



TIMING IS EVERYTHING

TECHNOLOGY, EDUCATION, AND TOMORROW'S TRANSPORTATION WORKFORCE

BY GREGORY D. WINFREE, AGENCY DIRECTOR, TEXAS A&M TRANSPORTATION INSTITUTE

To understand how tomorrow's transportation system will look, you have to think in 4D. Self-driving cars, intelligent infrastructure, drones delivering medical prescriptions to your front door—as it's currently evolving, the system will rely more on successfully and seamlessly integrating technology than ever before.

Why do I say, "Think in 4D?" Because tomorrow's transportation landscape will depend absolutely on

that fourth dimension of time for the safe, efficient movement of people and goods. Take self-driving cars, for example. Vehicles will constantly talk to one another and the roadside infrastructure, sharing information about speed, location, destination—every piece of data necessary to move you and your family from place to place. Now, imagine how complex managing all that data is and especially how important timing will be to safely share it across the network.

If you think miscommunication with your significant other causes problems, consider four self-driving cars heading for the same intersection from different directions. To avoid a crash, their onboard navigation systems must communicate without interruption to ensure safety for all. Today, one of the keys to safety is "signal timing"—coordinating traffic signals to minimize the risk of crashes. Tomorrow, traffic safety will depend on managing millions of signals between vehicles and between vehicles and the roadside. Ensuring data security and timely data exchange will arguably be the most important job in the transportation workforce. And speaking of the workforce, what skills and expertise will future transportation require? The short answer is that our education system, like our transportation system, must be seamlessly integrated and timed to

sync together. Some worry that as technology does more of the work we're used to doing—driving the car, reading the toll tag, delivering the freight—today's workers could lose their jobs. Without proper planning, that could happen. But with proper planning, we can reeducate and provide workers career paths better suited to the evolving system.

Getting the timing right in education starts with fitting different pieces of the puzzle together. Four-year universities graduate engineers and computer scientists. Junior colleges and trade schools certify technically focused professionals in various disciplines. Secondary schools help identify where young minds excel. These levels of our education system must work together to produce a workforce that can manage tomorrow's complex network of transportation technologies.

At The Texas A&M University System, we're already developing this model through the RELLIS Academic Alliance, a partnership between Texas A&M University and Blinn College. The Alliance leverages the strengths of both schools to better prepare students. Folks interested in highly focused training can earn certificates in everything from advanced manufacturing to cybersecurity to specialized fire training from the Texas A&M Engineering Extension Service. Hundreds of these opportunities exist at Texas A&M alone.

Imagine the possibilities of similar institutions, whatever their level, across the nation and the world. These institutions can transition workers, who have vital skills today, toward new career paths more relevant to tomorrow. Maybe we won't need toll booth operators because toll tags perform the toll-taking function, but that doesn't mean former operators have to be out of a job. Our challenge, then, is to map talent to opportunity—that should be our guiding vision as we build tomorrow's workforce.

One example of how we're already working on that at the Texas A&M Transportation Institute (TTI) involves TTI Senior Research Scientist Bob Brydia. In 2016, Bob teamed with Texas A&M University in a new program called the Campus Transportation Technology Initiative (CTTI). Through (to date) 63 individual projects inserted into university classes, CTTI has involved engineering students in real-world deployments of new technologies across the campus. While helping solve local problems of mobility, access, and safety, the initiative trains students in cutting-edge technologies that will underly the coming integrated transportation network.



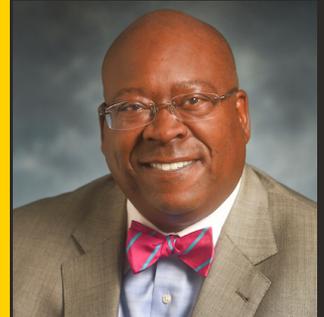
These kinds of educational initiatives will smooth the way for the adoption of transportation technologies. It's worth noting that today's younger generation self-reports that they're more motivated to make a difference than make a mint. We have an opportunity there, and it also involves getting the timing right. We can leverage this generation's affinity for public service by incentivizing them to pursue opportunities—and perhaps even employment in the public agencies charged with maintaining our transportation network—that will help us develop tomorrow's transportation system.

Innovation doesn't just describe how we evolve technology. It's also how we develop human capital to its greatest potential—through forward-thinking education, training, and certificate programs that match niche skill sets with evolving technologies that will one day populate our transportation network.

Making that happen? It's all in the timing. ■

GREGORY D. WINFREE was appointed Agency Director of the Texas A&M Transportation Institute (TTI) on December 15, 2016. TTI is a state agency and the largest and most comprehensive higher education-affiliated transportation research institute in the United States. He is also an Adjunct Professor at the Texas A&M University School of Law.

Greg joined the U.S. Department of Transportation's Office of the Assistant Secretary for Research and Technology in March 2010 as Chief Counsel and was later sworn in as the Assistant Secretary in January 2014. During his tenure, Greg also served as Deputy Administrator and Administrator of a predecessor agency, the Research and Innovative Technology Administration (RITA).



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