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Security Questions Abound as Autonomous Vehicles Emerge | College of Engineering

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(From Archive) Originally posted Aug. 19, 2014 – With the rollout of Google's self-driving car, computer security experts at Utah State University are posing new questions about the hardware and software features that will drive tomorrow's fleets of autonomous vehicles.

Led by assistant professor of electrical and computer engineering Ryan Gerdes, the multi-disciplinary research group will address driverless vehicle system security from bumper to bumper with funding from a $1.2 million National Science Foundation grant.

And for the first time, researchers will discover how resilient such systems are to manipulation from hackers and malicious attacks – something Gerdes says are legitimate threats to autonomous vehicles.

"Security in this realm really just hasn't been touched," he said. "Vehicle communication can be jammed, sensors can be jammed, and attackers could try to do just about anything to cause the system to be unsafe."

The goal for Gerdes and his colleagues is to build the foundation for a transportation system that increasingly relies on the cooperation, connectedness, and automation of vehicles to improve safety and efficiency on U.S. roadways. It's estimated the financial losses attributable to congestion in America's transportation infrastructure total more than $1 trillion annually and the loss of life in vehicle collisions is 40,000 deaths per year.

Autonomous vehicles – especially those operating in platoons – can improve safety, reduce emissions, extend personal transportation to the elderly and persons with disabilities and lessen the size and number of roadways.

"We will have automated vehicles in the future," says Gerdes. "A key factor to people embracing them and feeling confident in their operation is that we design security into their systems from the very beginning."

To study the range of systems and hardware inside an autonomous car, Gerdes and colleagues Kevin Heaslip (Virginia Tech), Ming Li, Rajnikant Sharma, and Chris Winstead are developing small wheeled robots that will undergo testing in the lab and on USU's Electric Vehicle and Roadway Research Facility.

The test track slated for construction this year will be a proving grounds for the safety and automation protocols that will make transportation with driverless vehicles possible.

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