

KEY BENEFITS

E-payment:

Simplifies in-vehicle transactions by integrating E-payment applications with Intelligent Transportation Systems to provide open road tolling, parking, gas, and drive-through payments. MobiWAVE has been successfully field tested with leading tolling backend systems.

Mobility:

Integrates a range of new ITS applications into a single system, delivering dynamic information to mobile devices (both in-vehicle devices like speakers and handhelds such as cell phones/personal digital assistant devices). Drivers receive alerts regarding static roadway features such as school zones, high hazard locations, parking locations and traffic restrictions (e.g. one-way, no left turn).

Safety:

Reduces traffic-related fatalities and injuries, as well as congestion on highways with a range of advanced features, such as cooperative intersections and collision avoidance systems, signal violation warnings, vehicle-to-vehicle communications capabilities, and in-vehicle signing for both static advisories (e.g., sharp curves, school zones) and dynamic advisories (e.g. temporary work zones, weather impacts, presence of emergency vehicles, congestion ahead etc).

MobiWAVE: Intelligent Transportation Applications for Greater Mobility and Safety

MobiWAVE is a wireless vehicular on-board unit, designed as a flexible open platform based on Linux for deploying Intelligent Transportation Systems (ITS) applications to improve mobility and safety on the roadways. It features a 500Mhz processor, 256MB of memory, 512MB of compact flash disk space, dual radios (DSRC, WiFi), a GPS receiver, 3G and a Bluetooth radio. The MobiWAVE on board unit powers via the automotive cigarette lighter or a standard 110V connection. DSRC and WiFi antennas are attached to the unit and do not require an external mount, as long as it is near the windshield. The magnetic mount GPS receiver can be attached to exterior of the vehicle for better reception.

Leading-Edge Technology

- **Best-of-breed outdoor quality wireless radios.** 600mw DSRC radio with transmit range over 50km (LOS) and -94dB receive sensitivity; 400mw WiFi radio with transmit range over 50km (LOS) and -97dB receive sensitivity.
- **Variable channel widths.** Support for 5Mhz, 10Mhz, 20Mhz and 40Mhz channel widths enables customizing throughput vs. range for applications.
- **GPS.** Integrated SiRF Star III USB GPS enables location-based applications.
- **Integrated Bluetooth.** Offers wide flexibility for in-vehicle devices. An ordinary cell-phone or PDA can be paired with MobiWAVE to be used as human interface. Cell-phone/PDA can also be used as a modem (via Bluetooth) to connect to 3G network.
- **Flexible backhaul options.** Optional 3G modem enables continuous internet connectivity via 3G network. MobiWAVE seamlessly selects the best available uplink connectivity between DSRC, WiFi and 3G at any given instance. WiFi can be used in AP mode to share the 3G connectivity inside the vehicle.
- **Web-based management.** Enables remote management and updates over the air (DSRC/WiFi/3G) or through Ethernet.
- **Wireless software stack.** IEEE 1609.3 and IEEE 1609.4 standards compliant WAVE protocol stack enables rapid development and deployment of ITS applications, providing interoperability with Kapsch TechnoCom MCNUs and Denso WSUs. IEEE 802.11 a/b/g/n standards compliant AP and Client mode software enables out-of-the-box interoperability with various commercial WiFi APs and clients.
- **Security.** Advanced wireless security features including WPA2, WPA, WEP, MAC Authentication and Radius Server based authentication plus IPSec and SSL for application level security.
- **Easy-to-use, flexible SDK.** Feature-rich libraries and header files for WAVE, IP, Web, GPS, Bluetooth, etc.
- **Touch-panel display.** S200 model offers display and touch-panel functionality for touch-panel based HMI. Required software libraries are included in the SDK for easy development of touch panel interface.

APPLICATIONS

Electronic Payment

- Toll collection
- Open road tolling
- Gas payment
- Drive through payment
- Parking lot payment

Fleet/Mobile Device

- Asset management/tracking

Mobile Router

- In-Vehicle (bus, car, train) shared internet connectivity

Operations

- Traffic congestion data collection
- Weather data collection
- Road surface conditions data collection
- Traffic signal priority for emergency and transit vehicles
- Parking spot locator

Enhanced Route Guidance and Navigation

- Point of interest notification
- Food discovery and payment
- Map downloads and updates
- Location based shopping/advertising
- In-route hotel reservation

Safety

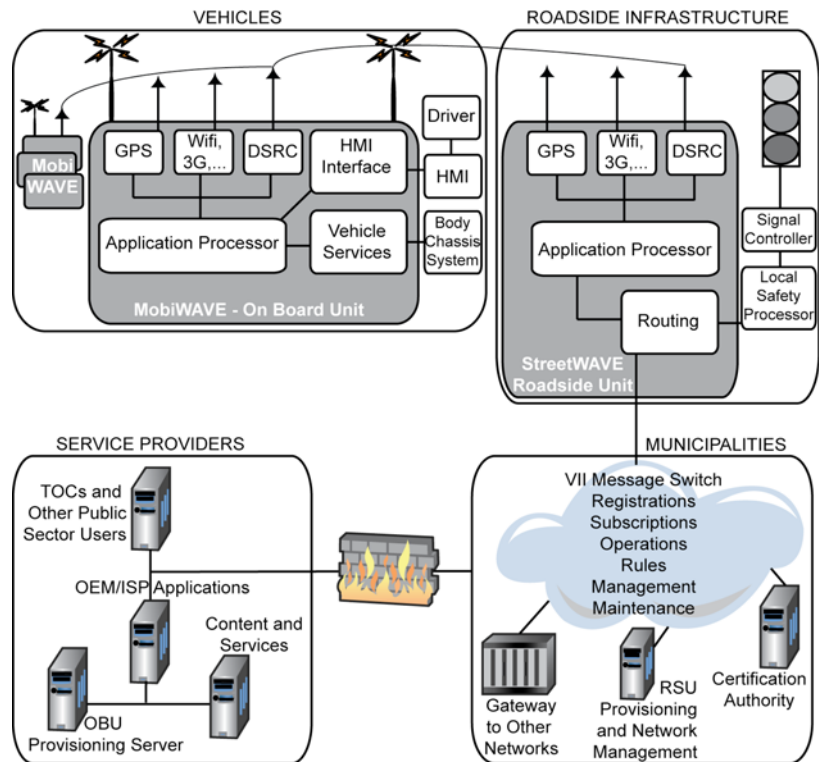
- Traffic signal violation warning
- Curve over-speed warning
- Emergency electronic brake lights
- Pre-crash warning
- Cooperative forward collision warning
- Left turn assistant
- Lane change warning
- Stop sign movement assistance



Product Specifications

	S100	S200
Processor	500Mhz AMD Geode LX800	500Mhz AMD Geode LX800
Memory	256MB DDR DRAM	256MB DDR DRAM
Storage	512MB Compact Flash	512MB Compact Flash
DSRC Radio	IEEE 802.11a 5Ghz, 600mW 28dBm TX, -94dBm RX Sensitivity	IEEE 802.11a 5Ghz, 600mW 28dBm TX, -94dBm RX Sensitivity
WiFi Radio	IEEE 802.11b/g 2.4Ghz, 400mW 26dBm TX, -97dBm RX Sensitivity	IEEE 802.11b/g 2.4Ghz, 400mW 26dBm TX, -97dBm RX Sensitivity
Channel Width	5/10/20/40 Mhz	5/10/20/40 Mhz
DSRC Antenna	5dBi @5GHz RP-SMA	5dBi @5GHz RP-SMA
WiFi Antenna	3dB @ 2.4GHz RP-SMA	3dB @ 2.4GHz RP-SMA
Ethernet	One (1) 10/100 (RJ-45) port with Auto Uplink™	One (1) 10/100 (RJ-45) port with Auto Uplink™
Console	standard RS-232C interface with DB-9 male connector	standard RS-232C interface with DB-9 male connector
Power Supply	15V, 1.2A DC jack or Power over Ethernet. Car power adapter (12v, 2Amps)	15V, 1.2A DC jack or Power over Ethernet. Car power adapter (12v, 2Amps)
Temperature	-31C to +75C	-31C to +75C
Form Factor	16cm X 10cm	16cm X 10cm
GPS	SiRF STAR III e/LP, 20 channel, USB based. Accuracy: 5m 2D RMS w/ WAAS, 10m 2D RMS w/o WAAS	SiRF STAR III e/LP, 20 channel, USB based. Accuracy: 5m 2D RMS w/ WAAS, 10m 2D RMS w/o WAAS
Bluetooth	Class II (10mtrs) USB dongle, 1 mW, +4 dBm TX power	Class II (10mtrs) USB dongle, 1 mW, +4 dBm TX power
Standards Compliance	IEEE 802.11 a/b/g/n, IEEE 802.11p, IEEE 1609.3, IEEE 1609.4	IEEE 802.11 a/b/g/n, IEEE 802.11p, IEEE 1609.3, IEEE 1609.4
Security	WPA2, WPA, AES-CCMP, TKIP, 64/128bit WEP, IEEE 802.1x, MAC, IPsec & SSL	WPA2, WPA, AES-CCMP, TKIP, 64/128bit WEP, IEEE 802.1x, MAC, IPsec & SSL
3G	AT&T 3G Sierra Wireless USB modem	AT&T 3G Sierra Wireless USB modem
Display	None	Mini D-Sub 15-Pin VGA type
Touch Panel	None	USB interface

System Architecture



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