



# FutureStructure

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## Infrastructure Must be Ready to Accommodate Modern Vehicles

*As autonomous vehicles become more common on America's roads, "smart infrastructure" will also become common.*

BY RYAN MARSHALL, THE FREDERICK NEWS-POST, MD. / FEBRUARY 14, 2017



(TNS) -- In early January, the U.S. Department of Transportation announced the winner of its Smart City Challenge. Seventy-eight cities competed on plans on how they will integrate technology into future transportation projects.

Columbus, Ohio, the winner, proposed a plan to use connected infrastructure, electric vehicle charging stations and autonomous vehicles. The technology would be used to create a system to help expectant mothers reach doctors' appointments to reduce infant mortality in Columbus' Franklin County.

As autonomous vehicles become more common on America's roads, "smart infrastructure" will also become common. Smart infrastructure refers to buildings, roads, and bridges that can provide data to feed vehicles' computers and let them make more educated decisions about what actions to take. It can help revolutionize how cities operate and traffic flows through them, advocates say.

The Columbus plan -- which will receive up to \$40 million in federal funding -- will include a trip-planning application across transportation modes, such as buses and trains; a common payment system across transportation methods; and a combination of travel options at important locations.

The city will create a "smart corridor" to connect underserved parts of the city with jobs and services. The corridor is expected to help improve a bus rapid transit system by putting in smart traffic signals and street lighting, traveler information, and free public wireless internet access along the route. It will feature six electric autonomous vehicles to help expand the reach of the BRT system to help it reach more retail areas and job centers, according to a Department of Transportation report.

Other finalists were Austin, Denver, Kansas City, Pittsburgh, Portland, and San Francisco.

San Francisco was awarded nearly \$11 million to install connected vehicle technology that could allow the city's traffic signal system adjust signals' timing and to detect vehicles that run red lights. The proposal also includes a pilot program of an autonomous electric shuttle.

Pittsburgh got nearly \$11 million to install traffic signal technology to reduce delays along main traffic corridors.

A May report by the Information Technology & Innovation Foundation argued that infrastructure has always been important to the country's economic success, but adding "information and communication technology" will be vital for economic growth.

The technology will "enable all infrastructure elements within a nation's transportation system -- the roads, bridges, traffic lights, toll booths, message signs, etc. -- to become intelligent by embedding them with sensors and empowering them to communicate with each other through wireless technologies," the report said.

The future of infrastructure development won't be about building more roads, but using existing roads more effectively, said Stephen Ezell, the foundation's vice president for global innovation policy.

Studies have shown that investing in smart infrastructure has a 60 percent greater impact than investing in roads alone, Ezell said.

Automated vehicles can increase the capacity of roads without building new ones because sensors let vehicles travel much closer together than cars driven by humans, said Christopher Leinberger, the chairman of the Center for Real Estate and Urban

Analysis at George Washington University.

"You can be bumper-to-bumper, almost," when vehicles' speed, direction, braking and other actions are controlled by information from cars around them, he said.

The move toward smart infrastructure likely will increase a trend of more dense, walkable urban communities, where the vast majority of new economic growth is coming, Leinberger said.

That sort of development -- near or centered around public transportation and providing a vibrant mix of residential and commercial development -- is particularly popular among younger workers.

Leinberger cited the recent example of Marriott, which announced its intention to move from a Montgomery County corporate park to downtown Bethesda. The company said a desire to be closer to public transportation was a key motivation for its move.

Those types of communities likely will involve collecting large amounts of data to help them run more efficiently, Leinberger said.

They include significantly fewer parking spaces and fewer cars per household -- often 25 percent of the spaces per capita of those provided in drivable suburban spaces, he said.

To help guide people to where those spaces are -- via smartphones or by sending information directly to their cars -- or to provide other services or information, the communities will gather large amounts of information from a wide variety of sources, Leinberger said.

He warned that such development won't be here right away, because "we are just 1 or 2 percent" of the way toward a truly smart city grid.

Ezell thinks it will take at least a decade for smart infrastructure to truly be implemented.

"I think it's near term, but it's not tomorrow," he said.

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