**PBIC Automated Vehicle Module Series**

**Readings and Resources**

**Module References**

The following references were those cited in the modules. The references are organized according to the modules where they appeared.

**General**

[PBIC Discussion Guide for Automated and Connected Vehicles, Pedestrians, and Bicyclists](http://www.pedbikeinfo.org/cms/downloads/PBIC_AV_Discussion_Guide.pdf). The Discussion Guide presents challenges areas (and implications for policy and research) that need to be at the center of automated vehicle discussions across all sectors and stakeholders, along with a glossary of important terms and key references. It is referenced throughout the modules.

**Automation Terminology**

[MyCarDoesWhat.org](https://mycardoeswhat.org/safety-features/). The National Safety Council’s pages on car safety features provide a concise overview of currently available driver assist technology.

*Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles*, better known as [J3016](https://www.sae.org/standards/content/j3016_201806/), is the source for the definitions of the six levels of driving automation. It is a free download available from SAE.

[ITS Research: Connected Vehicles](https://www.its.dot.gov/research_areas/connected_vehicle.htm). Information on the US Department of Transportation’s Connected Vehicle Program. Maintained by the Office of the Assistant Secretary for Research and Technology, it includes detailed information about connected vehicles.

**AV Development: Past. Present, Future**

[The EDGE: Autonomous Vehicles](https://www.morganstanley.com/im/publication/insights/investment-insights/ii_edge_autonomousvehicles_us.pdf?1544764367308). Released by Morgan Stanley, this brief white paper summarizes some of the changes that could result from broad AV deployment.

[The Law of Accelerating Returns](https://www.kurzweilai.net/the-law-of-accelerating-returns). Written by futurist Ray Kurzweil in 2001, this paper provides detailed information about the history and possible future resulting from technology innovations that occur at an exponential rate.

[If We Want To Get To Real Time AI, We’ve Got To Build Another iPhone Industry](https://medium.com/s/ai-and-the-future-of-computing/when-moores-law-met-ai-f572585da1b7). Published via medium, this paper explains the technological innovations needed to develop the AI for autonomous vehicles.

[Urbanism Next](https://sci.uoregon.edu/urbanism-next-0): How Technology is Transforming Our Cities. An initiative from the University of Oregon to systematically explore on the secondary effects of AVs on city development, form, and design, with implications for sustainability, resiliency, equity, cost, and general livability.

**AV Technology: How it Works (or Doesn’t)**

[Automated Vehicles and Pedestrian Safety: Exploring the Promise and Limits of Pedestrian Detection](https://www.sciencedirect.com/science/article/pii/S0749379718320932) (requires university access). A paper co-written by the authors of these modules investigating automated vehicles’ potential for reducing pedestrian fatalities by analyzing data from the Fatality Analysis Reporting System.

Combs, T., Sandt, L., Clamann, M. and McDonald, N. (2019). Automated Vehicles and Pedestrian Safety: Exploring the Promise and Limits of Pedestrian Detection. *American journal of Preventative Medicine*. 56(1):1-7.

Insurance Institute for Highway Safety [Pedestrian Autonomous Emergency Braking Test Protocol](https://www.iihs.org/media/1caedbd2-902d-47d7-966a-a6f382da07ba/kFAjgQ/Ratings/Protocols/archive/test_protocol_pedestrian_aeb_v1.pdf) (Version 1). Describes the test procedure used to evaluate pedestrian autonomous emergency braking (P-AEB) systems on passenger vehicles.

[Automatic Emergency Braking](https://www.adac.de/rund-ums-fahrzeug/tests/assistenzsysteme/notbremsassistenten-vergleich/): The Power to Stop (German, *Notbremsassistenten: So gut schneiden sie ab*). Summarises intependent tests of automatic emergency braking for predestrians using the Euro NCAP protocols.

Safe Passage: [New ratings address pedestrian crashes](https://www.iihs.org/externaldata/srdata/docs/sr5402.pdf). An IIHS Status Report (February 2019, 54(2)) discussing the tests results for eleven pedestrian crash prevention systems.

[AEB Cyclist](https://www.euroncap.com/en/vehicle-safety/the-ratings-explained/vulnerable-road-user-vru-protection/aeb-cyclist/). Description of the Euro NCAP tests for bicycle crash prevention systems.

[Petite vidéo de la conduite autonome](https://twitter.com/Korben/status/837990377097428992/video/1) (French). Amateur in-car video of a close call involving a Nissan test vehicle and a bicycle in 2017.

**AV Testing Basics**

[Volvo DriveMe](http://sciencepolicy.duke.edu/content/volvo-drive-me-autonomous-driving-research-project) was a research project announced by Volvo in 2015 and scaled back at the end of 2017. The [original goal](https://www.theguardian.com/business/2017/feb/02/volvo-seeks-volunteers-for-self-driving-car-trial-in-west-london-public-roads) was to recruit local drivers in Gothenburg, Sweden to participate in a test of Volvo’s autonomous vehicle technology. The [project has been postponed](https://www.theverge.com/2017/12/14/16776466/volvo-drive-me-self-driving-car-sweden-delay) until 2021.

Several independent organizations have released policy statements on AVs:

* [Human Factors and Ergonomics Society](http://cms.hfes.org/Cms/media/CmsImages/HFES_Policy_Statement_Autonomous_Vehicle_Safety.pdf) (HFES)
* [National Association of City Transportation Officials](https://nacto.org/wp-content/uploads/2016/06/NACTO-Policy-Automated-Vehicles-201606.pdf) (NACTO)
* [Institute of Transportation Engineers](https://www.ite.org/pub/?id=6059BDBD-AAEF-45E4-58F6-F14962022873) (ITE)
* [Association of Pedestrian & bicycle Professionals](https://www.apbp.org/news/402457/APBP-Adopts-AV-Policy-Statement.htm) (APBP)
* [National Conference of State Legislators](http://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx) (NCSL)

**Patient Zero**

National Transportation Safety Board (NTSB) Preliminary Report, [Highway HWY16FH018](https://www.ntsb.gov/investigations/AccidentReports/Pages/HWY16FH018-preliminary.aspx). The NTSB report on the *Collision Between a Car Operating With Automated Vehicle Control Systems and a Tractor-Semitrailer Truck Near Williston, Florida*, that killed Josh Brown in his Tesla in 2016.

Additional summary information from the [New York Times](https://www.nytimes.com/interactive/2016/07/01/business/inside-tesla-accident.html) on the 2016 Tesla crash in Florida.

National Highway Traffic Safety Administration (NHTSA) preliminary evaluation report, [Automatic Emergency Braking (AEB) or Autopilot systems may not function as designed, increasing the risk of a crash](https://static.nhtsa.gov/odi/inv/2016/INCLA-PE16007-7876.PDF). The NHTSA report on the 2016 Tesla crash in Florida that concluded, “a safety-related defect trend has not been identified.”

Differing statements following the 2016 Tesla crash in Florida:

* [Elon Musk](https://twitter.com/elonmusk/status/822128741228756992?lang=en) (via Twitter)
* [The Brown family](https://www.globenewswire.com/news-release/2017/09/11/1117570/0/en/Landskroner-Grieco-Merriman-Issues-Statement-on-Behalf-of-the-Family-of-Joshua-Brown.html) (via Landskroner Grieco Merriman)
* [NTSB Chairman Robert L. Sumwalt](https://www.ntsb.gov/news/press-releases/Pages/PR20170912.aspx)

National Transportation Safety Board investigation, [Car with automated vehicle controls crashes into pedestrian](https://www.ntsb.gov/investigations/Pages/HWY18FH010.aspx). Preliminary NTSB report on the Uber crash in Tempe, Arizona.

[San Francisco's Vision Zero SF Injury Prevention Research (VZIPR) Collaborative](https://www.sfdph.org/dph/EH/PHES/PHES/TransportationandHealth.asp). A Methodology for Emerging Mobility Injury Monitoring in San Francisco, California Utilizing Hospital Trauma Records: Version 1.0.

**Pedestrian and Bicyclist Interaction with AVs**

References for this section are from multiple academic sources.

Shinar, D. (2017). Pedestrians. In *Traffic Safety and Human Behavior* (2nd ed.). Emerald Publishing.

Snyder, M. G. and R. L. Knoblauch (1971). Pedestrian safety: The identification of precipitating factors and possible countermeasures. National Highway Traffic Safety Administration. *Report DOT FH-11-7312*. U.S. Department of Transportation, Washington, DC.

Urmson, C, I. Mahon, D. Dolgov, and J. Zhu. Pedestrian Notifications. Google, Inc., assignee. 16 Patent US 9196164 B1. 24, 2015

Wegman, F., Zhang, F. and Dijkstra, A. (2012). How to make more cycling good for road safety? *Accid. Anal. Prev*., 44(1), 19-29.

**Rulemaking for AVs**

National Highway Transportation Safety Administration (NHTSA) [Federal Motor Vehicle Safety Standards](https://www.nhtsa.gov/laws-regulations/fmvss) (FMVSS). Federal regulations specifying design, construction, performance, and durability requirements for motor vehicles and regulated automobile safety-related components, systems, and design features.

NHTSA’s voluntary guidance documents on automated vehicle technology:

* [Federal Automated Vehicles Policy](https://www.transportation.gov/AV/federal-automated-vehicles-policy-september-2016) (1.0)
* [Automated Driving Systems: A Vision for Safety](https://www.transportation.gov/sites/dot.gov/files/docs/AV%20policy%20guidance%20PDF.pdf) (2.0)
* [Preparing for the Future of Transportation: Automated Vehicle 3.0](https://www.transportation.gov/av/3)

[Waymo Safety Report: On the Road to Fully Self-Driving](https://storage.googleapis.com/sdc-prod/v1/safety-report/Safety%20Report%202018.pdf). Waymo’s report addressing NHTSA’s 12 safety design elements.

[Automated Vehicle Principles for Healthy and Sustainable Communities](http://opr.ca.gov/docs/20181115-California_Automated_Vehicle_Principles_for_Healthy_and_Sustainable_Communities.pdf). Created by the California Multi-agency Workgroup on AVs to summarize principles for maximizing alignment between California’s automated vehicle policy and goals for climate, air quality, health, environment, land use, quality of life, and equity.

[Human engineering for an effective air navigation and traffic control system](https://apps.dtic.mil/dtic/tr/fulltext/u2/b815893.pdf). Paul Fitts’ 1951 report that introduced the *Fitts List*, observing differences between human and machine capabilities.

[Autonomous Vehicle Technology: A Guide for Policymakers](https://www.rand.org/pubs/research_reports/RR443-2.html). RAND report for state and federal policymakers on the many issues raised by AV technology.