KEY MILESTONES IN THE HISTORY OF INTELLIGENT TRANSPORTATION SYSTEMS

Pre-1980s

1914 | The first three-colored traffic signal is deployed in Ohio

1935 | The first parking meter is deployed in Oklahoma

1956 | Congress passes the Federal-Aid Highway Act (Eisenhower Highway Bill) and the U.S. interstate network is created

1963 | The first ramp meters are deployed on the Eisenhower Expressway in Illinois

Mid-1960s | General Motor's Driver Aided Information and Routing System is deployed

1960s | The first mobile robots are developed

1960s | The first dynamic message signs are deployed

1967 | Government agencies begin setting vehicle and highway safety standards; seat belts, padded dashboards, standard bumper heights, and dual braking systems become mandatory for new cars in 1967

Late 1960s | The Federal Highway Administration (FHWA) Electronic Route Guidance System is deployed

Late 1960s | The first North American traffic management centers are deployed

1966 | The U.S. Department of Transportation (USDOT) is established

1968 | The first 911 system is installed in Alabama

1970 | The National Highway Traffic Safety Administration (NHTSA) is established by the Highway Safety Act

1972 | Minneapolis introduces a bus bypass lane at metered ramps to promote use of mass transit

1970s | Early generation bus automatic vehicle location mapping technology is deployed

1980s

1984 | Los Angeles Automated Traffic Surveillance and Control System integrates vehicle detectors, closed-circuit TV, and coordinated signal timing data

1985 | The Defense Advanced Research Projects Agency (DARPA) Autonomous Land Vehicle demonstrations begin

Mid-1980s | The Crescent Demonstration Project researches ways to pre-screen and weigh commercial trucks at highway speeds

1986 | The TRANSCOM coalition forms to improve incident notification, regional incident management, and construction coordination

Mid-1980s | The Automatic Route Control System is the first advanced autonomous route guidance system utilizing on-board computer with digitized maps, map-matching software, and dead-reckoning subsystem

Mid-1980s | The FHWA Traffic Systems Division partners with several universities to conduct exploratory projects on freeway management, advanced traffic control, computer simulation, and driver information systems

1990 | In California, the Pathfinder in-vehicle information system assesses communications technology for route guidance and in-car traffic navigation

1991 | The Intelligent Vehicle Highway System (IVHS) Joint Program Office (JPO) is established as part of the FHWA

1991 | The E-ZPass Interagency Group is created to develop an interoperable tolling system among seven independent toll agencies throughout New York, New Jersey, and Pennsylvania

1987 | U.S. Congress establishes the University Transportation Centers through the Surface Transportation and Uniform Relocation Assistance Act

1987 | Northeast corridor states embark on electronic toll collection interoperability (NY, NJ, PA)

1988 | Mobility 2000 is created — a collaboration with the American Association of State Highway and Transportation Officials (AASHTO), Transportation Research Board, Highway Users Federation for Safety and Mobility, and FHWA

1989 | Mobility 2000's first meeting is held in Dallas, Texas

1989 | Operation Greenlight addresses vehicle congestion in the Illinois area and includes freight modes: trucking, rail, marine terminals, airlines, and freight associations

1989 | The World Wide Web is invented by Tim Berners-Lee

1990s

1990 | Intelligent Vehicle Highway Society of America (IVHS America) incorporates in Washington, DC

1991 | ISTEA designates IVHS America a Utilized Federal Advisory Committee to the USDOT's IVHS Joint Program Office

1991 | The Intermodal Surface Transportation Efficiency Act (ISTEA) is passed by Congress, and the federal ITS research program is established

1991 | IVHS America holds its First Annual Meeting in Reston, VA

1992 | FAST-TRAC integrates advanced traffic management systems and advanced traveler information systems in Oakland County, Michigan

1992 | TravTek deploys in-vehicle traveler information system and navigation device

1992 | The Guidestar Program Genesis project deploys wireless personal communications devices to send drivers alpha-numeric text travel information in the Twin Cities area

1992 | INFORM Project presents traffic flow and alternate routing information through changeable message signs in Long Island, New York

1993 | Truck rollover warning system is deployed

1993 | The Chicago Transit Authority integrates smart card technology into its automated fare collection system

1993 | The I-95 Corridor Coalition is formed as a partnership of transportation agencies, toll authorities, public safety, and related organizations

1993 | E-ZPass is deployed at the New York State Thruway

1993 | The USDOT identifies four intelligent transportation system priority corridors, including Gary/Chicago/Milwaukee Corridor, Northeast Corridor, Southern California, and Houston

1994 | IVHS America becomes the Intelligent Transportation Society of America (ITS America)

1994 | The National Automated Highway System Consortium is established to address ISTEA AHS Automated Highway System (AHS) mandate

1994 | The term "ITS" is officially sanctioned by USDOT as a replacement for IVHS

1994 | Bluetooth is invented

1995 | The Crash Avoidance Metrics Partnership (CAMP) is launched by Ford and General Motors

Mid-1990s | The IVHS Program develops a national systems architecture and standards to promote interoperability and coordinated national approach

1995 | The first implementation of congestion pricing using electronic variable tolling is deployed in Orange County, CA

1995 | "No Hands Across America": Researchers from Carnegie Mellon University drive a specially outfitted car with autonomous capabilities from Pittsburgh to Los Angeles

1995 | GPS is commercially available

1996 | The USDOT selects four Metropolitan Model Deployment Initiative communities (FCC) to allocate 75 MHz of spectrum in the 5.9 GHz band for ITS

1996 | The USDOT establishes the ITS Standards Program

1997 | Congressionally mandated AHS Demonstration is held in San Diego, California

2000s

1999 | The Commercial Vehicle Information Systems and Networks Deployment Grant Program is initiated

1999 | ITS America successfully petitions the Federal Communications Commission (FCC) to allocate 75 MHz of spectrum in the 5.9 GHz band for ITS

2000 | The Federal Motor Carrier Safety Administration is established as a separate operating administration within the USDOT

2000 | FCC designates 511 as the single travel information telephone number across the country

2000 | Travel time information is displayed on dynamic message signs as part of 511

1998 | Speed cameras are deployed as a traffic surveillance method

1998 | The USDOT's Intelligent Vehicle Initiative (IVI) Program is established

1996 | U.S. Congress passes the Transportation Equity Act for the 21st Century (TEA-21)

2002 | The USDOT releases the National ITS Program Plan: A Ten Year Vision

2003 | The USDOT launches the Vehicle-Infrastructure-Integration (VII) Program

2003 | First forward collision warning system is offered in the United States on a Toyota Lexus LS 430

2004 | The Research and Innovative Technology Administration is established within the USDOT to support ITS initiatives

2004 | The USDOT's Clarus initiative is established to reduce the impact of adverse weather conditions on surface transportation users

2004 | The first lane departure warning system available in the United States is developed by Iteris and Valeo for the Nissan Infiniti FX

2004 and 2005 | The DARPA Grand Challenge is conducted to accelerate the development of technology for autonomous vehicles

2005 | The National 911 Program Office is established by NHTSA and the National Telecommunications and Information Administration

2005 | The USDOT initiates a 5.9 GHz-based VII proof of concept; a continuation of the Advanced Vehicle Control Systems envisioned by Mobility 2000

2005 | The Mobility Services for All Americans initiative begins

2005 | The Integrated Vehicle-Based Safety Systems initiative is established to develop and test integrated safety systems on light vehicles and commercial trucks

2005 | The first high occupancy toll lanes are deployed in Orange County, CA

2005 | U.S. Congress passes the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)

2006 | The USDOT partners with CAMP to develop and test prototype vehicle-to-vehicle (V2V) safety applications

2006 | The USDOT launches an integrated corridor management initiative to improve corridor performance

2007 | Blind spot detection is offered on vehicles

2007 | Apple's iPhone 1.0 is released

2007 | Lane departure warning, blind spot monitoring, and collision avoidance systems are available on luxury vehicles

2008 | The USDOT conducted a proof-of-concept test to investigate the technical feasibility of V2V and V2I applications in Michigan and California

2009 | Google's Self-Driving Car project starts

2010 | Crowdsourcing apps are developed for use in transportation

2011 | The first public connected vehicle demonstration is held at the 18th ITS World Congress in Orlando, FL

2010s

2012 | U.S. Congress passes the Moving Ahead for Progress in the 21st Century (MAP-21)

2012 | The USDOT launches the 2012–2013 Safety Pilot Model Deployment demonstrating V2V communication

2014 | General Motors announces semi-autonomous driving features and V2V communication capability in some 2017 Cadillacs

2014 | The USDOT issues Advanced Notice of Rulemaking for V2V communication technology for light vehicles

2014 | ITS JPO releases the ITS Strategic Plan 2015–2019

2015 | Connected Vehicle Pilot Deployment awards are announced

2015 | President Obama signs the Fixing America's Surface Transportation (FAST) Act into law

2015 | President Obama announces the Smart Cities Initiative and Secretary Foxx launches the Smart City Challenge

2015 | National Operations Center for Excellence is unveiled as a collaboration between ITS America, AASHTO, and Institute of Transportation Engineers, with support from FHWA

2016 | The USDOT announces seven finalists for Smart City Challenge; the winning city will be announced in June 2016

KEY

- Policy/Anniversary
- Technology/Deployment
- Research/Academia
- Stakeholder Champion or Meeting

Without question, ITS technology has made transportation safer and more efficient. While many think improving our nation's transportation system solely means repairing aging infrastructure or building new roads, the future of transportation lies not only in these efforts, but also increasingly in implementing ITS technologies. The benefits of ITS are wide reaching and applicable to urban and rural populations; commuters and commercial truck drivers; and pedestrians, bikers, and public transportation system users. Building on decades of ITS research and deployments, the very near future will likely include vehicles that can talk to one another and roadside infrastructure to avoid collisions, improve congestion, and recognize environmental benefits. ITS will enable automated vehicles to interact with the transportation system—a concept that has captured the human imagination for decades, and is closer than ever to widespread deployment.

ITS technology has already had a significant impact on the current transportation environment. We are now on the verge of greater benefits and impacts due to advances in technology. For example, connected vehicle technology research indicates that vehicle-to-vehicle safety systems may address up to 80 percent of collision-based accidents where the driver is not impaired. Fully automated vehicles may offer even greater safety benefits. As research, development, and deployment marches on, these advanced solutions will increasingly yield even more mobility, environmental, safety, and other benefits.

Over time, the ITS field has evolved, not only technologically but also in the area of public and private interactions. The relationship between industry and the government has

progressed into an essential partnership, which has catalyzed the development of new technologies. This partnership is critical to the success of ITS. The *History of ITS* report highlights both public and private agency investments and advances, often achieved through collaborations between the two.

The United States Department of Transportation (USDOT) commissioned this report in part to celebrate the convergence of three milestone anniversaries occurring in 2016 — the USDOT's 50th Anniversary, the ITS JPO's 25th Anniversary, and the 60th Anniversary of President Eisenhower signing the Federal-Aid Highway Act. In addition to celebrating these milestones, the ITS JPO wants to highlight the history and future of ITS developments and how these technologies have shaped our current environment and will influence our future.

> " We are not just in the transportation business. We are in the quality of life business.

– James Pol, Technical Director of the Federal Highway Administration, Office of Safety Research and Development

2016 is the **25th anniversary** of the Intelligent Transportation Systems Joint Program Office.
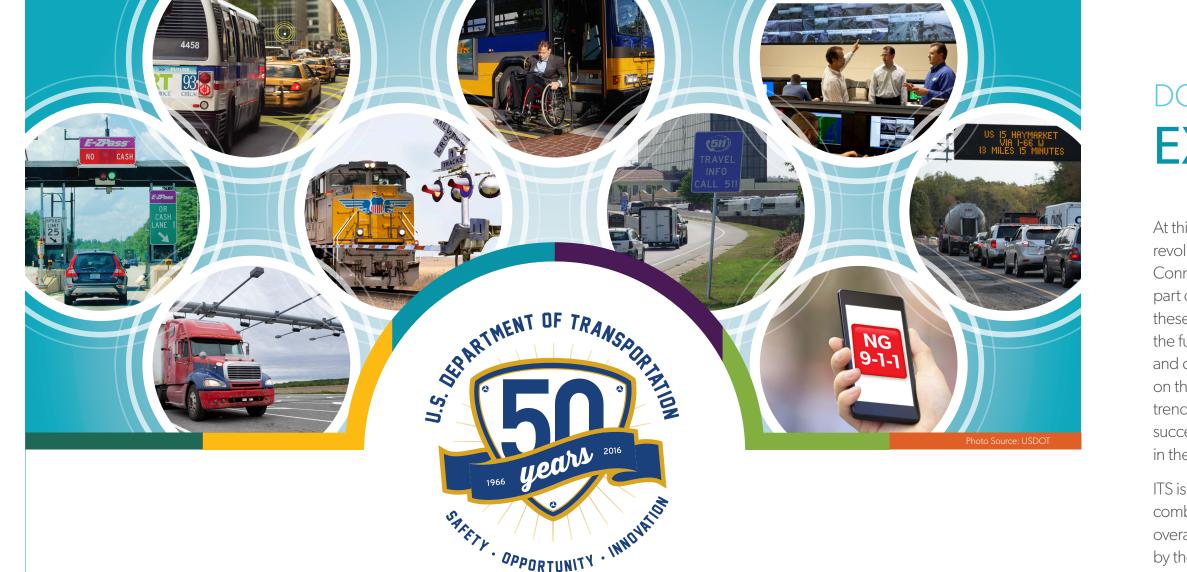
Download your free copy of the *History of ITS* at: **www.its.dot.gov/history.**

Journey through the history as we prepare for the future of intelligent transportation.

U.S. Department of Transportation Celebrates
50 Years of Innovation in Intelligent Transportation

DOT'S HISTORY OF INTELLIGENT TRANSPORTATION SYSTEMS
EXECUTIVE SUMMARY

At this moment, our nation stands at the cusp of some of the most revolutionary changes to our transportation system in decades. Connected and automated vehicles are closer than ever to being part of our everyday world, and the decisions we make regarding these and other advanced technologies could profoundly affect the future of transportation. As we move toward a more intelligent and connected transportation system, it is important to reflect on the history of the field, recognize lessons learned, identify trends and their historical implications, and acknowledge both the successes and the failures that have brought us to our current point in the evolution of intelligent transportation systems (ITS).

ITS is an operational system of various technologies that, when combined and managed, improve the operating capabilities of the overall system. According to a recent national survey conducted by the University of Iowa, there are very large gaps in the public's knowledge about ITS.[1] Many people have little knowledge of "formal" ITS, yet they benefit from its existence every day. ITS technology is the phone application that you use to determine how long to wait before walking to catch the next bus. It is your car's advanced braking system that monitors wheel speed and adjusts brake pressure so that you can stop quickly and safely without

losing control of your vehicle. ITS allows you to drive at highway speeds through toll collection kiosks, and helps you determine the exact location and delivery date of your online purchase with just a few clicks of the mouse. Moreover, ITS technologies (such as GPS use for mapping and positioning) and operational advancements (such as coordinated traffic management centers) allow quick and efficient mobilization of responders to an incident by providing real-time traffic, route, weather, and even hazardous material information across agencies.

> " The history of ITS was greatly influenced by specific champions who pushed the branding of ITS and created a much-needed consciousness of what ITS can do.

—Scott McCormick, President of the Connected Vehicle Trade Association

1 http://www.sltrib.com/home/2929434-155/survey-shows-big-gaps-in-knowledge