

Glossary of Terms for EU-US Cooperation

Version 7

In 2009, the USDOT Research and Innovative Technology Administration (RITA) established a partnership with the Information Society and Media Directorate-General (DG-INFSO) of the European Commission (EC) to conduct cooperative research on Intelligent Transportation Systems (ITS) applications for surface transportation. The five-year commitment between the two organizations will further the development and implementation of global ITS initiatives, with an emphasis on vehicle-to-vehicle and vehicle-to-infrastructure communications for safety, mobility, and environment.

The US-EU bi-lateral working group is composed of USDOT representatives on the U.S. side and European Commission and industry representatives on the European side. The working group has established a technology roadmap for cooperative safety and sustainability and a set of collaborative work activities in the areas of applications, assessment tools, driver distraction, standards, and terminology.

This glossary, focused on Cooperative Systems Research in the U.S. and similar work in Europe, has been created as the main focus of the terminology task. The objective is to establish a common working definition for key terms and concepts to facilitate mutual understanding in ongoing discussions. The terms were chosen and vetted by the members of the bi-lateral task force. They have neither been adopted nor approved by the European Commission and cannot therefore be regarded as official or codified Commission terminology.

In order to make it easier to use this Glossary, its contents have been divided into two parts. One is for "general" terms, i.e. are in general use, either world-wide, or within cooperative systems for ITS, and the other is for "technical" terms, i.e. those that relate to a particular technology or its use within cooperative systems for ITS.

This glossary is a living document and as such suggestions for additions and comments are welcome. Please send any comments to Richard Bishop, Bishop Consulting, at: richardbishop@mindspring.com and Richard Bossom at: rb_its@btinternet.com.

General Terms

Term	Description	Source	
		EU	US
ACAT	Advanced Collision Avoidance Technologies – a NHTSA program which is defining methodologies to measure the link between technological performance and safety impact of crash avoidance systems.		✓
Access Technologies	Name of OSI layers 1 and 2 ¹	✓	
Access Technology Selector	In general an ITS Station offers several radio access technologies. Some of the applications are not assigned to a fixed technology and can choice an appropriate one. This facility can be used to select the access technology and to map messages onto it. The facility provides information on the status, availability and properties of the access technologies to the applications, but it will not automatically select a technology. The selection might be done using the information provided by the access technology selector either by the application itself or a by specific management entity. Particularly for safety critical applications the use of the ITS-5GS technology for message transmission is mandatory, but this does not exclude to use another, supplementary one.	✓	
Addressing Support	This facility supports the sending of message via broadcast, geocast or (local and global) unicast.	✓	
Aftermarket	Refers to equipment brought into the vehicle which is installed or brought in after purchase of the vehicle. Aftermarket modifications do not involve the vehicle manufacturer, as contrasted with retrofits which are done with the involvement of the vehicle manufacturer.		✓
AERIS	Applications for the Environment: Real-Time Information Systems -- part of the USDOT Cooperative Research Program program		✓
AU	Application Units	✓	

¹ Forms part of the ITS station reference architecture of ISO and ETSI – see also ITS station definition.

Glossary – General Terms

Term	Description	Source	
		EU	US
CALM	<p>Communications Access for Land Mobiles</p> <p>A standardized set of :</p> <ul style="list-style-type: none"> • access technologies for short, medium and long range ITS communication using one or more of several media; • networking and transport protocols; • upper layer protocols (facilities). <p>It operates in a bounded secure management domain supporting ITS services by means of communications between mobile stations (e.g. vehicles), between mobile and fixed stations and between fixed stations with the capability of handover between stations and access technologies. CALM is implementing opportunistic networking.</p>	✓	
CCU	Communication & Control Unit	✓	
CEN	<p>European Committee for Standardization (Comité Européen de Normalisation)²: it has a Technical Committee (TC278) that is dedicated to creating standards for ITS and operates in conjunction with a similar ISO Technical Committee (TC204). In TC278 there are several Working Groups dedicated to creating and maintaining standards for particular aspects of ITS. Its standards can be obtained through European Standards Organisations.</p>	✓	
Certificate	<p>A set of data that uniquely identifies an entity, contains the entity's public key and possibly other information, and is digitally signed by a trusted party, thereby binding the public key to the entity.</p>		✓
Certification	<p>The process of assuring that a system component or interface meets an established standard.</p>		✓
ConOps	<p>Concept of Operations – a user-oriented document that describes a system's operational characteristics from the end user's viewpoint.³</p>		✓

² For more information see: <http://www.cen.eu/cen/pages/default.aspx> .

³ The Institute of Electrical and Electronics Engineers, Inc (IEEE) Std 1362-1998 - IEEE Guide for Information Technology System Definition - Concept of Operations (ConOps) Document

Glossary – General Terms

Term	Description	Source	
		EU	US
Cooperative Systems	An EU term for systems that can bring new intelligence for vehicles, roadside systems, operators and individuals, by creating a universally understood communications “language” allowing vehicles and infrastructure to share information and cooperate in an unlimited range of new applications and services.	✓	
CVO	Commercial Vehicle Operations		✓
DG-INFSO	DG Information Society & Media – the part of the European Commission that is responsible for achieving the Information Society. Its G4 unit promotes ICT for Transport and manages the research and development work on cooperative systems currently being carried out in Europe.	✓	
EC	European Commission	✓	
EN	European Norm – it is the prefix given to individual European Standards	✓	
ESO	European Standards Organisations: a term usually given to national standards organisations in Europe, such as AFNOR (France), BSI (UK), DIN (Germany) and ÖNORM (Austria) ⁴ .	✓	
ETSI	European Telecommunications Standards Institute – produces globally-applicable standards for ICT, including fixed, mobile, radio, converged, broadcast and internet technologies. It has a Technical Committee (TC ITS) that is dedicated to creating standards for ITS. ⁵ .	✓	
FHWA	Federal Highway Administration – a major agency of the USDOT charged with the broad responsibility of ensuring that America’s roads and highways continue to be the safest and most technologically up-to-date.		✓
FOT	Field Operational Test – a real world test activity over an extended period of time conducted in real traffic not using professional test drivers and using near production systems. The intent is to get empirical data on impacts, user acceptance, and technical performance, as well as an understanding of unintended consequences.	✓	✓

⁴ A full list of ESO's can be found at: <http://www.worldwidestandards.com/european-standards>.

⁵ For more information see – <http://www.etsi.org/WebSite/Technologies/IntelligentTransportSystems.aspx>

Glossary – General Terms

Term	Description	Source	
		EU	US
FP6	Framework Programme 6 – a programme of Research, Technological Development, and Demonstration (RTD) projects and Support Actions that was funded in part by the EC during the period 2003 to 2006	✓	
FP7	Framework Programme 7 – the current programme of Research, Technological Development, and Demonstration (RTD) projects and Support Actions being funded in part by the EC during the period 2007 to 2014	✓	
GPL	General Public Licence – any source code and hardware designs with this Licence are fully public with no further limitations than the rules imposed by the License.	✓	
ICT	Information and Communications Technologies	✓	
IEEE	The Institute of Electrical and Electronics Engineers is the world’s largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity. IEEE and its members inspire a global community through IEEE's highly cited publications, conferences, technology standards, and professional and educational activities.		✓
Integrated Project (IP)	Integrated Project – an instrument within the EC Framework Programmes that enables the mobilisation of the critical mass of activities and resources needed to achieve ambitious scientific and technological objectives through a series of semi-independent sub-projects.	✓	
Intellectual Property	Intellectual Property (IP) is the term used in works originating as creations of the mind or intellect Examples are patents or trademarks or copyrights but IP can also include hardware and software design, algorithms, and methods.		✓
International Telecommunication Union (ITU)	ITU is the leading United Nations agency for information and communication technology issues, and the global focal point for governments and the private sector in developing networks and services. ITU plays a key role in standards development.	✓	

Glossary – General Terms

Term	Description	Source	
		EU	US
Interoperability	The ability of a system to communicate with other systems to provide the same service in different physical locations. It is also the ability of one system (or component) to replace another without degrading the service being provided.		✓
IPR	Intellectual Property Rights – a collection of rights which allow the IP creator to protect any of their creations that may have commercial value. The creator is granted certain exclusive rights and also may prevent others from exploiting them without his permission.	✓	
ISO	International Standards Organisation ⁶ : it has a Technical Committee (TC204) that is dedicated to creating standards for ITS and operates in conjunction with a similar CEN Technical Committee (TC278). In TC204 there are several Working Groups dedicated to creating and maintaining standards for particular aspects of ITS.	✓	
ISPs	Internet Service Providers	✓	
ITS	Intelligent Transport Systems: means applying Information and Communication Technologies (ICT) to the transport sector in an effort to manage factors that typically are at odds with each other, such as vehicles, loads, and routes to improve safety and reduce vehicle wear, transportation times, and fuel consumption	✓	
ITS Application	A functional definition of a service provided to an end user, which fulfils specific needs of a user; for example, forward collision warning	✓	✓
ITS Application Service Domain	This domain represents specific ITS implementations, such as road traffic control, management or information centres plus other forms of service provision that is related to road vehicles and may utilise vehicle-to-business communication.	✓	
ITS Architecture	A high-level system architecture developed specifically for Intelligent Transport Systems. Typically it will show the main “building blocks” from which ITS implementations can be created.	✓	

⁶ For more information see: <http://www.iso.org/iso/home.html>.

Glossary – General Terms

Term	Description	Source	
		EU	US
ITS Operational Support Domain	This domain includes components that are required to operate the ITS. There can be many of these components depending on the number of services that the ITS is expected to provide. An example is security related components that distribute or revoke certificates.	✓	
NHTSA	National Highway Traffic Safety Administration – a major agency of the USDOT with the mission to save lives, prevent injuries and reduce economic costs due to road traffic crashes, through education, research, safety standards and enforcement activity.		✓
Open Platform	A software and/or hardware environment that is available to those organisations wishing to develop and demonstrate applications in a particular domain. Thus there can be Open Platforms for vehicles, roadside and control centres.	✓	
Open Source	A set of software that is available for any organisation to use in the development and demonstration of applications.	✓	
OSGi	Open Services Gateway initiative, now called the OSGi Alliance – it is an open standards organization that has specified a Java-based service platform that can be remotely managed ⁷ .	✓	
PRE-DRIVE C2X	PREparation for DRIVING implementation and Evaluation of C-2-X Communication Technology – an EC funded project in the 7 th Framework Programme which was operational from October 2008 until September 2010. Its successor is the DRIVE C2X project.	✓	
Public Key Infrastructure (PKI)	It is a set of hardware, software, people, policies, and procedures needed to create, manage, distribute, use, store, and revoke digital certificates.		✓
Privacy	The ability of an individual or group to seclude themselves or information about themselves and thereby reveal themselves selectively.		✓

⁷ For more detailed information go to: <http://en.wikipedia.org/wiki/OSGi>

Glossary – General Terms

Term	Description	Source	
		EU	US
RTTI	Real Time Traffic Information – this term is applied to a service that provides drivers with information about the current state of traffic in a road network. It is updated to show how conditions are changing and may apply to all or part(s) of the road network.	✓	
SAE International	The Society of Automotive Engineers ⁸ is a global association of more than 128,000 engineers and related technical experts in the aerospace, automotive and commercial-vehicle industries. SAE International's core competencies are life-long learning and voluntary consensus standards development.		✓
Safety	The state of being “safe”, the condition of being protected against physical, occupational, psychological or other types or consequences of failure, damage, error, accidents, harm or any other event which could be considered non-desirable.		✓
Scalability	A system’s ability to handle growing amounts of work in a graceful manner or its ability to be enlarged (easily) in capacity to do so. For example, it can refer to the capability of a system to increase total throughput under an increased load when resources (typically hardware) are added.		✓
SCITS	Smart Communications in ITS. ⁹	✓	
Security	It is the degree of protection against danger, loss, and criminals, i.e. resistance to harm ¹⁰ .	✓	
SOA	Service Orientated Architecture	✓	
SOA Session Support	It is a facility that supports all applications using vehicle-to-business communication with session-related features. These include connection to backend systems (e.g. a central ITS Station), handling unexpected connection losses due to ITS Station mobility and maintaining the best connection as the available mechanisms change.	✓	

⁸ For more information see: <http://www.sae.org/>.

⁹ Used in the ETSI architecture standard on ITS. Synonym to CALM.

¹⁰ For more detailed information go to: <http://en.wikipedia.org/wiki/Security>

Glossary – General Terms

Term	Description	Source	
		EU	US
Stakeholder	Person or group affected by a transportation plan, program, or project. Stakeholders include any person or group with a direct interest (a “stake” as it were) in the US DOT Cooperative Research Program system.		✓
Subsystem	The collective name for the hardware and software components which provide the functionality in an application or a “building block” in an ITS architecture.	✓	✓
System Architecture	A formal description of a system, organized in a way that supports reasoning about the structural properties (components and interfaces) of the system.		✓
TCC	Traffic Control Center	✓	
TMC	Traffic Management Center	✓	
Use Case	A description of the behavior that a system will exhibit as it responds to a request that originates from outside that system. A use case is a particular scenario in which initial conditions are defined and a desired system response occurs to achieve an expected outcome.	✓	

Technical Terms

Term	Description	Source	
		EU	US
Absolute Positioning	Refers to a vehicle locating its position, to a very high degree of accuracy, with respect to an ideal surface of the Earth.		✓
ad-hoc networks	A de-centralised wireless network that does not rely on a pre-existing infrastructure, e.g. access points found in managed (infrastructure) wireless networks. Each participating node can forward data for other nodes. Which nodes will do this is determined dynamically based on the current network connectivity – see also ITS AD-hoc Network Domain.	✓	
Asynchronous Messaging Support	Due to the mobility of most ITS Stations, a synchronous communication between entities is not appropriate. Rather, an asynchronous exchange of information is required to account for the intermittent connectivity of ITS Stations and allow for the use of scalable system architectures. This covers both the pure exchange of information and the invocation of services provided by ITS Stations. As an example, this could be achieved by an event-based information exchange according to the asynchronous interaction style publish/ subscribe.	✓	
Automated Braking	Braking by control systems in the vehicle without driver initiation.		✓
Blind Spot Warning + Lane Change Warning (BSW+LCW)	This application will warn the vehicle driver if the blind spot zone into which the driver intends to switch the vehicle is, or will soon be, occupied by another vehicle traveling in the same direction and that a lane change is not safe. The application also provides advisory information to the vehicle driver whenever a vehicle in an adjacent lane is positioned in its blind spot zone. A lane change attempt is based, only as a proxy, upon driver's initiation of the vehicle's turn signal indicator.		✓
Brake Assist	Braking by control systems in the vehicle after the driver has initiated braking. The vehicle senses that the driver intends to apply a force and completes the braking for the driver.		✓
C2C	Car to Car communications	✓	

Glossary – Technical Terms

Term	Description	Source	
		EU	US
C2X	“Car to anything” communications, i.e. it covers Car to Car (C2C) and Car to Infrastructure, Car to Central Systems, etc.	✓	
CAM	Co-operative Awareness Message – it has the role of a heartbeat of the communications network, regularly providing key information to/from the ITS stations.	✓	
Car breakdown warning	A safety-related hazard warning based use case which warns drivers when approaching a breakdown car either by the stranded car itself or by a following car that detects a disabled vehicle (e.g., detecting zero velocity).	✓	
Cautionary Threat Level	A driving conflict in which the probability of a collision is sufficient to inform the driver and/or prepare vehicle systems for automatic intervention.		✓
Central ITS Station	The instance of an ITS Station that is in a "central" location such as a TCC or Service Provider Centre – see definition of "ITS Station" for what it contains.	✓	
CI	Communication Interface. Implementation of an access technology. ¹¹	✓	
CICAS	Cooperative Intersection Collision Avoidance System – systems that provide warning and/or control to assist drivers at intersections in cases of impending violations of traffic control devices and in general to help them safely manoeuvre through cross traffic.		✓
CICAS-SLTA	CICAS specifically focused on Signalized Left Turn Assistance at signalized intersections with permissive left turns.		✓
CICAS-V	CICAS specifically focused on preventing violations of traffic signals and stop sign devices.		✓
Collision Mitigation	The process of reducing the energy of a crash by reducing speed when the crash is judged to be inevitable. A collision mitigation system reduces speed via automatic braking.		✓
Control Loss Warning (CLW)	This application enables a vehicle to broadcast a self-generated control loss event to surrounding vehicles. The receiving vehicle determines the relevance of the event and, then if appropriate, provides a warning to its driver.		✓

¹¹ ISO standard

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Controller Area Network	Controller Area Network (CAN) is a data bus used within passenger vehicles to share data among vehicle systems.		✓
Cooperative flexible lane change	A safety-related awareness based use case which considers the flexible allocation of a dedicated lane (e.g. reserved to public transport) to some vehicles, which get a permanent or temporary access right.	✓	
Cooperative forward collision warning	A safety-related cooperative awareness based use case which warns drivers when collisions (rear-end collisions, etc.) might happen.	✓	
Cooperative glare reduction	A safety-related cooperative awareness based use case which enables automatic switching of headlights (high-beam to low-beam) of the vehicle when it approaches a vehicle that goes in the opposite direction.	✓	
Cooperative merging assistance	A safety-related cooperative awareness based use case in which vehicles negotiate the merging process with each other and give advice to the driver.	✓	
Crash Avoidance Safety Applications	These applications warn a driver or potentially initiate vehicle control actions in the final seconds prior to an impending crash.		✓
Curve speed warning	A safety-related hazard warning based use case which calculates safe speed for vehicle entering the curve and provides information to driver if current speed is higher than safe speed.	✓	
Data Authentication	A process used to verify data integrity, e.g., verification that data received are identical to data sent, or verification that a program is not infected by a virus. ¹²		✓
DENM	Decentralized Environmental Notification Message – it provides information about a location based situation detected by vehicles or roadside units and distributed by store and forward mechanisms within the ITS Ad Hoc Domain without a central control unit.	✓	

¹² Alliance for Telecommunications Industry Solutions ATIS-0100523.2007 - Telecom Glossary

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Differential GPS (DGPS)	DGPS is an enhancement to Global Positioning System that uses a network of fixed ground based reference stations to broadcast the difference between the positions indicated by the satellite systems and the known fixed positions. These stations broadcast the difference between the measured satellite pseudo-ranges and actual (internally computed) pseudo-ranges, and receiver stations may correct their pseudo-ranges by the same amount.		✓
Discovery Mechanism	A mechanism used by both V2V and V2I networks to obtain information about ITS Stations and their hosted applications. It provides functionality for multicasting probe messages and the ability to listen to announcements broadcast by ITS Stations. This mechanism is used in cooperative systems to enable vehicle based ITS Stations to "discover" the services that are available in the current geographic locations.	✓	
Do Not Pass Warning (DNPW)	This application warns the driver when a slower moving vehicle cannot be safely passed using a passing zone which is occupied by vehicles with the opposite direction of travel. When a passing maneuver is initiated (uses the turn indicator actuation as a proxy) the application determines the presence or absence of an on-coming vehicle in the passing zone of the adjacent lane and if found a warning is issued to the driver. This application can also be operated in an advisory mode to inform the driver that the passing zone is occupied without the use of the turn signal actuation as a proxy.		✓
DVI	Driver Vehicle Interface (used synonymously with HMI)		✓
DSRC	Dedicated Short Range Communications: these provide low-latency data-only V2V and V2I communications for use in applications such as such as Electronic Fee Collection (EFC), crash avoidance, and In-Vehicle Signing. The term “DSRC” originally was used to refer to tolling systems at 5.8 GHz. Now the term is also used to refer to DSRC operation at 5.9 GHz under the IEEE 802.11p standard.	✓	
ECU	Engine Control Unit	✓	

Glossary – Technical Terms

Term	Description	Source	
		EU	US
EFC	Electronic Fee Collection	✓	
Emergency Electronic Brake Lights (EEBL)	<p>USA: A V2V application in which a strongly braking vehicle sends a message intended for following vehicles which indicates the degree of braking and location of the braking vehicle. It enables a vehicle to broadcast a self-generated emergency brake event to the surrounding vehicles. The receiving vehicle determines the relevance of the event and provides a warning to the driver if appropriate. It is particularly useful when the driver's line of sight is obstructed by other vehicles or bad weather conditions, e.g., fog, heavy rain.</p> <p>EU: A safety-related cooperative awareness based use case which warns drivers before driving into a (suddenly) hard braking vehicle.</p>	✓	✓
Emergency vehicle warning	A safety-related cooperative awareness based use case which warns drivers to yield right of way to an approaching emergency vehicle.	✓	
Enabled	Used for Forward Collision Warning/Mitigation systems developed in the U.S. CAMP program to indicate that the feature has been enabled; however, feature activation criteria are not met yet to perform monitoring or warning functions.		✓
Engaged	Used for Forward Collision Warning/Mitigation systems developed in the U.S. CAMP program to indicate the system is monitoring the relevant data inputs and assessing the threat from potential remote target vehicles. The system is ready-to-warn in case of any rear-end collision determination by computing warning functions.		✓
Event Driven Architecture (EDA)	A software architecture for promoting the production, detection and consumption of events. The last two may include reacting to them .	✓	
Facilities	Name of OSI layers 5, 6 and 7. ¹³		
False Alarm	The occurrences of incorrect driver alarms are presented to a driver by a crash avoidance system.		✓

¹³ Forms part of the ITS station reference architecture of ISO and ETSI – see also ITS station definition.

Glossary – Technical Terms

Term	Description	Source	
		EU	US
FCD	Floating Car Data – data provided by cars about their current location, speed and direction of travel, together with a time stamp. This data can be used to determine traffic flow rates and speeds across a road network. This term is interchangeable with “probe vehicle data” in the US and is also sometimes expressed as Floating Vehicle Data – FVD.	✓	
Forward Collision Warning (FCW)	This application issues a warning to the vehicle driver in case of an impending rear-end collision with a vehicle ahead in traffic in the same lane and direction of travel. It will help drivers avoid or mitigate rear-end vehicle collisions in the forward path of travel.		✓
Generic Access Network Domain	A facility that can be used to connect ITS Stations in vehicles and the roadside directly to the Internet. Using it requires the support of the communications infrastructure (i.e. base stations or access points) and is thus not based on ad hoc networking principles.	✓	
Geo-Networking	it is the geographic addressing and routing via the exchange of information with vehicles in a particular geographic area (potentially far away from the information source) using reliable and scalable communication capabilities.	✓	
GID	Geometric Intersection Description – a digital representation of the geometry (physical layout and measurements) of the intersection that enables a vehicle to match itself to the correct approach road and to the correct approach lane on that approach road.		✓
Global Positioning System (GPS)	A USA-operated satellite-based navigational system allowing the determination of a unique point on the earth's surface with a high degree of accuracy and provides a highly accurate time source given a suitable GPS receiver. The network of satellites is owned by the US Department of Defense. It uses an intermediate circular orbit (ICO) satellite constellation of at least 24 satellites.		✓

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Global System for Mobile Communications (GSM)	The most popular standard for mobile communications in the world, using digital methods for both speech and signalling channels. Its ubiquity makes international roaming very common between mobile phone operators and also provides the operators with the ability to choose components from a wide variety of suppliers.	✓	
Hazardous location notification	A safety-related hazard warning based use case which warns drivers against upcoming bad weather road conditions (slippery road, fog, rain, etc.).	✓	
HMI	Human Machine Interface (used synonymously with DVI)	✓	
I2V	Infrastructure to Vehicle communications	✓	
Identity management	Describes how identities and keys to be used in secure communications are managed. This includes a description and management of identities for vehicular communications.	✓	
IEEE 1609 (WAVE)	The IEEE 1609 Family of Standards for Wireless Access in Vehicular Environments (WAVE) define an architecture and a complementary, standardized set of services and interfaces that collectively enable secure vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) wireless communications. Together these standards are designed to provide the foundation for a broad range of applications in the transportation environment, including vehicle safety, automated tolling, enhanced navigation, traffic management and many others.		✓
IEEE 802.11p™	IEEE 802.11™ is a standard covering wireless LANs in vehicular environments. Its full title is, "IEEE Standard for Information Technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements--- Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications---Amendment 6: Wireless Access in Vehicular Environments."		✓
Imminent Threat Level	A driving conflict in which the probability of a collision is sufficient to alert the driver to take avoidance action and/or trigger vehicle systems for automatic intervention.		✓

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Infrastructure Device	Any piece of equipment connected to the cooperative system that is placed on the roads, bridges, rail lines, and similar public works that are on or near a transportation system or other public institution.		✓
Intelligent cooperative Intersection Safety (IRIS)	A SAFESPOT project infrastructure-based application to identify potential red light violators, to support drivers turning right in being aware of pedestrians and cyclists, and to assist unprotected left turning vehicles without a separate green light.	✓	
Internet Domain	This is the backbone communication network that allows bridging the different communication domains. These may include domains that provide a wide range of Internet services, such as WWW, email and many other services.	✓	
Intersection Movement Assist (IMA)	This application warns the vehicle's driver when it is not safe to enter an intersection due to high probability of collision with other vehicles. Initially it is intended to help drivers avoid or mitigate vehicle collisions at stop-sign controlled and uncontrolled intersections.		✓
In-vehicle security components	The components within the vehicle needed to create a trustworthy sender and protect the in-vehicle systems from un-authorized access and may consist of intrusion detection systems or firewalls.	✓	
ITS Ad Hoc Domain	See ITS Ad-hoc Network Domain below.	✓	
ITS Ad Hoc Network Domain	This domain comprises ITS Stations, including ITS Vehicle Stations and ITS Roadside Stations and enables ad hoc communication in between them. The communication in this domain is based on wireless technologies using communications protocols such as IEEE 802.11p ¹⁴ . It allows for mobility of the ITS (Vehicle) Stations forming arbitrary network topologies without the need for a coordinating communication infrastructure and includes the necessary measures to maintain privacy, security and trustworthiness in the communications.	✓	

¹⁴ See separate definition of the IEEE 802.11™ standard.

Glossary – Technical Terms

Term	Description	Source	
		EU	US
ITS Personal Station	A consumer electronics device, which is typically assigned to a person, e.g. pedestrian or cyclist. In case the consumer electronics device is linked to a vehicle, it is considered as ITS Vehicle Station. The ITS Personal Station typically consists of two components: a) Personal CCU, which realises the communication to participate within the ITS ad hoc network and to get access to the core network via e.g. UMTS; and b) one or more application units to run ITS applications.	✓	
ITS Roadside Infrastructure Network Domain	This domain enables ITS Roadside Stations to communication with each other, using either wired or wireless networks. Access to a core network in the Internet Domain can also be provided but may be intermittent due to the limited wireless coverage of the short range wireless technology used in the ITS ad hoc networks. It can also be used by ITS Vehicle Stations to communicate with each other via a local network.	✓	
ITS Station	A collection of functional components that participate in the provision of ITS services at a particular location. Thus an ITS Station may exist in a vehicle, at the roadside, in a central location such as a TMC or TCC ¹⁵ , or in a mobile device – see definitions of particular instances.	✓	
Lane change assistant	A safety-related cooperative awareness based use case which provides information about cars on neighbouring lanes when the driver intends to make a lane change.	✓	
Latency	Latency is strictly defined as the time from the start of packet transmission on the originating node to the start of packet reception at the end node and may include time spent in relaying via an access point or a base station. This definition is independent of the communications link throughput and the packet size and is the absolute minimum delay possible. Latency can be dependent on a number of installation specific factors and these should be stated when they apply.	✓	

¹⁵ See later definitions.

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Left turn collision warning	A safety-related cooperative awareness based use case which provides information of presence, position and movement of oncoming vehicles from opposite traffic.	✓	
LDM	Local Dynamic Map – a time and location referenced database that forms layers on top of an accurate digital map. The layers enable such things as landmarks, road signs, and vehicles to be separately located on a digital map. ¹⁶	✓	
LLC	Logical Link Control	✓	
Location Referencing	Location Referencing: location referencing defines and specifies a reference method to locate a geographic coordinates point or event with regards to road topology and road traffic.	✓	
Long Term Evolution (LTE)	It is a set of enhancements to the Universal Mobile Telecommunications System (UMTS) and was introduced in 3rd Generation Partnership Project (3GPP) Release 8 and has the aim of increasing the capacity and speed of mobile telephone networks. Much of 3GPP Release 8 focuses on adopting 4G mobile communication's technology, including an all-IP flat networking architecture. However LTE is not fully compliant with the accepted 4G requirements.	✓	
LTAP/OD	Crash type: Left Turn Across Path/Opposite Direction		✓
M5	"Microwaves at 5 GHz". Indicates an access technology based on IEEE 802.11p. ¹⁷	✓	
MAC	Medium Access Control – a sub-layer of the data link layer that is specified in the seven-layer OSI model. It provides addressing and channel access control mechanisms that make it possible for several nodes to communicate within a multi-point network.	✓	
Message Queuing	A facility that enables output messages to be buffered when connectivity is not available to the ITS Station. It supports both a traditional First-In-First-Out (FIFO) queue and, by making use of the facility Priority Management, a priority-based queue based on the varying importance of the data in the buffered messages.	✓	

¹⁶ A detailed definition is available in a document that can be downloaded from the SAFESPOT project website at: http://www.safespot-eu.org/documents/D3.3.3_local-dynamic-map-spec.pdf

¹⁷ IEEE standard – see earlier reference.

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Messaging Support	A facility that supports the generation, extraction and management of Cooperative Awareness Messages (CAM) and Decentralized Environmental Notification Messages (DENM). It also supports the generation of service advertisements and includes the facility of message caching.	✓	
Message Throughput	The number of messages (successfully) delivered per unit time. It depends on several network parameters (e.g., queuing, two-way latency, available bandwidth, radio channel quality and potential retransmissions).	✓	
Missed Detection	Indicates the situation in which a collision avoidance system fails to detect a threat which the system is designed to detect		✓
Motorcycle warning	A safety-related hazard warning based use case which warns drivers for approaching motorcycles.	✓	
Networking & Transport	Name of OSI layers 3 and 4. ¹⁸	✓	
OBE	On-Board Equipment – a piece of ITS related hardware that is located in a vehicle to collect data from the vehicle, and/or provide an interface through which ITS services can be provided, e.g. navigation, trip planning, travel information. ¹⁹ It may be one piece of equipment or several pieces of equipment are packaged into a single physical entity.	✓	
OBU	On-Board Unit – a piece of hardware that is located in a vehicle and is only used for Electronic Fee Collection.	✓	
Overtaking vehicle warning	A safety-related cooperative awareness based use case in which an overtaking (passing) vehicle signals its action to the vehicle being overtaken to secure the situation.	✓	
Packet Error Rate	It is the number of incorrectly transferred data packets divided by the number of transferred packets. A packet is assumed to be incorrect if at least one bit in it is incorrect.	✓	

¹⁸ Forms part of the ITS station reference architecture of ISO and ETSI – see also ITS station definition.

¹⁹ Used in ITS architecture standards from ISO and ETSI

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Personal ITS Station	The instance of an ITS Station that is located in a personal device – see definition of "ITS Station" for what it contains.	✓	
Pre-crash sensing	A safety-related cooperative awareness based use case which prepares for imminent and unavoidable collisions by exchanging vehicle attributes after a non-avoidable crash is detected.	✓	
Priority Management	This facility enables the definition and the assignment of priorities to information (i.e., messages) gathered by ITS stations. So for example, the priority of data can be reflected by the order in which messages are delivered.	✓	
Privacy components	It defines the components that are needed to protect the privacy of the communication system users..	✓	
Profile Concept	This enables the description and efficient management of dependencies among the technology components that belong to a particular variant of a system that is a subset of a generic ITS architecture. It is closely interconnected to system deployment and enables this to be done gradually using sub-sets with different profiles.	✓	
Relevance Checker	It is a facility that checks whether a received message is relevant or not in the current context and is used to support applications. Frequently used checks include that the message is relevant to the position of the vehicle according to a digital map and in particular whether it relates to something in front of, or behind it.	✓	
Retrofit	<p>(adj.) Refers to a component that has been installed after a vehicle or part of the transport infrastructure was constructed.</p> <p>(v.) To install on-board equipment into existing vehicles for communication with other vehicles, the infrastructure or portable communication devices.</p> <p>Retrofits are done with the involvement of the vehicle manufacturer, as contrasted with aftermarket modifications, which do not involve the vehicle manufacturer. Retrofitted devices therefore can access proprietary vehicle-based data.</p>		✓
Right turn collision warning	A safety-related cooperative awareness based use case which provides information of presence, position and movement of oncoming vehicles from left side.	✓	

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Roadside ITS Station	The instance of an ITS Station that is located at the roadside – see definition of "ITS Station" for what it contains.	✓	
Roadway Inventory	A collection of geo-reference and descriptive data from the road network that may include elements such as lane width, roadway markings, traffic signs, and traffic devices. Geo-reference data provide the location of the element in space: latitude, longitude, and altitude while descriptive data define the element: length, width, height, content and condition.		✓
Road works warning	A safety-related hazard warning based use case which informs drivers of ongoing road works and associated obstruction of road traffic in the vicinity.	✓	
RSE	Road Side Equipment – a piece of ITS related hardware that is located at the side of the road to exchange data with vehicles in its locality and in some instances provide an interface through which travellers can access ITS related services, e.g. Public Transport schedules ²⁰ . It may be one piece of equipment or several pieces of equipment are packaged into a single physical entity.	✓	
RSU	Road-Side Unit – a piece of hardware that is located at the roadside and is only used for Electronic Fee Collection.	✓	
RTK	Real-Time Kinematic (RTK) uses carrier phase observations processed in real-time to provide corrections for satellite-based positioning.		✓
RTTI	Real Time Traffic Information – this term is applied to a service that provides drivers with information about the current state of traffic in a road network. It is updated to show how conditions are changing and may apply to all or part(s) of the road network.	✓	
SAE J2735	This SAE standard “Dedicated Short Range Communications (DSRC) Message Set Dictionary”, supports interoperability among DSRC applications through the use of standardized message sets, data frames and data elements.		✓

²⁰ Used in ITS architecture standards from ISO and ETSI

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Service Content Database	It provides a storage medium for maintaining information about vehicle applications. As examples, it can be used to store parameters such as the interface description needed to invoke an ITS Station application,, or to maintain the dynamic information gathered by a monitoring facility.	✓	
Signal violation warning	A safety-related use case which warns drivers when a signal is violated and to modify the pre-emption in presence of emergency vehicles.	✓	
Slow vehicle warning	A safety-related hazard warning based use case which warns drivers to prevent rear-end collisions to slow moving vehicles.	✓	
Smart Park	A United States Department of Transportation (USDOT) Federal Motor Carriers Safety Administration (FMCSA) project to demonstrate technology for conveying real-time information on parking availability to truckers on the road.		✓
SPAT (also written as SPaT)	Signal Phase and Timing – refers to a message that conveys real-time information (including current signal indications) from a specific traffic signal device. In the US DOT Cooperative Research Program, the message is sent from the roadway infrastructure to an approaching vehicle.		✓
Station Capability & Monitoring	It is a facility that contains information about the ITS Station type (e.g. Vehicle, or Roadside), the Station capabilities (e.g. the supported access technologies), the Station identity (static for Roadside ITS Stations or dynamically changed pseudonyms to protect the privacy of Vehicle ITS Stations), and other Station related static or variable information.	✓	
Stop Line	Demarcated location on an approach to an intersection where a vehicle needs to stop for appropriate traffic control devices. For CICAS, the stop line location must be included in the geometric intersection description. For intersection approaches that do not have a stop line, an appropriate stopping location will be included in the geometric intersection description.		✓
Stop sign violation	A safety-related case which warns driver and the incoming driver about a stop signal violation.	✓	

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Target Classification	A mechanism for classifying the type of target detected by such things as sensors on-board vehicles. Thus for example targets could be classified as other vehicles (with the vehicle type), motorcyclists, cyclists, pedestrians, etc.	✓	
Threat Arbitration	A mechanism that arbitrates between threats that are detected by ITS Stations.	✓	
Traffic jam ahead warning	A safety-related hazard warning based use case which warns drivers when approaching the tail end of a traffic jam.	✓	
Traffic Management Message Support	It is a facility that provides functions for generating, sending, receiving and extraction of messages. These functions are not application specific and may be used by every application in a particular ITS Station.	✓	
Traffic signal phase	The green, yellow, and red clearance intervals in cycle that are assigned to an independent traffic movement or combination of movements.		✓
Traffic signal timing:	The amount of time allocated for the display of a signal indication.		✓
Transmission Interval Control (TIC)	It is a mechanism that enables the intervals between successive message transmissions to be controlled in order that congestion in the communications network can be managed.	✓	
Transmit Power Control (TPC)	It is a mechanism that enables the power of message transmissions to be controlled and thus the geographic area in which they are available. This is used to manage the congestion in the communications network.	✓	
UMTS	Universal Mobile Telecommunications System: one of the third-generation (3G) mobile telecommunications technologies.	✓	
V2B	Vehicle-to-Business Communication: a form of V2X specific to vehicles interacting with businesses, such as car dealerships, or vehicle insurance organisations.	✓	
V2I	Vehicle to Infrastructure communications: communications between Vehicle ITS Stations and the infrastructure, e.g. Roadside ITS Stations.	✓	

Glossary – Technical Terms

Term	Description	Source	
		EU	US
V2V	Vehicle to Vehicle communications: communication between Vehicle ITS Stations without the direct involvement of other ITS Stations, except in ad-hoc networks.	✓	
V2X	“Vehicle to anything” communications, i.e. it covers Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I), Vehicle to Central Systems, etc. (essentially the same definition as C2X)	✓	✓
VCI	Virtual CI. Instantiation of a CI. ²¹	✓	
Vehicle Data Provider	It is a facility that manages the access that applications within a Vehicle ITS Station have to actual vehicle data, e.g. acceleration, status of exterior lights. The facility just presents the data, hiding how it was obtained, but does include indications of its accuracy and how close to real time it is.	✓	
Vehicle-Infrastructure	Abbreviated V-I or V2I – One- or two-way communication between vehicle-based devices and devices in the roadway infrastructure.		✓
Vehicle Integration Platform (VIP)	It is a component to facilitate a secure and efficient message exchange among vehicles and backend systems, and provides dedicated mechanisms to discover and monitor the former.	✓	
Vehicle ITS Station	The instance of an ITS Station that is located in the vehicle – see definition of "ITS Station" for what it contains.	✓	
Vehicular Ad Hoc NETWORK (VANET)	It is a technology that uses moving vehicles as nodes in a road network to create a mobile communications network. Every participating vehicle becomes a wireless router or node, allowing vehicles approximately 100 to 300 meters of each other to connect and, in turn, create a network with a much wider range. As vehicles fall out of the signal range and drop out of the communications network, others can join in, connecting vehicles to one another so that a mobile Internet is created.	✓	
Vehicle Safety Communications	Low-latency wireless communications between vehicles or between vehicles and infrastructure that support Crash Avoidance Safety Applications		✓

²¹ ISO standard

Glossary – Technical Terms

Term	Description	Source	
		EU	US
Violation	A violation is operationally defined under CICAS V as crossing the stopping location at a stop sign before stopping or as passing the stopping location on a red light for a signalized intersection although legal definitions may vary by locality.		✓
VMIS	Vehicle Maintenance Information System - a system containing a set of reporting features that allow accurate performance evaluations in order to run vehicular fleets at full capacity. ²²	✓	
Vulnerable road user warning	A safety-related hazard warning based use case which provides warning to driver of the presence of vulnerable road users, e.g. motorcycles in case of dangerous situations.	✓	
Which Lane	It is the accuracy level for the vehicle location that enables the vehicle to determine which lane on which road it is using as it approaches an intersection.		✓
Which Road	It is the accuracy level for the vehicle location that enables the vehicle to determine which road it is using as it approaches an intersection.		✓
Wrong way driving warning	A safety-related hazard warning based use case which detects wrong way driving vehicles and warns affected, endangered drivers.	✓	
WRI	Wireless Roadside (safety) Inspection –an inspection of a commercial vehicle or driver that occurs at the roadside where data is collected from on-board systems and transmitted via wireless communications to public sector entities (people and systems).		✓
XFCD	Extended Floating Car Data – data provided by cars that in addition to their current location, speed and direction of travel and time stamp, includes some of the data that can be obtained from the increasing amount of intelligence that is fitted to cars (such as rain sensor, obstacle detection, traction information, etc.). It may also be expressed as "vehicle probe data" in the US and is also sometimes expressed as Extended Floating Vehicle Data – XFVD ²³ .	✓	

²² EU Technical Roadmap document for cooperative systems.

²³ Note that it is possible that over time "XFCD" will replace "FCD".

Glossary – Technical Terms