

# IROS gets earful on Google's self-driving cars (w/ video)

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Google's self-driving car

(PhysOrg.com) -- Lots of people now know about [Google's self-driving car project](#). The latest stats find Google's fleet of robotic vehicles have done over 190,000 miles with only occasional human intervention. The company has welcomed favorable news inquiries, from mainstream TV interviews to newspaper reporters, that their self-driving cars can make it on their own on the roads, even in city traffic. How do the cars maintain safety amongst other vehicles, pedestrians, and traffic lights? What

people generally know is that the vehicles are "cloud computing" cars that run along on sensors, cameras, artificial intelligence, and GPS.

The latest overview about these cars was presented recently in a keynote speech at the IEEE International Conference on [Intelligent Robots and Systems](#) in San Francisco. Stanford University professor Sebastian Thrun, who guides the project, and [Google](#) engineer Chris Urmson, who is the project's tech lead, walked the audience through some performance specifics.

What, then, makes the [car](#) so successful in obeying traffic rules and avoiding obstacles? A laser range finder mounted on the roof of the car is a core component. This is a Velodyne 64-beam laser that generates a detailed 3-D map of the environment. The car then combines the laser measurements with high-resolution maps of the world, producing different types of data models. The vehicle carries four radars, mounted on the front and rear bumpers, that allow the car to "see" far enough to deal with fast traffic on freeways; a camera near the rear-view mirror, that detects [traffic lights](#); and a GPS, inertial measurement unit, and wheel encoder,

It's quite possible, however, that some people may find it entirely difficult to believe driverless cars will be a part of the six o'clock commute drive home, a part of the wearying ordeal of staying safe from erratic drivers, tricky intersections, and last-second decision makers in neighboring lanes.

At the IEEE event, the Google pair showed footage that makes a convincing case for the advantages of riding in self-driving cars. The audience saw the on-board computer and how it detects other cars, pedestrians, and traffic lights. The video shows also how the car behaves at an intersection. After the light turned green, the car starts to make a turn, but if [pedestrians](#) cross, the car yields to them. The car also yields

to a man who decides to cross at the last minute. At a four-way intersection, the car yields to other vehicles based on road rules; if other cars do not reciprocate, it advances a bit to show to the other drivers its intention. Without programming that kind of behavior, Urmson said, it would be impossible for the robot car to drive in the real world.

Thrun, who came to work on the Google project from Stanford, has all along hammered home a message that driving accidents are the number one cause of death for young people and many of the accidents are due to human error. Thrun believes that robotics, not humans, can do the better job in making driving decisions and sparing lives.

That does not sound so crazy to the state of Nevada, which earlier this year passed a law authorizing the Department of Transportation to develop rules to govern driverless cars. Nevada's bill sets the framework for "authorizing... the operation of, and a driver's license endorsement for operators of, autonomous vehicles."

Thrun and Urmson talk of many challenges ahead in the future of driverless vehicles, including sorting out legal and liability issues. Still, there's no looking back.

**More information:** via [IEEE Spectrum](#)

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