The Honorable Pete Buttigieg  
Secretary of Transportation  
U.S. Department of Transportation  
1200 New Jersey Ave, SE  
Washington, D.C. 20590

Re: U.S. DOT - Automated Vehicles Comprehensive Plan

Dear Secretary Buttigieg:

Congratulations on your confirmation as the U.S. Department of Transportation Secretary. We look forward to your vision, leadership, and support to ensure the United States leads the world with advanced mobility and safe and secure operations. The Department of Transportation has always led the United States forward with transformational solutions in mobility. Rail, aviation, automobiles, urban transport are just a few. We have not seen an initiative to impact the nation at scale since the 1956 Interstate Highways Act. It is time to stop looking at the past and start to build the future.

The United States Department of Transportation leadership is vital to ensure we stay competitive and protect our national sovereignty. Investment in a 21st-century Digital Edge Infrastructure is among the highest priorities for stimulating economic expansion, national security, job growth and will drive the largest infrastructure buildout in our nation's history. Digital Infrastructure (PINNs, 5G, 1Gb+ broadband for all); Transportation (mobility for all, autonomous systems, resilient cities); Energy (charging stations, grid-scale storage, SMR, Direct Air Carbon Capture) are just a few listed in the Biden team Infrastructure Plan. Time to Build the 21st-Century Digital Highways.

The Autonomy Institute is a 501c3 consortium of over 100 industry, government, and academia organizations. Our core focus is accelerating the "Path to Commerce" for Intelligent and Autonomous Infrastructure and autonomous systems. The Autonomy Institute would like to share our support for the U.S. DOT - Automated Vehicles Comprehensive Plan, more specifically for the CARMA and VOICES platforms. We believe these two platforms can be foundational building blocks for a national program if combined with similar FAA, NASA, and DOE efforts. With proper leadership, we can unify our digital infrastructure as we did for rail, aviation, automotive, electric, and the Internet.

The Massive Opportunity to Drive the Future of Industry 4.0 Innovation

We are now experiencing the most extensive transformation in our nation's history, larger than the internet and transportation industries combined. Industry 4.0 will create new trillion-dollar economies that the transportation domain will substantially impact. Technologies include advanced mobility, autonomous systems, artificial intelligence, freight logistics, digital edge infrastructure, intelligent things, digital twins, wireless networks, intelligent cities, city data exchanges, resilient electrical grids, additive manufacturing, and secure data platforms.

“We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before.” Klaus Schwab, WEF Executive Chairman

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U.S. Department of Transportation Leadership

We believe the United States' success is highly dependent on the leadership of the Department of Transportation. Once disparate agencies will need to unify and support essential standards to enable effective competition for industry participants for the United States to lead. Industry 4.0 requires bridging the physical world of infrastructure with the digital world to support mass production and worldwide supply-chains. No single industry has a business model capable of enabling the large-scale convergence that will launch the next revolution.

There is national recognition that digital edge infrastructure requires major industry collaboration and impacts just about every industry and certainly every region across the United States. There is a push for industry-government collaboration, public-private partnerships, unified infrastructure, trusted capital, and mobility & broadband for all. The FAA, DOT, FCC, DOD, DOE, MITRE, etc. have shared what they need - Data and a supporting System-of-Systems. It is the only way to move the industry forward.

New Infrastructure is at the Heart of Transformation

Big transformational programs are driven by new Infrastructure, and this is no exception. Investment in a 21st-century Intelligent & Autonomous Infrastructure is among the highest priorities for stimulating economic expansion, job growth, national security, and resilience. Industry 4.0, fueled by autonomy, requires the bridging of the physical and the digital.

New Infrastructure has always been the Foundation for massive Transformations

- Freight Trains - required Railways and Depots
- Aviation - required Control Towers, Communications, Radars, GPS, Antennas
- Interstate Commerce - required Roads, Highways, Bridges
- Transport Ships - required Ports and Containers
- Overnight Delivery - required Nonstop Systems and Air Transport
- Internet - required Network Access Points, Data Centers, and Fiber
- Industry 4.0 - requires NextGen Highways, Public Infrastructure Network Nodes

The challenge of digital edge infrastructure is the requirement to be densely deployed on the sidewalk. A unified infrastructure is required to support integrated city services, autonomous systems, commercial use cases beneficial to the community, and National Security and Privacy. Public Infrastructure Network Nodes (PINNs) will be as foundational as transformers on the electrical grid or traffic lights to roadways. One example of government leadership was from Secretary of Energy nominee Granholm who highlighted the opportunity to bury transmission and fiber in the highway right of way during her Senate confirmation hearing.

Edge computing, 5G wireless, Broadband, Intelligent Transportation Systems (ITS), Assured Position Navigation and Timing (APNT), and an ultra-resilient electrical grid will drive the largest infrastructure buildout in our nation’s history. It will drive a massive resurgence of manufacturing, engineering, construction, installation, programming, and jobs of the future. This next-generation infrastructure will enable the digital and autonomous world and drive the next trillion-dollar economic expansion. This

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infrastructure will create Highways and Byways in order to support more efficient mobility, automated city services, autonomous cars and trucks, autonomous shuttles, air taxis, inspection drones, and many intelligent city applications. Addressing these challenges will make the following 5 – 10 years easier for the adoption of both terrestrial semi-autonomous and fully autonomous robotics.

For every billion we spend on "Digital Infrastructure," it will provide us $3-4 billion to invest in revitalizing our asphalt and concrete. The Internet drove a national economic resurgence from the collapse in the 80s, and Industry 4.0 will drive the next economic resurgence. We will also see billions of dollars from "private-investors" to underwrite this new digital infrastructure.

**National Program to Ensure Infrastructure for All**

We need a national "ALL-UP" Digital Edge Infrastructure program. Visionary leaders like Senator Warner are highlighting the need for a "Digital Edge Commerce Act." AN ACT To encourage and develop the deployment of the Intelligent and Autonomous Infrastructure and the use of autonomous systems in commerce and for other purposes. This will require an amendment to United States Code title 49 - Transportation, title 23 - Highways, title 47 - Telecommunications, title 51 - National and Commercial Space Programs, title 33 - Navigation, title 15 - Commerce, title 10 - Energy.

A Digital Edge Infrastructure ACT will be significantly accelerated by the Department of Transportations leadership. The 1956 interstate highways enabled a major expansion of commerce, and delivering electricity to the farmer drove a massive agriculture boom in the United States. Digital Edge Infrastructure will operate the largest productivity gains in history by turning on Industry 4.0 jobs, economic expansion, and world leadership. With the proper deployment of this infrastructure, we would also see the complete elimination of the digital divide.

We need to revitalize our industry, academia, and government collaboration. Our innovation supply-chain is severely broken. United States leadership is as critical now as it was for past endeavors. Transformational programs like the moonshot, GPS, computers, Internet, 3D maps, nuclear, RF spectrum, and interstate highways required national leadership. DOT, DOE, NASA, DARPA, and others were vital.

Digital Edge Infrastructure is as tactical as roads are to cars. Similar to the military convoy trying to drive across the country in the early 1900s, we were focusing on bigger wheels, better suspension, bigger engines until Eisenhower finally said, "We need to build interstate highways." We find ourselves in the exact situation; everyone is focused on the vehicle, the device, the digital service, the drone, the aircraft rather than realizing this is a digital and physical infrastructure challenge. Vehicles required roads, and the Internet required backbone networks. Intelligent and Autonomous systems require a dense, secure, and resilient "Digital Edge Infrastructure."

The White House identifies broadband, 5G, AI, APNT, resilient electrical grids, and Autonomy as top priorities. We need to acknowledge the immense challenge required to support these systems - the dense physical infrastructure required by them all.

**The Time for Leadership is Now**

We need to fix our OODA Loop. Timing, things need to move faster. Anything that can become a distraction should be ignored until we have a unified vision and unstoppable force. As a nation of pioneers and builders, we can no longer wait for the next generation. COVID had almost stopped the world on its axis. It is time to roll up our sleeves and build the future we want for our nation.
In the 60s, when we built the most advanced and fastest aircraft we have had, the SR71, in THREE years no less - the world was experiencing 10X the magnitude of worldwide instability. We had worldwide (pandemic) outbreaks of influenza in 1957 and 1968; the Cuban missile crisis; Bay of pigs; Civil Rights; The ramp of the Cold War; Vietnam; Three major assassinations; we had the equivalent of the creative Millennials; they were called hippies. We also had John F. Kennedy - the "New Frontier." "We choose to go to the Moon in this decade and do the other things, not because they are easy, but because they are hard, one we are unwilling to postpone, and one we intend to win!

**Immediate Actions to Ensure U.S. Leads with a "Path to Commerce"**

- Support a national PINN Public-Private Partnership Program to accelerate the Digital Edge. The private infrastructure investors could completely support this to start.
- Establish an Advanced Research Project Agency for Autonomy (ARPA-A). We have the best scientist, engineers, and innovators - we need to unleash them on a unified set of objectives.
- Create 24/7 operational facilities at universities, research centers, and DoD bases. Support 10s of thousands of deployments to capture the petabytes of data required to drive legislative decisions.

In summary, we are looking to agencies like DOT, DOE, NASA, and the FAA for leadership and to support the deployment of Intelligent and Autonomous Infrastructure, which drives massive amounts of DATA to drive decisions.

We hope to engage your knowledge, wisdom, and leadership in assuring the United States leads the world in the adoption of connected and autonomous systems.

With high regards,

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NEW INFRASTRUCTURE, NEW INDUSTRIES

PUBLIC INFRASTRUCTURE NETWORK NODES - PINN
UNIFIED INTELLIGENT & AUTONOMOUS CITY INFRASTRUCTURE (5G, Edge, ITS, APNT)

- 5G Deployments
- Rural Broadband
- Intelligent Transportation Systems
- Retail/Business
- Telemedicine
- Edge Computing
- Connected Corridors
- Intelligent City Services
- National Security

21ST-CENTURY INFRASTRUCTURE

10 NATIONAL PRIORITY
NATIONAL STRATEGY TO SECURE 5G

- 5G
- Broadband
- APNT
- AI
- Autonomy

Presidential Executive Order on Streamlining and Expediting Requests to Locate Broadband Facilities in Rural America

THE NATIONAL ARTIFICIAL INTELLIGENCE RESEARCH AND DEVELOPMENT STRATEGIC PLAN: 2019 UPDATE

Ensuring American Leadership in Autonomous Vehicle Technologies

AUTONOMOUS SYSTEMS IMPACTS JUST ABOUT EVERY INDUSTRY

DELIVERY
URBAN AIR
MOBILITY

AIR DELIVERY
INSTRUCTIONS
INDUSTRIAL

AEROSPACE
BUILDING & REPAIR
FREIGHT & PORTS

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INDUSTRY 4.0 WILL CREATE MILLIONS OF NEW JOBS

SUPPORTING INVESTMENT & RESEARCH AREAS:

EXECUTING AN “ALL-UP” STRATEGY FOR INTELLIGENT AND AUTONOMOUS SYSTEMS

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ECONOMIC DEVELOPMENT:

INDUSTRY 4.0 IS DRIVING INNOVATION, GROWTH, & PROSPERITY

NATIONAL DUEL-USE TECHNOLOGIES:

DIGITAL EDGE INFRASTRUCTURE WILL DRIVE THE 21ST-CENTURY
INVESTING IN THE NEXT CENTURY OF TECHNOLOGIES IMPACTING DUAL USE APPLICATIONS

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