

Google Self-Driving Car Project

Monthly Report

December 2015

Activity Summary (all metrics are as of December 31, 2015)

Vehicles

- 23 Lexus RX450h SUVs – currently self-driving on public streets; 18 in Mountain View, CA, 5 in Austin, TX
- 30 prototypes – currently self-driving on public streets; 23 in Mountain View, CA & 7 in Austin, TX

Miles driven since start of project in 2009

“Autonomous mode” means the software is driving the vehicle, and test drivers are not touching the manual controls. “Manual mode” means the test drivers are driving the car.

- Autonomous mode: 1,372,111 miles
 - Manual mode: 970,390 miles
 - We’re currently averaging 10,000-15,000 autonomous miles per week on public streets
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Sensing in the rain. The limits of self-driving in sunny California.

After a multi-year drought, we’re finally starting to get some rain in California. It’s not only a welcome relief for farmers and gardeners, but an opportunity for our cars to get more time learning in cold and rainy weather.

Driving in rain makes many human drivers nervous due to reduced visibility, and some of our sensors -- particularly the cameras and lasers -- have to deal with similar issues. For example, we’ve had to come up with our own equivalent of a windscreen wiper on the dome to ensure our sensors have the best view possible. Our laser sensors are able to detect rain, so we have to teach our cars to see through the raindrops and clouds of exhaust on cold mornings, and continue to properly detect objects. We’re helped by our diversity of sensors, since our radars have no problem seeing through this sort of clutter.



As we’re developing the technology, we’ve made sure our cars are aware of how rain may affect their ability to drive. Our cars can determine the severity of the rain, and just like human drivers they drive more cautiously in wet conditions when roads are slippery and visibility is poor. For now, if it’s particularly stormy, our cars automatically pull over and wait until conditions improve (and of course, our test drivers are always available to take over). To explore even more challenging environments, we’re beginning to collect data in all sorts of rainy and snowy conditions as we work toward the goal of a self-driving car that will be able to drive come rain, hail, snow or shine!



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Traffic Accidents Reported to CA DMV

None for the month of December.

What we've been reading

- The Atlantic, ["The High-Stakes Race to Rid the World of Human Drivers"](#), (December 2015)
- The Atlantic: ["Driverless Cars Are Like Elevators"](#), (December 2015)
- Associated Press: ["US officials signal move toward embracing self-driving cars"](#), (December 2015)
- San Jose Mercury News: ["Quinn: The DMV puts a brake on our transportation future"](#), (December 2015)
- Fortune: ["Elon Musk Says Tesla Vehicles Will Drive Themselves in Two Years"](#), (December 2015)

