Ethernet-based TCMS
(Train Control and Monitoring System)

Mitsubishi Electric provides TCMS based on train-wide Ethernet communication and wireless communication between train and wayside for reliable and efficient train operation.

Ethernet (100BASE-TX) network

High-speed and open network
IEC61375(Ethernet Train Backbone/Ethernet Consist Network)
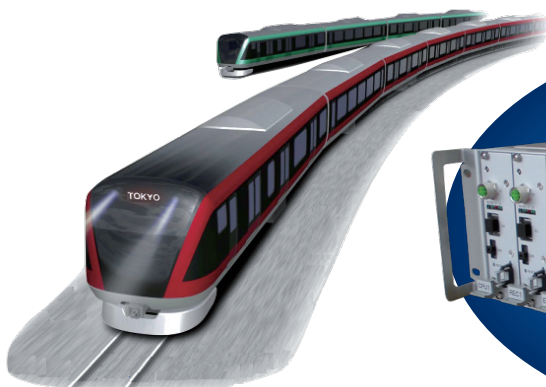
Integrated Train-wide Control

Total control over on-board equipment operation for improved energy efficiency
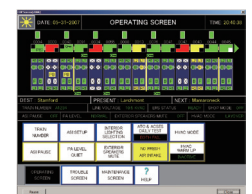
Reduction of Hard-wires

Reduced in-car hard-wires by transmitting control commands and applying Remote I/O

Data transmission to WMDS

Remote monitoring, diagnosis and parameter setting of onboard equipment

TCMS

Drivers Display

Monitoring

Ethernet Train Backbone

Between Trains

Ethernet Consist Network

Between Vehicles

VCU

ED ED   ED ED   ED ED
ED ED   ED ED   ED ED

Wireless devices

VCU

Wireless Data Link

WMDS

VCU: Vehicle Control Unit
ED: End Device (subsystem)
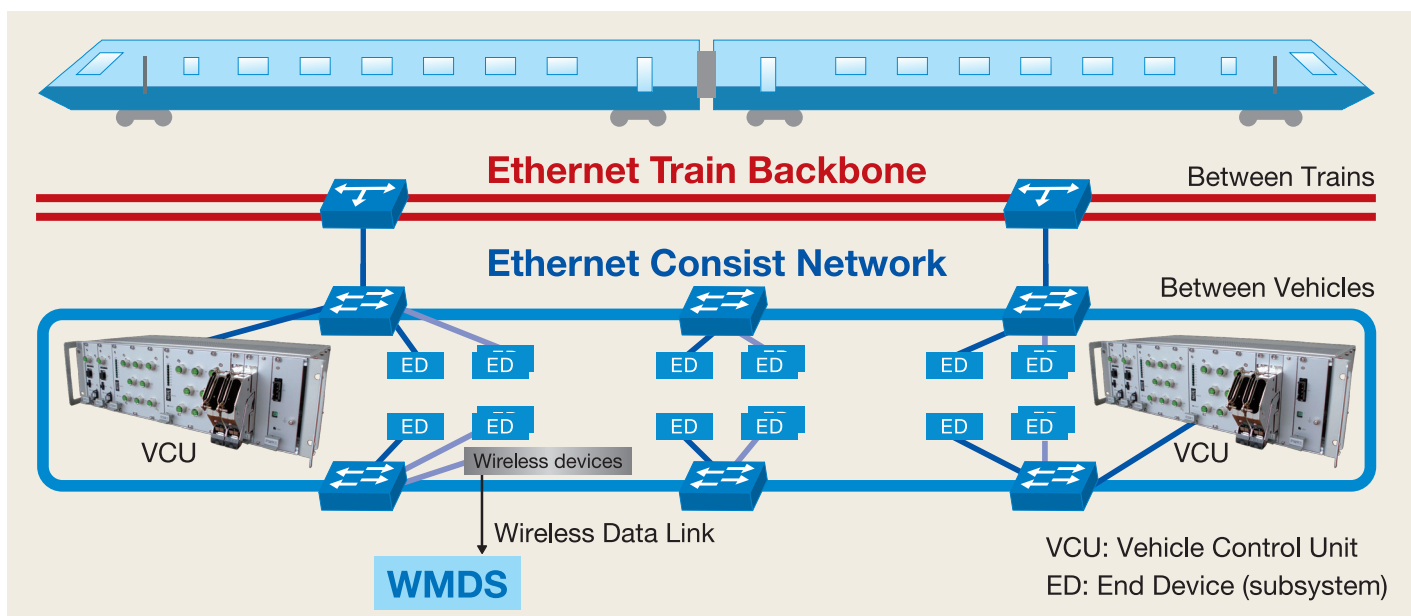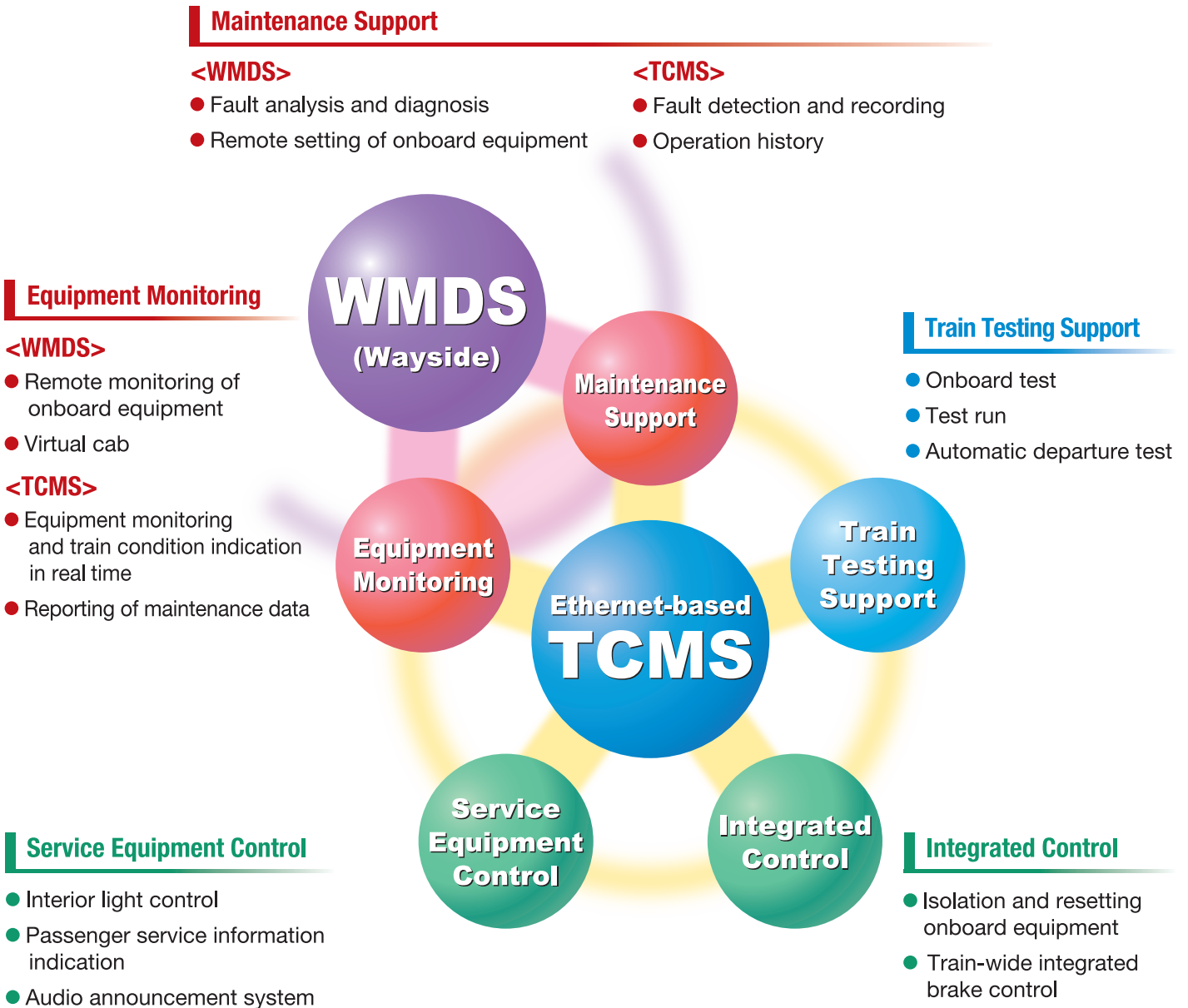
- **High bandwidth train-wide network enhances all TCMS functions:** equipment monitoring, maintenance support, train testing support, service equipment control and integrated control.

- **Data communication to WMDS enhances two TCMS functions:** equipment monitoring and maintenance support.

Maintenance Support

<WMDS>
- Fault analysis and diagnosis
- Remote setting of onboard equipment

<TCMS>
- Fault detection and recording
- Operation history

Equipment Monitoring

<WMDS>
- Remote monitoring of onboard equipment
- Virtual cab

<TCMS>
- Equipment monitoring and train condition indication in real time
- Reporting of maintenance data

Train Testing Support

- Onboard test
- Test run
- Automatic departure test

Service Equipment Control

- Interior light control
- Passenger service information indication
- Audio announcement system

Integrated Control

- Isolation and resetting onboard equipment
- Train-wide integrated brake control

WMDS (Wayside)

Ethernet-based TCMS

Maintenance Support

Equipment Monitoring

Train Testing Support

Service Equipment Control

Integrated Control

MITSUBISHI ELECTRIC CORPORATION