Bluetooth, to enable data transfer from the vehicles to the cloud platforms. This versatility allowed the construction machinery to transmit data even in remote areas with weak network coverage.

To enable vehicle-wide updates, comprehensive data logging, and remote diagnostic commands via the OTA platform, the rugged telematics device serves as a gateway into the vehicle and provides a stable connection to the cloud. The rugged telematics device downloads software updates from companies' cloud-based servers via Wi-Fi or LTE cellular networks and installs them in vehicles. The device's intelligent connectivity management ensured that data was buffered and transmitted when a stable connection was available, mitigating the challenges posed by intermittent connectivity.

By leveraging the Wi-Fi infrastructure within the construction site, iWave, together with their client-developed software, allows the telematics Module to store and transmit critical information to the servers each time a machine encounters a configured wireless access point. This functionality enabled the data to be reviewed on a daily basis while remaining secure on an internal network.

Furthermore, the [rugged telematics device](#) was integrated with the J1939 protocol for compatibility with heavy-duty vehicles and commercial trucks. This standard includes the digital annex (DA), which defines thousands of signals that could be used on the CAN bus, a subset of which are EV-specific signals (such as high voltage, battery state of charge, vehicle charging status, and more).

The rugged telematics device provided real-time GPS tracking, enabling the company to monitor the location and movement of each off-road vehicle. This information helped optimize the routing and allocation of resources.

The combination of reliable connectivity and real-time data access allowed fleet managers to respond promptly to any issues or emergencies, minimizing vehicle downtime and improving operational efficiency.

For more information, please contact mktg@iwavesystems.com.



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