

## Science Module: Autonomous Vehicle Data Generation and Sharing

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### WHAT IT DOES

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A connected transportation system will require networks that can reliably transfer massive quantities of data. Large, quantities of complex data are generated when manufacturers train autonomous driving systems to handle various driving conditions before market entry and when consumers drive autonomous driving systems on the road. There are no universal standards for how information will be shared between manufacturers and users or how systems will be linked into the network. This uncertainty may lead to further concerns regarding information privacy and access in remote areas.

### RELEVANT SCIENCE

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- [Crowdsourcing](#) is the collection of data from a large number of people through the internet. Autonomous driving systems will likely use crowdsourced data to keep up with constantly fluctuating circumstances and conditions that impact driving performance. Crowd sourced data is particularly useful to supply driving systems with geographical information related speed limits, traffic, and construction sites.
- [Big data](#) is a term that refers to data sets that are so large and complex that they require specialized computational methods for processing because traditional computational methods are insufficient. Autonomous driving systems will use big data to understand the trends, patterns, and associations between data inputs it receives from sensors, maps, infrastructure, other driving systems, and the environment as a whole. This data processing burden presents logistical difficulties that will need to be overcome for efficient data utilization.
- [Over-the-air \(OTA\)](#) updates are vehicle software updates that are downloaded from a remote location.
- [Internet of Things \(IoT\)](#) is a concept in which all devices are connected to one another through wireless broadband internet, more commonly known as Wi-Fi. [Industry leaders envision](#) that autonomous driving systems can be connected to other devices through the internet, hypothetically allowing them to talk to internet-connected devices other than those strictly related to driving and traffic regulation. For example, if the driving system experiences traffic on the way to a meeting scheduled in the calendar of the mobile device of the driver, it may send a text notification to the other party to alert them that the driver may be late.
- [Verification and validation](#) is the process through which autonomous driving systems will be tested to ensure optimal driving performance. Different manufacturers have taken different approaches to this process; common strategies include testing on geofenced tracks, on open roads, or through simulations.

### BACKGROUND

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Further reading:

<http://www.digitalistmag.com/iot/2017/11/17/connected-cars-autonomous-ve...>

<https://www.forbes.com/sites/bernardmarr/2017/11/06/the-future-of-the-tr...>

[https://mcity.umich.edu/wp-content/uploads/2017/05/Mcity-White-Paper\\_Acc...](https://mcity.umich.edu/wp-content/uploads/2017/05/Mcity-White-Paper_Acc...)

**PRIMARY AUTHOR**

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Nicole Kastelic

**EDITOR(S)**

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Michael Clamann, PhD, CHFP

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