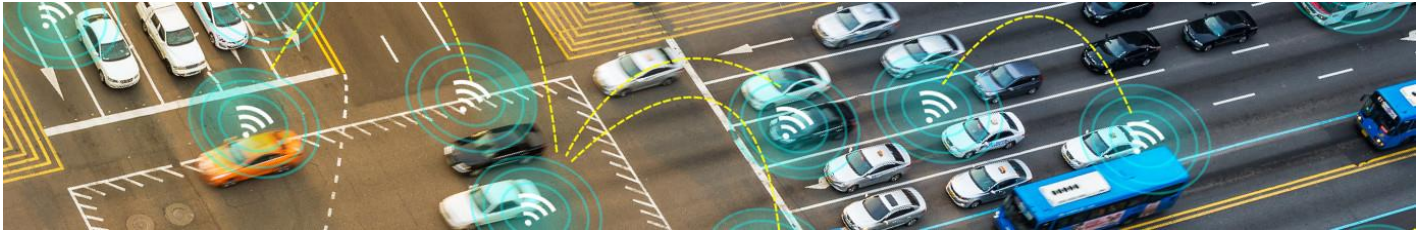


FULL-FEATURED SOFTWARE SOLUTION FOR V2X EQUIPMENT



MARBEN V2X OFFERS A COMPLETE READY-TO-USE SOFTWARE SOLUTION FOR RAPID DEVELOPMENT OF V2X EQUIPMENT INTEGRATING ROAD SAFETY APPLICATIONS AND NEW IN-VEHICLE MOBILITY SERVICE

READY-TO-USE SOLUTION – *GET YOUR V2X EQUIPMENT RUNNING QUICKLY*

PREDEFINED SAFETY APPLICATIONS

- MARBEN V2X offers a set of road safety applications:
 - Emergency Vehicle Approaching
 - Stationary Vehicle
 - Adverse Weather Warning
 - Roadwork and Advanced Roadwork
 - Emergency Electronic Brake Lights
 - Traffic Condition
 - Human Presence on the Road
 - In Vehicle Signage
 - Pedestrian Crash Avoidance
 - Wrong Way Driving
 - Variable Message Sign
 - Control Loss Warning
 - Vehicle Signal Priority/ Emergency Vehicle Pre-empt
 - Forward Collision Warning
 - Stop Sign Violation Warning
 - Blind Spot Warning
 - Lane Change Warning
 - Intersection Movement Assist
 - Left Turn Assist
 - Do Not Pass Warning
 - Curve Speed Warning
 - Icy Road Warning
 - Red Light Violation Warning
 - Green Light Optimal Speed Advisory
 - Transit/Freight Signal Priority
- Comes with easy-to-use C++ API for a rapid development of new applications

FULL PROTOCOL STACK WITH SECURITY & PRIVACY

- Supports European (ETSI) and US (IEEE/SAE) communication profiles including Security and Privacy management. Supports Chinese SAE profile.
- Supports US SCMS, European SCOOP@F and ETSI PKI.

EFFICIENT, SCALABLE & PORTABLE – *BENEFIT FROM DECADES OF EXPERIENCE*

FAST WITH A SMALL MEMORY FOOT PRINT

- Tunable parameters to optimize performance and memory usage
- Scalable to take advantage of multi-core and multi-processor architectures

HARDWARE AND NETWORK AGNOSTIC

- Supports DSRC 802.11p and LTE-V2X/5G,
- Supports most of the CPUs, Operating Systems, Hardware Security Module (HSM) and crypto accelerators available in the market

STANDARDS COMPLIANT & INTEROPERABLE – *COMPLETE CONNECTIVITY*

PROVEN INTEROPERABILITY

- Successful participation in V2X interoperability events and field operational tests (FOTs)
- In-Vehicle testing for all software modules for production readiness accuracy

AUTOMOTIVE GRADE

- Automotive Spice & MISRA C++ compliant

TARGET ITS STATIONS

- Onboard units
- Roadside units
- Mobile devices

About Marben

A global leader of communication solutions for the Telecommunication, Transportation and Automotive markets.

More than 30 years of experience

Delivers interoperable, robust and efficient software solutions to accelerate its customer's time to market.

Marben Customers

Bosch, Continental, Ericsson, Ficos, Flir ITS, Laird, LGE, Navya, Nokia, Oracle, PSA, Renault, Sirius XM, Valeo, Visteon, WNC ...

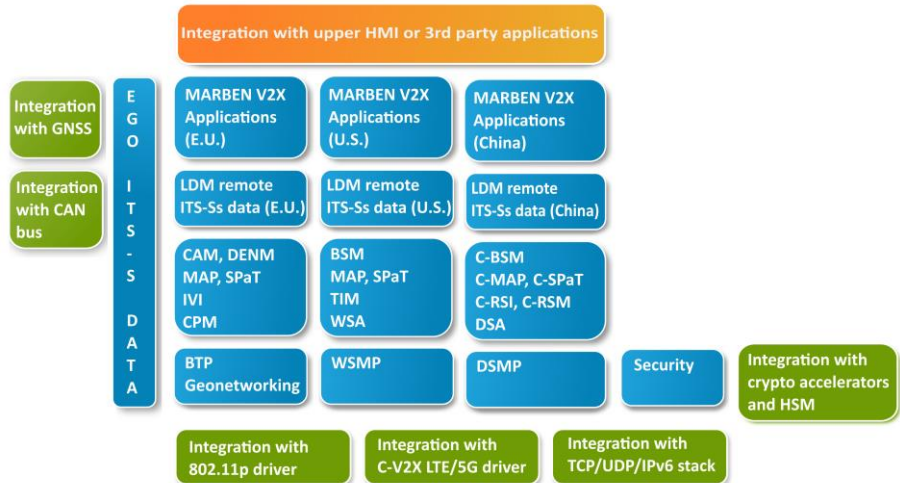
TECHNICAL OVERVIEW

COOPERATIVE INTELLIGENT TRANSPORTATION SYSTEMS

ITS (Intelligent Transportation Systems) are support systems for an efficient and safe use of transport infrastructures. Existing road ITS and driving assistance systems already increase road safety, reduce environmental impact or improve traffic management but additional benefits will come from sharing mobility information between vehicles and road infrastructures thanks to Cooperative ITS.

REQUIREMENTS

Sharing mobility information between vehicles and road infrastructures requires continuous communication for up to date information about vehicle states and their environment. ITS stations (vehicle and infrastructure) will constantly send and receive messages to and from stations in their neighborhood which results in a high volume of transmitted data. Therefore, ITS stations must be able to process a huge volume of messages within a very short time and support specific routing, transport and access technologies for direct vehicle communication.



MARBEN V2X SOFTWARE SOLUTION

MARBEN V2X is a complete software solution supporting the US (SAE/IEEE standards), the European (ETSI standards) and the Chinese (CSAE standards) V2X profiles. It has been designed to satisfy V2X demanding performance, reliability and robustness requirements. MARBEN V2X is hardware and network agnostic (CPUs, 802.11p, LTE V2X/5G, Hardware Security Modules) and can run on most of the available operating systems including Linux, QNX, ThreadX, PikeOS or Android but also in Autosar environment. By embedding security and privacy management, offering user-friendly APIs and pre-defined set of road safety and traffic optimisation applications, MARBEN V2X dramatically accelerates the development and the integration of V2X On-Board and Roadside units.

Fully scalable to take advantage of multi-core processor architectures, MARBEN V2X is ready to support the significant increase in the volume of Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) messages that will be exchanged when Cooperative ITS will be widely deployed. Moreover, by relying on MARBEN ASN.1 tools that enjoy a solid reputation for efficiency and robustness and are extensively deployed in the field, MARBEN V2X is the most efficient solution available on the market. Delivered as portable source code, MARBEN V2X can run on most operating systems and hardware platforms even on highly constrained systems.

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CONFORMANCE

IEEE 802.11p, IEEE 1609.4,
IEEE 1609.2, IEEE 1609.3 (WSMP, WSA/WRA),
SAE J2735 (BSM, MAP, SPaT, TIM, RSA, EVA, ICA, RTCM,
SSM, SRM,...), SAE J2945-1,
U.S. DOT/CAMP SCMS,
NHTSA/CAMP Applications recommendations,

ETSI EN 302 663 / TS 102 724 (Access Layer),
ETSI TS 102 792 (Mitigation)
ETSI TS 102 687 (DCC) / C2C-CC DCC white paper,
ETSI TS 102 894-2 (CDD),
ETSI EN 302 636-4-1 (Geonet), ETSI EN 302 636-5-1 (BTP),
ETSI EN 302 637-2 (CAM), ETSI EN 302 637-3 (DENM),
ISO/TS 19321 (IVI),
ETSI TS 103 301 (MAP, SPaT, IVI, RTCMEM, ...),
ETSI TR 103 562 (CPM),
ETSI EN 302 895 (LDM),
ETSI TS 103 097 (Security),
ETSI TS 102 941 (PKI)
ETSI TS 101 539-1 (Road Hazard Signalling)
C2C-CC Profile, C2C-CC triggering conditions

CSAE 53-2017 (Application Layer and Data Exchange)

SYSTEM REQUIREMENTS

Operating Systems:

- Linux
- QNX
- ThreadX
- PikeOS
- Real Time Kernels
- Android

Software:

- C++ compiler