

Ford and Autonomous Vehicles: 'Making Mobility Better'



PROFILES IN INNOVATION

An interview with

Dragos Maciuca

Executive Technical Director, Ford Motor Company

Forever renowned as the first company to mass-produce the automobile, Ford was not the first disruptor when it came to autonomous vehicles (AVs). By the time the company opened its Palo Alto R&D center in 2015, several other automakers and technology companies were already developing AV technology in Silicon Valley.

But Ford has hit the ground running. Its center is now one of the largest of its kind in the Valley, with more than 200 employees. And in 2016, it announced what *The New York Times* called one of the most ambitious development goals of any company: to mass-produce autonomous vehicles—no steering wheel, no gas or brake pedal—for commercial deployment by 2021.

The burden of that starry goal falls on multiple groups within Ford, including the Palo Alto-based Research and Innovation team, which is under the leadership of Dragos Maciuca. The Romanian-born engineer has been researching AVs since he was a grad student at UC Berkeley, and sports BMW, Lockheed Martin, and Apple on his resume. "I think we're on track," he says. "We're still in development and trying to solve many of the technological intricacies needed to solve this very complex problem."

Could the AV revolution leave old-school carmakers like Ford in the dust? Not likely. "It turns out manufacturing cars is a lot harder than it looks," says Robert McKenna, an Orrick partner who has worked with Ford Smart Mobility on ride-sharing innovations. "Ford

invented modern manufacturing, and they're acquiring and developing the technology for AVs. So it would be very unwise to count them out."

Meeting Startups

Traditionally, OEMs like Ford have focused on the design, assembly, and marketing of vehicles, while suppliers develop parts and systems. Ford is betting that many of tomorrow's car parts and systems will be developed in Silicon Valley—and it's not waiting for its current stable of direct suppliers (known as Tier 1 suppliers) to offer them up.

"Ford has long had connections to Silicon Valley," Maciuca says. "But you need to be here in person, connecting with startups very early, when they're in stealth mode, looking out for the emerging technologies that Tier 1 suppliers cannot provide. In that context, Ford can provide knowledge of the auto industry and the huge market for these products. We educate startups about the auto industry, and honestly, we educate Ford about how startups and Silicon Valley work. We can take technologies from other industries like consumer technology and adapt them for the auto industry, creating additional markets for startups that had never even thought of being in the industry."

Ford's center is actively engaged with more than 80 startups, 90 venture capital firms, and a dozen incubators. In just the past two years Maciuca has watched an explosion in the number of Silicon Valley startups developing high-resolution radar imaging, cameras and LIDAR,

(which uses light to develop 3-D maps in real time). He's also encouraged by the re-emergence of hardware startups that are designing—at considerable cost—chips dedicated to machine learning. "All these technologies coming together is what's driving this huge improvement in AVs," he says.

Ford's single largest investment in its 2021 goal is its \$1 billion commitment to Argo AI, an AI startup charged with developing the "virtual driver system" for Ford's 2021 vehicle. Founded by veterans of Google and Uber, Argo AI agreed to take on Ford as its initial backer and customer. "It's the best of both worlds," Maciuca says. "You give a software-centric startup freedom to develop the system on their terms, but with a clear target with our products."

Rounding the Corners

Ford still faces a long road to 2021. They'll have to grapple with a regulatory patchwork and a public that is still skittish about driverless cars. Then there are the "corner cases," those complicated and unexpected circumstances that still cause AV technology to glitch. But Ford is working on many technologies that promise to improve the efficiency and experience of mobility through connectivity, big data, AI and more.

"Our goal at Ford is to make life more livable in cities and make mobility more enjoyable," Maciuca says. "We look at it as making mobility better. If we can reduce traffic, the number of cars looking for parking, the number of parking lots you need, we would consider that a success because we would've improved life in the city through better mobility. It's not hard to imagine something like that."

PHOTO BY CRAIG LEE



Look! No Drivers

In the coming months, California motorists will have to get used to an unusual sight—cars without drivers. Sacramento-based Orrick attorney Ian Adams worked on comments to California's new autonomous vehicle rules, which took effect in April. He says the new rules will help California compete with states that have taken a less regulated approach. Besides, with the vast majority of crashes being due to human error, there is debate within the industry about whether the presence of a "safety driver" really improves safety.

The new rules will also help acclimate the public to driverless vehicles. AV technology is nearing the point that technical barriers won't be the biggest hurdle to widespread adoption, says Robert McKenna, a partner in Orrick's Public Policy Group, which works to steer clients along uncharted regulatory paths. Instead, it will be regulatory and policy issues like licensing, permitting, and liability.

But the single biggest barrier may be public acceptance, McKenna says.

"There's something about turning over operations to a robot that freaks people out a bit, or a lot."

With no binding federal regulations in place, states like California have been tempted to take on a role normally reserved for the feds: designing rules related to vehicle safety, design, and performance. "We're in uncharted waters," Adams says. States are trying to "strike a balance between ensuring the protection and safety of the public and foreclosing avenues of development for this new technology." It's not just rules on AV testing that vary by state, notes Ford's Dragos Maciuca. It's also the traffic rules themselves, which force AVs to learn a new set of laws each time they cross a state line. Then there are all the unwritten driving customs: Why are drivers so much more aggressive in Manhattan? Why do drivers in Pittsburgh let one—but just one—oncoming driver go left on green? It's enough to drive any smart car a little bit crazy.

—Richard Sine