WORKING WITH YOU TO
CONNECT THE WORLD

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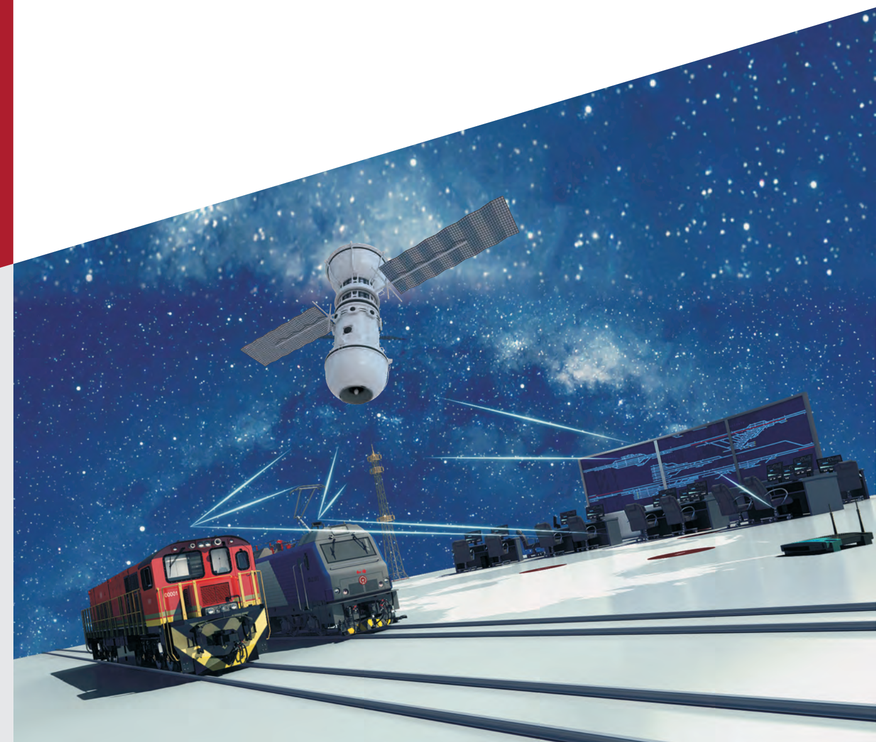
CRRC

TECHNICAL SPECIFICATIONS FOR A TRAIN MONITORING SYSTEM **BASED ON SATELLITE COMMUNICATION TECHNOLOGY**

Full monitoring, global tracking

OVERVIEW

A train monitoring system that combines satellite communication technology with traditional wireless communication technology and offers the rail industry an optimized system that covers a range of functions including: network positioning, real-time data transmission, remote monitoring and diagnostics, and remote expert support. The system also allows ground communication in areas out of reach of wireless networks, and can function as an emergency communication channel.



MAIN FEATURES

REAL-TIME TROUBLE SHOOTING

- As the system detects a fault, the ground control center alerts train maintenance staff in real time. The system uses DARS (Remote data monitoring and diagnostic system) to analyze operation data in order to identify the cause of the fault and instructions to carry out the necessary repairs.

ADVANCED COMMUNICATION NETWORK FOR DATA TRANSMISSION

- A unique communication protocol system has been developed in order to meet different data needs across a diverse range of rail projects.
- A special mechanism allows the system to automatically switch between WLAN/3G/4G satellites according to the availability of wireless networks. This ensures sustained, stable and reliable intercommunication between the ground monitoring center and on-board equipment.
- An advanced coding algorithm reduces data size, minimizing the network bandwidth required for transmission, effectively improving the speed and efficiency of data transmissions.

REAL-TIME MONITORING AND FAULT DIAGNOSIS

- Real-time tracking allows you to monitor the life cycle of products

The application of advanced equipment diagnostics and computer information processing technology allow for effective vehicle monitoring and the speedy detection of faults and their diagnoses.

Advanced big data storage mining technology and data support facilitate maintenance

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KEY TECHNOLOGIES

HARDWARE PARTS

ON-BOARD DATA TRANSMISSION UNIT

The data transmission terminal (including both on-board and ground equipment) uses a low-profile Ku-band satcom on the move (SOTM) satellite communication antenna. This is a high performance communication antenna specifically developed to provide mobile communication for moving vehicles. The low profile of the antenna makes it an apt solution for moving vehicles where height is a restriction. With minimal space required for installation, the antenna can be fitted to the roof of rail vehicles. This allows the moving vehicle to retain uninterrupted communication with the satellite network, at high speeds, high capacity and with unprecedented reliability.

MAIN TECHNICAL PARAMETERS

Operating Frequency Band,	Tx, GHz	14.0 ~ 14.5
Operating Frequency Band,	Rx, GHz	10.95 ~ 12.75
Gain	Tx, dBi	36.1
Gain	Rx, dBi	35.0
-3dB Beam Width	Tx	2.6°
-3dB Beam Width	Rx	3.0°
Interface		WR-75
Receiver-transmitter Isolation		85 dB
Polarization		Line polarization, automatic adjustment
Cross Polarization Isolation		≥30dB
Azimuth Rotation Range		360°, continuous infinite rotation
Pitch Rotation Range		20°~80°
Polarization Adjustment Range		±90°
Travel Speed		500Km/h
Initial time required to connect to satellite whilst in motion		Less than 2 minutes
Recapture Time		Less than 1sec
Rotational Angular Velocity		100°/s for azimuth, 100°/s for pitch
Rotational Angular Acceleration		400°/s² for azimuth, 400°/s² for pitch
Antenna Controlling Unit (ACU) Size		1U, 19 inch standard cabinet
Working Temperature		-40°C~+60°C (antenna) -20°C~+50°C(ACU)
Relative Humidity		0~100%
Power Supply		220VAC, 50Hz or 28VDC
Power consumption		400W

ON-BOARD DATA RECORDING UNIT (DRU)

The DRU (Data Recrding Onit) can be accessed directly through the MVB network in order to transfer relevant data from network storage to satellite using the Ethernet .

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MAIN TECHNICAL PARAMETERS

External Dimension	3U, 42TE
Input voltage	Rated 110 V DC | Rating power | 20W
External interface	MVB、ETHERNET、USB、RS232、RS485
External Communication	MVB bus

WIRELESS MODULE

A wireless module allows access to the on-board maintenance network through Ethernet. GPS location, as well as operation and diagnostics data can then be uploaded through 3G/4G and WLAN.

MAIN TECHNICAL PARAMETERS

External Dimension	200 x 57x120 mm		
LAN	2 adaptive 10/100Mbps Ethernet ports (M12)	WLAN Module	IEEE802.11a/b/g/n WLAN module, supporting TCN antenna connector
LTE module	50-channel U-blox 6 engine	Cellular network modul	GSM/GPRS/EDGE/LTE
Input voltage	Rated 110 V DC	Rating power	20W

SOFTWARE PARTS

CLIENT DATA ANALYSIS CORE (DAC) SOFTWARE

DAC software facilitates data communication with the CCU or ERM through the Ethernet. Features include real-time variable monitoring, enforcement, data storage, CCU/ERM configuration and program file upload, record data download, offline data analysis, data statistics and report printing.

REMOTE DATA MONITORING AND DIAGNOSTIC SYSTEM (DARS)

The remote data monitoring and diagnostics system evaluates and stores both real-time and historical data. Real-time and vehicle fault data acquired through the GPS system is sent to a server via wireless transmission (3G/4G/WLAN/satellite), and stored in a database server. The data is then analysed through specialist software to produce operational statistics, fault diagnoses and other relevant data. This full tracking of all aspects of vehicle operations can be used to provide support for vehicle maintenance and express servicing.

EXAMPLES OF CURRENT APPLICATION OF THE TRAIN MONITORING SYSTEM ON THE GLOBAL RAIL MARKET

Our train monitoring system is currently in use on 61 vehicles across a range of projects, including on the Wuhan Metro Line 6 in China, and in Izmir, Turkey. It is also successfully operating on a total of 232 D45 diesel locomotives in South Africa.