National Center for Safety (Safety21)

Carnegie Mellon University

Center Type – National
Focus Area – Promoting Safety

US DOT National
University Transportation Center for Safety

Center Vision and Objectives

Change is coming to transportation, whether we're ready for it or not. We're entering a transportation landscape rich with possibility and full of challenges. Technological advances offer the promise of safety, efficiency, sustainability, and improved access.

The state of the art in vehicle autonomy however is not mature enough for widespread deployment. Connectivity presents new threats to privacy and cyber-physical security. Recent roadway deaths of a pedestrian, motorcyclists, and vehicle operators due to failures of autonomy features raise legitimate questions of trust and reliability. Much to our detriment, other countries can take over leadership in promising new technologies invented in the US. Given these crossroads, we must remain competitive by furnishing domestic industry and workers with the technology, policy frameworks and training that are sorely needed.

Safety21, the National University Transportation Center for Safety, will leverage new technologies and revolutionary trends in transportation, to research, develop and deploy cutting edge technologies, policies, and develop workforce and educational programs that directly address the challenges of integrating Autonomous, Connected, Electric and Shared vehicles (ACES) with a transformative focus on safety, equity, sustainability and economic growth.

Center Initiatives

Safety21 aims to take a revolutionary leap in our transportation network, enabled by a transformative approach which offers safety and reliability in an equitable, sustainable, and efficient fashion across multiple modes.

USDOT Deputy Secretary of Transportation, Polly Trottenberg with Safety21 Researcher Prof. Corey Harper

Safety21 consists of researchers from Carnegie Mellon University, Morgan State University, Ohio State University, University of Texas – Rio Grande Valley and University of Pennsylvania. They will collaborate closely with the Community College of Allegheny County and the Community College of Philadelphia to provide education and training for the existing and emerging transportation workforce.

The expected transformational impact of Safety21 technology and policy research is the knowledge and understanding of how to apply a Multimodal Safe Systems approach to capitalize on opportunities arising from ACES and mitigating its risks. The beneficiaries of this increased knowledge and understanding will include local, state, regional and federal transportation managers, mobility advocacy organizations, new and traditional transportation companies, public officials, and the general public.

Research: The Safety21 research program adopts an innovative system-of-systems approach to integrate ACES systems safely, equitably, sustainably, and efficiently into the transportation network. ACES systems provide both great opportunity and risks for the traveling public as well as infrastructure owners and operators (IOO).

As various levels of automation are already beginning to be commercialized and deployed on our roads, our research portfolio targets innovations in technology and policy to enable communities to benefit from the opportunities while mitigating the risks. Our macro-goal is to retain the US technological and commercial lead in CAVs, as competitors around the world are increasingly active in this domain. Our current Deployment Partner Consortium of 190+ organizations will support our researchers in ensuring adoption and impact.

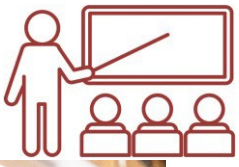
Education and Workforce Development: Educating, recruiting, and training new workers will be critical to managing our country's infrastructure safely and efficiently. Safety21 strives to help develop an equitable and sustainable transportation workforce capable of designing and maintaining the complex transportation systems of tomorrow.

Leveraging our Deployment Partner Consortium, we will provide students with real-world partners who will show pathways for integrating both equity and deployment strategies into student course work as well as research. In our education programs, we are incorporating innovative technologies and tools such as AI, digital twinning, and data analytics to prepare the emerging and existing transportation workforce for the modern transportation system of the future. We are also incorporating examples of our research activity into our education programs.

Technology Transfer: We will continue to base our tech transfer strategy on deployment. It is the bridge activity between R&D and technology transfer. Our approach since 2010 has been and will be Research, Development and Deployment (R&D&D). Technology transfer cannot happen without demonstrating the applicability, utility, and value of the technology first.

Every UTC project will thus be undertaken with the goal of actually deploying. When deployment succeeds, the technology is more likely to be transferred. CMU's previous UTC Technology Transfer Plan was identified by the USDOT as a model for other UTCs and CMU was awarded the 2022 CUTC Technology Transfer Leadership Award.

The real-world partnerships that must be forged for each research project – including public agencies, non-profits, and private enterprises – are key to this success. These partnerships ensure the research team does not proceed in an academic vacuum, while ensuring that ready and willing advocates are available for implementation and transfer.



USDOT Director of UTC Grants Program, Caesar Singh with Safety21 Director Raj Rajkumar

Products & Outcomes

The research phase is only the beginning. We focus on bridging the gap between research and practice to deliver real impact on the current landscape of transportation. Our technology transfer program provides strategic training, workshops, nationwide conferences, and technical assistance that provide researchers with an opportunity to solve real-world problems.

Technology transfer cannot happen without demonstrating the utility of the technology first. Thus, every research and development project will be undertaken with the goal of actually deploying a pilot demonstration. When deployment succeeds, the technology will be transferred.

Using our operating philosophy of performing Research and Development and Deployment (R&D&D), we will continue to create additional opportunities for Safety21 research to make a lasting and transformative impact on making transportation safer and more efficient .

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