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Information Report on ITS Terms and Definitions

Foreword—This SAE Information Report explains terminology in the field of Intelligent Transportation Systems (ITS). The primary audiences for this document are SAE members and other automotive engineering professionals.

Intelligent Transportation Systems (ITS) is a broad term, encompassing everything from actuated traffic signals to cars that drive themselves. Underneath the confusion of acronyms and jargon (which this document attempts to explain) ITS is basically the combination of traditional transportation technology with computers and sensing and communications equipment. ITS represents real technological advances that are already being deployed as commercial products in production vehicles. This document covers terms specific to ITS which are not found in the 1992 edition of the SAE Glossary of Automotive Terms, or which are used in a specific way in ITS.

The document consists of definitions of Intelligent Transportation Systems technologies, applications, components, organizations, and services in alphabetical order. A list of commonly used acronyms follows the definitions.

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1. ***Scope—***This SAE Information Report defines consistent terminology for Intelligent Transportation Systems (ITS). The list of defined terms is followed by a list of acronyms. Certain criteria were used in selecting terms for this document. Terms in widespread use in the ITS community covering significant services, technologies, and applications were chosen. This document focuses on terms used in the United States, although it covers aspects of worldwide ITS deployment. This document focuses on automotive applications, which include interfaces to and from the automobile. Later versions may include a wider scope.

ITS includes a wide array of services, applications, and technologies. The Department of Transportation ITS National Program Plan divides ITS into 29 User Services, which are included in this glossary. The User Services range from Pre-Trip Travel Planning to Fully Automated Highway Systems. Other organizations and experts have divided ITS into a smaller set of more general application types, such as Traveller Information or Advanced Public Transportation. This document, in keeping with the general purpose of SAE, focuses primarily on services, applications, and technologies in or on a vehicle. The field of ITS includes applications, such as communications between traffic management centers, which do not directly interface with the vehicle and therefore are not included in this document.

Products and commercial systems were excluded. Terms which are used in the ITS community, but are not unique to ITS, such as “hard disk” or “half duplex” were not included. In the interests of keeping the document current, specific project names were not included. (Descriptions of FHWA projects are published annually by the FHWA, and are available from that agency.) Terms of interest only to narrow technical subfields were not included. Names of local agencies were not included.

The overall goal of this document is to provide the reader with basic information on terms relevant to ITS, including relevant technologies, standards, organizations, applications, and acronyms. Definitions are listed alphabetically in Section 3, followed by acronyms in Section 4.

2. ***References***

2.1 **Applicable Publications—**The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the lastest revision of SAE publications shall apply.

2.1.1 ISO PUBLICATIONS—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 3779—Standard vehicle identification numbering system
ISO 7498—Information processing systems—Open system interconnect—Basic reference model
ISO 9735:1988—EDI for administration, commerce, and transport

2.1.2 FEDERAL SAFETY STANDARDS—Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

FMVSS 115—Vehicle Identification Number Basic Requirements

2.2 **Related Publications—**The following publications are provided for information purposes only and are not a required part of this document.

AHS Update, NAHSC, November 1994, Vol. 1 - No. 1
CORD Recommended Definitions of ATT Subfunctions, Functions and Areas, version 1.0
Special Report 209: Highway Capacity Manual - National Research Council, Transportation Research Board, May 1992
IVHS Meets NAB—Kelley, Terrapin Corp, 1993
IVHS/RTI Glossary—Jidosha Soko denshigijutsu Kyokai (JSK), 1993
National Program Plan for Intelligent Vehicle-Highway Systems (IVHS)—U.S. Department of Transportation, Federal Highway Administration, November 1994
Open Systems Interconnection—ISO 7498, parts 1–4

Proposed Terminology and Definitions for TICS System Architectures—ISO TC 204 WG 1
Glossary (N53.2)—ISO TC 204 WG 14
Siemens Abbreviations/Translations Version 4.1, October 1992
SAE Glossary of Automotive Terms, SAE M105, 1992
Strategic Plan for IVHS—IVHS AMERICA, 1992
Strategies for Real-Time System Specification—Hatley, Derek J. and Pirbhai, Imtiaz A., Dorset House Publishing Co, New York, NY, 1988
Traffic System Analysis for Engineers and Planners—Wohl, Martin and Martin, Brian V., McGraw-Hill Book Company, New York, 1967
Webster's New Collegiate Dictionary—G. & C. Merriam Company, Springfield, Massachusetts, USA, 1976

3. Definitions

3.1 **911—**The National Emergency Number used in the U.S. Dialing 911 on any phone (mobile or wireline) is expected to connect the caller to an emergency response center where the situation can be assessed and the proper response agency (police, fire, etc.) can be dispatched. ITS “Mayday” products are expected to provide similar functions automatically, using mobile telecommunications combined with automatic vehicle location and automatic incident detection. See also: Mayday, Incident Detection.

3.2 **Acknowledgement—**A procedure used during data transmission which allows the transmitting system to conclude that the message has been received by the receiver system. Depending on the communication protocol used, this could mean that the message was received without transmission errors, but may not mean that the message content is correct or intelligible.

3.3 **Adaptive Cruise Control (ACC)—**An enhancement to standard cruise control systems which allows the subject vehicle to follow a forward vehicle at an appropriate distance by controlling the engine and/or power train and potentially the brake.

3.4 **Advanced Driver Information Systems (ADIS)—**Original name for ATIS (Advanced Traveller Information Systems). In-vehicle devices that provide the driver with information about travel conditions, including traffic, roadside services, recommended route to destination, potential road hazards, etc. This information, which may be static or dynamic, is used for trip planning and routing and related decisions.

3.5 **Advanced Public Transportation Systems (APTS)—**Applications which are designed to improve the efficiency of public transportation and increase the demand for such transportation.

3.6 **Advanced Research Projects Agency (ARPA)—**Formerly the Defense Advanced Research Projects Agency (DARPA). ARPA is assigned the basic scientific research and initial development role for the United States Department of Defense. ARPA investigates new technologies for possible military applications in armaments, communications, transportation and information theory. (The Internet is an outgrowth of DARPA communications and information research.)

3.7 **Advanced Rural Transportation Systems (ARTS)—**Activities relating to the deployment of ITS in rural, non-urban regions. Often embodies ADIS, AVCS, ETTM, and other ITS technologies.

3.8 **Advanced Traffic Management Systems (ATMS)—**Semi-automated and automated systems intended to enhance traffic flow by detecting problems and initiating corrective action or expediting traffic through congestion points. Includes the DOT National ITS Program Plan User Services of Incident Management, Demand Management, Traffic Management and Electronic Toll Collection.

3.9 **Advanced Transport Telematics (ATT)—**Advanced Transport Telematics. A European term for ITS. The current preferred term is Road Transport Telematics (RTT).

3.10 Advanced Traveller Information Systems (ATIS)—Systems and devices that provide routing, traffic, and other information to travellers for use in pre-trip and en-route planning and booking. Information may be supplied by diverse sources, such as traffic control centers, public transport operators, rail operators, and tour operators. The information may be accessed through in-vehicle devices or public kiosks or over phone or cable television lines in homes or workplaces.

3.11 Advanced Vehicle Control Systems (AVCS)—The collection of ITS user services, as defined in the United States, that provide safety warnings or control assistance to drivers, or assume full control of vehicle movements. The safety warnings address phenomena that require action in one second or less, to distinguish them from the longer-term warnings that are incorporated within ATIS. Related terms with the same meaning are Advanced Vehicle Safety Systems (AVSS) and Advanced Vehicle Control and Safety Systems (AVCSS). AVCS includes such ITS services as longitudinal collision avoidance, lateral collision avoidance, intersection collision avoidance, vision enhancement for collision avoidance, safety readiness alerts, pre-collision deployment and automated vehicle/highway operations.

3.12 American Automobile Association (AAA)—A national association of motor clubs that provides services including route planning, roadside assistance, travel reservations, insurance, and advanced traveller information services.

3.13 American Automobile Manufacturers Association (AAMA)—Formerly the Motor Vehicle Manufacturers Association (MVMA). Primarily an industry lobbying organization; its membership consists of Chrysler Corporation, Ford Motor Company and General Motors Corporation.

3.14 American National Standards Institute (ANSI)—The U.S. member of ISO, the International Standards Organization. Coordinates the development and issuance of ISO standards in the U.S. ISO Technical Committee 204 deals with Transport Information and Control Systems (TICS), which is called ITS in the U.S.

3.15 American Society for Testing and Materials (ASTM)—Certifies the content and properties of materials, including pavement materials.

3.16 Anchor Point—A map cartography term used to describe a common point of reference. Typically map items will use the anchor point as an absolute position and provide only their relative offset from it, hence resulting in more efficient information coding. See also: Reference Point.

3.17 Architecture—The art or science of describing the high level functions and interfaces of a system. An architecture may be described by conceptual, logical and/or physical representations based on logical decomposition of a set of stated user requirements.

3.18 Architecture (Hardware)—Description of the arrangement of the various pieces of equipment of a system (generally a computer based system) and the interconnections between them.

3.19 Architecture (Logical)—The iterative decomposition of requirements into primitive functional processes identifying all data and control flows between the processes.

3.20 Architecture (Physical)—The translation of a logical architecture into the physical domain, typified by grouping functional processes into stand-alone modules and enriching the functional requirements by adding physical requirements such as reliability and environmental constraints.

3.21 Arrival Prediction—The predicted time of a vehicle at a given point along a route, based on historical data and real time traffic information.

3.22 Association of Public Communications and Safety Officers (APCO)—A professional organization of Public Safety (Police, Fire, etc.) dispatchers and communications network officers. Involved with the deployment of advanced emergency response (mayday) systems and the development of standards for those systems. See also: NENA.

3.23 Attribute—In the context of navigable digital map databases, the term “attribute” is usually used to describe a particular characteristic of a road segment or link between two intersections. Attributes include legal restrictions such as turn restrictions, one-way street restrictions, speed limits, etc.; physical restrictions, such as medians, traffic circles, etc.; as well as descriptive characteristics such as address ranges, street names, etc.

3.24 Automated Collision Notification—A sub-service of the Emergency Notification and Personal Security service which is provided by an in-vehicle device for immediately communicating the location and nature of the collision to a 911 dispatcher.

3.25 Automated Debiting Systems (ADS)—Automated Debiting Systems, a European term for advanced tolling systems. In the U.S., ETTM (Electronic Toll and Traffic Management) is the preferred term.

3.26 Automated Highway System (AHS)—The Automated Highway System (AHS) will safely operate properly equipped vehicles under full automatic control on dedicated lanes. Full automation will provide the driver with the opportunity to perform other tasks while traveling on the AHS (“hands-off, feet-off” operation). The AHS is a system incorporating specially equipped vehicles and specially equipped roadway facilities operating such that control of vehicle speed, steering, and spacing relative to other vehicles and the highway infrastructure are automated. AHS will improve safety and reduce travel time for system users and reduce congestion for all highway users.

3.27 Automated Platoon—A group of vehicles operating in cooperation with one another via some means of coordination such as inter-vehicle communication that allows their coordinated movement as a single entity. See also Automated Highway System (AHS).

3.28 Automated Roadside Safety Inspections (ARSI)—Applications which provide safety inspectors with real-time access to information about the vehicle, the carrier, and the driver, including real-time vehicle diagnostics. One of the DOT National ITS Program Plan User Services.

3.29 Automated Vehicle Classification (AVC)—Automated Vehicle Classification. A term used by the CVO community to imply automatic detection and forwarding to some control point the classification (size, weight, restrictions, goods carried, HAZMAT, etc.) of the subject vehicle. See also: weigh in motion, automated roadside safety inspections.

3.30 Automatic Clearance Sensing—A CVO technology used to help the driver of a large vehicle detect whether sufficient height clearance exists as the vehicle approaches low or limited clearance objects such as bridges, overpasses, and viaducts.

3.31 Automatic Location Identification (ALI)—The determination and display of a caller location (coded by his wireline phone address of record) used by a PSAP (primary safety answering point) in responding to 911 calls. A major issue facing the deployment of ITS “mayday” services is that wireless callers (including a person using a cellular phone in a car or an automated emergency call system in the vehicle) do not automatically present an address in the systems deployed today.

3.32 Automatic Number Identification (ANI)—The determination and display of the caller's phone number which is used by a PSAP in responding to 911 calls.

3.33 Automatic Vehicle Identification (AVI)—An automated means of determining the identity (typically some sort of assigned serial number) of a vehicle. This information is then typically used in tolling and tariff applications, however AVI technology has also been widely applied to commercial container shipping and tracking. See also: smart cards.

3.34 Automatic Vehicle Location (AVL)—An automated means to determine and report the location of a vehicle to a central dispatcher without driver intervention. Technical approaches vary with the positioning technology used (GPS, Triangulation, Network systems) but typically involve the relaying of the position to a central command facility on an as-needed or periodic basis. Commonly used in CVO and transit/dispatch applications. AVL is not normally used in autonomous navigation systems.

3.35 Automatic Vehicle Location System (AVLS)—A system involving the use of automatic vehicle location. The term "system" is often appended to "AVL" in those approaches where the position determination occurs at a central site or involves the use of a fixed infrastructure as part of the determination process (information regarding the vehicle position is then forwarded to the dispatch point where it is used). Systems which use time and/or angle of arrival of a vehicle-originated signal would be examples of this. Autonomous navigation systems can also provide vehicle location information to a 911 dispatch system.

3.36 Automatic Vehicle Monitoring (AVM)—Obsolete term. The 902~928 MHz band allocated by the FCC for mobile vehicle services including position tracking. Also used by some toll tag systems and unlicensed spread spectrum transmitters. This band and service have been under interim rules. Final rules were issued in February 1995 and the name AVM was replaced with Location and Monitoring Service (LMS).

3.37 Autonomous Intelligent Cruise Control (AICC)—See adaptive cruise control.

3.38 Autonomous Location Estimation—Approximates the geographical position of the vehicle with reference to the road network. It can be performed on-board using dead reckoning and map matching. The presence of an on-board navigable digital map database enables users to select precise destinations.

3.39 Autonomous Navigation—Navigation that requires no communications between the vehicle and the infrastructure. Location sensing, map data storage, route generation and driver interfaces are all accomplished without the aid of external resources. See semi-autonomous navigation, interactive navigation.

3.40 Axle Weight—The maximum allowable weight that may be carried on an individual axle of a vehicle. Typically limited by the weight carrying capacity of the tires and suspension. Maximum allowable axle weight may be limited by law for certain classes of commercial vehicles.

3.41 Bar Code—System allowing identification of objects through optical reading. Used in advanced tolling and freight management applications.

3.42 Beacon—A fixed piece of roadside equipment used for data communications with vehicles or travelers as they pass. Typically, the transmission is short range (less than 100 m) and may be accomplished with any wireless technology, e.g., infra-red, RF. The transmission may be one-way to the vehicle, or two-way transactional. In the former case, the beacon is sometimes called a "signpost," and continuously sends fixed or dynamic data whether a receiver is present or not. The latter case covers applications such as electronic toll collection and centralized route guidance, where a fee is involved or a one-to-one information exchange is required.

3.43 Beacon Head—The part of the beacon that contains the transmitter/receiver.

3.44 Beacon Region—The geographical area for which the beacon transmits information.

3.45 Blind Spot—Angle within which an obstruction prevents observation of an area. Typically two areas behind and to the side of the vehicle's operator in which the operator cannot see an obstacle or another vehicle.

3.46 Broadcast—Refers to the wide distribution of (radio) messages, as opposed to a point to point transmission. A broadcast message can be received by many users with a single transmission. Broadcasting is by nature a one-way event, although some transmission media are capable of sending point to point transmissions as well.

3.47 Broadcast SubCarrier (BSC)—The generic term for the additional information streams found in commercial FM, AM, and Television signals. These may provide a means to transmit ITS traveler information services. BSC is the more generic (and correct) term for "SCA." The following terms are a few specific examples of Broadcast SubCarriers: RBDS, RDS, MBDS, HS-SCA, VBI, AM-RDS, and ARI.

3.48 Calibration (of Vehicle Position Sensors)—Sensors used for determining a vehicle's position or location in the road network such as odometers, gyroscopes, and compasses, are prone to errors caused by temperature variations, tire pressure variations, improper wheel alignment, slippery roads, etc. In order to continuously maintain a correct position or location, these sensors must be calibrated dynamically in real-time. The calibration consists of using the output from the map-matching algorithm or a differential GPS position to determine the errors and then re-calibrating the sensors "on-the-fly" to eliminate these errors.

3.49 Capacity—The maximum sustained hourly rate of flow at which vehicles can reasonably be expected to traverse a uniform segment of roadway under prevailing roadway and traffic conditions. This maximum is a function of density and therefore speed. Several traffic control, physical and traffic conditions affect the free-flow speed along a given highway. These conditions include: speed enforcement, design speed, speed limit, lane width and lateral clearance, median type, access points, and heavy-vehicle factor.

3.50 Capacity Reduction—The reduction of the normal road capacity, as a percentage, due to an event or incident.

3.51 Car Pooling—The sharing of one car/van by several persons on a given journey. As a formal government-supported program, this is a form of paratransit organized for a specific group of persons having similar origin/destination pairs.

3.52 CD-CRAFT—CD and CRT Applied Format. A standard format for CD-ROM based application software for in-vehicle navigation systems.

3.53 Cellular Digital Packet Data (CDPD)—A cellular communications protocol that allows multiple users online, at the same time, with each having a unique identification number. CDPD sends information in "bursts," allowing large volumes of data transfer in short time periods. The ID number is used to communicate with/to a particular user. May be used by the traffic management center for communications with vehicles.

3.54 Central (Route Guidance) Computer—A computer at a fixed central location that calculates routes and services multiple locations for control and input/output.

3.55 Central Office (CO)—See transportation management center.

3.56 Changeable Message Sign (CMS)—A highway information sign that has the capability of displaying one of a list of predetermined notices. See also VMS.

3.57 Class 1 to Class 8—A method used in the U.S. to classify heavy trucks for purposes of registration, tariffs and drivers' licenses. Class 1~3 refers to smaller trucks, such as a 3-ton van, while a Class 8 truck is a large commercial freight vehicle.

3.58 Clear Channel—A radio term used to describe an allocation of frequency in which no other user is on that same frequency, hence making it "clear" over a very wide area. Certain commercial AM radio stations are examples of clear channels. The allocation of several 220 MHz frequency pairs exclusively for ITS use is also an example of a clear channel.

3.59 Closed Architecture—A logical and physical architecture where the developers keep all information as to the processes or design as proprietary information. While intended to prevent other firms from copying the design details and lowering the price of equipment or software (and hence profit), a closed architecture may also inhibit innovation by third parties. See also open architecture.

3.60 Collective (Network) Route Computation—A route generation technique in which routes are calculated for each of a number of vehicles on the same road network in the same time frame. The route calculation for a particular vehicle is cognizant of route calculations for other vehicles in such a way that stable traffic densities and link times are achieved.

3.61 Collision Avoidance—A system which detects potential obstacles to the trajectory of a moving vehicle and responds to those obstacles by changing the trajectory or velocity of the vehicle and/or providing advice to the driver. The system assists drivers in avoiding collisions by sensing the location of other vehicles as well as the location and trajectory of the host vehicle relative to roadway features, and using that information to determine the likelihood of a collision, and providing advice to the driver on the need for evasive action. Future generation collision avoidance systems will automatically apply the brakes if the vehicle becomes dangerously close to an obstacle, and/or steer the vehicle away from the impending collision.

3.62 Collision Risk Estimation—Detects potential obstacles in relation to the dynamics and predicted trajectory of a moving vehicle for collision avoidance. A subsystem in a collision avoidance system.

3.63 Combined Vehicle Gross Weight—The maximum weight for a vehicle (tractor) and all trailers (caravans) being towed as part of a unit. Typically established by the tractor (tow vehicle) manufacturer as the maximum combined weight the tractor can accelerate up a slope. A function of engine power, transmission and rear axle ratio for the tractor. Relevant to ITS CVO applications, particularly Weigh in Motion.

3.64 Comite Consultatif International des Radio-communications (CCIR)—Previous name for International Telecommunication Union--Radiocommunications Sector (ITU-R). A sector of the ITU which studies technical and operational questions relating to radio communications and issues Recommendations (i.e., standards) on them. Working Party 8A of Study Group 8 will develop radio system standards for ITS in conjunction with ISO TC 204.

3.65 Comité Consultatif International Telegraphique et Telephonique (CCITT)—Previous name for International Telecommunication Union--Telecommunication Standardization Sector (ITU-T). A sector of the ITU which develops telecommunications standards.

3.66 Comité Européen de Normalisation (CEN)—A Pan-European standards development organization. CEN standards are mandatory for public procurement in the EU, unless relevant ISO standards exist. CEN standards are sometimes used as the foundation for ISO standards, and vice versa, under the Vienna Agreement.

CEN Technical Committee 224 covers Machine Readable Cards, Related Device Interfaces and Operations. CEN Technical Committee 278 covers Road Transport and Traffic Telematics. CEN Technical Committee 287 covers Geographic Information. CEN Technical Committee 296 covers the Transport of Dangerous Goods.

3.67 Comité Européen de Normalisation Electrotechnique European (CENELEC)—European standards organization for electro-technical standards.

3.68 Commercial Fleet Management—ITS will facilitate intermodal transfer of cargo and provide real-time traffic information to commercial vehicle dispatchers, increasing the efficiency of freight distribution. One of the DOT National ITS Program Plan User Services.

3.69 Commercial Vehicle Administrative Processes—A service which allows truck and bus companies to electronically pay for vehicle registration and other motor carrier taxes and licenses; electronically record mileage, fuel purchase, trip and vehicle data by state; and eventually seamlessly pre-clear the Mexican and Canadian borders. One of the DOT National ITS Program Plan User Services.

3.70 Commercial Vehicle Preclearance—See weigh in motion. One of the DOT National ITS Program Plan User Services.

3.71 Conceptual Architecture—An overall description of a system incorporating operational concepts and user requirements, together with known inter-relationships with other systems. The overview is described by means of vision and mission statements and an explanation as to the method by which this functionality will be achieved. This usually includes a simple hierarchy chart or network diagram dealing with overall concepts, relationships and external terminators (input sources and output sinks).

3.72 Consumer Information—In the context of an ETTM system, consumer information is a data set containing any relevant information concerning the identity and location of a consumer. The consumer may be an organization representing several users.

3.73 Control Architecture—A detailed description of the control elements or processes of a system, depicting the flow of control signals between processes and interface to a control specification or CSPEC. Describes the control behavior of the architecture elements to effect change from one state (condition) to another (state) transition.

3.74 Coordinate System—A system for representing points in space by coordinates, such as latitude and longitude or numbers in a specific grid system.

3.75 Corridors—Parallel roadways that generally serve major metropolitan areas.

3.76 Critical Course Determination—Continuous determination of a safe trajectory for the vehicle with regards to road boundaries and stationary and moving objects. This consists of determination of the vehicle's trajectory, identification of potential collisions with obstacles, and identification of a course which minimizes the risk of collision. A potential component of collision avoidance.

3.77 Crow Flies—A straight line distance between two points, as opposed to the distance between the points along established roadways. A straight line distance of 10 km, for instance, might be expressed as 10 km “as the crow flies.”

3.78 Data Stream—The concept of multiple independent flows of information over a common transmission media. Information may be divided by encoding methods (such as CDMA) or by time multiplexing (such as TDMA), or a combination of the two. This term is often used to indicate the “portion” of traveller information data which might be broadcast over a shared medium such as a SubCarrier.

3.79 Date and Time Stamping—See time stamp.

3.80 Dead Reckoning—A technique for estimating current position based on a previously known position, and vehicle heading(s) and distance(s) travelled from that position. The term is derived from the term “deduced reckoning.”

3.81 Dedicated Road infrastracture for Vehicle safety in Europe (DRIVE)—A European Community program to find ways to alleviate road transportation problems through the application of advanced information and telecommunications technology. Different phases of the program are known as DRIVE, DRIVE II, DRIVE III, etc.

3.82 Demand Management—Policy measures to influence the volume of travel and/or its spatial, temporal, and modal distribution. Short-term demand management uses variable pricing to discourage, thwart, or redistribute travel demand. Medium-term demand management focuses on geographic diversification of activities to smooth out or reduce mobility demand. Long-term demand management aims to redistribute traffic demand to avoid overloading the road network at peak hours (e.g., diversification of shopping hours, school times and peak periods).

3.83 Demand Prediction—Predicts the actual traffic load in the network based on historical (statistical) data and current information from neighboring networks.

3.84 Demand Restraint—Measures to reduce congestion in sensitive or overloaded areas and to control modal choice.

3.85 Destination—The ending point of a route. Users may specify destinations in several ways, such as by street address, intersection, or by name. See also: route.

3.86 Destination Area—The vicinity of the destination. When a vehicle reaches any portion of the destination area, the destination has been reached.

3.87 Destination Memory—A navigation system feature that stores, usually in sequential order, the most recent destinations navigated to. These destinations are made available for quick reselection or reference.

3.88 Destination Zone—In a centralized route guidance system, the destination zone is a predefined zone which encompasses all the destination areas within it. The destination zone is a zone where a dual mode, centralized route guidance system can switch to autonomous guidance.

3.89 Detection Loop—Term used in EU for a loop detector. See also: loop detector.

3.90 Detection Zone—The area in which transmissions from the beacon head may be received by a passing vehicle or traveler, and from which the beacon can receive a response from a passing vehicle or traveler.

3.91 Deutsches Institut fur Normung (DIN)—German Institute for Standardization. One of the DIN standards used in automotive electronics sets a standard opening size for panel/console mounted equipment at 178 mm x 50 mm.

3.92 Differential Correction—A technique for overcoming GPS position determination errors. A GPS receiver is placed at a known control location. The difference between the indicated GPS position and actual position is calculated. Correction information is then broadcast to other GPS systems in the near vicinity.

3.93 Differential Odometer—The use of separate odometers on two opposing wheels. The two odometers provide a rapid, but different, sensor update when the vehicle is turning. Early navigation systems used this approach to overcome inaccuracies in the electronic (magnetic) compass. The wheel rotation sensor can be the same as that used for the antilock braking system of the vehicle, when the system is designed by the manufacturer, but is a separate sensor in aftermarket products.

3.94 Digital Audio Broadcasting (DAB)—Digital Audio Broadcasting. The technology (and standards development effort under the NAB-NRSC) for the transmission of today's commercial FM broadcast radio signals by more advanced digital means. In the U.S. market, DAB is expected to be implemented “in-band” - that is, it will occupy the same 88~108 MHz area of spectrum of radio frequency which broadcasters use today. In the EU, this technology will be at a higher frequency which the DOT has determined is not suitable for the U.S. Of interest to the ITS community is that this modulation makes provisions for data streams suitable for traveler information services with effective data rates greater than 10 KBPS per channel.

3.95 Digital European Cordless Telephone (DECT)—An EU standard for private branch exchange cordless phone systems. A candidate technology for ITS communications.

3.96 Digital Road Map Association (DRMA)—Japanese organization responsible for creating and maintaining the digital base map of Japan. More commonly known in the U.S. as JDRMA.

3.97 Display Unit (DU)—The portion of a vehicle navigation system which acts as a visual interface with the vehicle operator.

3.98 Distance and Heading Guidance—A method of guidance in which the direct heading and the straight line distance to the destination are continuously calculated and displayed to the driver.

3.99 Diversion Advice—A message to an in-vehicle or portable device advising travelers to take an alternative route around an incident or event which may be causing congestion.

3.100 Driving Restrictions—Restrictions on the flow of traffic on a particular link, such as one-way streets and no-left turn signs. Includes both explicit posted restrictions, such as no-left turn signs, and implicit turn restrictions, such as one cannot turn onto a one-way street going in the direction opposite to the flow of traffic.

3.101 Dual Incidence Matrix Encoded Files (DIME)—Digital map database files of the U.S. created under contract to the U.S. Census Bureau and used for the 1980 census. The comparable files for the 1990 census are called TIGER files.

3.102 Dual Mode Route Guidance System—A route guidance system which utilizes both centralized (beacon-based) guidance where such infrastructure exists and autonomous route guidance in areas without centralized infrastructure.

3.103 Dual Tone Multi-Frequency (DTMF)—Otherwise known as “touch-tone” dialing. A technology common to many wireline and wireless communications applications, including ITS.

3.104 Duration—The expected period over which the (traffic) situation is likely to continue.

3.105 Dynamic Parking Information—An application which provides drivers with information on real time parking space availability through broadcasts, VRC, or variable message signs.

3.106 Dynamic Route Guidance, Dynamic Route Guidance System (DRG, DRGS)—A form of route guidance in which a route generated at the start of the trip may be automatically modified one or more times after the start of the trip, based on information collected enroute. Unanticipated weather conditions, road closures, or traffic incidents may trigger a dynamic route guidance algorithm to reroute the vehicle. See also: static route guidance.

3.107 Dynamic Traffic Management—Techniques that allow the traffic management authorities to control and manage traffic flows in real time, and the driver to access real-time information to make optimal choices concerning the route, time, and mode of his journey.

3.108 E911—Enhanced 911, a term for 911 systems which have the additional feature of matching the user's (wireline) phone number to a database of known locations, and hence the caller's presumed address. See also 911, Mobile-911.

3.109 Electronic Data Interchange (EDI)—A family of standards, including EDIFACT (EDI for Administration, Commerce, and Transport, ISO # 9735:1988) The standards apply to the interchange of digital information (data) between sensors and computers or solely between computers, over an electrical (or light) transmission path according to agreed standards and protocols. EDI is done in accordance with the International Standards Organization's Open System Interconnection Standard (ISO 7498, Information Processing Systems - Open System Interconnect - Basic Reference Model).

3.110 Electronic Payment Services—See smart cards. One of the DOT National ITS Program Plan User Services.

3.111 Electronic Serial Number (ESN)—One of the identifying serial numbers in a cellular phone handset.

3.112 Electronic Toll Collection (ETC)—Collection of tolls using electronic means, to save labor and reduce toll booth congestion.

3.113 Electronic Toll and Traffic Management (ETTM)—Application of ITS to toll collection and traffic management.

3.114 Emergency Broadcast System (EBS)—The cooperative system between commercial broadcasters used in time of national and local emergencies to alert the public. There are provisions in RDS to send similar signals for ITS use. It is expected that systems under development will preserve, if not expand, this ability.

3.115 Emergency Notification and Personal Security—Advanced technologies that would automatically send information on the location of a vehicle and the nature of an accident to the appropriate response agency or agencies. It consists of two sub-services; Driver and Personal Security, and Automated Collision Notification. One of the DOT National ITS Program Plan User Services.

3.116 Emergency Service Numbers (ESN)—The directory of which public safety group handles a given location. Used by a PSAP (primary safety answering point) to direct calls to the proper response group. Relevant to advanced ITS emergency response applications which automatically route calls to the appropriate agency.

3.117 Emergency Vehicle Management—Use of route guidance, signal pre-emption, and other advanced technologies to assist emergency vehicles in reaching their destination more quickly. One of the DOT National ITS Program Plan User Services.

3.118 Emergency Medical Services (EMS)—In the context of ITS, the routing and dispatching of ambulances and other emergency medical services to emergency sites. ITS may be able to provide more accurate and timely routing information to EMS vehicles. The EMS community places unique needs on both the TMC (to coordinate passage in the road network) and on the on-board vehicle equipment (the EMS van may be authorized to take routes which are designated as illegal, including U-turns, driving the wrong way on a one way street, etc.).

3.119 En route Driver Advisory—A service which provides drivers with in-vehicle traffic and traveller information. One of the DOT National ITS Program Plan User Services.

3.120 En route Transit Advisory—A service which provides public transit riders with traveller information while en route. One of the DOT National ITS Program Plan User Services.

3.121 European Broadcasting Union (EBU)—Organization of radio broadcast interests involved in and responsible for developing broadcast standards.

3.122 European Road Transport telematics Implementation Coordination Organization (ERTICO)—Closest U.S. equivalent is ITS AMERICA.

3.123 Event—Disturbance to the normal flow of traffic. An event may be a preplanned incident (i.e., a sporting event), an accident, a planned or unplanned road closure or maintenance action, gawker block (slowing of vehicles and traffic to observe an off-road incident such as a fire), etc. See incident.

3.124 Event-Driven Message—This class of message is not cyclically exchanged, but is generated in response to an exception caused by the occurrence of special or unusual events and the need for specific adaptive measures on the part of the system.

3.125 Expiry Time—The date/time at which a data record shall be deleted from a database. In ITS, refers to removing outdated information from a traveller information broadcast system.

3.126 Externally Assisted Location—A system which estimates the position of a vehicle with the aid of external devices such as satellites, cellular mobile radio stations, or roadside beacons.

3.127 Federal Communications Commission (FCC)—Regulates spectrum assigned to civilian use in the U.S. NTIA regulates spectrum allocated to the federal government.

3.128 Fiber Optic Gyroscope—An angular rotation sensor based on an optical principle known as the Sagnac effect. The device differs from conventional gyroscopes in that it does not employ either rotating or vibrating sensor elements. The angle rate measurement is used to determine the change in vehicle heading and is combined with conventional odometer data to form the dead reckoning component of a vehicle location system.

3.129 Federal Radio-Navigation Plan (FRP)—The FRP represents the U.S. Government's "5 year plan" for various radio services used in both government and civilian applications. Originally a document with an Air and Marine focus, it has a growing emphasis on ground users, especially with the increased use of GPS. The FRP outlines the Government's policy intent for such issues as the continued use of LORAN, the availability of DGPS by the Coast Guard, and GPS use by the FAA.

3.130 Floating Car Data—If a vehicle is equipped with a navigation or route guidance computer that is aware of the vehicle's location at all times, the vehicle can be used to gather travel time information (floating car data) as it traverses the road network. These travel time data are a valuable supplement to data from fixed surveillance equipment such as loop detectors, since they are provided for all roads on which the equipped vehicle travels, not only in the areas where the fixed surveillance is deployed. Also known as "probe data."

3.131 Flow Rate—The number of vehicles, axles, or persons which pass a fixed point in a specified time period.

3.132 Freight and Fleet Management—Activities related to optimal management of vehicular fleets. Similarities exist between the management of freight fleet operations and transit fleet operations, however the significant differences result in separate definitions. Freight and fleet management is also a subset of the Commercial Vehicle Operations DOT National ITS Program Plan User Service, and includes real-time communications for vehicle location, dispatching, and tracking between commercial vehicle drivers, dispatchers, and intermodal transportation providers to reduce delays for drivers and shippers improving the efficiency of commercial delivery and just-in-time service.

3.133 Fully Automated Vehicle Operation—See Automated Highway System (AHS). One of the DOT National ITS Program Plan User Services.

3.134 Functional Architecture—The schematic depiction of a system from the highest conceptual level down to the simplest primitive functions through increasingly simple functions. A description of a design in terms of process flows that depict data and control inputs, processes, and data and control outputs. It does not include hardware or software requirements or physical entities.

3.135 Functional Specification—In the context of a system architecture, a specification describing the operations to be performed.

3.136 Future Public Land Mobile Telecommunications Systems (FPLMTS)—Third generation mobile systems, scheduled to begin service around the year 2000. These systems will provide telecommunication services to mobile or stationary users by means of one or more radio links. May be appropriate for ITS systems.

3.137 Gaper's Block—Another term for on-looker slowdown.

3.138 Geocode—The transformation of raw geographic information, such as aerial photography, into vector road map data.

3.139 Geodetic Coordinates—Coordinates which are corrected to account for the curvature of the earth. See also: coordinate system.

3.140 Geographic Data File (GDF)—A CEN transfer standard for navigable digital road map databases. Currently being used as the foundation for an ISO TC 204 transfer standard.

3.141 Geographic Information System (GIS)—A computerized data management system designed to capture, store, receive, analyze, and report geographic and demographic information.

3.142 Global Orbiting Navigation Satellite System (GLONASS)—A satellite based positioning system operated by the Russian Space Forces. GLONASS is similar to GPS, but lags GPS in implementation.

3.143 Global Positioning System (GPS)—A satellite based positioning system operated by the United States federal government. A receiver may calculate its position to within 100 meters or better depending on the status of the selective availability feature (see “selective availability”). In its early stages of development, GPS was referred to as “NAVSTAR (Navigation, Satellite Timing, and Ranging).”

3.144 Graphical User Interface (GUI)—Refers to a graphical rather than text-oriented paradigm used for human interaction with a computer or other device. In the case of ITS, it refers also to the nature of the user interface to an ITS-related device, such as a guidance computer in a vehicle, or a portable traveler information system. The term is loosely used to describe both the cognitive model (the structure of menus, methods of accessing information, etc.) and the presentation model (or “look and feel”), although these are distinct and different interfaces.

3.145 Gross Vehicle Weight—The total weight of an individual vehicle and its load, including the tongue weight or fifth-wheel weight of a trailer hauled by the vehicle. Relevant to ITS CVO applications such as weight in motion.

3.146 Groupe Speciale Mobile (GSM)—ETSI (European Telecommunications Standards Institute) standard for cellular telephones. This is the “next generation” cellular phone system currently being installed by many (if not most) EU countries as well as parts of Africa and Asia. It is a digital system employing a variety of methods to send multiple data streams over the same transmitter. Among these data streams can be inserted ITS data in both direct delivery and broadcast modes. The use of GSM as a means to send ITS data forms the “middle grade” of the EU architecture for data delivery (by comparison, RDS represents the “bottom”).

3.147 Guidance—The process of presenting navigation information to the driver of a vehicle. Guidance involves not only the information content, but timing and media aspects as well.

3.148 Guidance Computer, Guidance System— A computer system that is capable of planning a route between a user-specified origin and destination, generating a list of maneuvers (turns) required to traverse the route, and then presenting these maneuvers to the user, one at a time. The maneuvers will be stepped through manually by the user, or presented automatically to the user by the guidance computer itself, based on the user's current location.

3.149 Guidance Information— Turn by turn instructions, maneuvers, and any other pertinent information, such as special restrictions, road signs, speed limits, etc., that might be needed by a user while being guided from an origin to a destination.

3.150 Guided Link— A link in the digital network that is used for route guidance. Some links in the database may never be used by the system for passenger car guidance, such as those only legally useable by emergency vehicles.

3.151 Guided Mode— The mode in which a route has been planned, and the user is being guided to the destination in real-time by the guidance system. This is in contrast to "tracking mode" which is the mode in which the user's location is being updated in real-time, but no guidance information is being provided to the user.

3.152 HAZMAT— Industry term for vehicles carrying hazardous material, as well as various regulations concerning the portage and conveyance of same (routing restrictions, etc.). The term is also used in non-transportation fields to refer to the issues of storing such materials.

3.153 Heading Up— A term used in in-vehicle navigation systems and map display systems to signify that the top of the screen is the direction in which the vehicle is traveling. Many navigation systems offer a choice of "heading up" or "North up."

3.154 Head Up Display (HUD)— An optical display that projects information to the operator/driver on a clear optical surface (such as the windshield) in the operator's forward line of sight. (In some systems, the information is projected onto a clear surface which has enhanced reflective properties.) Information is typically focused at some distance in front of the driver so that he/she does not have to redirect his/her gaze between the outside world and the instrument panel. Originally an aviation term, a HUD allows the pilot to check gauges, etc. while still looking outside the cockpit; hence the term head up display. Some ITS equipment inside the vehicle may present information to the driver using a HUD.

3.155 Headway— Time between which the leading surfaces of two consecutive vehicles pass the same location along a roadway. Headway is related to subject vehicle speed V, clearance C, and length L by the formula H= (L+C)/V where Length is the length of the lead vehicle and Clearance is the distance from the lead vehicle's trailing surface to the following vehicle's leading surface.

3.156 High Level Data Link Control (HDLC)— An ISO standard communications protocol for transmitting large amounts of data efficiently. Used in some ITS applications for communications between roadside beacons and vehicles.

3.157 Highway Advisory Radio (HAR)— A traffic information broadcasting system used in the U.S. Drivers are alerted to tune their car radios to a specific channel, usually a local AM channel operating at low power, to receive current traffic information.

3.158 Impairment Alert— An application which provides the driver with warnings regarding his/her fitness to drive. One of the DOT National ITS Program Plan User Services.

3.159 Incident—Any planned (e.g., roadwork) or unplanned (e.g., vehicular problem) occurrence on a roadway, its associated shoulder or occasionally nearby the roadway, which could present a hazard or distraction to the road users and typically will impede the free flow of traffic on the roadway. Planned incidents include scheduled maintenance actions such as repaving a roadway or painting a curb and special events such as sporting events, parades or concerts. Unplanned incidents include any unscheduled event on or near the roadway which could impede traffic flow such as a traffic accident and associated emergency medical treatment.

3.160 Incident Detection—The sensing and processing of sensor data that indicates a lessening of traffic flow (i.e., congestion) before some point on the roadway. Includes motorist report of an incident. Confirmation of an incident may be by multiple reports or emergency personnel arrival at the scene or remote monitoring (by video).

3.161 Incident Management—Action taken to alleviate the abnormal traffic flow resulting from an incident. Includes action to clear an incident, broadcasting traffic reports of the incident to warn motorists, use of message signs to advise motorists of the incident and actions to route traffic around an incident.

3.162 Incremental Map Updating—Providing updates to a selected link or links in a digital map database.

3.163 Independent Service Provider (ISP)—See Value Added Service Provider.

3.164 Inductive Loop—See loop detector.

3.165 Inertial Navigation System (INS)—A system which measures acceleration and heading data to compute an estimated position. Typically used in conjunction with some form of absolute positioning system such as GPS. The term INS generally is applied to complex systems for avionics or military use. See also: dead reckoning, fiber optic gyro, differential odometer.

3.166 Information Architecture—The definition of the conceptual structure of the information from/to system terminators and within a system and its meaning. This includes the data messages, mandatory and optional words of the data message, and the actual construction of said data words and messages to the bit/byte level and frequency of transmission.

3.167 Information Supplier—See value added service provider (VASP).

3.168 Infrared (IR)—Electromagnetic radiation lying outside the visible light spectrum at its red (low frequency) end. Used for short range communications and sensing vehicle separation and speed differential in some ITS applications.

3.169 Innovations Deserving Exploratory Analysis Program (IDEA)—A Transportation Research Board (TRB) initiative for ITS which supports innovative new concepts, products and results that help to accelerate the deployment of ITS. An ongoing program.

3.170 In Receiver Database Systems (IRDS)—A RDS term which refers to a database format which permits format scanning of both AM and FM stations based on a downloadable database provided over RDS.

3.171 Institute of Electrical and Electronics Engineers (IEEE)—IEEE is an international professional society and standards developing organization. IEEE members belong to one or more of some 30 individual societies, including the Vehicular Technology Society. IEEE has formed Standards Coordinating Committee 32 (SCC 32) to manage the development of IEEE standards for Intelligent Transportation Systems.

3.172 Intelligent Cruise Control (ICC)—Less preferred term. See adaptive cruise control.

3.173 Intelligent Transportation Society of America (ITSA)—Formerly IVHSA (Intelligent Vehicle Highway Society of America). A nonprofit scientific and educational corporation working to advance ITS in the U.S. A utilized federal advisory committee of the U.S. DOT.

3.174 Intelligent Transportation Systems (ITS)—An expanded and updated term for the previous term IVHS (Intelligent Vehicle Highway Systems). Adopted by the U.S. DOT and many other organizations in the U.S. to indicate the extension in use of information technology to all modes of ground transportation, not just vehicles operating on highways.

3.175 Intelligent Vehicle Highway Systems (IVHS)—Alternate term for Intelligent Transportation Systems (ITS).

3.176 Interactive Navigation—Navigation that requires two-way communications between the vehicle and the infrastructure. An example would be a system that acts as a terminal to a central route guidance computer. See autonomous navigation, semi-autonomous navigation.

3.177 Interface—In the context of system architecture, the linkage between a system or subsystem, and another system or subsystem; between two pieces of equipment; or between a system or subsystem and an operator or system user.

3.178 Intermodal—An application involving more than one mode of transportation. For example, a trip which involves a drive to the train station, then a train ride.

3.179 Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)—The current version of the "highway bill." Provides federal funding and guidelines for highway programs, including ITS, through FY 1997.

3.180 International Bridge, Tunnel, and Turnpike Association (IBTTA)—Industry association for toll collection industry and standards-setting organization.

3.181 International Standardization Organization (ISO)—ISO Technical Committee 204 deals with standards for Transport Information and Control Systems (an international term for ITS). ISO TC 22 deals with standards for Road Vehicles. ISO TC 211 deals with Geomatics (GIS systems).

3.182 International Telecommunications Union (ITU)—An international treaty organization which develops Recommendations (i.e., standards) for radio and telecommunication systems. The ITU has two Sectors: Radiocommunication (ITU-R, formerly CCIR) and Telecommunication (ITU-T, formerly CCITT). ITU Recommendations are also used as the technical basis for frequency allocations made at World Radio Conferences (WRCs).

3.183 Interoperability—Describes the ability of a piece of equipment to inter-operate correctly in more than one geographical region with other equipment from different suppliers. A user should not need to perform any configuration or other manual task as he or she moves from one geographical area to another. This will set requirements for interfaces, for the harmonization of definitions of basic concepts and data, and for the basic principles of function and presentation of information.

3.184 Intersection Collision Avoidance System—Application of ITS technologies to provide drivers with assistance in avoiding collisions at intersections. One of the DOT National ITS Program Plan User Services.

3.185 Intersection Traffic Control—Traffic control measures specific to a particular intersection, such as actuated traffic signals (signals which sense traffic patterns and adjust timing of signals appropriately).

3.186 In-Vehicle Equipment—See on board equipment.

3.187 In-Vehicle Signing—On board display of roadside sign information. The information can be obtained either by short range information from the roadside or from on-board data storage.

3.188 Japan Automobile Federation (JAF)—Private organization under direction of the MOT (Ministry of Transport) and NPA (National Police Agency). JAF is a nationwide vehicle user's association, similar to AAA.

3.189 Japan Automobile Manufacturer's Association (JAMA)—Composed of 13 auto and motorcycle manufacturers under the direction of MITI (Ministry of International Trade and Industry). JAMA is similar to the AAMA.

3.190 Japan Automobile Research Institute (JARI)—An association of private companies under the direction of MITI. JARI conducts basic research with emphasis in the areas of automotive safety, energy, and environment. JARI is similar in mission to NHTSA, but is not a regulatory agency.

3.191 Japan Automobile Standards International Center (JASIC)—An association of private companies under the direction of MOT (Ministry of Transport). JASIC works toward international harmonization with regards to automobile related standards.

3.192 Japan Auto Parts Industry Association (JAPIA)—An association of private companies under the direction of MITI. JAPIA's goals are to improve auto manufacturing technologies and to improve international cooperation.

3.193 Japan Road Traffic Information Center (JARTIC)—A private organization under the direction of the MOC (Ministry of Construction) and PMO (Prime Minister's Office). JARTIC collects road and traffic information from various administrators and disseminates it to the public.

3.194 Kiosk—A structure housing a walk-up information station or posting keyboard. Kiosks may provide a point of access to information networks and/or a conduit for consumer transactions. ITS traveller information kiosks can provide a variety of ITS services to users, including dynamic traffic and transit information, travel directions, fare card dispensing, travel reservations, and yellow pages information.

3.195 Lateral Collision Avoidance—The collection of ITS AVCS user services that are designed to reduce or eliminate crashes involving improper lateral movement of vehicles. These include lane-change and blind spot obstacle detection and warning systems as well as systems to detect and warn the driver of an inadvertent lateral departure from the lane or roadway. One of the DOT National ITS Program Plan User Services.

3.196 Lateral Vehicle Control—Control of the lateral movement of a vehicle, which is normally effected by control of the steering but can also be accomplished by selective application of braking on one or more wheels.

3.197 Link—A portion of a roadway between two intersections (nodes).

3.198 Link Attributes—Characteristics of a particular link, including address range, speed limit, road classification, driving restrictions, number of lanes, etc. See attribute.

3.199 Link Travel Times—The time required for a vehicle to traverse an incremental section of roadway referred to as a “link.”

3.200 Local Area Augmentation System (LAAS)—A Federal Aviation Agency program to provide local area differential corrections near airports. LASS will provide the accuracy (about 1 meter), integrity, and availability required for precision approaches and landings. This is a possible source of differential correction data for GPS receivers and on-board navigation systems.

3.201 Localization—The process of determining the user's position or location. The *position* is usually specified in absolute coordinates, such as latitude/longitude, whereas *location* is usually specified in relation to a map or other geographical reference, such as an address on a roadway, an intersection of two streets, etc.

3.202 Location and Monitoring Service (LMS)—The 902~928 MHz band used for wideband and spread spectrum location systems. So called “multilateration” systems which can locate objects as well as toll tags and unlicensed “Part 15” devices occupy this band. Formerly called the Automatic Vehicle Monitoring (AVM) band.

3.203 Logical Architecture—Determines the nature of the system as being based on Information, Control, or Functions, and describes the inter-relationships of these aspects. The logical architecture is independent of any hardware or software approach. A logical architecture can be described as either from an Object Oriented of Process Oriented perspective. An Object Oriented approach may be expected to provide an integrated description working from the identified objects, their attributes, methods and inter-relationships through to the supporting services/systems and state transitions. A Process Oriented decomposition of the Logical Architecture is represented by Functional, Control and Information Architectures.

3.204 Longitudinal Activation/Control—Applies to the dynamic control of the longitudinal motion of a vehicle, i.e., speed and distance between the vehicle and its neighbors ahead and behind it. Cruise control is an example of current day longitudinal control. Adaptive Cruise Control will maintain a time or distance between the vehicle and the vehicle in front of it, and application of ITS technologies to provide drivers with assistance in avoiding rear-end, head-on, and backing collisions.

3.205 Longitudinal Collision Avoidance—The collection of ITS AVCS user services that are designed to reduce or eliminate crashes involving improper longitudinal movement of vehicles. These include forward and rear obstacle detection and warning systems, which may be extended beyond warning functions to include application of the brakes as well. Adaptive cruise control is sometimes (inappropriately) grouped within this category. One of the DOT National ITS Program Plan User Services.

3.206 Loop Detector—Arrangement of cable, usually under the road, to detect cars. It forms an electrical circuit able to sense magnetic field variations caused by cars.

3.207 Low Earth Orbit Satellite System (LEO)—A system of communications satellites which would be placed into a low orbit (150 miles) above the earth as a means to provide 2-way communications services similar to paging and current cellular systems. There are a number of proposers of such systems. LEOs are one of the many communications systems being proposed for ITS use.

3.208 M911—Slang term for “Mobile 911.” See Mobile 911.

3.209 Magnetic Field Sensor (MFS)—A device which senses the magnetic field it is placed in (a compass). Not to be confused with a “gravity” field device. Used in ITS as a means to determine the current heading of the vehicle, however electromagnetic interference inside the vehicle commonly causes significant errors.

3.210 Man Machine Interface (MMI)—This term is used to generically describe all aspects of the user interface to a computer, instrument, or other device. It covers visual, aural, and tactile interfaces. The man-machine interface, sometimes called a human-computer interface, consists of all command, control, and communication techniques and physical components that enable human beings to operate devices and to learn the status of their operation and information display. Besides the graphical user interface (GUI), the input equipment may include buttons, microphones, joysticks, head- or glove-mounted sensors, mice, pens, and keyboards, while output equipment may include CRT or LED display devices, tactile devices, loudspeakers, etc.

3.211 Map Display System—An in-vehicle system which displays a digital map with the location of the vehicle and the location of the desired destination. Typically does not include turn-by-turn route guidance instructions.

3.212 Map Matching—Computer software which matches the position of a moving vehicle to a digital road map, correcting for any errors caused by the inaccuracy of the position sensors.

3.213 Map Updating—See incremental map updating.

3.214 Master Street Address Guide (MSAG)—The database used in 911 systems which contains data on selective (call) routing, emergency number directories (ESNs), and complete address ranges for the covered area.

3.215 Mayday—An international radio-telephone signal word used as a distress call. In the context of ITS, refers to systems which automatically determine vehicle location and summon emergency help.

3.216 Message—A set of data elements grouped together for transmission. The term message is usually used in the context of the application layer of a protocol, and describes the data content of the transaction.

3.217 Message Number—A unique number assigned to a message by the sender so that the receiver can identify duplicates or other characteristics. For example, if a long message is broken down into a series of shorter messages for transmission, the order in which these are received by the recipient is not always guaranteed to be the same as the order in which they were transmitted. The message number allows the receiver to reconstruct the longer message in the proper order. In ITS applications, downloaded routes or other advisory information may be sent in this way.

3.218 Message Priority—Indicates the degree of importance of a message and the urgency with which its contents should be processed or transmitted.

3.219 Mobile 911—Calls to the 911 system placed by a mobile cellular phone. Calls of this type present a problem for the 911 dispatcher, who does not know the caller's location. It is generally believed that future mobile phones will be able to report their position. The FCC has currently proposed a set of regulations which would require new phones to have this ability.

3.220 Mobile Environment—In data and voice communications, “mobile” usually means vehicle-mounted equipment, as opposed to “portable,” which usually refers to hand-held equipment not permanently attached to the vehicle. In some cases, equipment can be both portable and mobile, as in the case of a portable cellular phone that can be placed in a “dock” in the car which provides battery charging and transmission power amplification.

3.221 Mobility 2000—Informal (ad-hoc) organization in the late 1980s of transportation officials, university and industry leaders and electronics manufacturers who were of the opinion that advanced technologies were needed, not more concrete, to solve our transportation congestion problems. Original government/ industry/ university consortium/committee to define ITS area and issues. Led to the formation of IVHS AMERICA, subsequently ITS America.

3.222 Modal Interchange—A point in a trip where the traveller switches from one mode of transportation to another, or a load of freight is transferred from one mode of transportation to another. See intermodal.

3.223 Multilateration—The process of determining the location an object (vehicle or other) by multiple time of arrival measurements. The 902~928 MHz band is used for several such systems. In multilateration a strict control of timing is enforced to measure signals. LORAN uses a multilateration approach.

3.224 National Association of Broadcasters (NAB)—The trade association representing the needs of commercial broadcasters in various matters, including the setting of voluntary technical standards. Of note to the ITS community is the National Radio Systems Committee (NRSC) which is charged with developing technical advancements of concern to broadcasters. Three active subcommittees of the NAB-NRSC are of interest to ITS, covering the topics of RDS-RBDS, High Speed SCA, and Digital Audio Broadcast (DAB).

3.225 National Emergency Number Association (NENA)—The professional association concerned with operating the U.S. 911 system. Relevant to ITS advanced emergency response systems. See also APCO.

3.226 National Radio Systems Committee (NRSC)—The committee of the NAB which develops recommendations concerning technical matters of concern to AM and FM broadcasters. Notable work of the NRSC is the development of the RDS standard for the U.S., and current efforts to develop a suitable highspeed broadcast SubCarrier for ITS use.

3.227 National Research Council (NRC)—An independent advisor to the federal government on scientific and technical questions of national importance. Jointly administered by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. An important unit of the NRC is the Transportation Research Board.

3.228 National Telecommunications and Information Administration (NTIA)—Part of the Department of Commerce. Regulates spectrum for federal users.

3.229 Navigable Digital Road Map Database—A digital road map database which includes the attributes required for safe and legal navigation, including one way streets, turn restrictions, address ranges, etc.

3.230 Navigation—The practice or art of directing the movement of a vehicle from one point to another.

3.231 Navigation Computer—A computer that performs navigation functions.

3.232 Navigation System—An on-board device whose purpose is to provide navigation information to the driver. Navigation systems range in functionality from being autonomous to being communications terminals linked to external resources.

3.233 Naviken—(Japanese) Navigation System Research Association (standard). A standard format for CD-ROM based application software for in-vehicle navigation systems.

3.234 Network Parking Guidance—Provides wide-area guidance information related to parking facilities with available spaces.

3.235 Node—A node (0-cell) is a topologically significant point, such as a simple intersection of roadways or other linear features, or an endpoint of such a feature. A junction is a collection of more than one nodes that represents a logical feature, such as a complex intersection.

3.236 Occupancy Time—The time interval during which a vehicle is physically located over an inductive loop detector or other similar "spot" surveillance sensor in the roadway. The occupancy time can be used to derive an average measure of the rate of traffic flow or speed on the roadway.

3.237 O-D Pair—An Origin - Destination Pair is the start and stop point of a traveler engaged in some type of trip. OD pairs are a technique used to simulate traffic flows in computer models; actual OD pairs of real vehicles are very rarely used in traffic management.

3.238 On Board Diagnostics—System power up, continuous or on-demand verification of proper operation from within the vehicle. This may be a simple "go/no go" output or may record or output status values relative to acceptable performance limits. The ABS light (ok/malfunction) and engine light (acceptable/below acceptable performance) on the dashboard are respective examples of these two types of information.

3.239 On Board Equipment—Any equipment attached to a vehicle, or any activity that occurs in a vehicle is said to be "on board" the vehicle. Such equipment or activities are sometimes referred to as "in-vehicle."

3.240 On Board Safety Monitoring—Includes diagnostic and warning systems that will alert the commercial vehicle operator to pending emergencies while driving, improving commercial vehicle safety. One of the DOT National ITS Program Plan User Services.

3.241 On Line—The situation in which equipment on board the vehicle is “logged in” to, or actively engaged in two way communication with, equipment outside the vehicle (e.g., via a cellular telephone network).

3.242 Onlooker Slowdown—Slang term for the effect of reduced traffic flow on the roadside opposite from a given incident caused simply by the reduced flow as passing traffic pauses to gawk at the event. Often used by radio traffic reporters. Also called “rubbernecking” or “gaper's delay.”

3.243 Open Architecture—A logical and physical design in which the developers make the design details available. See also closed architecture.

3.244 Operator (of a TMC)—The person or organization which is charged with managing the operations of the TMC.

3.245 Operator (of a Vehicle)—The person who is currently operating or responsible for the vehicle in question.

3.246 Optimal Route Generation—A route generation computation in which the result is optimized according to one or more criteria, such as shortest time or shortest distance.

3.247 Origin—The starting point of a route. Users may specify origins in several ways, such as by current vehicle location, street address, intersection, or by name. See route.

3.248 Path—A series of one of more contiguous road links along a route, for which no intermediate maneuvers are required. A path that starts just after maneuver N terminates at maneuver N+1. The first path starts at the origin and the last path terminates at the destination. A series of contiguous paths makes up a route. See route.

3.249 Peak Time—The times of the day when (transportation system) occupancy is highest.

3.250 Personalized Public Transit—Publicly subsidized vehicles which provide a service similar to that of a taxi. One of the DOT National ITS Program Plan User Services.

3.251 Personal Communications Services (PCS)—A concept for a suite of wireless, full duplex, voice and data communications services, accessible anytime and anywhere over portable transceivers or handsets. Proposed services include telephone, paging, and traffic information. Proposed implementations include TDMA, CDMA, and GSM.

3.252 Physical (Application) Architecture—Describes the physical configuration and physical interconnection of equipment required to achieve the desired performance of the system. Does not describe the deployment itself.

3.253 Point of Interest (POI)—Information contained in a digital map database in addition to basic road network information, including hotels, businesses, restaurants, museums, and other "yellow pages" type locations. This allows the user of a navigation system to select a destination, such as a hotel, without requiring the user to know the address of that location.

3.254 Portable—In data and voice communications, “mobile” usually means vehicle-mounted equipment, while “portable” usually refers to hand-held equipment not permanently attached to the vehicle. In some cases, equipment can be both portable and mobile, as in the case of a portable cellular phone that can be placed in a “dock” in the car which provides battery charging and transmission power amplification.

3.255 Position Sensor—A device capable of determining its position relative to the earth. A GPS receiver is an example of a position sensor.

3.256 Pre-Crash Restraint Deployment—Application of advanced technology to initiate pro-contact restraint deployment (e.g., the air bag), thus improving the injury prevention capability of the restraint system. One of the DOT National ITS Program Plan User Services.

3.257 Predictive Traffic Information—In a dynamic route guidance system, the use of historical data in conjunction with current travel time data to predict road congestion in the near future. This information is then used to generate optimal routes based on predicted road conditions.

3.258 Pre-Trip Travel Information—Provision of information before a trip to facilitate travel planning and travel booking, and to provide information about en route services. Access can be provided via kiosks, personal portable devices, or through dial-up on-line services. One of the DOT National ITS Program Plan User Services.

3.259 Primary Network—The major roads or links in a map database used for navigation. See secondary network.

3.260 Primary Safety Answering Point (PSAP)—A term used by the emergency number community to refer to the actual place where emergency (911) calls are routed to. Typically the PSAP dispatcher is in direct contact with local fire, police, ambulance, etc., and acts as the central management agent coordinating between those groups. It is expected that "Mayday" services, both user initiated and automatically detected by the vehicle, will be routed to a PSAP for further processing. See also NENA, APCO, mayday.

3.261 Probe Data, Probe Reports—If a vehicle is equipped with a navigation or route guidance computer that is aware of the vehicle's location at all times, the vehicle can be used to gather travel time information as it traverses the road network. These travel time data are a valuable supplement to data from fixed surveillance equipment such as loop detectors, since they are provided for all roads on which the equipped vehicle travels, not only in the areas where the fixed sensors are deployed. Also known as “floating car data.”

3.262 Probe Vehicle—Term for vehicles equipped with some means to determine their position and route progress through the road network and report that to a third party. Probes provide a means for vehicles in the traffic flow to replace or augment the data provided by loop sensors. It is generally believed that a modest penetration of probe data could be used by the TOC to measure link travel times when loop sensors do not exist.

3.263 Program for a European Traffic with Highest Efficiency and Unprecedented Safety (PROMETHEUS)—European private sector research and operational test program intended to advance ITS in Europe. Begun in 1986, the program was completed in 1994.

3.264 Proximity Beacon—A short range transmitter of radio, microwave or infrared location-coded signals. It can also be used as a communication link for traffic information, road sign information, and other localized information.

3.265 Public Transportation Management—One of the DOT National ITS Program Plan User Services.

3.266 Public Travel Security—The use of advanced technologies to improve the safety and security of public transportation. One of the DOT National ITS Program Plan User Services.

3.267 Quad Sheets—U.S.G.S. maps of the United States at a scale of 1:24000. Used as a base map in a wide variety of applications.

3.268 Queue Length—The length of the waiting line of vehicles at a signalized intersection. The average queue length at the beginning of a green period is proportional to the rate of flow of vehicles per lane (vehicles/lane/second) times the length of the red phase of the signal (second), plus (where queue length does not diminish to zero) the rate of flow of vehicles times an average vehicle delay (second).

3.269 Queuing Time—The average time delay experienced by a vehicle at a signalized intersection. This delay is a function of the cycle length (second), proportion of cycle length effectively green (which includes a factor for starting and stopping the queue), the actual volume of traffic (vehicles/lane/second), the degree of saturation (ratio of actual flow to maximum flow that can enter the intersection), saturation flow, and minimum vehicle headway at maximum flow(in seconds).

3.270 Radio Broadcast Data System (RBDS)—The American version of RDS, referring specifically to the NAB-EIA standard for U.S. use, in which the meanings of certain low level bits are different from the EU standard developed by the EBU. Sometimes called "RDS."

3.271 Radio Data System (RDS)—The 1187 BPS SubCarrier modulation centered at 57 KHz found in many FM radio broadcasts which contains provisions for the transmission of other data such as differential GPS corrections, traffic data or paging. The data link has a limited "spare" capacity of 300 BPS to accommodate all of the above services. RDS is widely used in EU and other markets as the "low end" ATIS broadcast media of choice. See also DAB, SubCarrier.

3.272 Ramp Control—A system which implements control measures for merging traffic flows at motorway intersections, taking into account traffic demand and the actual capacity of the roadway section ahead. Also called ramp metering.

3.273 Reader—In the context of ITS, equipment that "reads" smart cards used for tolls or parking receipts.

3.274 Real-Time—(1) In the context of ATMS, a system which collects traffic information and detects incidents as they occur (and perhaps passes that information on to equipped vehicles). "Real-time" traffic information is contrasted with predictive traffic information or merely recent traffic information. (2) A term from the computer industry. Real-time does not necessarily refer to the speed of execution of the computer system, but to its ability to handle events and interrupts with minimal latency under all anticipated load conditions.

3.275 Reference Point—A map cartographic term used to describe a common point of reference. Typically other map items will use the anchor point as an absolute position and provide only their relative offset from it, hence resulting in more efficient information coding. See anchor point.

3.276 Remote Fault Diagnostic—A technique used to monitor systems operation and perform check-out from outside the vehicle by "wireless" means or via a diagnostic port (connector). Typically this is facilitated by a systems bus such as SAE J1850.

3.277 Report (of an Incident)—In the context of ATMS, a report of an incident on or near the roadway that causes or may cause an impediment to traffic flow. An accident report is a report of an incident dealing with one or more vehicles involved in a collision with people, vehicles or other objects on or near a roadway.

3.278 Rerouting—The process of modifying a route while enroute. See dynamic route guidance, route diversions.

3.279 Rescue Service—A (typically private) firm providing roadside assistance to motorist with stranded vehicles. There are a number of private firms which provide this service in the U.S. under the name or identity of a sponsoring agency, such as the local cellular carrier. In some very congested areas, such as California, these services are provided by the local authorities as well as part of their mission to reduce congestion on the freeways.

3.280 Ride Matching and Reservation—Advanced car pooling services that allow real-time ride matching information and reservation. One of the DOT National ITS Program Plan User Services.

3.281 Road Characteristics—See attributes.

3.282 Road Network—Every drivable road segment in a given coverage area, including all the possible nodes between those links.

3.283 Road Pricing—General term for advanced measures of charging for road use. Traditional road toll systems are combined with computer technology which varies the tolls based on time of day, type of vehicle, or other criteria.

3.284 Roadside Beacon—See beacon.

3.285 Roadside Systems, Roadside Infrastructure—Systems in actual contact with traffic flows through the use of sensors and actuators. Roadside systems can provide local control capabilities such as ramp metering and interface with larger traffic management systems.

3.286 Road Transport Informatics (RTI)—European term for ITS.

3.287 Route—A series of one or more contiguous links that leads from an origin to a destination within a road network. A route also specifies paths, maneuvers, and street names. A route may specify other pertinent information such as times and distances.

3.288 Route Diversions—Diversions from a previously determined route.

3.289 Route Generation—The process of calculating a route. See route.

3.290 Route Guidance—The process of providing guidance to a driver along a route. See guidance, turn by turn guidance. One of the DOT National ITS Program Plan User Services.

3.291 Route Guidance Database—See navigable digital road map database.

3.292 Route Impedance—An EU term for the link travel time of a given roadway segment. The term “impedance” comes from a methodology of modeling roadway systems as if they were electrical networks. In this method resistance or impedance is added to a given segment to reflect the difficulty in traversing it. See also link travel time.

3.293 Route Planning—The process by which a traveller plans a route. The traveller may explore several alternatives based on preferences such as shortest time or shortest distance, or time of day.

3.294 Secondary Audio Program (SAP)—Secondary Audio Program. The secondary audio program is a television technique used to transmit additional audio information, typically a second audio track in a second language. For ITS purposes the SAP is a possible transmission medium for Traveler Information System (TIS) messages.

3.295 Secondary Network—Those roads in a network not used for route guidance by some route guidance systems.

3.296 Segment—See link.

3.297 Selective Availability—A technique of deliberately introducing a varying degree of inaccuracy into GPS broadcasts for civilian applications.

3.298 Semi-Autonomous Navigation—Navigation that requires the vehicle to receive certain information broadcast from the infrastructure. An example would be a system that uses a GPS receiver but otherwise operates autonomously. See autonomous navigation, interactive navigation.

3.299 Smart Card—An electronic information carrier system that uses plastic cards with an imbedded integrated circuit that stores and processes information.

3.300 Static Route Guidance—A form of route guidance in which route generation is performed at the start of the trip, and does not change without manual intervention of the driver. Conditions known at the time of the route generation are assumed to prevail throughout the trip. See dynamic route guidance.

3.301 Subsidiary Communications Authorization (SCA)—This term loosely refers to all the additional material which broadcasters were allowed to transmit in addition to the main channel. Deregulation in 1983 (in the U.S.) removed the need for "authorization" and thus outdated this term. ITS may be transmitted using this technology.

3.302 SubCarrier—A term for one or more additional modulations placed on a transmitted radio signal, in addition to a primary signal (often referred to as the main channel). The most common example would be the use of modulation above 54 KHz in commercial FM radio station broadcasts, although many other signals also contain SubCarriers. See also RDS.

3.303 Subfunction—In the context of a system architecture, single element of a function. Subfunctions may be further decomposed into subfunctions until a "primitive" function is defined. The level of subfunctions is unavoidably different in different areas of analysis. There is no one-to-one correspondence between functions/subfunctions on the one hand and technologies on the other hand (specific functions may dictate technological solutions, e.g., storage).

3.304 Surveillance—The observation of a designated area for the purpose of detecting the position and movements of vehicles in that area.

3.305 System Architecture—A non-technology-specific model of a system. A hierarchial structure defined in terms of requirements and functions to achieve a goal by defining a framework for the performance of functions, the efficient structure of data flow and management, and a consistent strategy of control decisions leading to an appropriate structure of physical components and interfaces.

3.306 Telecommunications Industry Association (TIA)—Develops U.S. telecommunications standards and represents U.S. telecommunications interests domestically and internationally. TIA administers ISO TC 204 Working Advisory Group 16 (Wide Area Communications), the U.S. Ad Hoc Working Party 8a for ITU, and the ITU TICS Correspondence Group.

3.307 Telematics—European term for the application of computers, telecommunications and electronics. Thus, Road Transport Telematics is the application of computers telecommunications and electronics to road transport.

3.308 Terminator—A system architecture term. An originator or receiver of system data (source or sink).

3.309 Time Stamp—Many applications require information on when a particular event occurred or when a particular piece of information was acquired. Time and date stamping "attaches" the time and date of the event to the information about the event so that a receiving entity can determine exactly when it occurred or was acquired. The accuracy and resolution of the time and date stamp is application dependent.

3.310 Topologically Integrated Geographic Encoding and Reference Files (TIGER)—Digital map database files of the U.S. created for the Census Bureau for the 1990 census. An updated version of the DIME files.

3.311 Traffic Control—The use of hardware, software, and actual humans to manage traffic. ITS brings additional computer power and advanced sensing technologies to this traditional transportation engineering field. One of the DOT National ITS Program Plan User Services.

3.312 Traffic Information—The provision of dynamic traffic and traffic-related information to drivers via dynamic signs (VMS or CMS) or individual in-vehicle units.

3.313 Traffic Management—The combination of semi-automated control of traffic signs and signals, application of demand management techniques, and traffic information and advisories to achieve an "optimal" (close to free flow) traffic flow throughout a defined management area (both urban and inter-urban). See Advanced Traffic Management Systems.

3.314 Traffic Message Channel (TMC)—Originally an RDS term to refer to the messages which contained traffic information, now used as a general term to refer to traffic data within any multiple message type media. (Not to be confused with Transportation Management Center, another term for TOC.) The RDS-TMC coding varies with locations. The most widely known is the ALERT protocol version developed in use in the EU. In North America the ENTERPRISE group has developed a similar format.

3.315 Traffic Prediction—Prediction of traffic flow patterns, based on current conditions, historical information, and analysis of that information, typically using complex computer algorithms. See also predictive traffic information.

3.316 Traffic Restrictions—See driving restrictions.

3.317 Transit Fleet Operations—A subset of the Public Transportation Management user service, automates operations, planning and management of public transit to improve schedule adherence, transfer connections, service (routes and trips), maintenance scheduling, and operator scheduling.

3.318 Transmitter Network Group—An RDS term for a related family of transmitters, typically transmitting the same program material over a dispersed coverage area. Used in ITS to refer to proposed sets of broadcast transmitters which would transmit various ATIS information in a coordinated fashion.

3.319 Transportation Management Center (TMC)—The Transportation Management Center is charged with being the nerve center for ITS operations within a specified region. The TMC will coordinate and control highway traffic throughout its area of responsibility by identifying and coordinating the clearing of incidents, routing traffic, changing traffic signal timing sequences and implementing traffic demand controls. The TMC is additionally the central collection point for automated and human generated traffic information reports, and provides Transit Operations and Traveler Information Services with up to date information on the traffic situation and area weather. Also called the Transportation Operations Center (TOC).

3.320 Transportation Research Board (TRB)—Supports and promotes transportation research. Part of the National Academy of Sciences. The TRB Communication Committee and ITS Committee recommend specific research topics in the field of ITS.

3.321 Travel Demand Management—One of the DOT National ITS Program Plan User Services. See demand management.

3.322 Traveller Services Information—A service which provides "yellow pages" information to the driver or other traveller. One of the DOT National ITS Program Plan User Services.

3.323 Travel Time—The time it takes a traveler to traverse from his origin to destination (O-D pair). Times can be expressed in absolute time taken, or in deviations from some historical norm. In general terms, the travel time (in the vehicle) is the sum of all link travel times in his O-D pair.

3.324 Travel Time Increase—The ratio of the actual link travel time to the average free-flow travel time.

3.325 Travel Time Profile—A travel time profile represents the travel time of a particular street segment or link at a particular time and over a period of time. The "free flow" travel time, which exists for some periods during the day, represents the baseline. Increases in travel time caused by recurring congestion, (e.g., during rush hours) are represented by the profile. In the absence of non-recurring congestion (e.g., caused by accidents or events), this profile can be used to predict the travel time along that link some time into the future. As more data are acquired, the profile can be improved to more accurately represent the historical behavior of that link.

3.326 Truck Restrictions—Restrictions on heavy vehicle travel on particular roadways due to legal and physical constraints, including height, weight, width, and cargo restrictions.

3.327 Turn by Turn Guidance—A method of guidance in which a route is presented to the driver as a series of maneuvers. Individual maneuvers are presented to the driver as the vehicle approaches the vicinity of the maneuver.

3.328 Universal Time Coordinate/Code (UTC)—The format generally used to keep "time" by modern communications and navigation systems. Most modern systems can "trace" their local time keeping to the UTC time system. Relevant to GPS receivers and other common ITS location devices.

3.329 Value Added Service Provider (VASP)—Value Added Service Providers (VASPs) provide transportation-related information typically customized to a particular application or group of consumers. They may exchange information with a Transportation Management Center for a fee. An example would be the private traffic information services which sell current traffic information to radio stations.

3.330 Variable Message Sign (VMS)—A traffic information sign capable of displaying an almost infinite variety of information by use of light bulbs individually emitting light or not, to form a character and character sequence. Typically such signs are capable of providing drivers with short messages on traffic or roadway conditions. See also changeable message sign.

3.331 Vehicle Class—The vehicle category or type to which an individual vehicle belongs. An official designation of vehicles. Private vehicles are class "C," large trucks (length greater than 13 m (40 ft) are class "A." Other restrictions apply: contact your local Department of Motor Vehicles for driver license requirements.

3.332 Vehicle Diagnostics—See on board diagnostics, remote fault diagnostic.

3.333 Vehicle Identification Number (VIN)—The vehicle identification number provides information on the manufacturer, country of origin, vehicle class and style, engine, emissions, safety features, maximum gross weight and production sequence. Covered by ISO standard 3779, Standard Vehicle Identification Numbering System. In the U.S., required and defined by Federal Motor Vehicle Safety Standard #115, Vehicle Identification Number Basic Requirements.

3.334 Vehicle Operational Status Monitoring—System (host) periodic or continuous monitoring of functions with warning when outside of acceptable limits. A typical example is the fuel gauge indicator on the dashboard.

3.335 Vehicle to Roadside Communications (VRC)—Data communications between a stationary or moving vehicle and fixed roadside equipment used for applications involving fee payment or the transfer of information. These applications include, but are not limited to, electronic toll collection by "debit" or "credit" card, the request for and reception of traveler information and/or routing assistance, and automating the exchange of regulatory information between heavy vehicles and weigh stations.

3.336 Vertical Blanking Interval (VBI)—The short period of time during which the electron beam of a television tube retraces from the bottom to the top of the screen. During this period of time no video data is transmitted, hence this period of time can be used to send other data (a SubCarrier). The VBI has been proposed as a means to broadcast ITS data.

3.337 Vision Enhancement for Crash Avoidance—An application which enhances the driver's vision with "night vision" or other sensors (radar or infrared) that provide auxiliary presentation of the driving environment during conditions of poor visibility. One of the DOT National ITS Program Plan User Services.

3.338 Voice Output/Input—The general concept of using the operator's voice rather than some form of tactical keyboard to control the user's device (ATIS display, navigator etc., typically an in-vehicle device).

3.339 Weigh in Motion (WIM)—A technology for weighing heavy vehicles without requiring them to stop at weigh stations.

3.340 Wide Area Augmentation System (WAAS)—A Federal Aviation Administration program to provide wide area differential GPS usable over the contiguous 48 states. Scheduled for deployment in 1988. A possible source of differential correction data for GPS receivers and on-board navigation systems.

3.341 Wireless 911—Another term for mobile 911. See mobile 911.

3.342 World Geodetic System 84 (WGS-84)—A coordinate system standard used in ITS map databases. See also geodetic coordinates.

***4. Acronyms*—**Acronyms commonly used in the ITS industry are listed below. Major categories of acronyms used include names of relevant standards organizations, communications standards, technologies, and national professional/industry associations. Where an acronym is obsolete or not preferred, the preferred U.S. term is listed. Many of these terms are defined in greater detail in the Definitions section (see Section 3).

4.1 AAA—The American Automobile Association

4.2 AAMA—American Automobile Manufacturers Association

4.3 AASHTO—American Association of State Highway and Transportation Officials

4.4 ACC—Adaptive Cruise Control (obsolete - ICC preferred)

4.5 ADIS—Advanced Driver Information System

4.6 ADS—Automated Debiting System (ETTM preferred in U.S.)

4.7 AFNOR—Association Francaise de Normalisation

4.8 AHS—Automated (Advanced) Highway System

4.9 AICC—Autonomous Intelligent Cruise Control (obsolete - ICC preferred)

4.10 ALI—Automatic Location Identification

4.11 ANI—Automatic Number Identification

4.12 ANSI—American National Standards Institute

4.13 APCO—Association of Public Communications and Safety Officers