

**NCHRP 20-24 (138): COLLECTIVE AND INDIVIDUAL ACTIONS  
FOR STATE DEPARTMENTS OF TRANSPORTATION  
ENVISIONING AND REALIZING THE NEXT ERA OF  
AMERICA'S TRANSPORTATION INFRASTRUCTURE—  
PHASE 1**

**Vision Framework**

**Prepared for  
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Transportation Research Board  
National Research Council**

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# *VISION FRAMEWORK*

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**NCHRP 20-24(138)**

Collective and Individual  
Actions for State Departments  
of Transportation Envisioning  
and Realizing the Next Era  
of America's Transportation  
Infrastructure

# VISION FRAMEWORK

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# VISION FRAMEWORK

## EXECUTIVE SUMMARY

The American Association of State Highway and Transportation Officials (AASHTO) has initiated a multi-year process to describe and advance implementation of a vision for the next era of transportation in the United States.

The vision is for a transportation system focused on **connecting communities, moving people and goods, and meeting customer needs** at all scales – from local to global – delivered as a partnership between state departments of transportation (DOT) and other public, private, and civic organizations.

The vision includes **six aspirational goals** that describe how the transportation system should function. These are intended as shared values, with each state DOT defining success and progress on each goal in a unique way.

This vision was developed through extensive research into prior periods of transformation in transportation and other industries, as well as the **trends, uncertainties, and potential disruptions** shaping the future of transportation. This vision also was developed through **extensive engagement with the leadership teams of all 52 state DOTs**, as well as thought leaders in other industries.

The AASHTO Board of Directors unanimously adopted this **vision** framework at its October 2022 meeting and committed to initiate implementation. Implementation will include continuing to collaborate with a range of non-traditional **partners**; advancing a small number of bold ideas or “**moonshots**” to transform transportation through the end of this decade; and identifying a range of **individual and collective actions** for state DOTs to pursue.



## PHASE 1 PRODUCTS

**Vision framework and resolution** adopted by AASHTO Board of Directors

- October 2022 -

## PHASE 2 PRODUCTS

**Continue collaboration** among state DOTs and with key thought leaders and partners through a **challenge network**

**Initiate implementation** of one or more **moonshots**

**Refine and advance** a spectrum of **individual and collective actions** for state DOTs

- 2023 and Beyond -

# VISION FRAMEWORK

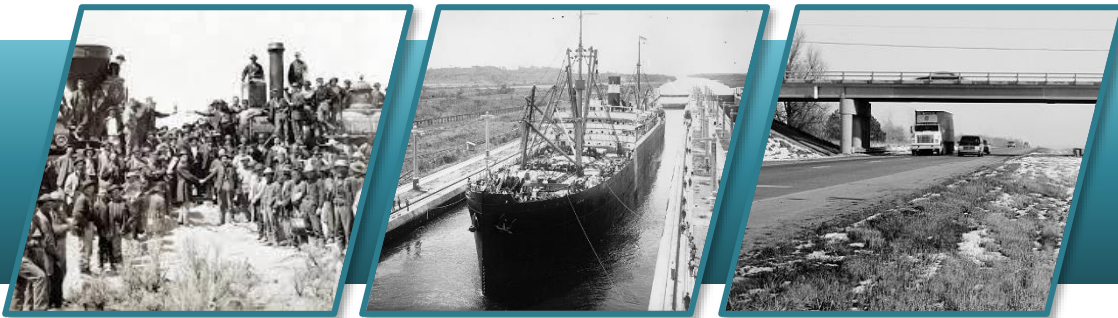
## WHY ADVANCE A VISION FOR TRANSPORTATION NOW?

Nearly 70 years after the initial segments of the Interstate Highway System were built – and nearly 140 years after the first automobile hit the streets – **it is time to set the vision for the next era of transportation, including individual and collective actions state departments of transportation (DOT) can take to achieve that vision.**

**The United States is changing as we near our 250th anniversary.** Our population is becoming older and more diverse, with significant variations in growth rates among regions. We remain the largest economy in the world – yet more than two out of five households struggle to afford basic needs and increasing numbers of Americans have limited access to jobs, health care, education, and healthy food.

**Our transportation system faces a confluence of challenges.** We are emerging from the COVID-19 pandemic with significant uncertainty about how people will live, work, and travel and rolling disruptions to global supply chains. We also face the largest increases in traffic fatalities in more than 70 years and continued increases in the frequency and severity of extreme weather and other disaster events.

**At the same time, we enjoy unprecedented opportunities.** The accelerating pace of technological change – from automation to connectivity to energy – is transforming our lives, including how and when we travel. Shifting demographics and emerging technologies also support new ways of interacting, engaging, and collaborating. Additionally, the combination of the largest federal infrastructure act in a generation and billions of private investments in new technologies and business models provides the resources to approach longstanding challenges in a new manner.



*Source: Library of Congress.*

## WHY THE STATE DEPARTMENTS OF TRANSPORTATION?

**The state DOTs can play a unique role defining and advancing a vision for the future.** State DOTs provide the perspective of each state while working closely with the federal government and local partners to achieve local, statewide, and national goals. State DOTs can address the distinct needs and preferences of every community – from urban to rural – and balance these needs with interregional and global flows of trade, travelers, and investment.

**We have learned that we accomplish more working together.** We operate within our political and physical contexts while recognizing transportation does not end at a city, county, or state border. We serve our states and communities more effectively when we collaborate with partners outside of transportation – such as health and human services organizations or private sector technology providers – so our decisions support the broader goals of our states and communities.

**We are prepared to move toward a new vision because of the foundation we established over the past few decades.** All state highway departments have transitioned into multimodal departments of transportation. All states advanced asset and performance management capabilities and expanded their emphasis on freight and operations. In addition, after more



# VISION FRAMEWORK

than a decade of research and testing, we are now deploying automated, connected, electric, and shared vehicles along with other emerging technologies. Our states are demonstrating we can be laboratories for mobility with new partnerships.

**We are prepared to implement a new vision because we are designed for action.** We are the get-it-done/fix-it departments in our states. We pave potholes, replace traffic lights, and enable people and goods to move on a routine day and during extreme weather events and other disruptions. We have tremendous ability to deliver, coordinate, and convene – and **we believe we can do tremendous good for the people we serve.**

**We are committed to work toward a new vision to deliver a brighter future for the people we serve.** Growing polarization and declining trust in our civic institutions makes it difficult to seize opportunities or address the challenges facing our nation. This generational investment in infrastructure provides the opportunity not only to repair Americans' roads and bridges, but also to restore Americans' faith in the institutions that deliver this system. A collective vision maximizes the impact of taxpayer dollars and demonstrates how states large and small can work together to improve lives.

**We are prepared to implement a new vision because we are designed for action.** We are the get-it-done/fix-it departments in our states. We pave potholes, replace traffic lights, and enable people and goods to move on a routine day and during extreme weather events and other disruptions. We have tremendous ability to deliver, coordinate, and convene – **and we believe we can do tremendous good for the people we serve.**

## HOW DID WE DEVELOP THIS VISION?

This framework is the product of research by the National Cooperative Highway Research Program (NCHRP) 20-24 (138). The visioning process integrated four major perspectives:



A **LOOK BACK** at prior eras of transportation, including the lessons learned from prior transformative periods in transportation in the United States.



A **LOOK AHEAD** at the trends, uncertainties, and potential disruptions that could shape transportation in the United States during the next few decades.



A **LOOK INWARD** at the opportunities and challenges facing state DOTs, through extensive engagement with DOT leaders during interviews and workshops, as well as a review of existing long-range and strategic plans. The process included engagement with the chief executive officers (CEO) or leadership teams of all 52 state DOTs, as well as briefings to the AASHTO Board of Directors and the boards for the four AASHTO regions.



A **LOOK OUTWARD** at the values and priorities of partners and stakeholders through extensive engagement with thought leaders in other industries, including interviews and participation with state DOT CEOs in a vision retreat.

# VISION FRAMEWORK



## A LOOK BACK:

### HOW HAS TRANSPORTATION CHANGED IN THE PAST?

Transportation transformed many times since the United States was founded as a nation – from the water routes and land trails of the 18<sup>th</sup> century to the rail system of the 19<sup>th</sup> century to the road system of the early 20<sup>th</sup> century to the multimodal system of today. Since the late 1800s, the U.S. surface transportation system can be characterized by four distinct eras:

- **Rising Automobility** (~1890-1956) – increasing size and density of major cities; widespread adoption of the automobile; and early state and local road building efforts that were uneven, disparate, and often disconnected.
- **Building the National Highway Network** (~1956-1975) – initial design and construction of the Interstate Highway System as a federal-state partnership, along with the network of state DOTs and metropolitan planning organizations (MPO) to support planning, development, and operation of this system. Concerns over the negative consequences of Interstate construction initiated a series of changes in highway policy and processes that continue to this day, including greater consideration of environmental and community impacts.
- **Redefining a Multimodal System** (~1975-2005) – a shift toward a more comprehensive approach to transportation policy and planning, including federal funding for transit, expanded roles for MPOs and local governments, and increasing emphasis on safety, asset management, and system operations.
- **Aspiration Meets Reality** (~2005 to present) – increasing emphasis on performance management and sustainability, innovations in finance and project delivery, and emerging technology solutions for vehicles and infrastructure. The COVID-19 pandemic and global economic shock increased emphasis on how transportation can support diversity, equity, and inclusion.

Each of these periods has been characterized by shifting modal emphases and policy objectives, as well as by evolving institutional arrangements for local, state, and federal transportation agencies. State transportation agencies are evolving at different paces from road and highway departments to multimodal departments of transportation, with a wide range of structures across states.



Source: Getty Images.



Source: Library of Congress.



Source: Getty Images.

“

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. Because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we're willing to accept. One we are unwilling to postpone.

”

John F. Kennedy, 9/12/62

Image Source: National Aeronautics and Space Administration





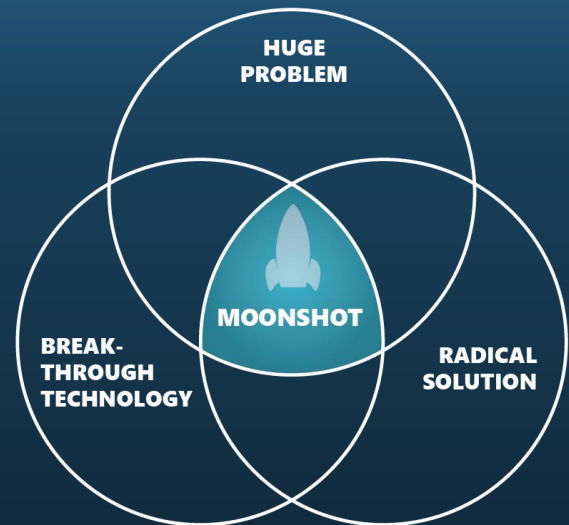
# VISION FRAMEWORK

As this evolution occurred, the U.S. transportation also was marked by a series of **transformational events** – from the “golden spike” marking the completion of the first transcontinental railroad in 1869 to the completion of the Panama Canal in 1914 to the creation of the Interstate Highway System in 1956 and the first moon landing in 1969. Each of these first-of-a-kind “**moonshots**” reflected bold vision, strong leadership, and collaboration of many partners over a short period of time. Moreover, in each case **transportation was not the end, but the means to accomplish a national goal**. The golden spike was about connecting a growing nation from coast to coast. The Panama Canal was about supporting growth in global trade. The Interstate Highway System was intended to support national defense and interstate commerce. The original moon landing was about restoring national confidence during the Cold War by marshalling resources to achieve a high visibility goal.

We also considered changes in transportation services through **private sector leadership** – for example, new air service models pioneered by Southwest Airlines, the rapid growth in transportation networking companies, and the advent of commercial space transportation with reusable launch vehicles developed and managed by private sector firms. We also considered other transformation of other infrastructure and consumer services industries – from the development of Walt Disney World more than 50 years ago to how private companies are transforming renewable energy, broadband and high-speed data communications, and e-commerce today.

These transformations often were characterized by common practices that are relevant to state DOTs and other public agencies looking to the future: a focus on understanding, responding to, and where possible, shaping **customer needs**; a bold vision supported by **strong leadership and commitment** throughout the organization; the **ingenuity to leverage emerging technologies** to advance new business models and customer delivery options; and strong **collaboration with internal and external partners** to accomplish change in short period of time.

**GoogleX has adapted the “moonshot” concept for today’s use**, regularly charging internal teams to develop initiatives that address significant and complex problems using breakthrough technologies and radical solutions. GoogleX’s challenge to its internal teams is to develop solutions that are **not 10 percent better than current approaches, but 10 TIMES BETTER.**



Source: GoogleX



Source: Library of Congress.



Source: Getty Images.



Source: Getty Images.

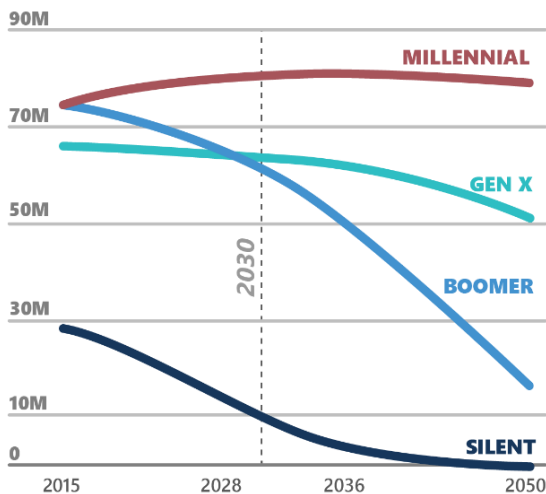


## A LOOK AHEAD: TRENDS AND UNCERTAINTIES SHAPING THE FUTURE OF TRANSPORTATION

Several trends, uncertainties, and potential disruptions are converging to create opportunities and challenges for transportation agencies:

**Population: growing and changing.** Although the pace is slowing, U.S. population growth is expected to continue to exceed most industrialized nations during the next decade – with a wide variation in growth among states. U.S. Census projections suggested the nation will achieve several major demographic turning points: immigration may exceed natural population growth (births-deaths) by 2030, the number of older adults may exceed the number of children for the first time in U.S. history by the mid-2030s, and no single racial or ethnic group may account for majority of U.S. residents by the mid-2040s.

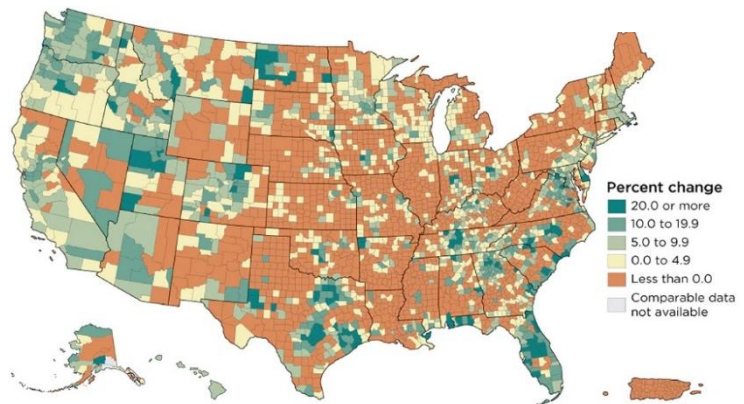
### MILLENNIALS NOW LARGEST U.S.



**Source:** Pew Research Center, 2020.

GenZ generation not yet officially defined.

### PERCENT CHANGE IN COUNTY POPULATION, 2010-2020

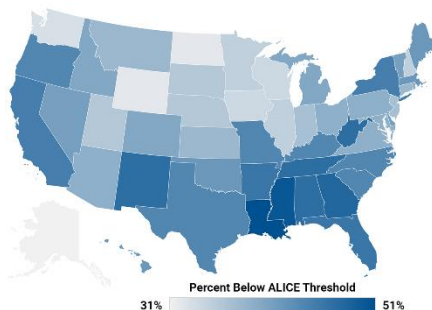


Note: Bedford city, VA, was changed to town status and added to Bedford County, VA, effective July 1, 2013. For purposes of presenting data, Bedford County is treated as if Bedford city were included in it at the time of the 2010 census.

**Source:** 2010 Census Redistricting Data (Public Law 94-171) Summary File; 2020 Census Redistricting Data (Public Law 94-171) Summary File.

**Places: a more urban nation.** The U.S. Census showed four out of five metropolitan areas gained population between 2010 and 2020, with growth concentrated in smaller cities and the suburbs or larger metropolitan areas, particularly in the south and west. More than half of the nation's counties lost population, with rural growth concentrated close to urban areas or recreational areas. These trends are expected to continue for the next few decades, with around 10 or so 'megaregions' accounting for the majority of U.S. population growth.

**42% of U.S. households cannot afford basic costs**



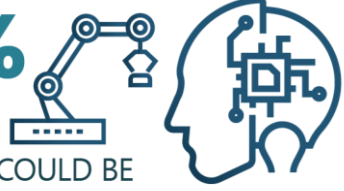
**Source:** United for ALICE, 2021, using 2018 data.

**Prosperity: leaving people behind?** Economic growth and prosperity have not been evenly spread across the nation. About 13 percent of households earn incomes below the poverty line, and an additional 29 percent are asset limited, income constrained, and employed (ALICE) (United for ALICE, 2021 using 2018 data). The average household spent 16 percent of total expenditures on transportation - the second biggest cost after housing (U.S. Bureau of Labor Statistics, 2020).

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**Work – redefining and recreating.** Americans increasingly will work in different ways, in more places, and in more varied kinds of jobs. In 2020, more than one of every four employees worked a flexible schedule and nearly two out of five reported working from home regulatory (Federal Reserve Bank). Job growth is shifting to cognitive and non-routine activities – and automation and other technologies are anticipated replace some jobs and create new ones.

**30-60% OF JOBS** IN MOST INDUSTRIES COULD BE **AUTOMATED** WITH TODAY'S TECHNOLOGIES



**Source:** McKinsey Global Institute, 2017.

**Trade and logistics- disrupting and adapting.** E-commerce experienced nearly a decade of growth during the pandemic, reshaping the supply chain and creating new delivery challenges (U.S. Census). Near-shoring, automation, and productivity gains could enable the United States to regain its leadership in global manufacturing and logistics.

**1 of 2 U.S. MANUFACTURERS** REPORT PLANS TO **INCREASE DOMESTIC SOURCING** OF GOODS



**Source:** A.T. Kearney, 2022 survey.

**Technology: transforming and accelerating.** Automation, artificial intelligence, digitization, connectivity, and electrification and new forms of energy are creating new opportunities for how we live work, interact, and move today – with more technologies just over the horizon.

THE **INTERNET OF THINGS** COULD **CONNECT AND MONITOR** IN REAL TIME **64 BILLION OBJECTS** BY 2025 – UP FROM 10 BILLION IN 2018.



**Source:** National Intelligence Council, 2021.

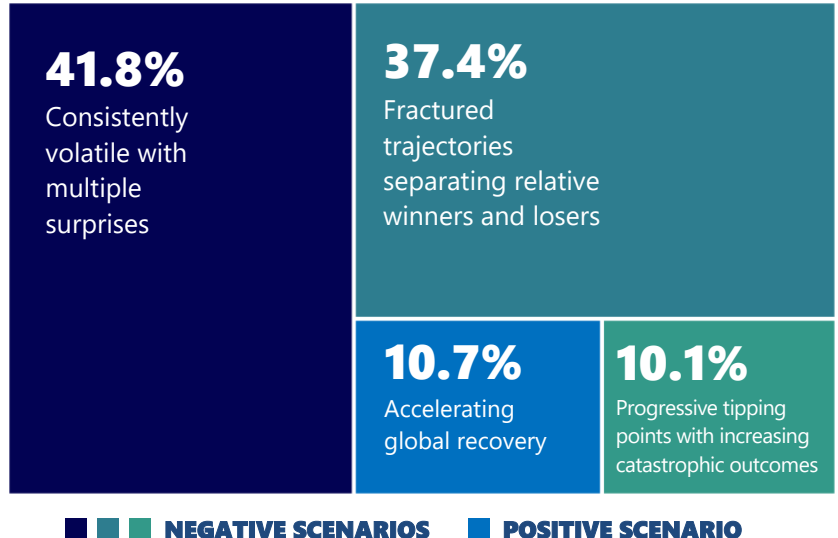
**Risks: reaching the tipping point?** The risks facing the United States continue to grow in frequency, severity, and complexity- from extreme weather and climate trends to public health emergencies to the potential for terror attacks. More than four out of five global experts report being worried about the future of the world (World Economic Forum).

## TOP 10 MOST SEVERE RISKS ON A GLOBAL SCALE

1. CLIMATE ACTION FAILURE
2. EXTREME WEATHER
3. BIODIVERSITY LOSS
4. SOCIAL COHESION EROSION
5. LIVELIHOOD CRISES
6. INFECTIOUS DISEASES
7. HUMAN ENVIRONMENTAL DAMAGE
8. NATURAL RESOURCE CRISES
9. DEBT CRISES
10. GEOECONOMIC CONFRONTATION

■ **ECONOMIC** ■ **ENVIRONMENTAL**  
■ **GEOPOLITICAL** ■ **SOCIETAL**

## "WHAT IS YOUR OUTLOOK FOR THE WORLD OVER THE NEXT THREE YEARS?"



**Source:** World Economic Forum, 2021-2022.





## A LOOK INWARD:

### ENGAGING CURRENT AND EMERGING STATE DOT LEADERS

The visioning process engaged the CEOs or other leadership team members of all 52 state DOTs through interviews, briefings, workshops with the boards of directors of all four AASHTO regions, and a vision retreat that involved 17 CEOs.

**State DOT leaders expect more change in the decade ahead,** including continued demographic shifts and related changes in customer needs and expectations, a more diverse economy with more complex supply chains, continued introduction of new technologies, and a changing climate. They see the opportunities these changes – particularly technology – provide for dramatically increasing safety, efficiency, and accessibility. At the same time, they are concerned about the ability to improve the system for all customers in an equitable way, and about whether existing policies, funding constraints, and partisan divisions will stand in the way of leveraging new opportunities.

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*"We are facing a collision of changing demographics, the shifting nature of work, the rise of automation, the rapid move to electrification, the interplay of shared mobility options, and greater emphasis on climate. Any of these alone are significant and they are in a cauldron all together."*

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**State DOT leaders believe their agencies will continue to evolve from a primary emphasis on building new capacity to a broader focus on being stewards of the multimodal transportation system.** They anticipate more emphasis on safety, resilience, equity, and customer service – as well as on how they support broader economic and community development goals that differ across states. They also anticipate new and evolving partnerships with local governments,

MPOs, and the private sector. They believe these changes will require new approaches to communicating and engaging with customers and partners, as well as organizing and managing their internal teams. They also believe these changes will influence the skills they seek to develop and retain in their workforce, with new competencies in areas including communications, customer service, psychology, analytics, and systems thinking.

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*"I'm not fearful of the future but I am fearful of the transition. We know how to manage the system today and we know the future will be better- but how do we work through the change?"*

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**State DOT leaders agree that a national vision could provide a framework for collaborative action among the states, as well as the flexibility for each state to pursue investments and actions that fit in its context.** They said a vision should provide core areas of agreement, enabling states that are ready to go farther while allowing others to evolve with the vision.

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*"Transportation should bring people together. In the past we separated people. In the past we have approached our job as getting people through communities. Are we asking how we can help a community achieve its goals? We can measure success not by transportation measures but by calling the mayor and asking if he or she would have us back."*

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## A LOOK OUTWARD: ENGAGING THOUGHT LEADERS AND PARTNERS

The process also engaged with thought leaders outside of state DOTs, including local governments, public transportation providers, and MPOs; and leaders in technology, energy, tourism, agriculture, economic development, workforce, health and human services, demographics, and the environment.

The engagement occurred one on one and through the vision retreat, and along the way began to build a “challenge network” of nontraditional partners committed to the future of transportation. These partners reinforced and expanded our thinking in several areas.

**State DOTs and our partners share many of the same concerns** – particularly around how to meet the changing needs of moving people and goods in a rapidly evolving nation. We share a sense of both the opportunities enabled by new technology and mobility options and the challenges supporting an increasingly diverse society with increasing gaps in access to opportunity. We share concerns about safety, resilience, and equity. And we agree transportation is not the end, but the means to achieving broader goals of economic prosperity, quality of life, and environmental stewardship.

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*“Everyone is waking up to the limits in physical and social mobility that we face.”*

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*“Our market is changing quickly. We are working a step at a time. But often the public sector thinks they need to design the 20-year solution now. What are the decisions you need to make today? How can we help you?”*

**State DOTs can learn much from our partners and achieve much working together.** As we think about how to better serve all communities, we can work more closely with partners involved in issues such as housing, health and human services, land use, economic development, and logistics to ensure we are making decisions in a broader context. We can work more closely with organizations who engage with traditionally unrepresented groups, from the working poor to senior citizens, to ensure we meet the needs of our increasingly diverse customer base. We also can work more closely with technology providers and entrepreneurs to leverage private sector innovation and entrepreneurial spirit to support public sector goals.

**State DOTs can play a unique role advancing a national vision and coalescing partners to action in individual states.** Our partners told us they desire a bold, shared national transportation vision focused on how transportation supports broader community goals - and like us, they recognize the need for state and region-specific solutions. They also reminded us that a new vision could require new roles and approaches for state DOTs and other agencies – and told us they welcome the opportunity for future collaboration toward a common vision. This emerging “challenge network” of non-traditional partners could well be one of the lasting outcomes of this visioning process.

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*“Everything connects to transportation. I would tell a DOT secretary that you have far more power than you realize to do good. You have way more money than anyone else in your state and way more capacity to deliver programs. You also have a great ability to convene people. You can unlock a lot of things as you focus on how transportation supports communities.”*

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# VISION FRAMEWORK

## WHAT DID WE RECOMMEND?

Our review of the prior era and previous “moonshots” in transportation; the trends, uncertainties, and potential disruptions shaping the future of transportation; and the input from state DOT leaders and our partners points to several implications about how to approach a vision for the future of transportation:

- The **vision** should focus on how transportation can be a means to achieve broader community and societal goals. Based on the review of the trends and the input from DOTs and partners, key elements of the vision should emphasize supporting community and economic development goals, including the increasing diversity of our population and economy.  
*“We need to look at every project we do in terms of how it benefits societal goals. We will never win the Oscar for best actor, but we will always be the best supporting actor.”*
- The vision should include a series of **aspirational goals** that encompass the key challenges facing our nation’s transportation system today, including safety, accessibility, resilience, and related topics. These goals could be shared values for state DOTs and other partners, recognizing that specific objectives and outcomes may vary by region or state.
- The vision should be implemented in part through a series of **moonshot concepts** that both demonstrate new approaches to transportation and harness the collective energy and resources of multiple DOTs and partners. Similar to previous game-changing events such as the construction of the Interstate Highway System, the moonshots could include significant infrastructure investment, particularly in digital technologies. However, the moonshots also could include a combination of many small but impactful actions to address complex problems such as the increasing number of transportation fatalities or the growing gaps in access to opportunity.  
*“We may not have another Interstate System in us as a nation. What can we do for the customer in a meaningful way across the country? Perhaps we should follow Mother Theresa’s words – do a lot of small things in a great way.”*
- The vision should be implemented through **individual action** by state DOTs, recognizing that each state DOT faces a unique set of opportunities and constraints. State DOTs can make progress toward a shared vision using a variety of tools, from policies and regulations to investments to organizational structures and workforce skills, and the actions should reflect this broad approach. There are opportunities for **collective action** as well.
- The vision should be implemented by state DOTs in **partnership** with federal, regional, and local agencies, as well as with partners in other industries and sectors.

### Our work to date produced three products:

A shared **vision and goals** for the future of transportation in the United States, which were unanimously adopted by the AASHTO Board of Directors in October 2022.

An initial set of bold ideas or “**moonshot**” **concepts** for collective action, which will be refined and advanced in 2023 and beyond.

An initial framework for a **spectrum of actions** individual DOTs could pursue to advance the vision in their state, which will be refined and advanced in 2023 and beyond.

# VISION FRAMEWORK

## WHAT IS OUR VISION?

Our vision is for a transportation system focused on **connecting communities, moving people and goods**, and **meeting customer needs** at all scales – from local to global – delivered as a partnership between state DOTs and other public, private, and civic organizations.

This vision builds on our progress during the past few decades. It continues our evolution from building and maintaining state highways to managing a **comprehensive, multimodal transportation system** that supports community and economic development goals.

This vision also extends beyond serving the users of the system to more broadly serving **all customers** - the people and businesses who are impacted by transportation. It means focusing on how transportation impacts our daily lives as we commute to work, bring children to school, bring elderly parents to medical appointments, enjoy our outdoors, visit family and friends in other communities, and obtain food, clothing, and supplies. It also means eliminating disparities in affordability and service across communities and demographic groups and providing all Americans with access to opportunity.



A community-centered transportation integrates modes and services to enable seamless end-to-end trips at all scales:

- **Within communities** – connects people to jobs, services, and recreation through local street networks, sidewalks, trails, micromobility, and other human-scaled transportation.
- **Between communities within a region** – connects people to jobs, education, health care, and other services in both urban and rural areas through options including regional roads and transit, water, and air.
- **Between regions within a megaregion** and **between megaregions within the United States** – connects workers, goods, and information at the scale of the economy through high-speed ground, water, and air transportation.
- **Between U.S. and global trading partners** – connects trade, visitors, and information through world-class seaports, airports, spaceports, border crossings, and other gateways integrated with the surface transportation system.

Ultimately, community-centered transportation means viewing transportation through the lens of how it can enhance and sustain what makes a community special: a sense of **security** and **stability**, a sense of **connectivity**, and a sense of **belonging**. Transportation is not the end – it is a means to creating the communities of our dreams and places where people can thrive.

# VISION FRAMEWORK

Our vision includes **six aspirational goals** that describe how the transportation system should function. These are intended as shared values for all state DOTs. Each state DOT may define success and define progress on each goal in a unique way.



VISION	
COMMUNITY-CENTERED TRANSPORTATION	
A transportation system focused on connecting communities, moving people and goods, and meeting customer needs at all scales, from local to global – delivered as a partnership between state departments of transportation and other public, private, and civic sector partners.	
ASPIRATIONAL GOAL	OUTCOME
SAFE & SECURE	No fatalities or serious injuries to people using all modes of the transportation system; the transportation system has limited vulnerability to criminal activity, terrorism, and cyberattack and is not a conduit for human trafficking, smuggling, or spread of disease
ACCESSIBLE & AFFORDABLE	Affordable and convenient transportation options to access jobs, health care, education, food, recreation, and other services for all people and families, regardless of geographic location, age, ability, or socioeconomic status
SEAMLESS & RELIABLE	Convenient, human-centered choices available on demand to move both people and goods from origin to destination, with minimal delay and quick transfers between modes and systems
HEALTHY & THRIVING	Transportation investments that help grow prosperity and improve the health of all Americans
CLEAN & SUSTAINABLE	Zero net emissions of greenhouse gases and air quality pollutants, and enhancement of the natural environment
AGILE & RESILIENT	Communities protected against and able to adapt to and recover from extreme weather and climate trends, service disruptions, and other risks; transportation agencies able to adapt to risks, disruptions, and uncertainties



## PHASE 2


### WHAT MOONSHOTS CAN WE ACHIEVE?

Implementation of the vision will be built upon several bold ideas – or “moonshots” - delivered through the end of this decade and beyond through collective action among a large number of state DOTs and other partners. These ideas were developed through the vision retreat and subsequent collaboration with state DOT leadership and partners. We strived to identify moonshots that would be first-of-a-kind or quantum improvements over current practices – but still achievable by the end of this decade. We are committed to further refining these concepts in Phase 2 and exploring how to advance the most promising ideas. We recognize, as in the first moonshot, these bold goals will focus and mobilize the best of our energies and skills.

WHY THIS MOONSHOT?	WHAT MIGHT WE DO?	GOALS SUPPORTED
<b>What if we...Make aggressive progress toward Vision Zero; reduce highway fatalities by xx percent by 2030</b>		
Nearly 43,000 people died in crashes on public roads in 2021 - an 10% increase over 2020 levels and the highest increase recorded in in more than 70 years ( <i>National Highway Traffic Safety Administration</i> )	<ul style="list-style-type: none"> <li>• Advance systemic solutions involving engineering, technology, behavioral change, and community design to reduce fatalities to levels not seen since the post-World War II era</li> <li>• Advance targeted solutions for pedestrians, bicyclists, and other vulnerable road users</li> </ul>	<ul style="list-style-type: none"> <li>• Safe &amp; secure</li> <li>• Accessible &amp; affordable</li> <li>• Seamless &amp; reliable</li> <li>• Healthy &amp; thriving</li> </ul>
 <p>Source: Getty Images.</p>		
<b>What if we...Work with partners to reduce the share of households who cannot afford basic survival costs by xx percent by 2030 through enhanced transportation accessibility and affordability</b>		
More than 2 out of every 5 households nationally earn incomes below the poverty line or at a level not sufficient to cover basic survival costs; many of these households lack affordable transportation options for connecting to jobs, education, and health care ( <i>United for ALICE</i> )	<ul style="list-style-type: none"> <li>• Build and strengthen non-traditional partnerships with health, human services, and workforce development organizations</li> <li>• Close critical gaps in access to jobs, health care, education, recreation, and other services</li> <li>• Provide more mobility options for households - including the option to not travel</li> <li>• Increase the affordability of transportation</li> </ul>	<ul style="list-style-type: none"> <li>• Accessible &amp; affordable</li> <li>• Seamless &amp; reliable</li> <li>• Healthy &amp; thriving</li> </ul>
 <p>Source: Getty Images.</p>		



# VISION FRAMEWORK

WHY THIS MOONSHOT?	WHAT MIGHT WE DO?	GOALS SUPPORTED
<b>What if we...Create a mobility marketplace so transportation works for our customers</b>		
Emerging technologies provide more options for people to plan, coordinate, and pay for mobility choices that reflect unique customer needs	<ul style="list-style-type: none"> <li>• Enable customers to choose the travel option(s) they want and need, including aspects like safety, convenience, accessibility, affordability, efficiency, and sustainability</li> <li>• Make it easy for people to budget and pay for the transportation services they consume</li> <li>• Ensure all customers can access mobility information and options, including customers who do not have access to a smart device, bank account, or credit card</li> </ul>	<ul style="list-style-type: none"> <li>• Safe &amp; secure</li> <li>• Accessible &amp; affordable</li> <li>• Seamless &amp; reliable</li> <li>• Healthy &amp; thriving</li> <li>• Clean &amp; sustainable</li> </ul>
 <p>Source: Getty Images.</p>		
<b>What if we...Change how we operate and manage the transportation system</b>		
Emerging technologies offer new solutions for achieving all goals - and the Interstate highway right of way offers potential to introduce new technology infrastructure in many regions	<ul style="list-style-type: none"> <li>• “Light up the Interstates” - deploy and enhance a nationwide digital infrastructure to support mobility and connectivity needs, using Interstate highway right of way as a starting platform</li> <li>• Deploy “Transportation 4.0” - including vehicle automation, connectivity, and artificial intelligence - to enhance safety, mobility, and access through public/private collaboration</li> <li>• Advance human-centered, machine-enabled transportation to enhance safety, mobility, and access, as well as options to substitute communications for travel</li> </ul>	<ul style="list-style-type: none"> <li>• All goals</li> </ul>





# VISION FRAMEWORK

## WHY THIS MOONSHOT?

## WHAT MIGHT WE DO?

## GOALS SUPPORTED

Source: Getty Images.



### What if we...Improve energy efficiency and reduce transportation emissions xx percent by 2030

The transportation system accounts for about one-fourth of all U.S. energy consumption and related greenhouse gas emissions (*U.S. Energy Information Administration; U.S. Environmental Protection Agency*).

- Deploy a nationwide network to use electricity and alternative fuel sources for transportation
- Improve energy efficiency and reduce emissions throughout the transportation system lifecycle, from construction to operations
- Use the transportation system to generate and store energy, such as solar highways and pavement sensors

- Affordable & accessible
- Seamless & reliable
- Healthy & thriving
- Clean & sustainable
- Agile & resilient

Source: Getty Images.



### What if we...Rethink how we connect communities and regions

Growing regions and megaregions often need more connectivity options including reconstruction or expansion of portions of the Interstate Highway System as well as modal alternatives

- Develop more options for how we connect communities, regions, and megaregions to meet customer needs, including next-generation transit, advanced air mobility, and high-speed ground transportation
- Create "Interstate 2.0": rebuild critical corridors with advanced design and materials and multiple modes and uses; close connectivity gaps on highway, rail, water, and air to support interstate commerce
- Use corridor rights of way as pathways for mobility, energy, water, broadband, and other systems

- All goals



# VISION FRAMEWORK

## WHY THIS MOONSHOT?

## WHAT MIGHT WE DO?

## GOALS SUPPORTED



Source: Getty.

### ***What if we...*** Prioritize strategies and investments to strengthen communities

Transportation planning and investment processes often have been oriented toward building and maintaining roads, and may need to adapt to focus on serving communities and moving people and goods

- Build and sustain diverse, inclusive partnerships reflecting community visions and needs at all scales
  - Make major transportation decisions in collaboration with community visions and customer needs
  - Focus planning processes, performance measures, and investment decisions on building and sustaining communities
  - Balance the needs and preferences of multiple scales of communities and customers impacted by transportation decisions, from local to global
- All goals



Source: Getty.



# VISION FRAMEWORK

## HOW DO INDIVIDUAL STATE DOTs MOVE TOWARD THE VISION?

Each state DOT can take actions to advance the vision in ways that work for them today and in the future. A **spectrum of actions** is being developed to address the levers of change available to a state DOT. These levers include both *external* actions (such as partnerships or coordination with other states or other sectors such as land use) and *internal* actions (such as the decisions DOTs make about policies, plans, and investments or how they organize their operations and develop and retain their workforce). For each lever of change, a spectrum of actions from modest to transformative change will be identified in Phase 2, building on the examples below. Beyond these specific examples, each state DOT can identify additional actions that will challenge and evolve their departments and programs.

LEVER OF CHANGE	EXAMPLE ACTIONS		
	MODEST CHANGE	SIGNIFICANT CHANGE	TRANSFORMATIVE CHANGE
<b>EXTERNAL LEVERS</b>			
<b>Partnerships</b>	Support nontraditional partnerships (for example, serving on housing coalition or public health working groups)	Establish working groups to maintain regular engagement with nontraditional partners	Share planning and delivery responsibilities with MPOs, regional transportation planning organizations, and local governments; assist with transportation needs for health/human service partners
<b>Communications &amp; customer service</b>	Establish and maintain regular stakeholder and customer service engagement channels via multiple media	Deepen understanding of needs of specific customer groups, such as asset-limited, income-constrained, employed households	Establish mobility manager functions to incentivize, develop, fund, and advance customer-focused services
<b>Land use coordination</b>	Review transportation impacts of proposed land use changes and consider community impacts of transportation investments during the planning process	Incorporate local and regional land use planning objectives and related policies such as housing into long-range transportation planning process	Play active role in shaping land use decisions, functioning as a long-term planning arm for the state in partnership with local governments
<b>Multi-state or megaregional coordination</b>	Meet regularly with neighboring states to coordinate on common initiatives	Align investments and operations on multi-state corridors to meet customer needs	Develop multi-state compacts to advance solutions benefitting multiple states



# VISION FRAMEWORK

LEVER OF CHANGE	EXAMPLE ACTIONS		
	MODEST CHANGE	SIGNIFICANT CHANGE	TRANSFORMATIVE CHANGE
<b>INTERNAL LEVERS</b>			
<b>Policies &amp; regulations</b>	Review and modernize existing rules and processes to reflect emerging mobility options	Strengthen tools and processes for benefit/cost analysis, tradeoff analyses, and risk analyses	Develop policies to leverage and share technology, data, and private investments while focusing on public good
<b>Plans &amp; programs</b>	Increase emphasis on community vision/values in planning process	Enhance community engagement at all phases of planning; flag community-priority projects for incorporation into programs	Redesign the planning process with community vision at the center
<b>Assets &amp; right of way</b>	Maintain assets in state of good repair; identify potential vulnerabilities to extreme weather or other risks	Incorporate resilience considerations into asset management decisions and right of way management plans	Strategically assess function of existing right of way and assets; make decisions to renew, repurpose, decommission, or relocate
<b>Investments</b>	Rightsize project designs to reflect customer needs	Establish a return-on-investment framework with broad-based analysis of transportation's outcomes, including community impacts	Establish cross-sector partnerships with public and private entities to pool resources for investments that integrate transportation with other critical infrastructure
<b>Technology &amp; data</b>	Continue research and testing of new technologies and data sources	Establish data sharing agreements with private sector and local governments	Create "Transportation 4.0" technology partnerships with multi-use corridors or toll authorities as testbeds
<b>Human resources</b>	Strengthen staff recruitment, development and retention; update core competencies with greater emphasis on customer service and innovation	Deepen skills in behavioral psychology, data analytics, and emerging technology	Adapt recruiting and retention strategies to evolve the DOT workforce to be more representative of the people we serve
<b>Organization &amp; governance</b>	Strengthen cross-functional teams and break down internal silos	Create offices of strategic planning/management or innovation strike teams	Reorganize DOTs to function like private enterprises, while working for the public good



# VISION FRAMEWORK

For some DOTs transformative change already is happening; for others, a modest change may be a challenge. Through these levers of change, each individual state DOT will advance the vision, producing collective national impact. The profile for how each state moves toward the vision will be unique and customized, and the cumulative impact could be significant.

## STATE "A"

Lever of Change	Modest	Significant	Transformative
Partnerships			●
Communications & customer service		●	
Land use coordination	●		
Multi-state coordination		●	
Policies & regulations			●
Plans and programs		●	
Assets & right of way		●	
Investments		●	
Technology & data			●
Human resources		●	
Organization & governance	●		

## STATE "B"

Lever of Change	Modest	Significant	Transformative
Partnerships		●	
Communications & customer service			●
Land use coordination		●	
Multi-state coordination			●
Policies & regulations			●
Plans and programs	●		
Assets & right of way	●		
Investments		●	
Technology & data		●	
Human resources			●
Organization & governance		●	

## STATE "C"

Lever of Change	Modest	Significant	Transformative
Partnerships		●	
Communications & customer service		●	
Land use coordination	●		
Multi-state coordination	●		
Policies & regulations	●		
Plans and programs	●		
Assets & right of way		●	
Investments		●	
Technology & data	●		
Human resources			●
Organization & governance	●		





## CALL TO ACTION

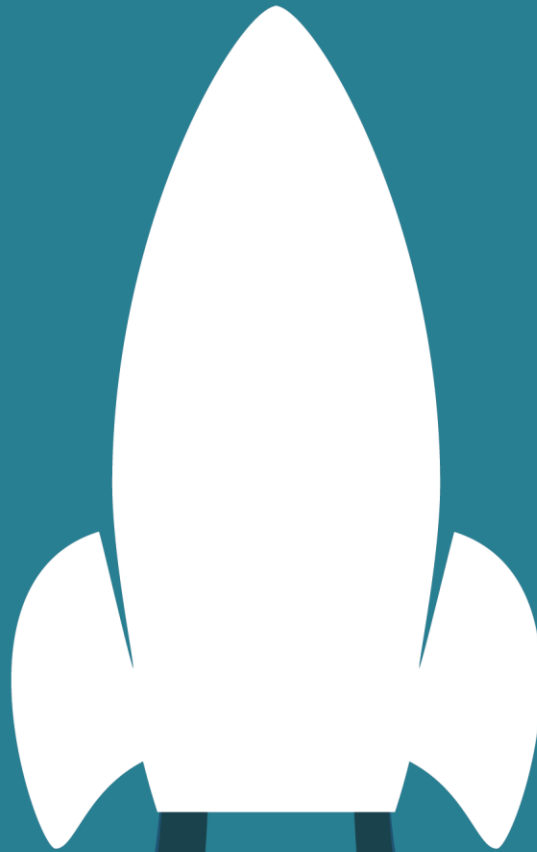
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The vision is bold, but, like the first moonshot, is focused what we can achieve in less than a decade if we work together.

**The time for action is now.** We face an unprecedented collision of challenges – from rising traffic fatalities to gaps in access to jobs and services to increasing risks and disruptions. But we also face an unprecedented set of opportunities, from record federal investment in infrastructure to the promise of new technologies and partnerships.

If we do not seize these opportunities, individual states may continue to maintain and improve their systems, but we will not deliver on the promise of better mobility for all Americans. If we work collectively with our partners, we can make significant progress toward strengthening our communities through a transportation system with **far fewer fatalities, far greater access to opportunity, and far more innovation** in how we operate and manage transportation.

We invite all of our partners to work with us as we – individually and collectively – advance a community-centered transportation system that moves all states— and our nation – forward.



**NCHRP** NATIONAL  
COOPERATIVE  
HIGHWAY  
RESEARCH  
PROGRAM

**NCHRP 20-24(138)**

Collective and Individual  
Actions for State Departments  
of Transportation Envisioning  
and Realizing the Next Era  
of America's Transportation Infrastructure