Cooperative Automated Transportation (CAT) Coalition Infrastructure-Industry Working Group

Primer of Definitions for AV Infrastructure and Related AV/CV Terms
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Background

The Infrastructure-Industry (I-I) Working Group is one of six working groups in the CAT Coalition. The I-I Working Group supports the adoption of pre-competitive industry research in driving infrastructure development and maintenance, connects Infrastructure Owner Operators (IOOs) with industry, pursues the natural evolution of infrastructure to accelerate connected and automated vehicle (CAV) deployment, and clarifies terms, definitions, and target audiences.

This document is a Primer that intends to define infrastructure-related AV/CV terms and acronyms. This resource was conceived as part of the inaugural I-I Working Group work plan. The intended audience for this document includes both public- and private-sector stakeholders who are seeking to understand the many terms and acronyms used for CAT in the industry.

This document is divided into the following sections:
- CAT-Related Terms
- CAT-Related Organization, Project, and Initiative Acronyms

Additionally, sources for all definitions are contained at the end of this resource. It is important to emphasize that the definitions contained in this Primer are not intended as a preferred definition or to be exclusive of variations or interpretations used by other organizations. Rather, the definitions below are intended to serve as a starting point for practitioners to have a common understanding of terms used either by IOOs, original equipment manufacturers (OEMs), or both. The far-right column is intended as a general reference for where the term originated: USDOT (and also broadly including other Federal sources), IOOs, or OEMs (including industry and standards development organizations). However, in some cases terms have a long history and may now be widely used across IOOs and OEMs, for example.

CAT-Related Terms

Acronym	Definition (Reference)	Origin
ABS	Anti-Lock Braking System. A system that prevents wheel lock-up by automatically regulating the brakes. ABS can decrease braking distances on slippery pavement, prevent skidding, and provide greater control during sudden stops. (1)	OEM
ACC	Adaptive Cruise Control. An available cruise control advanced driver-assistance system for road vehicles that automatically adjusts the vehicle speed to maintain a safe distance from vehicles ahead. As of 2019, it is also called by 20 unique names that describe that basic functionality, including dynamic cruise control. Control is based on sensor information from on-board sensors. Such systems may use a radar or laser sensor or a camera setup allowing the vehicle to brake when it detects the car is approaching another vehicle ahead, then accelerate when traffic allows it to. (2)	OEM
ACN	Automatic Crash Notification. An emerging safety technology designed to notify emergency responders that a crash has occurred and provide its location. (3)	USDOT
ACR	Adjacent Channel Rejection. A measure of how well a receiver performs on its frequency channel when there is an interfering system in the vicinity operating on a nearby channel. (4)	OEM
ACSF	Automatically Commanded Steering Function. The function within a complex electronic control system where actuation of the steering system can result from automatic evaluation of signals initiated on-board the vehicle, possibly in conjunction with passive infrastructure features, to generate continuous control action in order to assist the driver in following a particular path, in low speed maneuvering or parking operations. (5)	OEM
ADAS	Advanced Driving Assistance Systems. Additional electronic systems in motor vehicles supporting the driver in certain driving situations. They often focus on safety aspects or on increased driving convenience. ADAS safety features are designed to avoid collisions and crashes by offering technologies that alert the driver to potential problems, or for example, automate the vehicle lighting to come on at dusk or sudden darkness, provide adaptive cruise control, give automated braking, assist a vehicle to stay in its lane, give automated traffic warnings via GPS, allow hands free voice activated smartphone connection, alert drivers to other cars or dangers, etc. There are many forms of ADAS available that function from data supplied by modules such as cameras, Light Detection and Ranging (LIDAR), radar, sensors, computers, and in-car networking. Emerging ADAS systems will also take advantage of externally supplied data through V2V and V2X systems through real time interface with other vehicles and surrounding infrastructure. (1)	
ADS	Automated Driving System. A complex combination of various components that can be defined as systems where perception, decision making, and operation of the automobile are performed by electronics and machinery instead of a human driver, and as introduction of automation into road traffic Automated Driving Systems may include systems for which there is no human driver or for which the human driver can give control to the automated driving systems and would not be expected to perform any driving-related tasks for a period of time. (1)	
ADV	Automated Delivery Device. An automated or autonomous car, van, or truck which operates on the public roads, and carries goods, but not passengers. (22)	
AEB	Automated Emergency Braking. A system that detects an impending forward crash with another vehicle in time to avoid or mitigate the crash. These systems first alert the driver to take corrective action to avoid the crash. If the driver's response is not sufficient to avoid the	OEM

Acronym	Definition (Reference)	Origin
	crash, the AEB system may automatically apply the brakes to assist in preventing or reducing the severity of a crash. The NHTSA (8) believes these technologies represent the next wave of potential significant advances in vehicle safety. AEB systems, such as dynamic brake support (DBS) and crash imminent braking (CIB), have the potential not only to save lives but to also reduce moderate and less severe rear-end crashes that are common on our roadways. (1)	
AERIS	Applications for the Environment: Real-Time Information Synthesis. USDOT Research Program established by the Intelligent Transportation Systems (ITS) Joint Program Office (JPO) to investigate whether it was possible and feasible to: • Identify connected vehicle applications that could provide environmental impact reduction benefits via reduced fuel use and efficiency impacts on emissions. • Facilitate and incentivize "green choices" by transportation service consumers (i.e., system users, system operators, policy decision makers, etc.). • Identify vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and vehicle-to-grid (V2G) data (and other) exchanges via wireless technologies of various types. • Model and analyze connected vehicle applications to estimate the potential environmental impact reduction benefits. • Develop a prototype for one of the applications to test its efficacy and usefulness. (6)	USDOT
AFV	Alternative Fuel Vehicle. An alternative fuel vehicle is a motor vehicle that runs on alternative fuel, an energy other than traditional petroleum fuels (petrol or Diesel fuel); and also refers to any technology of powering an engine that does not involve solely petroleum (e.g., electric car, hybrid electric vehicles, solar powered). (2)	OEM
AGC	Automatic Gain Control. A closed-loop feedback regulating circuit in an amplifier or chain of amplifiers, the purpose of which is to maintain a suitable signal amplitude at its output, despite variation of the signal amplitude at the input. (2)	OEM
AHDA	Automated Highway Driving Assistant. Highway Driving Assist system by Toyota that includes cooperative-adaptive cruise control that uses 700 MHz band vehicle-to-vehicle ITS communications to gather acceleration/ deceleration data from the vehicles ahead and maintain a safe, uniform following distance. The second part of AHDA is Lane Trace Control, which Toyota described as a more advanced form of its Lane Keeping Assist system. Current-generation lane systems simply provide a warning or minimal amount of steering feedback when the vehicle begins to stray from the lane, but Toyota's Lane Trace adjusts the steering angle, torque and braking in order to maintain a driving line within the lane. (7)	OEM
AMS	Analysis, Modeling and Simulation. The use of data analysis and models (e.g., physical, mathematical, or logical representation of a system, entity, phenomenon, or process) as a basis for simulations to develop data utilized for managerial or technical decision making. (2)	
ANPRM	Advance Notice of Proposed Rulemaking. Agency publication of an initial analysis of subject matter, often asking for early public input on key issues. Any data or communications regarding the upcoming rule would be made available to the public for review. Occasionally, a board of potentially affected parties is comprised to do give-and-take bargaining over rulemaking subject-matter which would otherwise result in deadlocked opposition by an interested party. (2)	USDOT
AP	Access Point. A networking hardware device that allows other Wi-Fi devices to connect to a wired network. (2)	OEM

Acronym	Definition (Reference)	Origin
ASD	Aftermarket Safety Device. A connected device not integrated during vehicle manufacture but added after sale. It is installed in a vehicle and is capable of sending and receiving messages over a Dedicated Short-Range Communication (DSRC) wireless communications link. The device has a driver interface, runs V2V and V2I safety applications, and issues audible or visual warnings and/or alerts to the driver of the vehicle. (1)	OEM
ASN.1	Abstract Syntax Notation One. A standard interface description language for defining data structures that can be serialized and deserialized in a cross-platform way. It is broadly used in telecommunications and computer networking, and especially in cryptography. (2)	OEM
ATC	Advanced Transportation Controller. A standardization effort being undertaken by the United States Department of Transportation as part of their intelligent transportation system (ITS) efforts and being developed by the Institute of Transportation Engineers. The ATC is being developed to provide an open platform for hardware and software for a wide variety of ITS applications. ATC has been identified as the highest priority standardization effort within the ITS community. (2)	USDOT
ATIS	Advanced Traveler Information System. Technologies that provide travelers, businesses, commercial carriers, and transportation professionals with the information they need to make decisions, from daily individual travel decisions to larger-scale decisions that affect the entire system, such as those concerning incident management. (8)	IOO
AV	Automated Vehicle. One of several widely used terms to call a vehicle with automation capability. These are an automated vehicle, an autonomous vehicle, a self-driving vehicle, and a driverless vehicle. It should be noted that some people use these terminologies interchangeably without any clear distinctions while other people attempt to differentiate the terminologies and use a specific term over the other. Given that there is no consensus on the definitions of these terminologies as of now, a few example definitions are provided below. (1)

• Automated Vehicle: A vehicle in which at least some aspects of a safety-critical control function (e.g., steering, throttle, or braking) occur without direct driver input. Vehicles that provide safety warnings to drivers (forward crash warning, for example) but do not perform a control function are, in this context, not considered automated, even though the technology necessary to provide that warning involves varying degrees of automation (e.g., the necessary data are received and processed, and the warning is given, without driver input). Automated vehicles may use onboard sensors, cameras, GPS, and telecommunications to obtain information in order to make their own judgments regarding safety-critical situations and act appropriately by effectuating control at some level

• Self-Driving Vehicle: A vehicle having the ability to drive by itself using onboard sensors, without the need of any intervention from human driver. A self-driving car is not as advanced as driverless, in that driverless doesn't have the back-up of a person taking control, and self-driving might. Driverless taxis are not merely self-driving, they pick up passengers and may be personless. In SAE terms, driverless is Level 5, while self-driving is Level 4 or below.

• Autonomous Vehicle: A vehicle that is capable of sensing its environment and navigating without human input. A human may select a destination but is not required to mechanically operate the vehicle. Autonomous vehicles sense their surroundings with such techniques as radar, LIDAR, GPS technology, or computer vision. Advanced control | OEM |

Acronym	Definition (Reference)	Origin
	systems on board the vehicle then interpret the sensor information to identify the appropriate navigation paths and obstacles and interpret the relevant signs. Given that driverless and autonomous are nearer to synonyms, autonomous is Level 5 in SAE terms. A vehicle in which vehicle operation occurs without direct human driver input to control key functions such as steering, acceleration, and braking. There are various degrees of autonomy, but future systems will be principally designed so that the vehicle's passenger is not required to monitor the roadway or intervene in the operation of the vehicles in any way. • Driverless Vehicle: A driverless car (sometimes called a self-driving car, an automated car or an autonomous vehicle) is a robotic vehicle that is designed to travel between destinations without a human operator. To qualify as fully autonomous, a vehicle must be able to navigate without human intervention to a predetermined destination over roads that have not been adapted for its use.	
AVI	Automatic Vehicle Identification. A system which combines an on-board tag or transponder with roadside receiver for the automated identification of vehicles. Used for electronic toll collection, stolen vehicle recovery, using vehicles as traffic probes, etc. (8)	IOO
AVL	Automatic Vehicle Location. Computerized system that tracks the current location of fleet vehicles, to assist dispatching, etc. (8)	
AVR	Automated Vehicle Research. Research to develop, test, and safely advance automated vehicle deployment. (6)	USDOT
BAA	Broad Agency Announcement. Technique for United States government agencies to solicit proposals from outside groups for certain research and development. The agency will then select proposals to fund as contracts or grants. (2)	USDOT
BER	Basic Encoding Rules. Original rules laid out by the ASN.1 standard for encoding abstract information into a concrete data stream. The rules specify the exact sequences used to encode a given data item. (2)	OEM
BSM	Blind Spot Monitoring. One of the ADAS applications that monitors the driver's blind spots at the rear quarters of the car and provides visual, audible and/or tactile alerts when a vehicle is present in a situation requiring such alerts. (1)	OEM
BSM	Basic Safety Message. Data broadcasted from vehicles through V2V and V2I at a frequency of 10 Hz. The core contents of a BSM are data elements that describe a vehicle's position (latitude, longitude, and elevation) and motion (heading, speed, and acceleration). (1)	OEM
BSS	Basic Service Set. A subgroup, within a service set, of devices that share physical-layer medium access characteristics (e.g. radio frequency, modulation scheme, security settings) such that they are wirelessly networked. (2)	OEM
BSSID	BSS Identifier. Defines the BSS and identifies all devices within it. A 48-bit label that conforms to MAC-48 conventions. A device may have multiple BSSIDs, but usually each BSSID is associated with at most one basic service set at a time. (2)	OEM
BSW	Blind Spot Warning. Notification generated using a vehicle-based sensor device that detects other vehicles located to the driver's side and rear. Warnings can be visual, audible, vibrating, or tactile. (2)	OEM
C-ITS	Cooperative Intelligent Transportation Systems. A subset of the overall ITS that Communicates and Shares Information between independently operated and independently	USDOT

Acronym	Definition (Reference)	Origin
	authenticated devices to give advice or facilitate actions with the objective of improving safety, sustainability, efficiency, and comfort. (9)	
CA	Certificate Authority. An entity that issues digital certificates that confirm authenticity of the certificate owner. (10) A trusted component authorized to create, sign, and issue public key certificates. (12)	
CA	Collision Avoidance. A motorcar safety system designed to prevent or reduce the severity of a collision. (2)	OEM
CACC	Cooperative Adaptive Cruise Control. A connected vehicle application that aims to dynamically adjust and coordinate cruise control speeds among platooning vehicles to improve traffic flow stability and increase throughput. (6)	OEM
CAN	Controller Area Network. A robust vehicle bus standard designed to allow microcontrollers and devices to communicate with each other's applications without a host computer. (2)	OEM
CAT	Cooperative Automated Transportation. The intersection of infrastructure with connected and automated vehicles, and associated supporting technologies.	IOO
CCH	Control Channel. Designated, single channel used as a special rendezvous channel that devices will tune to on a regular basis. (11)	OEM
CCI	Cross Channel Interference. Potential problems caused by simultaneous operation, particularly on adjacent channels, in a given region. (11)	OEM
CDDS	Communications Data Delivery System. Communications cost model developed by NHTSA. (6)	USDOT
CFR	Code of Federal Regulations. Codification of the general and permanent rules and regulations published in the Federal Register by the executive departments and agencies of the Federal government of the United States. (2)	USDOT
CI	Connected Intersection. An infrastructure system that broadcasts signal, phase and timing (SPaT), mapping information and position correction data to On-Board Units and Mobile Units. (23)	
CIB	Crash Imminent Braking. A system which automatically detects a potential forward collision and activates the vehicle braking system to decelerate the vehicle with the purpose of avoiding or mitigating a collision. (2)	OEM
CICAS	Cooperative Intersection Collision Avoidance Systems. Intersection collision avoidance systems that use both vehicle-based and infrastructure-based technologies to help drivers approaching an intersection understand the state of activities within that intersection. (6)	USDOT
CICAS-SSA	Cooperative Intersection Collision Avoidance Systems – Stop Sign Assist. An application that utilizes traffic information broadcasting from roadside equipment to warn drivers of potential collisions at stop sign intersections. (6)	USDOT
CICAS-V	Cooperative Intersection Collision Avoidance Systems – Violations. a vehicle-based driver warning system that alerts drivers to potential violations of stop signs or red traffic lights. (6)	USDOT
CLW	Control Loss Warning. Safety application that warns the driver in the case of an emergency control loss event (defined as activation of the Antilock Brake System, Traction Control System, or Stability Control System) by another vehicle traveling in the same or opposite direction. (6)	USDOT

Acronym	Definition (Reference)	Origin
CME	Certification Management Entity. The certificate issued to an SCMS function (e.g., PCA, RA, LA) that authenticates its trustworthiness to all other entities and users in the system. (12)	OEM
ConOps	Concept of Operations. A systems engineering document describing the characteristics of a proposed system from the viewpoint of one or more individuals who will use that system.	
CP	Certificate Policy. The document that describes the roles and responsibilities for implementing a Public Key Infrastructure (PKI), the rules governing how certificates are obtained, the technical requirements for generation and protection of private keys and certificates, and the requirements for periodic compliance audits and audit records. (12)	OEM
CRL	Certificate Revocation List. A list of certificate identifiers that the misbehavior authority (MA) identifies to be misbehaving due to technical malfunction or user malfeasance. (12)	OEM
CSMA	Carrier Sense Multiple Access. Media access control (MAC) protocol in which a node verifies the absence of other traffic before transmitting on a shared transmission medium, such as an electrical bus or a band of the electromagnetic spectrum. (2)	OEM
CSR	Common Safety Request. SAE J2735 message set used when a vehicle participating in the exchange of the basic safety message can make specific requests to other vehicles for additional information required by safety applications. (6)	OEM
CSW	Curve Speed Warning. A connected vehicle application where alerts are provided to the driver who is approaching a curve at a speed that may be too high for safe travel through that curve. (6)	USDOT
CV	Connected Vehicle. A vehicle (car, truck, bus, etc.) that is equipped with a wireless communication device (1). A CV uses any of the available wireless communication technologies to communicate with other cars on the road (vehicle-to-vehicle [V2V]), roadside infrastructure (vehicle-to-infrastructure [V2I]), and other travelers and the cloud. (1)	
CVE	Common Vulnerabilities and Exposures. System that provides a reference-method for publicly known information-security vulnerabilities and exposures. (2)	OEM
CVE	Connected Vehicle Environment. The deployed system of connected vehicle devices, infrastructure, and back-end functions that will enable safety, mobility, and environment applications to be used by transportation system users. (12)	
CVISN	Commercial Vehicle Information Systems and Networks. A network that connects existing Federal, State, and private-sector information systems to improve commercial-vehicle movement. (8)	USDOT
CVP	Connected Vehicle Professional. Credentialing Program that is a comprehensive education and certification curriculum collaboratively launched between the Connected Vehicle Trade Association (CVTA) and The Next Education. (13)	OEM
CVSS	Common Vulnerability Scoring System. A free and open industry standard for assessing the severity of computer system security vulnerabilities. (2)	OEM
CVRIA	Connected Vehicle Reference Implementation Architecture. A research effort by the USDOT ITS Joint Program Office (JPO) that aims to identify key interfaces of the Connected Vehicle environment and to develop a plan for Connected Vehicle Standards (5). The CVRIA has now been incorporated into the national ITS architecture (ARC-IT) and will no longer be a separate architecture. (1)	USDOT

Acronym	Definition (Reference)	Origin
CWIM	Crash Warning Interface Metrics. NHTSA project that addressed issues of the driver-vehicle interface (DVI) for Advanced Crash Warning Systems. (14)	USDOT
DAC	Driver Acceptance Clinics. USDOT effort to obtain feedback on connected vehicle technology and safety applications from a representative sample of drivers. (6)	USDOT
DBS	Dynamic Brake Support. A technology that supplements the driver's brake if it is not hard enough already. (2)	OEM
DCM	Data Capture and Management. USDOT Program supporting the creation and expansion of access to high-quality, real-time, multimodal transportation data, captured from connected vehicles, mobile devices, and infrastructure. (6)	USDOT
DCM	Device Configuration Manager. A function that is critical to the activation of devices. The DCM is responsible for providing end-user devices and internal SCMS functions with access to new information, such as updates to the CME certificates of one or more authorities, and relaying policy decisions or technical guidelines issued by the SCMS manager. (12)	USDOT
DDT	Dynamic Driving Task. Various activities required to operate a moving vehicle in an environment that changes due to alignment, weather, roadside conditions, etc. These tasks include steering, braking, accelerating, etc. (1)	OEM
DE	Data Element. A basic unit of information built on standard structures having a unique meaning and distinct units or values. (2)	OEM
DER	Distinguished Encoding Rules. A subset of Basic Encoding Rules (BER) defined in the ITU-T X.690 standard that encodes each data item (element or frame) in a three-part structure consisting of an identifier, length, and contents. (11)	OEM
DF	Data Frame. A collection of one or more data elements within a message set. (2)	OEM
DFS	Dynamic Frequency Selection. A channel allocation scheme specified for wireless LAN, commonly known as Wi-Fi. (2)	OEM
DII	Driver Infrastructure Interface. Infrastructure-based technology and signage through which a driver is given information from the roadside. (6)	IOO
DIL	Driver-In-The-Loop. Indication that a driver is involved in the driving task and is aware of the vehicle status and road traffic situation. Being in-the-loop means that the driver plays an active role in the driver-vehicle system. (15)	OEM
DMA	Dynamic Mobility Applications. USDOT program containing six bundle application prototype development projects, e.g. FRATIS, IDTO, and INFLO. (6)	USDOT
DNPW	Do Not Pass Warning. An application where alerts are given to drivers to help avoid a head-on crash resulting from passing maneuvers. (6)	USDOT
DNS	Domain Name System. A hierarchical and decentralized naming system for computers, services, or other resources connected to the Internet or a private network. (2)	OEM
DOL	Driver Out (of the) Loop. Performance meaning that the driver is not immediately aware of the vehicle and the road traffic situation because they are not actively monitoring, making decisions or providing input to the driving task. (15)	OEM
DoS	Denial of Service. A cyber-attack in which the perpetrator seeks to make a machine or network resource unavailable to its intended users by temporarily or indefinitely disrupting services of a host connected to the Internet. (2)	

Acronym	Definition (Reference)	Origin
D-RIDE	Dynamic Ridesharing. USDOT application that is an approach to carpooling in which drivers and riders arrange trips within a relatively short time in advance of departure. (6)	USDOT
DR-OPT	Drayage Optimization. USDOT application bundle that seeks to combine container load matching and freight information exchange systems to fully optimize drayage operations, thereby minimizing bobtails/ dry runs and wasted miles, as well as spreading out truck arrivals at intermodal terminals throughout the day. (6)	USDOT
DSS	Decision Support System. Technology system that can assess a large volume of data and situations to assist operators with the prediction and evaluation of complex traffic interactions and selection of appropriate response strategies. (6)	
DSRC	Dedicated Short Range Communications. A communications protocol developed to address the safety critical issues associated with sending and receiving data among vehicles and between moving vehicles and fixed roadside access points. These provide low-latency data-only V2V and V2I communications for use in applications such as Electronic Fee Collection (EFC), crash avoidance, In-Vehicle Signing and Cooperative Adaptive Cruise Control (CACC). 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. (1)	
DVI	Driver Vehicle Interface. The displays and controls through which the driver and the vehicle system interact. (14)	OEM
EBS	Electronic Braking System. Heavy duty commercial vehicle system that provides electronic activation of all braking system components including retarder and engine brake. (2)	OEM
ECA	Enrollment Certificate Authority. The function that activates or initializes the OBE by issuing an enrollment certificate. (12)	OEM
ECACC	Eco-Cooperative Adaptive Cruise Control. Connected vehicle application that is part of AERIS Eco-Lanes bundle for dedicated freeway lanes. (6)	USDOT
ECC	Elliptic Curve Cryptography. A public key cryptography method that utilizes points found within a curve group to create keys. The point selected from the curve is multiplied by a random number numerous times. (12)	OEM
ECDSA	Elliptic Curve Digital Signature Algorithm. An asymmetric cryptographic algorithm used in IEEE 1609.2 authentication. (11)	OEM
ECU	Electronic Control Unit. A unit embedded in the vehicle that controls one or more electrical systems, such as the engine control unit or the human-machine interface. (1)	OEM
EDCA	Enhanced Distributed Channel Access. Mechanism that provides different priorities of wireless access primarily through selection of the idle time and backoff range parameters. (11)	OEM
EEBL	Electronic Emergency Brake Light. Connected vehicle application where the driver is alerted to hard braking in the traffic stream ahead. This provides the driver with additional time to look for, and assess situations developing ahead. (6)	USDOT
ELD	Electronic Logging Device. A piece of electronic hardware attached to a commercial motor vehicle engine to record driving hours. (2)	OEM
EPKA	Enveloped Public Key Encryption. Method that allows for the secure sending of a communication over an open networked environment. (2)	OEM

Acronym	Definition (Reference)	Origin
ESC	Electronic Stability Control. A system that provides selective wheel braking to improve vehicle handling and help drivers regain control in certain extreme circumstances. ESC employs components of the anti-lock braking system and is required on all passenger vehicles starting with the 2012 model year. Systems on SUVs generally also incorporate Rollover Mitigation. (1)	OEM
ESS	Environmental Sensor Station. Sensor in the field that is part of a Road Weather Information System (RWIS) to measure and collect a specific type of field data, such as real-time atmospheric parameters, pavement conditions, water level conditions, and visibility. (2)	
EVAC	Emergency Communications and Evacuation. An application providing dynamic route guidance information, current traffic and road conditions, location of available lodging, and location of fuel, food, water, cash machines, and other necessities. (1)	USDOT
EVAM	Emergency Vehicle Alert Message. SAEJ2735 message that might be sent by emergency vehicle types, including police cars, ambulances, and tow trucks. (11)	OEM
FARS	Fatality Analysis Reporting System. Nationwide census providing NHTSA, Congress, and the American public yearly data regarding fatal injuries suffered in motor vehicle traffic crashes. (https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars)	USDOT
FCW	Forward Collision Warning. An application where alerts are presented to the driver in order to help avoid or mitigate the severity of crashes into the rear end of other vehicles on the road. Forward crash warning responds to a direct and imminent threat ahead of the host vehicle. (6)	USDOT
FISMA	Federal Information Security Management Act. 2002 United States law requiring each federal agency to develop, document, and implement an agency-wide program to provide information security for the information and information systems that support the operations and assets of the agency, including those provided or managed by another agency, contractor, or other source. (2)	
FIPS	Federal Information Processing Standards. Publicly-announced standards developed by the National Institute of Standards and Technology for use in computer systems by non-military American government agencies and government contractors. (2)	
FMVSS	Federal Motor Vehicle Safety Standard. U.S. federal vehicle regulations developed and enforced by NHTSA specifying design, construction, performance, and durability requirements for motor vehicles and regulated automobile safety-related components, systems, and design features. (2)	USDOT
FOT	Field Operation Test. Test including multiple objects to be tested in a real-life environment for an extended period of time. (6)	IOO
FRATIS	Freight Advanced Traveler Information Systems. USDOT bundle of applications that provides freight-specific dynamic travel planning and performance information and optimizes drayage operations so that load movements are coordinated between freight facilities to reduce empty-load trips. (6)	USDOT
FSP	Freight Signal Priority. A method of signal priority that provides right of way at signals near freight facilities based on current and projected freight movements (1)	
FSS	Fixed Satellite Service. A radiocommunication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas. (2)	OEM

Acronym	Definition (Reference)	Origin
FV	Following Vehicle. The vehicle immediately upstream of the specified vehicle. (6)	OEM
GES	General Estimates System. Data used in traffic safety analyses by NHTSA as well as other DOT agencies. (https://www.nhtsa.gov/national-automotive-sampling-system-nass/nass-general-estimates-system)	USDOT
GID	Geometric Intersection Description. Representation of road segments conveyed as part of the SAE J2735 MAP Message. (6)	USDOT
GHz	Gigahertz. 1000000000 hertz, which is the derived unit of frequency in the International System of Units (SI). Hertz is defined as one cycle per second. (2)	
GPS	Global Positioning System. A United States government satellite-based radionavigation system that provides geolocation and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. (2)	
GSM	Group System for Mobile. Standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets. (2)	
HAV	Highly Automated Vehicle. SAE Levels 3-5 vehicles with automated systems that are responsible for monitoring the driving environment, in order to draw a distinction between Levels 0-2 and 3-5 based on whether the human operator or the automated system is primarily responsible for monitoring the driving environment. (1)	OEM
HF	Human Factors. Research conducted to understand the impact of automated technology on human decision-making and driving behavior. For instance, studies are being done to investigate whether the use of cellular phones while driving distracts drivers to the extent that more accidents occur with their use. (8)	
HIA	Here I Am (devices). Devices in vehicles that have no access to internal vehicle state, and derive their safety message contents primarily from GPS signals; they do not have receivers or provide driver warnings. (11)	
HMAC	Hash-based Message Authentication Code. A specific type of message authentication code (MAC) involving a cryptographic hash function and a secret cryptographic key, which may be used to simultaneously verify both the data integrity and the authenticity of a message. (2)	OEM
HMI	Human Machine Interface. An interface responsible for two-way communication between a vehicle and its occupants. An HMI may incorporate touchscreen displays, voice recognition, or integration with mobile devices. It enables a human being to interact with a machine. (1)	OEM
HTG	Harmonization Task Group. A means for focused analysis between United States and European Union transportation agencies to lead to harmonization and/or joint development of specific standards, protocols, and policies for connected vehicle systems. Initiated in 2009, this included HTG1: Security Standards, HTG3: Communication Protocols, HTG6: Security Policy, and HTG 7: Standards Selection. (https://www.standards.its.dot.gov/DevelopmentActivities/IntlHarmonization)	USDOT
HUD	Heads Up Display. A display of important information within the user's field of vision. (1)	OEM
HV	Host Vehicle. The specified vehicle that hosts the on-board unit and driver who will receive connected vehicle application messages. (6)	OEM

Acronym	Definition (Reference)	Origin
ICA	Intersection Collision Avoidance. Systems that use both vehicle-based and infrastructure-based technologies to help drivers approaching an intersection understand the state of activities within that intersection. (6)	
ICA	Intermediate Certificate Authority. A certificate authority (CA) that issues certificates for all CAs below it, and that is not a root CA. Its value is that it shields the root CA from traffic and attacks. It may also allow for greater flexibility in permission granting. (12)	OEM
ICM	Integrated Corridor Management. Efficiently managing a corridor as a multimodal system to make operational decisions for the benefit of the corridor as a whole to leverage underutilized capacity in the form of parallel roadways, single-occupant vehicles, and transit services to improve person throughput and reduce congestion. (6)	USDOT
ICWS	Intersection Conflict Warning Systems. Technology deployed at stop-controlled intersections to support safer decisions by drivers. (6)	IOO
IDTO	Integrated Dynamic Transit Operations. The bundle of applications that transform transit mobility, operations, and services through the availability of new data sources and communications. IDTO consist of three applications, T-CONNECT, T-DISP and D-RIDE. (1)	USDOT
IMA	Intersection Movement Assist. Connected vehicle safety application that warns the driver when it is not safe to enter an intersection due to a crash possibility. (6)	USDOT
IMU	Inertial Measurement Unit. Electronic device that measures and reports a body's specific force, angular rate, and sometimes the orientation of the body, using a combination of accelerometers, gyroscopes, and sometimes magnetometers	OEM
INC-ZONE	Incident Scene Work Zone Alerts for Drivers and Workers. An application with two components: one warns drivers that are approaching temporary work zones at unsafe speeds or trajectories; the other audibly warns public safety personnel and other officials working in such zones about potential vehicle incursions. (1)	USDOT
INFLO	Intelligent Network Flow Optimization. USDOT bundle of connected vehicle applications that includes SPD-HARM, Q-WARN, and CACC. (6)	USDOT
IP	Internet Protocol. Communications protocol that provides an identification and location system for computers on networks and routes traffic across the Internet. (2)	OEM
IPG	Inter Packet Gap. Minimal pause that may be required between network packets or network frames, which may be necessary to allow for receiver clock recovery, permitting the receiver to prepare for another packet, for example. (2)	OEM
IPv6	Internet Protocol version 6. Most recent version of the Internet Protocol (IP), the communications protocol that provides an identification and location system for computers on networks and routes traffic across the Internet. Developed by the Internet Engineering Task Force (IETF). (2)	OEM
I-SIG	Intelligent Traffic Signal System. A traffic signal system that uses data collected from vehicles through V2V and V2I communications as well as pedestrian and non-motorized travelers to control signals and maximize flows in real time. The ISIG application also plays the role of an overarching system optimization application, accommodating transit or freight signal priority, preemption, and pedestrian movements to maximize overall network performance. (1)	USDOT
ITS	Intelligent Transportation Systems. The application of advanced technologies to improve the efficiency and safety of transportation systems. (8)	

Acronym	Definition (Reference)	Origin
J2735	Dedicated Short Range Communications (DSRC) Message Set Dictionary. SAE standard intended to meet the requirements of applications that depend upon transferring information between vehicles and roadside devices, between vehicles themselves (using DSRC for time critical applications), and between vehicles and centers using other wireless mediums for non-time critical applications. The J2735 standard provides the foundation for a variety of applications including vehicle safety, emergency vehicle notification, automated tolling, enhanced navigation, traffic management and many others. (10)	OEM
J2945	Dedicated Short Range Communication (DSRC) Systems Engineering Process Guidance for SAE J2945/X Documents and Common Design Concepts™. (10)	OEM
J3016	Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles. (10)	OEM
LA	Linkage Authority. The function responsible for generation and creation of linkage values, which are added to certificates to achieve efficient revocation. (12)	OEM
LCW	Lane Change Warning. An application where alerts are given to drivers during host vehicle lane changes (Lane Change Warning) to help the driver avoid crashes associated with potentially unsafe lane changes.	USDOT
LDW	Lane Departure Warning. Technology designed to help drivers avoid unintentionally drifting out of lanes by providing warnings when they cross a lane line without signaling. (6)	OEM
LKA	Lane Keep Assist. Technology designed to help drivers avoid unintentionally drifting out of lanes by providing steering corrections when they cross a lane line without signaling or by actively centering them within their lanes. (6)	OEM
LOS	Level of Service. A qualitative measure used to analyze roadways and intersections by categorizing traffic flow and assigning quality levels of traffic based on performance measure like vehicle speed, density, and congestion. (2)	
LRR	Long Range Radar. Radars using the 77 GHz band (from 76-81GHz) that provide better accuracy and better resolution, and are used for measuring the distance to, speed of other vehicles and detecting objects within a wider field of view e.g. for cross traffic alert systems. Long range applications need directive antennas that provide a higher resolution within a more limited scanning range. Long-range radar (LRR) systems provide ranges of 80 m to 200 m or greater. (21)	OEM
LTA	Left Turn Assist. Connected vehicle safety application that warns the driver that, due to oncoming traffic, it may not be safe to proceed when attempting a left turn. (6)	USDOT
LTAP/LD	Left Turn Across Path / Lateral Direction. Crash type defined as a collision where a vehicle approaches an intersection and attempts to turn left across an opposing lane of traffic and either strikes or is struck by a vehicle entering the intersection from the cross-street on the left. (17)	USDOT
LTAP/OD	Left Turn Across Path / Opposite Direction. Crash type defined as a collision where a vehicle approaches an intersection and attempts to turn left across an opposing lane of traffic and either strikes or is struck by a vehicle entering the intersection from the opposite direction. (17)	USDOT
LTV	Light Truck Vehicle. US classification for trucks or truck-based vehicles with a gross vehicle weight up to 8,500 pounds and a payload capacity up to 4,000 pounds. (2)	OEM
LV	Lead Vehicle. The vehicle immediately downstream of the specified vehicle. (16)	OEM

Acronym	Definition (Reference)	Origin
LVD	Lead Vehicle Decelerating. The vehicle immediately downstream of the specified vehicle when it is decreasing velocity. (16)	
LVM	Lead Vehicle Moving. The vehicle immediately downstream of the specified vehicle when it is in motion. (16)	
LVS	Lead Vehicle Stopped. The vehicle immediately downstream of the specified vehicle when it is not moving. (16)	
MA	Misbehavior Authority. The SCMS function responsible for detecting, tracking, and managing potential threats to the SCMS and connected vehicle system. The MA is also responsible for CRL creation, management, and publishing through the CRL generator activity. Other activities within the MA include CRL store, CRL broadcast, and IBLM. (12)	OEM
MaaS	Mobility as a Service. The integration of various forms of transport services into a single mobility service accessible on demand. To meet a customer's request, a MaaS operator facilitates a diverse menu of transport options such as public transport, ride-, car- or bike-sharing, taxi or car rental/lease, or a combination thereof. For the user, MaaS can offer added value through use of a single application to provide access to mobility, with a single payment channel instead of multiple ticketing and payment operations. (1)	
MAC	Message Authentication Code. A short piece of information used to authenticate a message—i.e., to confirm that the message came from the stated sender (its authenticity) and has not been changed. The MAC value protects a message's data integrity, as well as its authenticity, by allowing verifiers (who also possess the secret key) to detect any changes to the message content. (2)	OEM
MAC	Medium Access Control. Data sublayer that defines the rules by which stations compete to share a wireless medium. (11)	OEM
MAP	MAP Message. SAEJ2735 message containing intersection geometry information. (6)	IOO
MMITSS	Multimodal Intelligent Traffic Signal System. A V2I connected vehicle application bundle that is the next generation of traffic signal systems. MMITSS provides a comprehensive framework to serve all modes of transportation, including general vehicles, transit, emergency vehicles, freight fleets, pedestrians, and bicyclists. (1)	
MOU	Memorandum of Understanding. A type of agreement between two or more parties. (2)	
NPRM	Notice of Proposed Rulemaking. A public notice that is issued by law when an independent agency of the US government wishes to add, remove, or change a rule or regulation as part of the rulemaking process. (2)	USDOT
OBD	On-Board Diagnostics. A built-in diagnostic system on all newer vehicles that monitors vehicle emissions control systems for proper operation. Problems that cause an increase in emissions will illuminate the "check engine" Malfunction Indicator Light (MIL) on the dash. The OBD system also provides a standardized Diagnostic Link Connector (DLC) for attaching diagnostic tools to the vehicle. (1)	OEM
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. tolls, navigation, trip planning, travel information. (1) Also known as an On-Board Unit.	OEM

Acronym	Definition (Reference)	Origin
OBU	On-Board Unit. 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. tolls, navigation, trip planning, travel information. (1) Also known as On-Board Equipment.	OEM
ODD	Operational Design Domain. A domain describing the specific conditions under which a given automated driving system or feature is intended to function, in the automated driving environment. An area that is limited by either geography or operating conditions under which a vehicle or autonomous features may be intended to work. Examples include Freeways, downtown areas, roadways with speed limits < 35 mph. (1)	OEM
OEDR	Object and Event Detection and Response. The detection by the driver or automated driving systems of any circumstance that is relevant to the immediate driving task, as well as the implementation of the appropriate driver or system response to such circumstance. (1)	OEM
OEM	Original Equipment Manufacturer. A company that produces hardware to be marketed under another company's brand name. For example, if Samsung makes a monitor that will be marketed by Dell, a "Dell" label will get stuck on the front, but the OEM of the monitor is Samsung. (1)	OEM
ORD	Object Registration & Discovery. Registration and lookup services necessary to allow objects to locate other objects operating within the Connected Vehicle Environment. (6)	USDOT
OTA	Over The Air. Software or firmware updates to a vehicle that are downloaded from the cloud. Connected vehicles are increasingly enabled to receive remote OTA software updates and transmit diagnostic and operational data from on-board systems and components. By leveraging vehicle connectivity in this way automakers can significantly reduce recall expenses, improve cybersecurity response time, increase product quality and operational efficiency. (1)	OEM
OTP	Objective Test Procedure. As part of the systems engineering process, tests that are designed to validate functionality of the developed system at a system level. (6)	USDOT
OVW	Oversize Vehicle Warning. Infrastructure technologies and connected vehicle application that detect vehicle characteristics to provide warnings to drivers of oversize (e.g., in height, width, or weight) vehicles if their vehicle may negatively impact the infrastructure and/or cause a collision. (6)	IOO
PC	Pseudonym Certificate. The short-term digital certificate used in V2Vsafety message exchange to indicate to the receiver that the sender is trustworthy. The OBE downloads and stores batches of pseudonym certificates. (12)	OEM
PCAM	Pedestrian Crash Avoidance/Mitigation. Systems that use forward-looking sensors, typically RADAR and/or cameras, to issue driver warnings, provide brake assist, or apply autonomous braking to avoid or mitigate the injury severity of an imminent crash with a pedestrian. (6)	
PCI DSS	Payment Card Industry Data Security Standard. An information security standard for organizations that handle branded credit cards from the major card schemes. (2)	
PCW	Pedestrian Crosswalk Warning. Connected vehicle application that detects pedestrian locations in the crosswalk and provides warnings to a driver of a potential collision.	USDOT
PDD	Personal Delivery Device. A ground-based robot that has been designed specifically for the purposes of delivering goods and does not make full use of the public road. The PDD may drive autonomously or be operated remotely. A PDD cannot carry passengers. (22)	

Acronym	Definition (Reference)	Origin
PED-SIG	Mobile Accessible Pedestrian Signal System. A signal system that integrates information from roadside or intersection sensors and new forms of data from pedestrian-carried mobile devices. (1)	USDOT
PER	Packet Error Rate. The percentage of the packets not received, in the context of testing connected vehicle message transmission.	OEM
PHY	Physical protocol or layer. Physical layer of the DSRC protocol stack. (11)	OEM
PII	Personally Identifiable Information. Any form of information that can be used to identify, contact, or locate an individual person, directly or indirectly. (12)	
PKI	Public Key Infrastructure. A set of hardware, software, people, policies, and procedures needed to create, manage, distribute, use, store, and revoke digital certificates. PKI has been chosen as the mechanism to provide integrity and authentication within the connected vehicle system. This system creates and manages digital certificates that bind an identity to its public key to certify the sources of the messages. PKI is the foundation of the SCMS technical design. (12)	OEM
PLCP	Physical Layer Convergence Procedure. Defines the mapping between the Medium Access Control (MAC) frame and the basic physical (PHY) layer data unit. (11)	OEM
PM	Privacy Module. Used by USDOT ITS JPO data programs to filter geolocations using geofencing and certain data fields. Also redacts fields based on definable conditions. (https://github.com/usdot-jpo-ode)	USDOT
PMD	Physical Medium Dependent. Sublayer of the DSRC physical (PHY) layer that interfaces directly with the wireless medium. (11)	OEM
POC	Proof Of Concept. A relatively small demonstration in principle with the aim of verifying that some concept or theory has practical potential. (2)	USDOT
PPP	Public Private Partnership. A cooperative arrangement between two or more public and private sectors, typically of a long-term nature. (2)	
PPS	Pulse Per Second. An electrical signal that has a width of less than one second and a sharply rising or abruptly falling edge that accurately repeats once per second. (2)	
PRNG	Pseudo Random Number Generator. An algorithm for generating a sequence of numbers whose properties approximate the properties of sequences of random numbers. (2)	OEM
PSD	Power Spectral Density. Limits specified at certain frequency offsets from the signal center frequency. (11)	OEM
PSID	Provider Service Identifier. A globally unique integer value that is associated with a service being provided using a communications system such as 5.9 GHz DSRC WAVE. (18)	OEM
Q-WARN	Queue Warning. A connected vehicle application that aims to provide drivers timely warnings of existing and impending queues. (6)	USDOT
RA	Registration Authority. The function responsible for certificate batching and issuance and cocooned key generation. In many cases this function is an intermediary between the PCA and other functions, as well as between the OBE and the PCA. At this point in time, it is believed that the RA will also create the internal blacklist of bad enrollment certificates. (12)	OEM

Acronym	Definition (Reference)	Origin
RCA	Root Certificate Authority. The master certificate authority (CA) that provides the signatures on the certificates for its subsidiary CAs. The root CA possesses a self-signed certificate that contains its own public key to differentiate itself from other CAs.	OEM
RCVW	Railroad Crossing Violation Warning. Connected vehicle application to alert and/or warn drivers who are approaching an at-grade railroad crossing if they are on a crash-imminent trajectory to collide with a crossing or approaching train. (6)	USDOT
RESCUME	Response, Emergency Staging and Communications, Uniform Management, and Evacuation. USDOT bundle of connected vehicle applications that include RESP-STG, INC-ZONE, and EVAC. (6)	USDOT
RESP-STG	Incident Scene Pre-Arrival Staging and Guidance for Emergency Responders. A connected vehicle application providing information to public safety responders while en-route to help guide them safely and efficiently to an incident scene (1)	USDOT
RF	Radio Frequency. The oscillation rate of an alternating electric current or voltage or of a magnetic, electric or electromagnetic field or mechanical system in the frequency range from around 20 kHz to around 300 GHz. (2)	OEM
RLVW	Red Light Violation Warning. Connected vehicle application that broadcasts signal phase and timing (SPat) and other data to the in-vehicle device, allowing warnings for impending red light violations. (6)	USDOT
ROAD	Real-world Operational Assessment Data. Data set collected as part of a NHTSA effort.	USDOT
RSD	Retrofit Safety Device. DSRC-based device to equip vehicles with connected vehicle technology. Tested on commercial vehicles as part of USDOT Commercial Vehicle RSD Kits Project. (6)	USDOT
RSU	Road Side Unit. A piece of ITS related hardware located at the side of the road or pedestrian passageway, exchanging data with vehicles in its locality and in some instances, providing an interface through which travelers can access ITS related services, e.g. Public Transport schedules. An RSU may also be mounted on a vehicle or is hand carried, but it may only operate when the vehicle or hand carried unit is stationary. Furthermore, an RSU operating under this part is restricted to the location where it is licensed to operate. However, portable or hand-held RSUs are permitted to operate where they do not interfere with a site licensed operation. A RSU broadcasts data to OBUs or exchanges data with OBUs in its communications zone. An RSU also provides channel assignments and operating instructions to OBUs in its communications zone, when required. The term Roadside Equipment (RSE) has been used to describe a broader set of field equipment, incorporating the narrowly-defined RSU and other functional components such as applications. (1)	
RSZW	Reduced Speed Zone Warning. A connected vehicle application that utilizes roadside equipment to broadcast alerts to drivers warning them to reduce speed, change lanes, or come to a stop within work zones. (6)	USDOT
RTK	Real Time Kinematics. A differential global navigation satellite system (GNSS) technique which provides high positioning performance in the vicinity of a base station. The technique is based on the use of carrier measurements and the transmission of corrections from the base station, whose location is well known, to the rover, so that the main errors that drive the stand-alone positioning cancel out. A RTK base station covers a service area spreading about 10 or 20 kilometers and a real-time communication channel is needed connecting base and	OEM

Acronym	Definition (Reference)	Origin
	rover. RTK, which achieves performances in the range of a few centimeters, is a technique commonly used in surveying applications. (1)	
RTSMO	Regional Transportation System Management Operations. A set of strategies implemented at a regional level that focus on operational improvements that can maintain and even restore the performance of the existing transportation system before extra capacity is needed. See TSMO. (19)	IOO
RV	Receiving Vehicle. Subject vehicle receiving messages and data from infrastructure or other vehicles.	
RWIS	Road Weather Information System. Comprised of Environmental Sensor Stations (ESS) in the field, a communication system for data transfer, and central systems to collect field data from numerous ESS. These stations measure real-time atmospheric parameters, pavement conditions, water level conditions, and visibility. (2)	
SAD	System Architecture Document. Documentation of the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. (2)	OEM
SCH	Service Channel. All channels in the band plan that are not the control channel (CCH). (11)	OEM
SCMS	Security Credential Management System. Security system for cooperative vehicle-to-vehicle crash avoidance applications using 5.9 GHz DSRC wireless communications. (1)	OEM
SLTA	Signalized Left Turn Assist. Infrastructure-based system that provides information to drivers performing unprotected left turns to judge the gaps in oncoming traffic as well as inform them when other users, such as pedestrians or bicyclists, pose hazards to completing a safe left turn. (6)	USDOT
SM	Security Module. Name of security used as part of NHTSA Vehicle Safety Communications – Applications effort. (20)	USDOT
SPaT	Signal Phase and Timing. The signal state of the intersection and how long this state will persist for each approach and lane that is active, according to the SPaT Benefits Report. The SPaT message sends the current state of each phase, with all-red intervals not transmitted. Movements are given to specific lanes and approaches by use of the lane numbers present in the message. In a connected vehicle environment, the message is sent from the roadway infrastructure to approaching vehicles. (1)	IOO
SPD-HARM	Dynamic Speed Harmonization. A connected vehicle application that aims to recommend target speeds in response to congestion, incidents, and road conditions to maximize throughput and reduce crashes. (6)	USDOT
SRR	Short Range Radar. Radars that use the 24 GHz frequency and are used for short-range applications like blind-spot detection, parking aid or obstacle detection and collision avoidance. These radars need a steerable antenna with a large scanning angle, creating a wide field of view. (21)	OEM
SSA	Stop Sign Assist. An application, also known as CICAS-SSA or SSGA, that utilizes traffic information broadcasting from roadside equipment to warn drivers of potential collisions at stop sign intersections. (6)	USDOT

Acronym	Definition (Reference)	Origin
SSGA	Stop Sign Gap Assist. An application, also known as CICAS-SSA or SSA, that utilizes traffic information broadcasting from roadside equipment to warn drivers of potential collisions at stop sign intersections. (6)	USDOT
SSL	Secure Sockets Layer. Cryptographic protocol designed to provide communications security over a computer network. This has been superseded by a new protocol called Transport Layer Security (TLS). (2)	OEM
SSM	Signal Status Message. SAE J2735 message used to relate the current preemption or priority signal state(s) a signalized intersection may be in. (6)	
SSP	Service Specific Permissions. Associated with PSIDs to grant certain devices special privileges, such as emergency vehicle preemption for emergency vehicles or transit signal priority for transit vehicles. (6)	OEM
SSVW	Stop Sign Violation Warning. An application that broadcasts the presence and position of a stop sign to the in-vehicle device, allowing the vehicle to determine, and provide alerts and warnings, if the driver is at risk of violating the stop sign. (6)	USDOT
STIP	Statewide Transportation Improvement Plan. A United States Federal requirement for each state. The TIPs of various MPOs within a state feed directly into the STIP. The STIP is approved by the Federal Highway Administration (FHWA) in conjunction with the Federal Transit Administration (FTA). See also TIP. (2)	
SWIW	Spot Weather Impact Warning. A connected vehicle application that warns drivers of local hazardous weather conditions by relaying management center and other weather data to roadside equipment, which then re-broadcasts to nearby vehicles (6)	USDOT
TADS	Timed Efficient Stream Loss-tolerant Authentication [TESLA] and Digital Signature (TADS). Approach that extends the TESLA approach of incorporating a very efficient symmetric cryptographic mechanisms to speed-up verification by including an ECDSA digital signature in every message. (20)	OEM
TCP	Transmission Control Protocol. One of the main protocols of the Internet protocol (IP) suite. It provides reliable, ordered, and error-checked delivery of a stream of octets (bytes) between applications running on hosts communicating via an IP network. (2)	OEM
T-DISP	Dynamic Transit Operations. A connected vehicle application that links available transportation service resources with travelers through dynamic transit vehicle scheduling, dispatching and routing capabilities. (6)	USDOT
TIC	Transportation Information Center. In the National ITS Architecture, this collects, processes, stores, and disseminates transportation information to system operators and the traveling public. The physical object can play several different roles in an integrated ITS. In one role, the TIC provides a data collection, fusing, and repackaging function, collecting information from transportation system operators and redistributing this information to other system operators in the region and other TICs. (6)	USDOT
TIM	Traveler Information Message. SAE J2735 message used to convey important traffic information to connected vehicles. (6)	OEM
TIP	Transportation Improvement Program. United States federally mandated requirement for all metropolitan planning organizations (MPOs). The TIP is a short-range plan that lists all transportation projects in an MPO's planning area that seek federal transportation funding within at least a four-year horizon. The TIP is complementary to the long-range transportation	

Acronym	Definition (Reference)	Origin
	plan (LRTP), or regional transportation plan (RTP), that plans on a twenty or thirty year horizon. (2)	
TMC	Traffic Management Center or Transportation Management Center. IOO nucleus for collecting, monitoring, verifying, and responding to traffic conditions, often by disseminating important information to other agencies and the public. (6)	
TNCs	Transportation Network Companies. A company that matches passengers with drivers of vehicles for hire via websites and mobile apps that, unlike taxicabs, cannot legally be hailed from the street. (2)	OEM
TOSCo	Traffic Optimization for Signalized Corridors. Connected vehicle application that enables vehicles traveling through a connected corridor to optimize movements for improved fuel economy, emissions reduction, and overall traffic mobility. (6)	USDOT
TRP	Transit Retrofit Package. USDOT safety applications for transit vehicles that can communicate V2V as well as V2I for enhanced transit vehicle and pedestrian safety. (6)	USDOT
TSCS	Traffic Signal Control System. Advanced systems that adjust the amount of "green" time for each street and coordinate operation between signals to maximize traffic flow and minimize delay based on real-time changes in demand. (8)	
TSMO	Transportation Systems Management and Operations. A set of strategies that focus on operational improvements that can maintain and even restore the performance of the existing transportation system before extra capacity is needed. (19)	USDOT
TSP	Transit Signal Priority. A signal system that allows transit agencies to manage service by granting bus right of way at a traffic signal based on a number of factors, such as schedule adherence or passenger loads. An operational strategy that facilitates the movement of transit vehicles, either buses or streetcars, through traffic-signal controlled intersections. Objectives of TSP include improved schedule adherence and improved transit travel time efficiency while minimizing impacts to normal traffic operations trips by providing travelers with choices relative to route, time, and mode. (1)	
TTC	Time To Collision. The time that it would take a following vehicle to collide with a leading one, if the current relative speed was maintained from the given headway. (6)	USDOT
U-NII	Unlicensed-National Information Infrastructure. Radio band defined by the United States Federal Communications Commission that is part of the radio frequency spectrum used by WLAN devices and by many wireless ISPs.	OEM
UTC	Coordinated Universal Time (Universal Time Clock). The primary time standard by which the world regulates clocks and time. (2)	
VAD	Vehicle Awareness Device. An aftermarket electronic device installed in a vehicle without connection to vehicle systems, only capable sending the basic safety message (BSM). Vehicle awareness devices do not generate warnings and may be used in any type of vehicle. (6)	USDOT
VDT	Vehicle Data Translator. Initiative started by the FHWA focusing on the ability to receive, validate, and integrate road weather observations in real-time and use them for predictions of road weather conditions. It has evolved to become Pikalert and was used in the "Integrated Mobile Observation" test programs in Minnesota, Michigan, and Nevada to collect weather information from connected state maintenance vehicles. (6)	USDOT

Acronym	Definition (Reference)	Origin
VoD	Verify-on-Demand. An approach for broadcast authentication in V2V safety communication that conforms to the IEEE 1609.2 standard. (20)	OEM
VSA	Vender Specific Action. IEEE 802.11p management frame that can be used by organizations that have either a 24-bit or a 36-bit Organization Identifier.	OEM
V2G	Vehicle to Grid. Grid system integration with connected vehicles, including data exchanges and use of infrastructure power systems. (6)	USDOT
V2I	Vehicle to Infrastructure. A communication that promotes the exchange of information between the vehicles and the infrastructure. (1)	
V2V	Vehicle to Vehicle. A communication that promotes the exchange of information between vehicles. (1)	
V2X	Vehicle to X. Pronounced "vehicle to many", a communication that promotes the exchange of information between the vehicles and various counterparts including other means of transport, the infrastructure, traffic management centers and various Internet applications. A communication allowing the car to communicate with various, non-vehicle located, smart enabled road infrastructure, such as electronics built in to traffic signals, stoplights, speed signs, bollards, barriers, message boards etc. (1)	
WAAS	Wide Area Augmentation System. Air navigation aid developed by the Federal Aviation Administration to augment the Global Positioning System (GPS), with the goal of improving its accuracy, integrity, and availability. (2)	IOO
WAVE	Wireless Access in Vehicular Environments. A vehicular communication system that was an amendment to the existing IEEE 802.11 wireless standard that adds wireless access in vehicular environments, known as WAVE. IEEE802.11p lays down certain enhancements to the existing wireless 802.11 to enable support of Intelligent Transportation Systems (ITS) applications. This support includes the exchange of data between vehicle to vehicle and also vehicle to infrastructure, known as V2V and V2X, which will be vital data resources in the Autonomous driving era. (1)	OEM
WLAN	Wireless Local Area Network. A local radio network usually operating to a specification from the IEEE-802.11 family. In some countries, the term Wi-Fi is commonly used for this narrower meaning, although it is frequently regarded as synonymous. (1)	OEM
WSM	WAVE Short Message. Format that consists of a variable-length header followed by a variable-length payload. The message format includes both mandatory and optional fields. (11)	OEM
WSMP	WSM Protocol. Layer 3 protocol defined by the IEEE 1609 WG that is efficient for 1-hop transmissions in order to avoid packet overhead associated with internet protocols, a minimum of 52 bytes for a UDP/IPv6 packet. (11)	OEM

CAT-Related Organization, Project, and Initiative Acronyms

Acronym	Definition
3GPP	3rd Generation Partnership Project
AASHTO	American Association of State Highway Transportation Officials
AAMVA	American Association of Motor Vehicle Administrators
ACAS FOT	Automotive Collision Avoidance System Field Operational Test (NHTSA)
ADUS	Automated Driving for Universal Services, Strategic Innovation Promotion Program (SIP), Japan

ARIB	Japanese Association of Radio Industries and Businesses
ASTM	American Society for Testing and Materials
BASt	Federal Highway Research Institute of the Republic of Germany (Bundesanstalt für Straßenwesen)
C2M2	Center for Connected Multimodal Mobility (Clemson University)
CAMP	Crash Avoidance Metrics Partnership
CCAT	Center for Connected and Automated Transportation (University of Michigan)
CCI	Clarifications for Consistent Implementation (USDOT & ITE Project)
CEN	European Committee for Standardization
CMAQ	Congestion Mitigation and Air Quality (Improvement Program)
CMC	CAMP Management Committee
CVPD	Connected Vehicle Pilot Deployment
CVTA	Connected Vehicle Trade Association
DOC	Department of Commerce
DOD	Department of Defense
DOT	Department of Transportation (U.S. and/or State Transportation Agency(ies); plural: DOTs)
EC	European Commission
EPA	Environmental Protection Agency
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission
FHWA	Federal Highway Administration (USDOT)
FMCSA	Federal Motor Carrier Safety Administration (USDOT)
FRA	Federal Rail Administration (USDOT)
FTA	Federal Transit Administration (USDOT)
FTC	Federal Trade Commission
ICANN	Internet Corporation for Assigned Names and Numbers
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IIHS	Insurance Institute for Highway Safety
IMSA	International Municipal Signal Association
InTrans	Institute for Transportation (Iowa State University)
ITS UCDavis	Institute for Transportation Studies at the University of California-Davis
IOS	International Organization for Standardization
ISACA	Information Systems Audit and Control Association
ISO	International Standardization Organization
ITE	Institute of Transportation Engineers
IT IS	Integrated Taxonomic Information System
ITS JPO	Intelligent Transportation Systems Joint Program Office (USDOT)
JAMA	Japanese Automobile Manufacturers Association
MCity	MCity (University of Michigan test facility)
MUTCD	Manual on Uniform Traffic Control Devices
NADS	National Advanced Driving Simulator (NHTSA ground vehicle driving simulator at the University of Iowa College of Engineering)
NAS	National Academy of Sciences
NCAP	New Car Assessment Program (NHTSA 5 Star Rating system)
NCHRP	National Cooperative Highway Research Program
NEMA	National Electrical Manufacturers Association
NHTSA	National Highway Transportation Safety Administration

NIST	National Institute of Standards & Technology
NTIA	National Telecommunications & Information Administration
NTCIP	National Transportation Communications for Intelligent Transportation System Protocol
NTIA	National Telecommunications and Information Administration
NTTAA	National Technology Transfer and Advancement Act
OICA	Organisation Internationale des Constructeurs d'Automobiles
OST-R	Office of the Assistant Secretary for Research and Technology (USDOT)
SHRP2	Strategic Highway Research Program 2
SRI	Smart Roadside Initiative
STSMO	Subcommittee Transportation Systems Management and Operations
TC204	Technical Committee 204 (ISO)
TFHRC	Turner Fairbank Highway Research Center (USDOT)
TRB	Transportation Research Board
TTI	Texas A&M Transportation Institute
UMTRI	University of Michigan Transportation Research Institute
VIIC	Vehicle Infrastructure Integration Consortium
VIIC MC	Vehicle Infrastructure Integration Consortium Management Committee
VIIC WG	Vehicle Infrastructure Integration Consortium Working Group
VSC2	Vehicle Safety Communications 2 Consortium
VSC-A	Vehicle Safety Communications – Applications project (NHTSA)
VRTC	Vehicle Research and Test Center (NHTSA)
VTTI	Virginia Tech Transportation Institute
WFA	Wi-Fi Alliance

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