Welcome | Bienvenidos |Welina | Bien binidu Buen binidu |Afio mai

“LTAP Resources and Innovations”

January 23-27, 2023

LTAP Resources and Innovations

2023 United States Territorial Peer Exchange

Greetings from Puerto Rico!

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University of Puerto Rico - Mayagüez

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Highway Engineer
FHWA - Puerto Rico and USVI
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Innovations

Every Day Counts
Innovation for a Nation on the Move

STIC
State Transportation Innovation Councils

Pedestrian/Bicyclist


Bicycle Lanes


Crosswalk Visibility Enhancements


Leading Pedestrian Interval


Medians and Pedestrian Refuge Islands in Urban and Suburban Areas


Pedestrian Hybrid Beacons


Rectangular Rapid Flashing Beacons (RRFB)


Road Diets (Roadway Configuration)


Walkways

Roadway Departure


Enhanced Delineation for Horizontal Curves

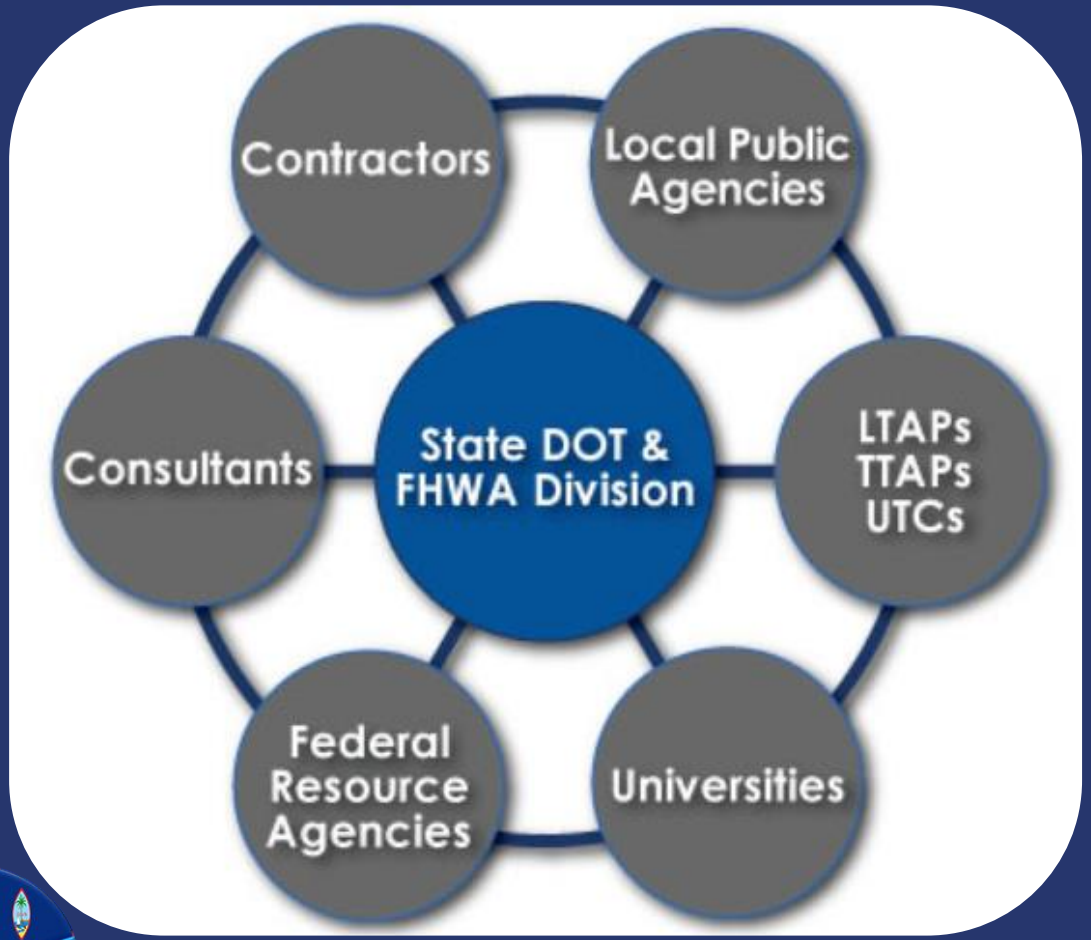

Longitudinal Rumble Strips and Stripes on Two-Lane Roads


Median Barriers

Every Day Counts - Round 7

7 new innovations

State Transportation Innovation Council



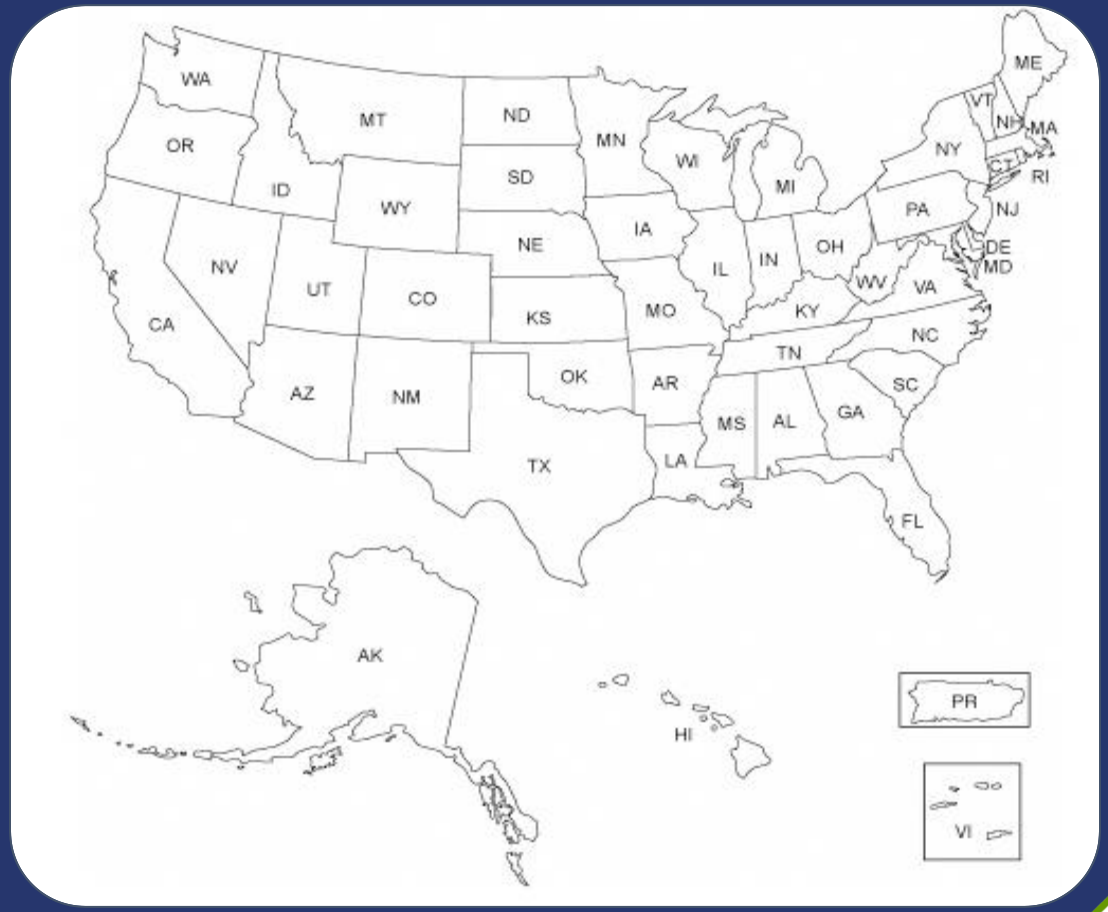
Group of Professionals working together to encourage the use of innovation in the State or Territory.

$100,000 Federal Funds for Projects (Incentive Program)

Conferences, Articles, Training

LTAP Overview

- The Local Technical Assistance Program (LTAP) and Tribal Technical Assistance Program (TTAP) are composed of a network of centers located in each state and territory.
- The LTAP/TTAP centers enable local counties, cities and towns to improve roads and bridges by supplying them with training programs, new and existing technology updates and many other technical resources.



LTAP Overview

MISSION

"To foster a safe, efficient, and environmentally sound surface transportation by improving skills and increasing knowledge of the transportation workforce and decision makers."

VISION

"To improve the quality and safety of the surface transportation system through interactive relationships and information exchange… driven by these relationships and known for our ability to enrich the knowledge base of our stakeholders."

PRLTAP-T^2 Center

- Founded in April 1, 1986 in the Civil Engineering and Surveying Department of the University of Puerto Rico Mayaguez Campus
- In 1991, the program was changed to the present LTAP and included technical assistance to the expanded network of 52 centers including seven tribal communities

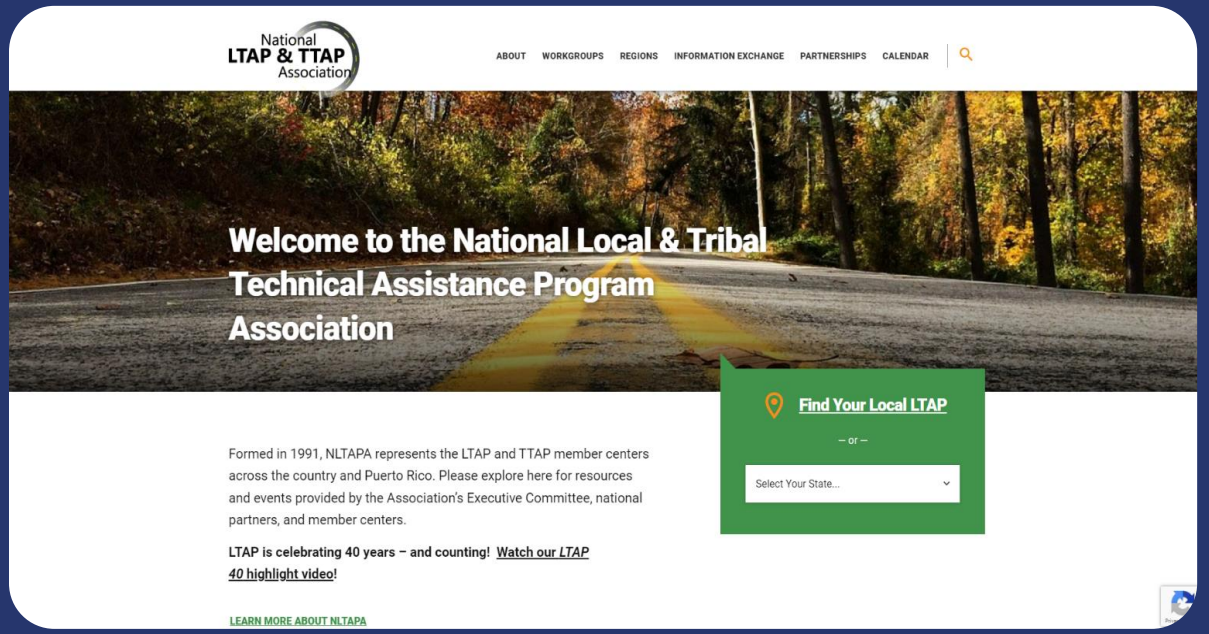
https://prltap.org/eng/

PRLTAP-T^2 Center Web Page

https://prltap.org/eng/

NLTAPA Overview

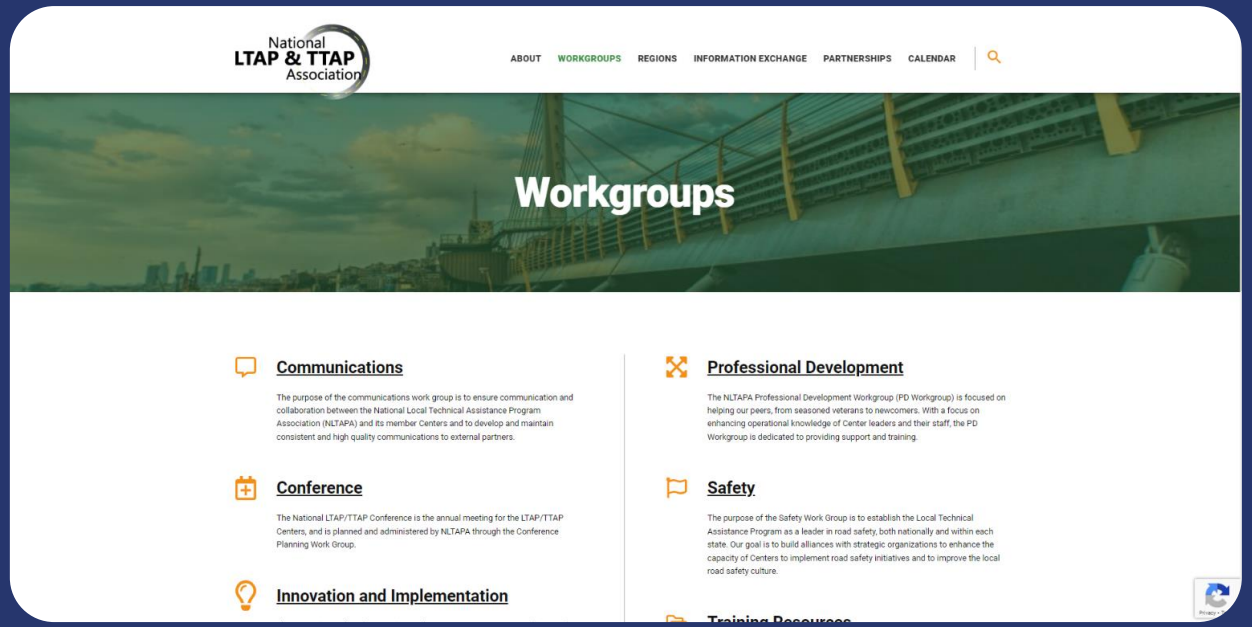
- The National Local Technical Assistance Program Association (NLTAPA) is a non-profit organization representing the 52 LTAP and TTAP centers in the United States and Puerto Rico.



https://nltapa.org/

NLTAPA Workgroups

- Communications
- Conference Planning
- Innovation and Implementation
- Partnership
- Professional Development
- Safety
- Training Resources

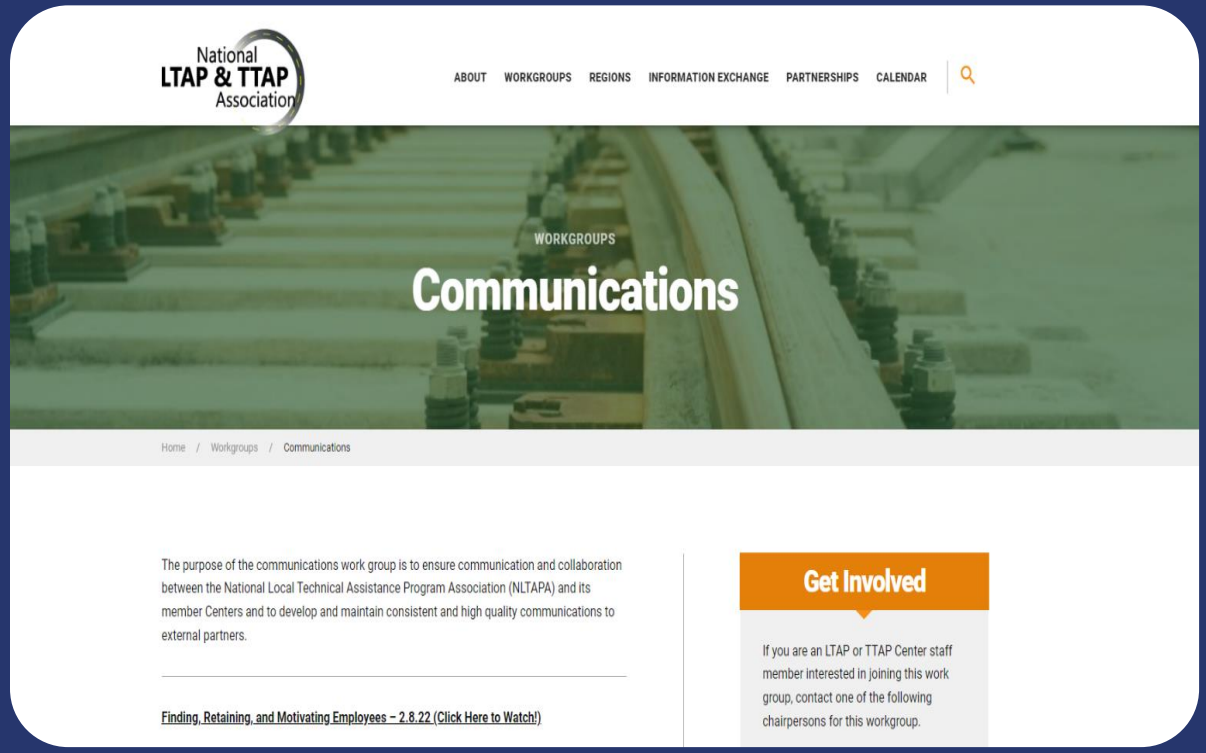


https://nltapa.org/workgroups/

NLTAPA Workgroups

Communications

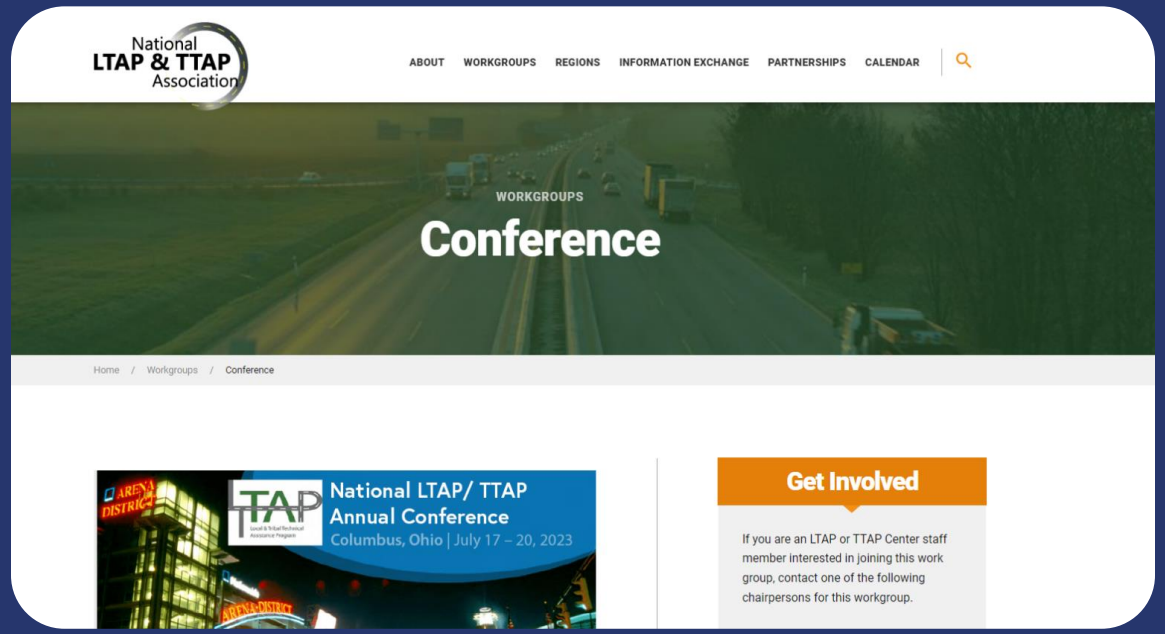
- The purpose of the communications work group is to ensure communication and collaboration between the National Local Technical Assistance Program Association (NLTAPA) and its member Centers and to develop and maintain consistent and high quality communications to external partners.



NLTAPA Workgroups

Conference Planning

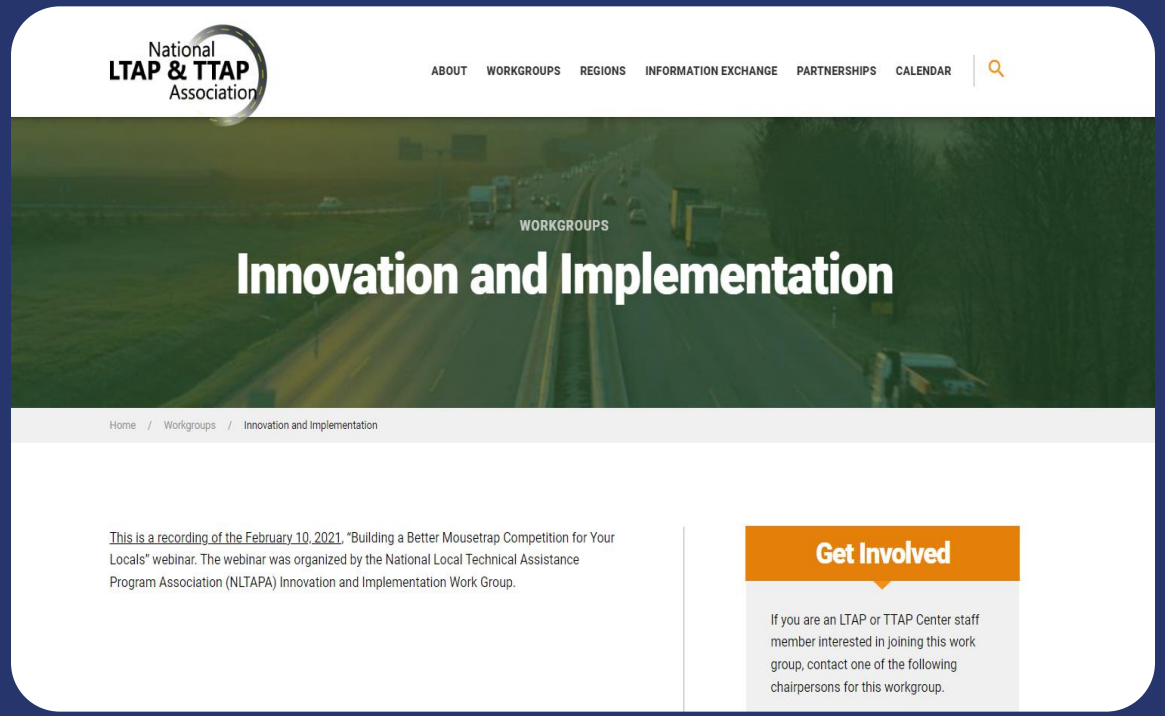
- The National LTAP/TTAP Conference is the annual meeting for the LTAP/TTAP Centers, and is planned and administered by NLTAPA through the Conference Planning Work Group.



NLTAPA Workgroups

Innovation and Implementation

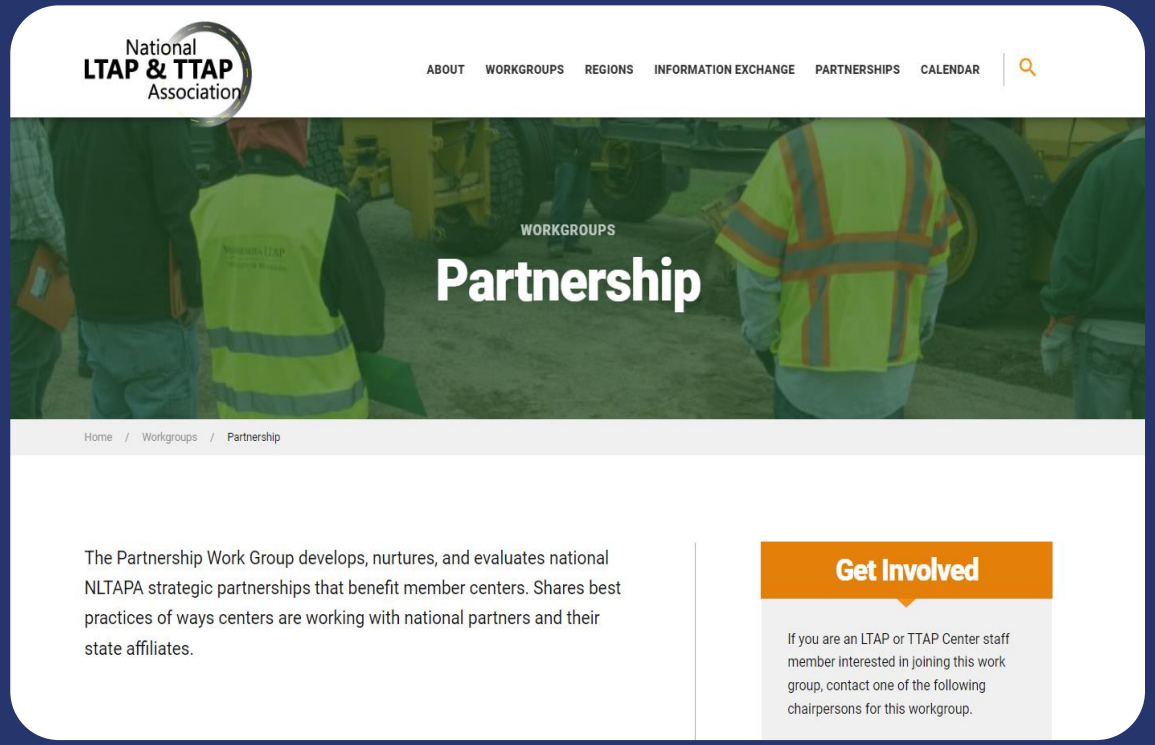
- The Innovation and Implementation Work Group supports NLTAPA and its member centers by identifying and sharing innovative practices, technologies, and implementation strategies that allow them to meet the needs of their local road practitioners.



NLTAPA Workgroups

Partnership

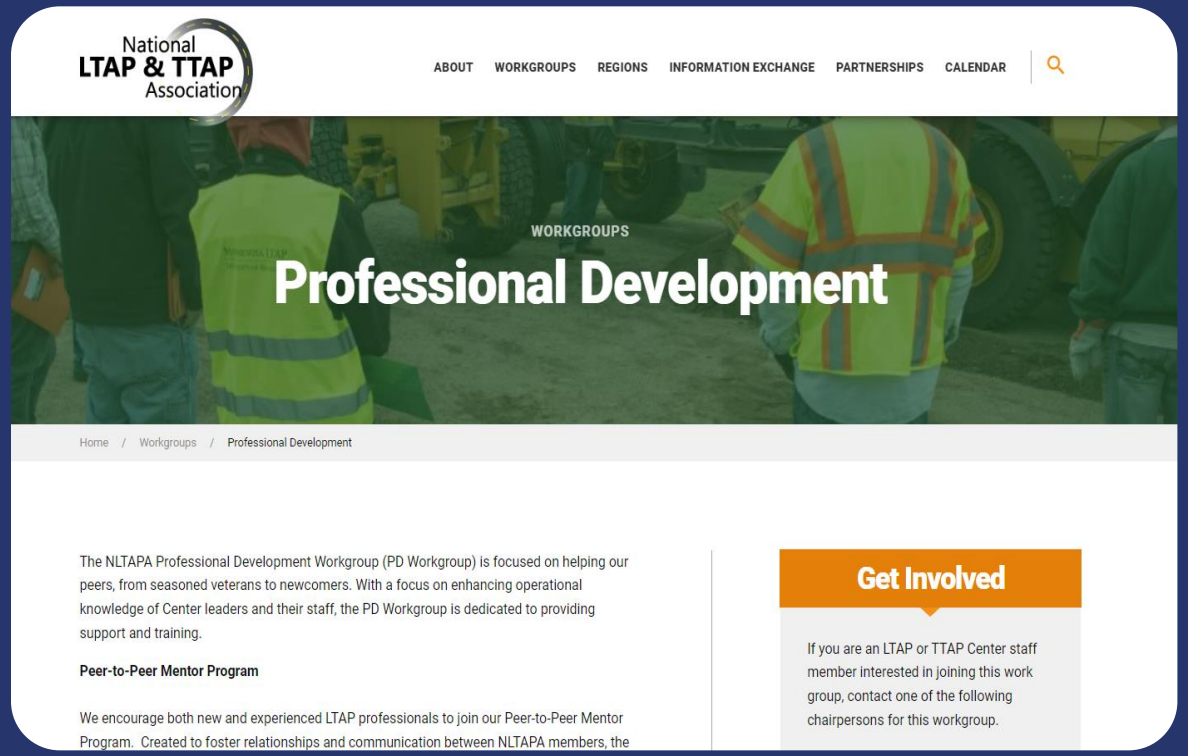
- The Partnership Work Group develops, nurtures, and evaluates national NLTAPA strategic partnerships that benefit member centers. Shares best practices of ways centers are working with national partners and their state affiliates.



NLTAPA Workgroups

Professional Development

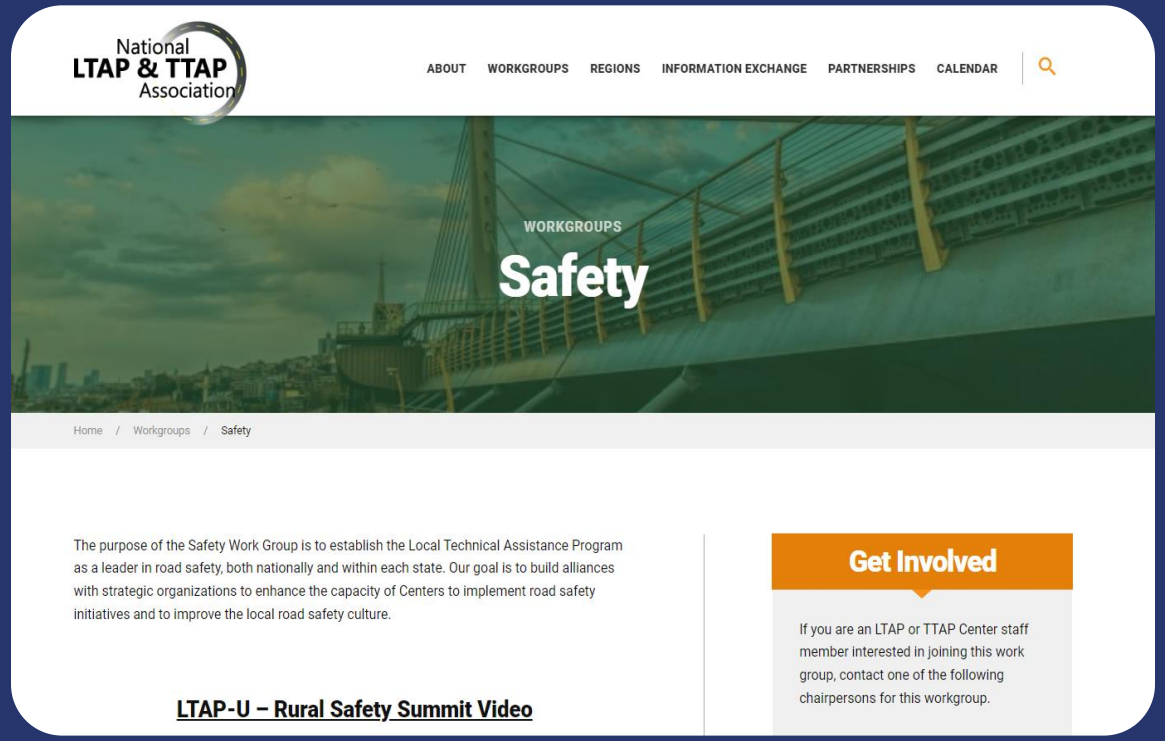
- The NLTAPA Professional Development Workgroup (PD Workgroup) is focused on helping our peers, from seasoned veterans to newcomers. With a focus on enhancing operational knowledge of Center leaders and their staff, the PD Workgroup is dedicated to providing support and training.



NLTAPA Workgroups

Safety

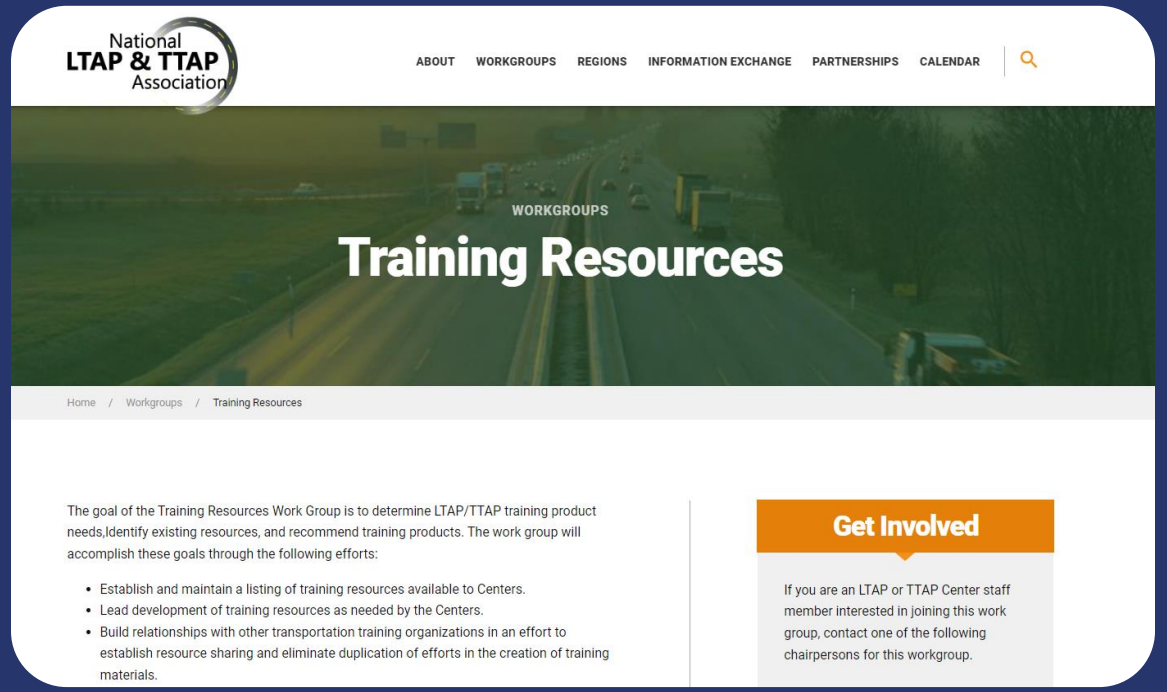
- The purpose of the Safety Work Group is to establish the Local Technical Assistance Program as a leader in road safety, both nationally and within each state.



NLTAPA Workgroups

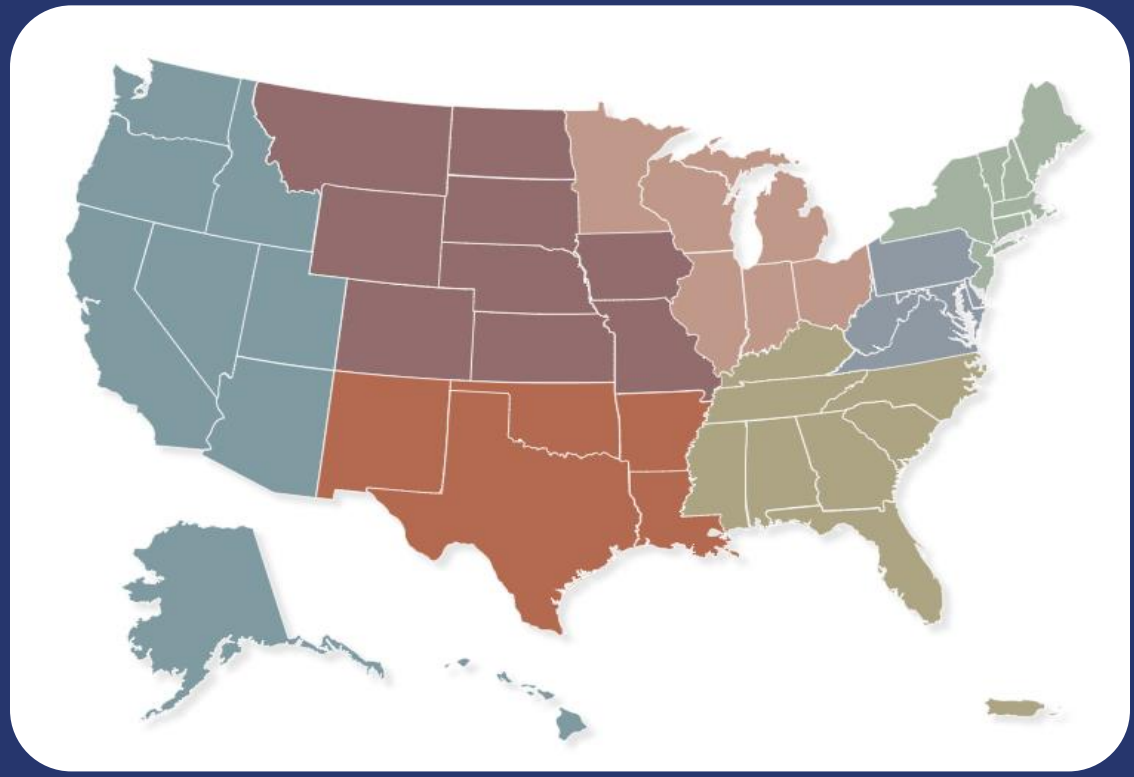
Training Resources

- The goal of the Training Resources Work Group is to determine LTAP/TTAP training product needs,Identify existing resources, and recommend training products.



NLTAPA Regions

- Great Lakes
- Mid-Atlantic
- North Central
- Northeast
- South Central
- Southeast



https://nltapa.org/regions/

LTAP CENTERS BY REGION

Eastern Tribal Technical		
Serving Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia and Wisconsin.		
Mountain West Tribal	Western Tribal	Plains Tribal
Serving Arizona, Colorado, New Mexico and Utah.	Serving California and Nevada.	Serving Montana, Wyoming and the Dakotas.
Alaska Tribal	Northwest Tribal	Southern Plains Tribal
Serving Alaska.	Serving Idaho, Montana (Western), Oregon and Washington.	Serving Kansas, Nebraska (Southern), Oklahoma and Texas.
Hawaii Local Technical Assistance Program		
Serving Hawaii.		

LTAP Innovations and Resources

How can the LTAP/TTAP assist…

…in surface transportation needs of territories in a safe and cost effective manner?

LTAP Innovations and Resources

INNOVATIONS

- Oversight of EDC and STIC Programs
- Pertinent to Pacific and Atlantic islands, territories and coastal zones (i.e. Hawaii, Guam, US Virgin Islands)
- Climate Change Technology
- Road Safety
- Drone Usage and Applications

RESOURCES

- International Journal of Natural Disasters, Accidents and Civil Infrastructure
- Coastal Resilience Center (CRC) Partnership
- Summits, Fact Sheets and Expert Talks
- Transportation Research Board (TRB)

Innovations and Technologies for Islands, Territories and Coastal Zones

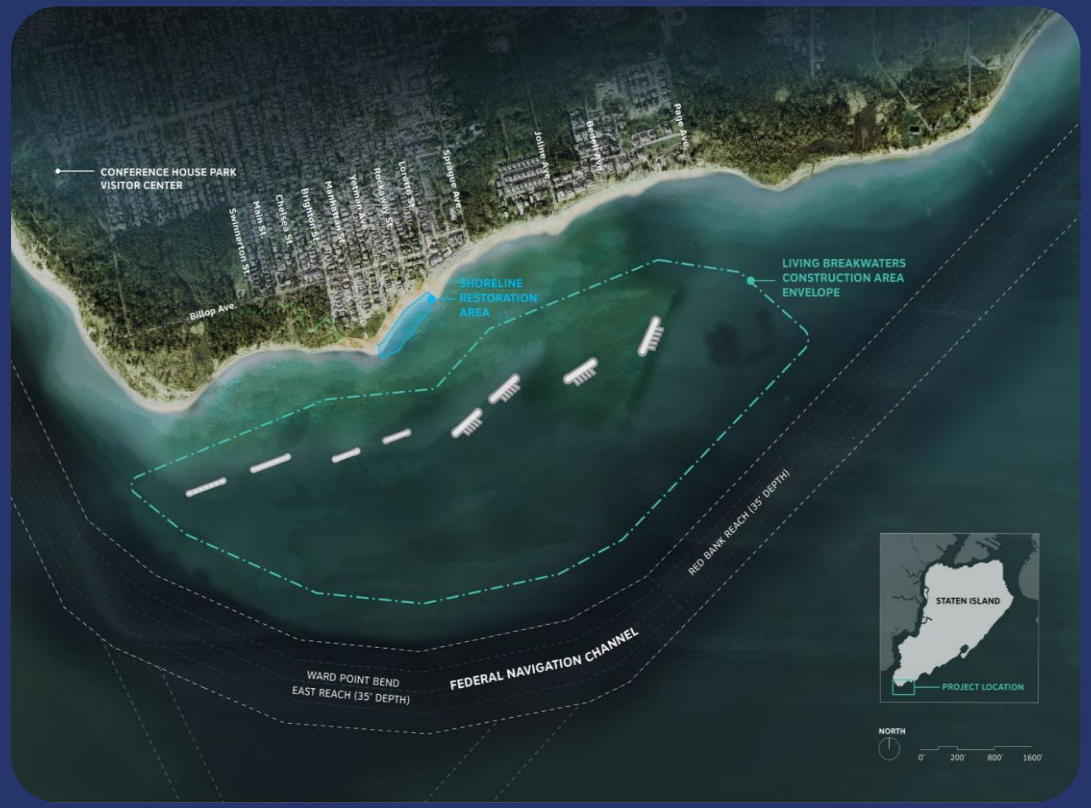
"There is a growing need to protect shorelines from coastal flooding due to the rapid sea-level rise and the increase in billion-dollar coastal storm disasters." (Palinkas et al., 2022)

http://www.coastalwiki.org/wiki/Extreme_storms

Innovations and Technologies for Islands, Territories and Coastal Zones

Living Breakwaters - New York Harbor

- This project consists of approximately 2,500 linear feet of nearshore breakwaters located 1,800 feet from shore.
- The project addresses both event-based and long-term shoreline erosion to improve safety and prevent damage to buildings and infrastructure.
- https://www.youtube.com/watch?v=BOlrW4A6XlE



https://stormrecovery.ny.gov/living-breakwaters-tottenville

Innovations and Technologies for Islands, Territories and Coastal Zones

Living Breakwaters - New York Harbor

- The breakwaters are designed to reduce the height of wind-driven waves reaching buildings and roads to less than 3 ft during a 100-year storm event with up to 18 inch of sea-level rise.

https://cyprus-mail.com/2016/09/25/breakwaters-answer-coastal-erosion/

Innovations and Technologies for Islands, Territories and Coastal Zones

Coastal Texas Protection and Restoration Project - Gulf of Mexico

- This project aims to minimize economic damage from coastal storm surge, inland and Gulf shoreline erosion, and restore threatened and endangered critical habitats hydrology to key lagoons.

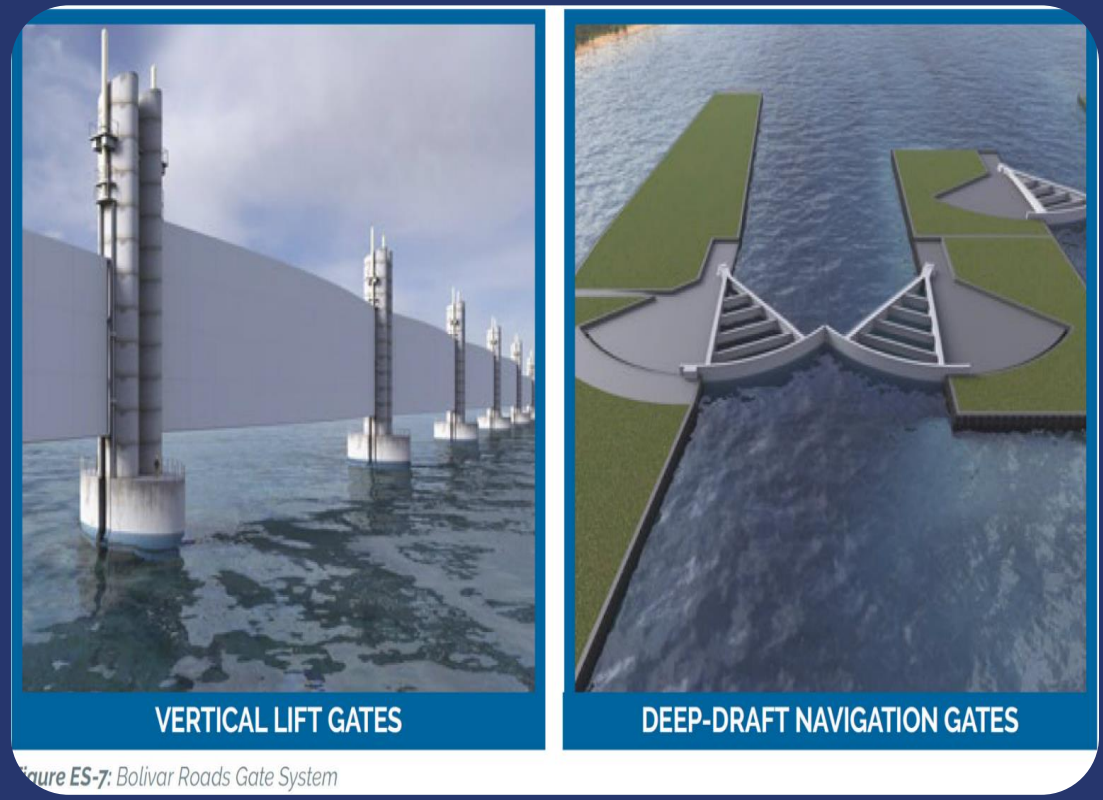
- Improves the resilience for residents, industries, and ecosystems in the Houston - Galveston region.

https://www.swg.usace.army.mil/Portals/26/docs/Planning/Public%20Notices-Civil%20Works/2020%20Coastal%20DIFR%20and%20dEIS/Coastal%20TX%20Executive%20Summary_20201019.pdf?ver=9fE_s4Hla4njYurhqiCYHQ%3D%3D

Innovations and Technologies for Islands, Territories and Coastal Zones

Coastal Texas Protection and Restoration Project - Gulf of Mexico

- It includes a 2.8-mile long gated surge barrier system across the Galveston Bay entrance
- Improvements to the existing Galveston Seawall
- 43 miles of beach and dune systems on Galveston Island
- Additional non structural improvements on the mainland including floodproofing and raising of at-risk structures.



igure ES-7: Bolivar Roads Gate System

https://stormwater.wef.org/2020/11/usace-floats-26-billion-plan-to-flood-proof-texas-coastline/

Climate Change Technology

Use of Recycled Tire Rubber in Asphalt Pavements

- Recycling of rubber from waste tires into asphalt pavements is an attractive alternative addressing engineering, economic and environmental issues.

- Almost the entire amount of original rubber from a waste tires is discarded, which necessitates a very long time for natural degradation.

https://phys.org/news/2020-12-finding-new-uses-for-waste.html

Climate Change Technology

Use of Recycled Tire Rubber in Asphalt Pavements

- Disposal of waste polymers is a serious environmental concern as polymeric materials do not decompose easily.

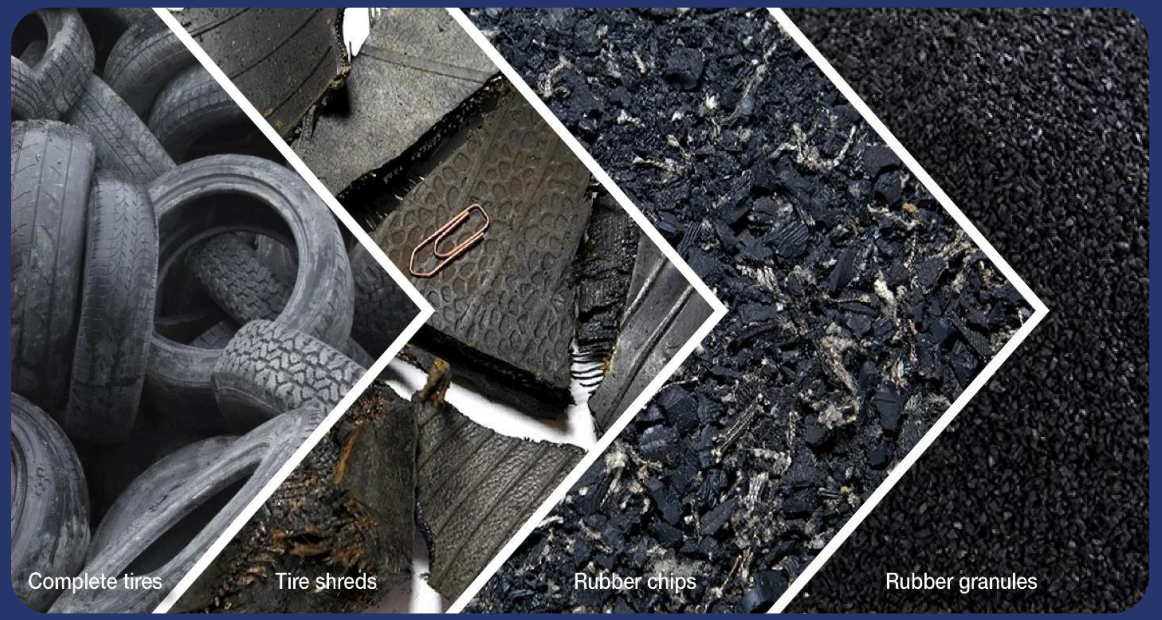
- This poses two major challenges: waste of valuable rubber and environmental pollution due to disposal of waste tires.

https://www.tirereview.com/importance-tire-recycling/

Climate Change Technology

Use of Recycled Tire Rubber in Asphalt Pavements

- Addition of ground tire rubber (GTR) to asphalt binder and mixture is an accepted asphalt mixture practice in asphalt production and consumes about 12 percent of the total GTR market today.



https://www.bioenergyconsult.com/what-is-tire-recycling/

Climate Change Technology

Use of Recycled Tire Rubber in Asphalt Pavements

- Modification of asphalt binders with GTR can provide high performance pavements that aid in reduction of the number of waste tires disposed of in landfills and elsewhere.

https://www.uniquepavingmaterials.com/what-are-the-uses-of-asphalt/

Road Safety Innovations

Implementation of Change from Traffic Light Intersections to Roundabouts

- Roundabouts are increasingly becoming more popular due to the benefits that they provide.

- These benefits include dramatic reductions in serious injury and fatality crashes as well as reductions in delay for road users.

https://www.fdot.gov/agencyresources/roundabouts/benefits.shtm

Road Safety Innovations

Safety and Time Saving Statistics

- 90% fewer fatalities and 75% fewer injuries
- 10%-40% fewer pedestrian/bicycle crashes
- Safer for beginner and elderly drivers
- 30%-50% increase in traffic capacity at intersections and less delay waiting at stops and signals

https://www.fdot.gov/agencyresources/roundabouts/benefits.shtm

Road Safety Innovations

Environmental and Cost Effectivity Statistics

- Reduce pollution (from cars not waiting at stops), noise and fuel consumption.
- Roundabouts can be landscaped with native plants and trees.
- No cost from traffic signal maintenance.
- Roundabouts still operate in power outages, eliminating the need for police to direct traffic.

https://www.fdot.gov/agencyresources/roundabouts/benefits.shtm

NextGen TIM

- Traffic Incident Management (TIM) has become the national standard of practice for law enforcement, fire, EMS, transportation, and towing response to roadway incidents.
- TIM has been shown to be an effective way to improve responder and motorist safety and reduce secondary crashes.

https://fasny.com/magazine_articles/the-tim-perspective-seeing-traffic-incident-management-through-the-eyes-of-others/

NextGen TIM

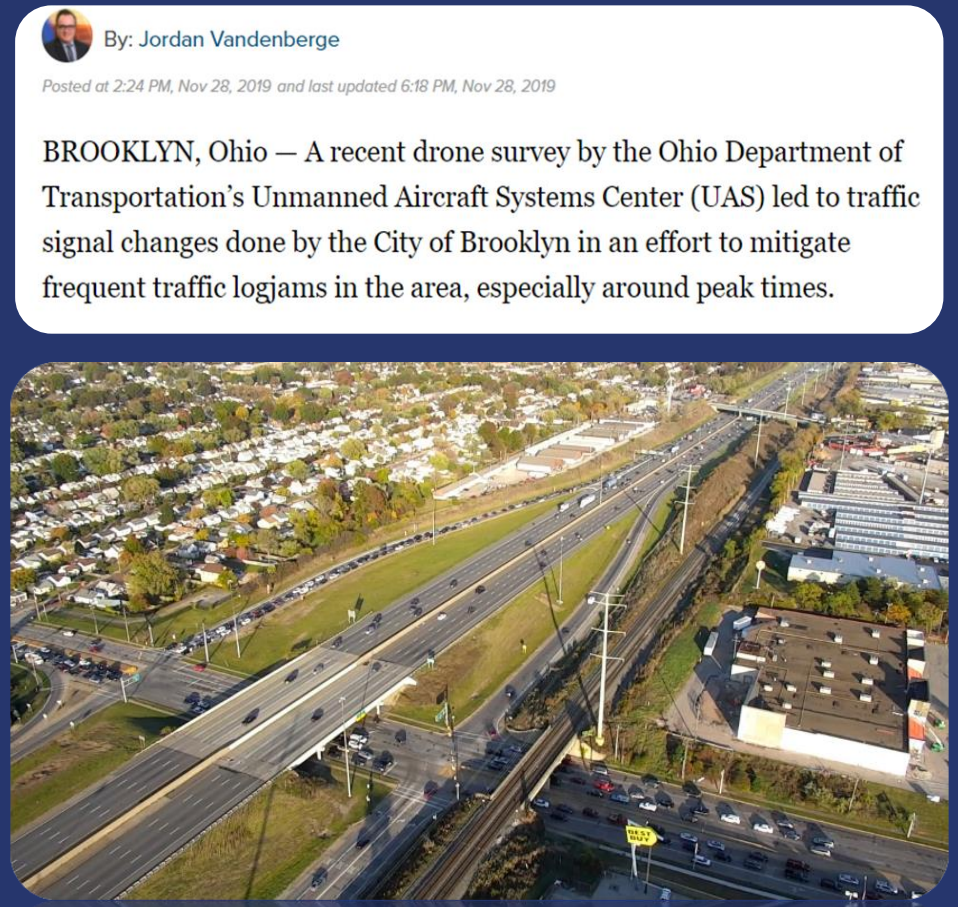
- NextGen TIM technologies such as Unmanned Aerial Systems (UAS), are low-cost solutions that will save lives, reduce incident response times, and improve travel reliability.

- The Washington State Patrol found that roads were cleared 80% faster when using UAS as opposed to other methods form mapping serious crash scenes.

https://medium.com/@droni_tech/

Drone Usage and Applications in Transportation Activities

- Aerial Photography/GIS
- Exterior/interior inspection
- Construction Monitoring
- Traffic Monitoring
- Natural Disaster/Emergency Management
- Communications/Promotional Videos
- Structure/Facility Inspections



By: Jordan Vandenberge

Posted at 2:24 PM, Nov 28, 2019 and last updated 6:18 PM, Nov 28, 2019

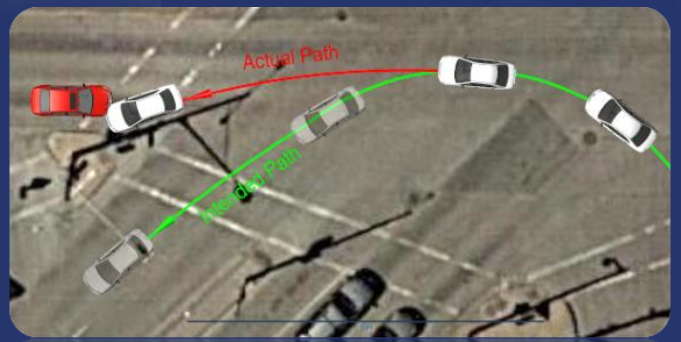
BROOKLYN, Ohio — A recent drone survey by the Ohio Department of Transportation's Unmanned Aircraft Systems Center (UAS) led to traffic signal changes done by the City of Brooklyn in an effort to mitigate frequent traffic logjams in the area, especially around peak times.

Drone Usage and Applications in Transportation Activities

Traffic crash documentation or reconstruction

https://i0.wp.com/www.suasnews.com/

https://www.heliguy.com/blog/.png



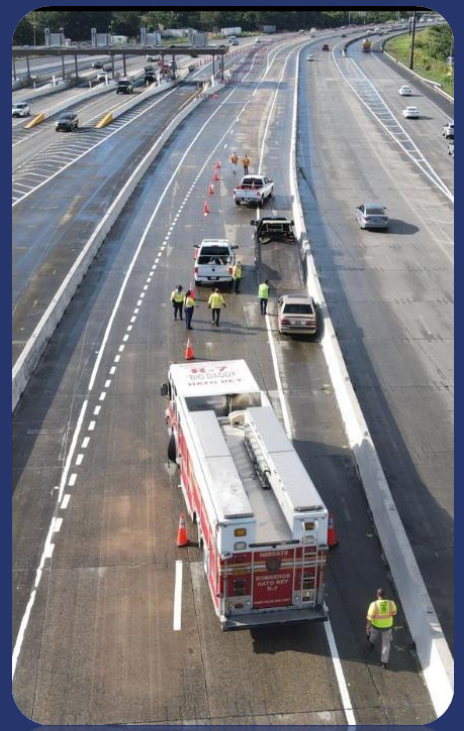
http://crashdataservices.net/.jpg

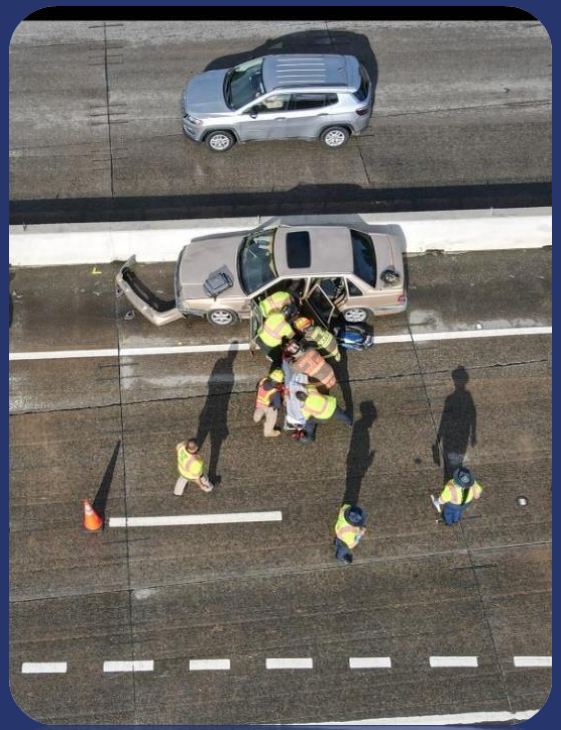
Drone Usage and Applications in Transportation Activities

Applications of drones in Puerto Rico - UAS technology as a tool to determine Hurricane María debris volumes in the municipality of Bayamón

Drone Usage and Applications in Transportation Activities

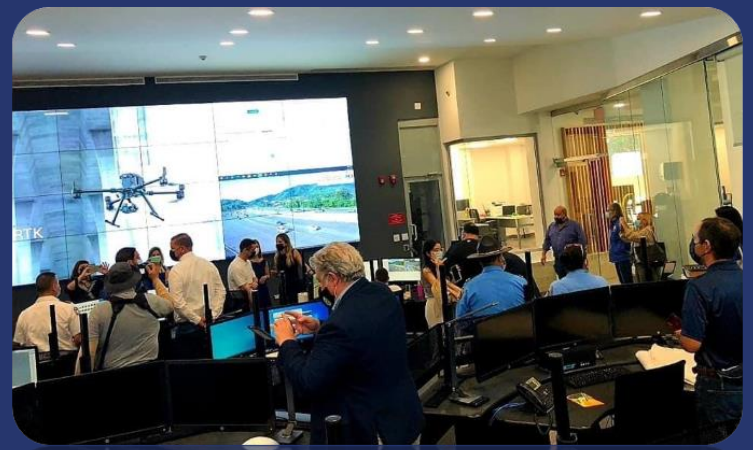
Traffic Incident Management





Drone Usage and Applications in Transportation Activities

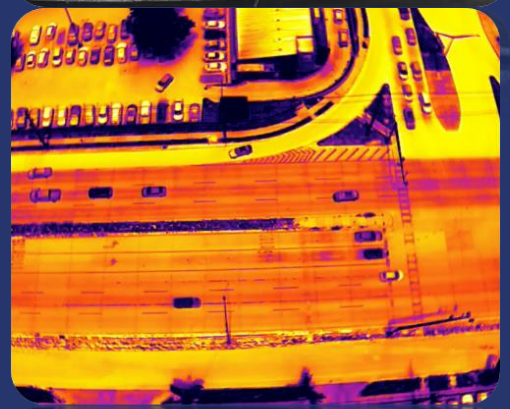
Traffic Incident Management (cont.)



Drone Usage and Applications in Transportation Activities

Thermal Filters in Drones

Black Hot



Iron Red

White Hot

Fulgurite

Drone Pricing Categories

Low-cost Drones & Toy Drones

- Drone cost: up to $200.00
- Expected Features: Ready-to-fly, comes with transmitter and controller
- Short battery life (5-10 minutes)
- Some examples: DJI Tello, JJRC X5 Epik, Syma X500

- Drone cost: $200.00-$500.00
- Expected Features: Ready-to-fly, full kits, advanced camera stability, longer battery life, GPS positioning
- Some examples: DJI Mavic Mini, FunSnap DIVA, Hubsan Zino 2

Entry-Level Camera and Racing Drones

Drone Pricing Categories

Mid-Range Consumer Drones

- Drone cost: $500.00-$1000.00
- Expected features: Improved optics and speed, cutting-edge software, better automation
- Some examples: DJI Mavic Air 2, Parrot Anafi FPV, DJI Air 2S, Parrot Anafi Work

- Drone cost: $1000.00-$2000.00
- Expected features: Larger sizes, DIY drones, improved camera quality
- Some examples: DJI Mavic 2 Pro, DJI Inspire

High-End Consumer Drones

Drone Pricing Categories

Professional Camera Drones

- Drone cost: $2000.00 and up
- Expected features: Made to suit professional camera setups
- Some Examples: DJI Inspire 2, Freefly Alta 8 Pro, Aurelia X8 Standard, xFold Cinema X12 U7

PRLTAP-T^2 Resources

1. **International Journal of Natural Disasters, Accidents and Civil Infrastructure**

- The scope of this publication covers engineering systems that provide support and help in the design of civil infrastructure, and to the natural disasters and accidents caused by human which may affect the infrastructure.

https://www.scipedia.com/sj/ridnaic

PRLTAP-T^2 Resources

2. Coastal Resilience Center Partnership

- The Coastal Resilience Center (CRC) conducts research and education to enhance the resilience of the nation's people, infrastructure, economies, and the natural environment, to the impacts of coastal hazards such as floods and hurricanes.

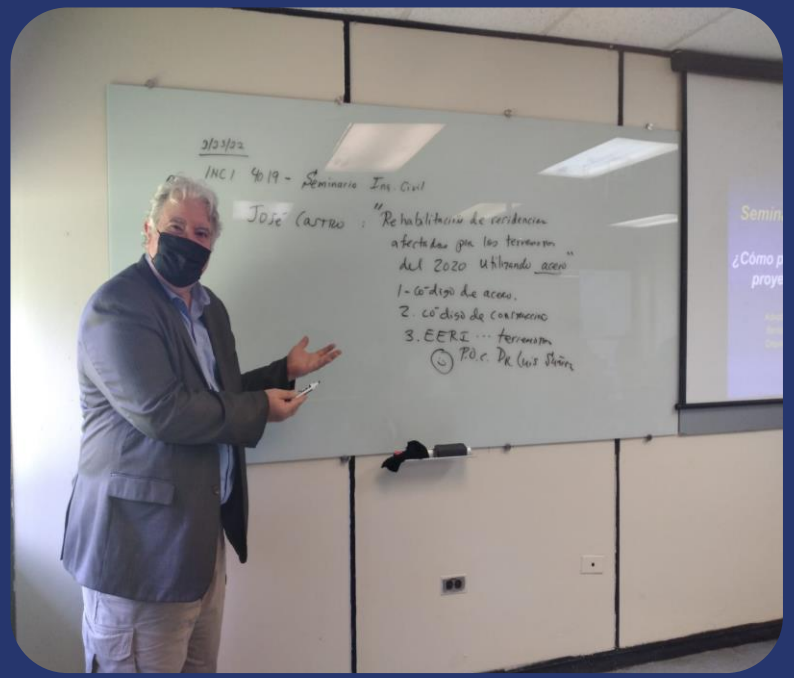
https://www.uprm.edu/inci/crc/

PRLTAP-T^2 Resources

3. Summits

4. Fact Sheets

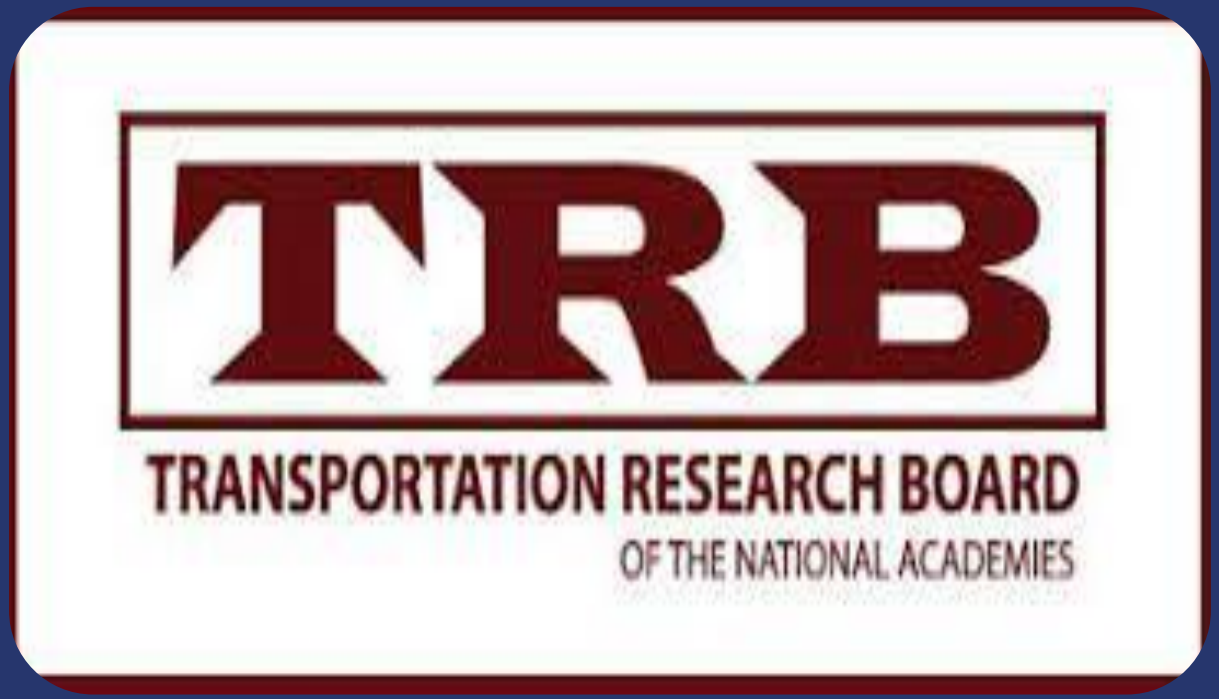
5. Expert Talks



PRLTAP-T^2 Resources

6. Transportation Research Board (TRB)

- Provides leadership in transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation.



https://www.nationalacademies.org/trb/transportation-research-board

References/Online Resources

1. Buckingham K., and J. Torossian. 2021. “Nature-Based Solutions for Coastal Highway Resilience.” FHWA-HRT-22-001. *Public Roads* 85,no. 3: 9-13. https://highways.dot.gov/public-roads/autumn-2021/02

1. FHWA. 2014a. *Highways in the Coastal Environment: Assessing Extreme Events.* Report No. FHWA_NHI-14-006. Washington, DC: Federal Highway Administration

1. FHWA. 2014b. *Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events.* Order No. 5520. Washington, DC: Federal Highway Administration. https://www.fhwa.dot.gov/legsregs/directives/orders/5520.cfm

1. FHWA. 2015. *FHWA Synthesis of Approaches for Addressing Resilience in Project Development.* Report No. FHWA-HEP-17-082. Washington, DC: Federal Highway Administration.

References/Online Resources

5. FHWA. 2019. “Sustainability: Resilience” (web page) https://www.fhwa.dot.gov/environment/sustainability/resilience/

6. FHWA. 2020. “Sustainability: Transportation Engineering Approaches to Climate Resiliency (TEACR) Study (web page) https://www.fhwa.dot.gov/environment/sustainability/resilience/ongoing_and_current_research/teacr/

7. FHWA. 2021b. “Sustainability: Tools”(web page). https://www.fhwa.dot.gov/environment/sustainability/resilience/tools/

8. FHWA. 2021c. “Sustainability: Resilience Pilots” (web page). https://www.fhwa.dot.gov/environment/sustainability/resilience/pilots/

References/Online Resources

FHWA-NHI Courses

1. FHWA-NHI-142085. 2023. “Addressing Climate Resilience in Highway Project Development and Preliminary Design” (web page). https://www.nhi.fhwa.dot.gov/course-search?tab=0&key=resilience&sf=0&course_no=142085/

1. FHWA-NHI-142081. 2023. “Understanding Past, Current and Future Climate Conditions” (web page). https://www.nhi.fhwa.dot.gov/course-search?tab=0&key=climate%20change&sf=0&course_no=142081

1. FHWA-NHI-380109. 2023. “Innovative Intersections and Interchanges” (web page). https://www.nhi.fhwa.dot.gov/course-search?tab=0&key=innovations&sf=0&course_no=380109


Thank you!