

**North Dakota State University
Upper Great Plains Transportation Institute
Agency 627
Denver Tolliver, Director**

2023-2025 Biennial Budget Request

**Presented to:
The Senate Appropriations Committee**

March 2, 2023

***Upper Great Plains Transportation Institute
Programs, Centers, and Focus Areas***

- | | |
|-------------------------------------|------------------------------------|
| ▪ Advanced Traffic Analysis | ▪ DOT Support Center |
| ▪ ND Local Technical Assistance | ▪ Tribal Technical Assistance |
| ▪ Western ND Transportation Liaison | ▪ Commercial Vehicle Safety |
| ▪ Small Urban & Rural Mobility | ▪ Transportation Safety & Security |
| ▪ Road & Bridge Needs Assessment | ▪ Agricultural Freight |
| ▪ Mountain-Plains Consortium | ▪ Transportation Learning Network |
| ▪ Advanced Technologies | ▪ Grade Crossing Safety |
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Upper Great Plains Transportation Institute Advisory Council

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| ▪ Aeronautics Commission | ▪ Grain Growers Association |
| ▪ Associated General Contractors of ND | ▪ League of Cities |
| ▪ Association of Counties | ▪ Lignite Energy Council |
| ▪ Greater ND Chamber | ▪ Motor Carriers Association |
| ▪ Corn Council | ▪ Public Service Commission |
| ▪ Department of Agriculture | ▪ Wheat Commission |
| ▪ Department of Commerce | ▪ Member of Dakota Transit Association |
| ▪ Department of Transportation | ▪ Representative of manufacturing sector |
| ▪ Farmers Union | ▪ Representative of railway industry |
| ▪ Grain Dealers Association | |
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Background Agency Information

Legislative Directives and Purpose
N.D.C.C
54-53-03

The Upper Great Plains Transportation Institute’s purpose is to “conduct and supervise research in the field of transportation and logistics in order to facilitate acquisition of a wider knowledge and understanding of marketing factors associated with the geographical location of the state of North Dakota and the upper great plains in the field of transportation and their influence on the socioeconomic systems of the state, region, and country.” UGPTI’s research areas “must include the study of commodity and other freight movements into and out of the state in order to better know and understand the various factors affecting the marketing of area products and services (N.D.C.C 54-53-03).”

Advisory Council
N.D.C.C
54-53-02

The Legislature established a transportation council to serve in an advisory capacity and “consult with the Institute in matters of policy affecting the administration of this chapter and in the development of transportation in the state of North Dakota.” The council shall elect its own chairman and the Director of the Institute shall serve as the executive secretary of the council.

Administration
N.D.C.C
54-53-01

The Institute must be administered by and in conjunction with the North Dakota State University of Agriculture and Applied Science. The president and administration of the North Dakota State University are responsible for the selection of personnel for and the administration of the Institute.

Major Accomplishments in Current Biennium

Biennial Road & Bridge Needs Assessment

With its general fund appropriation, UGPTI conducted its biennial analysis of county, township, and tribal road investment needs in the state. The study included 71,808 miles of road, including 5,843 miles of paved county road and 56,656 miles of gravel road. UGPTI staff and student employees counted and classified vehicles at 424 locations on county, township, and tribal roads throughout the state, recording the total number of vehicles per day at each site, as well as the number of trucks, by size category. When combined with NDDOT traffic counts on county roads, UGPTI’s traffic data provide a comprehensive picture of traffic around the state. In addition to the traffic counts, UGPTI analyzed the surface conditions of more than 2,750 miles of paved county road, collecting ride quality data in a cost-effective manner using sensors and special smart phones apps to measure road roughness and video images to assess road conditions (e.g., cracking) and develop composite ride scores. A survey was administered to each county to determine blading and gaveling practices, the sources and costs of gravel, and other cost factors needed for the unpaved portion of the road analysis. All 53 counties responded to the survey. The current conditions of 2,336 bridges on county roads were assessed during the biennium. The results are summarized below.

County, Township, & Tribal Road & Bridge Investment Needs Estimates (Millions)

Time Period	Unpaved Roads	Paved Roads	Bridges	All
Twenty Years	\$6,545.66	\$3,248.80	\$715.57	\$10,510.01
Current Biennium	\$660.35	\$557.10	\$139.42	\$1,356.87
Avg. Biennial	\$654.57	\$324.88	\$71.56	\$1,051.00

*Road &
Bridge
Asset
Management*

With its general fund appropriation, UGPTI is improving the Geographic Roadway Inventory Tool (GRIT), which stores and displays information on road surface type, current condition, shoulder width, subgrade strength, and other design features, as well as traffic, construction history, and improvement plans. A pavement condition forecasting procedure is included in GRIT that allows counties to project conditions of roads for up to 35 years. Recent enhancements include the incorporation of emergency-related projects such as flooding (so the public can see where roads are closed), a load restriction web-map linked to the NDDOT's Traveler Information Map that allows truckers to view state and local road restrictions on one web-based map, and an inventory and map of bridges and minor structures.

*Tribal
Technical
Assistance
Program
Center*

UGPTI was selected by Federal Highway Administration as the home of the Northern Region TTAP Center, with funding of \$300,000 per year with potential options for additional funding. TTAP Vision: to enhance the quality of life in Tribal communities by building capacity for Tribes to administer and manage their transportation programs and systems. The mission is to "serve as a go-to local resource for Tribal transportation training, technical assistance, and technology transfer needs and opportunities. The awarding of this center is a recognition of UGPTI's past and on-going efforts and a great tool for leveraging partnerships and resources.

One-Time Funding

*Funding
Amount
and
Source*

The Legislature provided UGPTI with \$225,000 in one-time funding from the strategic investment and improvements fund to be matched by at least that amount in federal funds. The funds have been used as match for \$336,000 in Federal grant funds (which require a dollar-for-dollar match). The federal funding extends through the end of Federal FY 2023. Two on-going project reports will be completed by then.

*Remote
Sensing
using
Drones
and AI*

These research results will inform stakeholders about appropriate types of drone and sensor payloads, as a function of the types of transportation assets being inspected. The research will describe the downstream data processing and model building required using artificial intelligence. The findings will support broad initiatives within North Dakota to expand remote sensing applications that can utilize the statewide deployment of a beyond visual line of sight (BVLOS) network.

*Autonomous
Aircraft
Logistics*

Technological advancements in energy storage, capacity, computing, communications, and lightweight structural materials promise to reduce the cost, size, noise, and risks of drone vehicle operations, making them potentially competitive with trucks for certain movements. This research will develop a better understanding of the opportunities that may exist for companies in the regions and challenges to deployment, including how drone deliveries fit into the overall logistics process.

Audits

A team from the Office of the State Auditor audited UGPTI's financial transactions and expenditures for the biennium that ended June 30, 2021. The audit did not identify any areas of concern. This was the only audit of UGPTI during the biennium.

UGPTI Funding Sources

Special Funds

UGPTI does not operate facilities or assess fees that generate revenue on a continuous basis. Rather, UGPTI's special funds appropriation request represents the authority to collect grants and contracts from state and local agencies and private industries. Most of UGPTI's special funds originate from the North Dakota Department of Transportation under a strategic agency partnership that has benefited North Dakota for the last four decades. The ND Wheat Commission and several metropolitan planning organizations (MPOs) are the other regular providers of grant funding in addition to the NDDOT. There is uncertainty in the levels of these grants and contracts that will be received during any biennium.

Federal Funds

The federal fund request represents a ceiling for UGPTI's federal grant collections. It is the agency's best projection of the authority needed to procure all grants that may become available during the biennium. The vast majority originates from the U.S. Department of Transportation (U.S. DOT), including grants from the Office of the Secretary, Federal Highway Administration, Federal Transit Administration, Federal Motor Carrier Safety Administration, and the National Highway Traffic and Safety Administration. Some grants (such as the University Transportation Center grant) are provided directly to UGPTI by federal agencies. In other cases, the funds are "federal source funds" provided by third parties through the federal procurement process. Although federal funds are important to UGPTI's budget, they have pre-determined uses. Ultimately, UGPTI has limited discretion in determining which critical issues are researched with federal funds. Federal research funds (although very important) are not a substitute for state research dollars.

General Funds

Although state general funds comprise a minor portion of UGPTI's overall budget, they are essential to the agency's success and sustainability. State general funds are needed to match federal grants and provide continuity in times of delay or disruption in federal funding. Many of UGPTI's direct grants (such as the University Transportation Centers grant) require a 100% match of non-federal source funds. UGPTI's general funds are the only dependable source of match for these funds. Moreover, general funds are the only hard dollars in UGPTI's budget. Federal and special funds are provided at the discretion of intermediate agencies and third parties and are subject to the budget limits placed on these agencies.

UGPTI Budget Requests

As shown in Table 1, the House increased UGPTI's general fund budget from \$4,485,607 to \$5,427,961. UGPTI's federal and special fund appropriations (which are shown as estimated income) were also increased in HB 1020. UGPTI's full-time equivalent positions have not been adjusted for the last several biennia and remain at 43.88 FTE.

Table 1. Budget Request as Approved by the House of Representatives

Item	Base Level	Enhancements	Appropriation
Total all funds	\$23,527,957	\$2,000,375	\$25,528,332
Less estimated income	\$19,042,350	\$1,058,021	\$20,100,371
Total general fund	\$4,485,607	\$942,354	\$5,427,961
Full-time equivalent positions	43.88	0	43.88

As shown in Table 2, UGPTI’s base-level general fund appropriation was increased by a total of \$543,904 by the House of Representatives. Of this total, \$243,904 are targeted for salary and benefit increases. The remaining \$300,000 are meant for a new freight transportation and logistics program, which is described below.

Table 2. Adjustments to Appropriations in HB 1020

Item	Base Level	One-Time
Salary & Benefit Increases	\$243,904	
Freight Transportation & Logistics Program	\$300,000	
Multimodal CO2 Transportation Study	\$0	\$398,450
Total Adjustments	\$543,904	\$398,450
<i>Source</i>	General Funds	Special Funds

In addition to the \$543,904 increase in base funding, the House of Representatives appropriated \$398,450 of one-time funding for a Multimodal CO₂ Transportation Study, which is also described below. The increase of \$1,058,021 in estimated income shown in Table 1 includes \$423,600 in one-time special funds that would be allocated from the Strategic Investment and Improvements Fund to establish a Transportation Data Intelligence Center. The remainder of the \$1,058,021 enhancement in estimated income consists of authorizations to collect additional grant and contract funds to cover the portion of the salary and benefit package that is not funded from general funds.

Transportation Data Intelligence Center

Request

This request, which was included in the Executive Recommendation and approved by the North Dakota Board of Higher Education and UGPTI’s Advisory Council, is for \$432,600 of one-time funding to repurpose and equip a room in the Quentin Burdick Building at North Dakota State University to receive, process, archive, and analyze data from field sensors, vehicles, and many other sources. The Transportation Data Intelligence Center will enable UGPTI to perform advanced data analytics, develop artificial intelligence solutions and tools, contribute timely transportation information to travelers and service providers, and train students in artificial intelligence and automation.

Benefits to the State

This one-time investment will support the deployment of advanced transportation technologies that enable safe and efficient travel, as well as facilitate future research which will benefit the State for years to come. The programs made possible by this one-time investment will enable data-driven transportation decision-making through the availability of timely information

and online tools and it will enhance UGPTI's capability to compete for federal grants in the field of advanced transportation technologies, partner with private entities, and support the training of future workers in artificial intelligence and advanced transportation technologies

*Functions
and
Roles*

The Transportation Data Intelligence Center will receive data from a variety of field sensors (e.g., roadway environmental sensors, traffic counters, vehicles classification sites, speed, and weigh-in-motion sensors), cameras, UAVs, and (ultimately) vehicles; process, temporarily store, and archive the data; mine and analyze the data using machine and deep learning algorithms written specifically for the tasks; provide near real-time data feeds of road and traffic conditions; and consolidate and analyze the field data needed for roadway and bridge asset management. The Center will support State initiatives such as the Transportation Management Center, as well as the deployment of advanced technologies (such as connected vehicle technologies).

Details

Specifically, the funding will be used to repurpose and equip a room in the Quentin Burdick Building, including remodeling expenses, computer workstations for staff and students, monitors to display field and traffic data, mini supercomputer to process large incoming data streams and run computationally intensive data mining and machine learning algorithms, servers to store and archive large data streams, and supporting telecom equipment.

Freight Transportation & Logistics Biennial Surveys and Reports

*Background
and Needs*

North Dakota's economy is dependent on freight transportation and logistics services. Transportation and supply-chain bottlenecks and breakdowns have major impacts on producers and industries. The Legislature and State agencies need comprehensive and current information to monitor rapidly changing industry activity levels and logistics patterns and identify trends, issues, and needs in a proactive manner. UGPTI currently analyzes and publishes shipment data from elevators to markets. However, this report covers only a portion of the supply chain and does not include information on farm-to-elevator, farm-to-processing plant, and elevator-to-processing plant movements or manufactured goods.

*Benefits
to the
State*

If this request is funded, UGPTI will conduct surveys and publish reports each biennium about the transportation patterns and needs of agricultural processors, shipments from farms to elevators, inbound and outbound shipments to and from manufacturing plants by mode and shipment type (as well as assessments of the quality of transportation services provided), and information on commercial trucking in North Dakota, including the sizes of firms, the commodities hauled, the types of equipment used, equipment ages and utilization rates, fuel consumption rates, and other information. In addition to this detailed information, the reports will include assessments of the transportation challenges and needs facing each sector. The reports will provide the Departments of Transportation, Agriculture, and Commerce (and other agencies) with critical planning information.

Details of Request

This request (which was initially for \$408,134 in base funding) was approved by the North Dakota Board of Higher Education and UGPTI's Advisory Council. However, it was not included in the Executive Recommendation. The House of Representatives decided to fund the program, but not at the level initially requested, reducing the funding level to \$300,000. This funding level will allow for the establishment of the program and for most of the surveys and reports to be undertaken.

UGPTI's Role and Statutory Responsibility

UGPTI is the ideal agency for this effort, as UGPTI can: (1) offer individuals and companies confidentiality of the raw data they provide, (2) combine the data collected by the new surveys with existing data to provide a comprehensive picture of freight transportation and logistics in the State, and (3) serve State agencies and the Legislature by providing them with tailored reports and information each biennium. The request will allow UGPTI to better fulfil its statutory responsibilities to study "commodity and other freight movements into and out of the state in order to better know and understand the various factors affecting the marketing of area products and services."

Multimodal Transportation System for Captured Carbon Dioxide

Public Interest

As stated in N.D.C.C. 38-22-1, "it is in the public interest to promote the geologic storage of carbon dioxide. Doing so will benefit the state and the global environment by reducing greenhouse gas emissions." Governor Burgum's vision is for North Dakota to lead the nation in carbon capture, utilization, and storage (CCUS) and achieve carbon neutrality by 2030. CO₂ has many industrial uses—including enhanced oil recovery—that could spur economic growth and productivity in the state.

Need for Transportation Study

North Dakota has the capacity to safely store much of the nation's carbon dioxide output for years to come. However, leading the nation in CCUS (while meeting the demands of industry for carbon dioxide) will require the movement of substantial quantities of CO₂ into the state. Many miles of new pipeline will be needed, not only in North Dakota but in the surrounding region. Other modes of transportation (especially railroads) will also be needed to move CO₂ into North Dakota from dispersed sources and serve CO₂ hubs and sequestration centers in the State. In many respects, a strategic CO₂ transportation plan is needed to support the State's vision,

Need for Multimodal Options

Pipelines can best serve large installations connected by a trunk-line network. However, many potential sources of CO₂ are not served by pipeline, and it is not economically feasible to connect all CO₂ generators to a trunk pipeline network. Most of these facilities, however, are already being served by rail. According to the Association of American Railroads (AAR), about 12,000 shipments of CO₂ are transported by railroads in the United States each year in specially designed tank cars. According to AAR, "railroads are interested in working with the Department of Energy to explore opportunities to transport captured carbon dioxide." Because the railroad network is already in place, the acquisition of

new right-of-way across farmland and the exercise of eminent domain would not be needed to start transporting CO₂.

*Study
Plan*

A strategic vision for a multimodal CO₂ transportation system that includes pipeline, railroad, and local delivery options is needed. The purpose of this one-time funding request is to conduct such a study and develop proposals for federal funding. In this effort, UGPTI will collaborate with pipeline operators, Class I and regional railroads, logistics and transload companies, potential supply-chain partners, and state agencies, including the Departments of Agriculture, Commerce, and Transportation and the Oil and Gas Division. The project will result in assessments of:

*Key
Study
Components*

- The potential for a multimodal (pipeline and railroad) transportation system to transport CO₂ into and within North Dakota, including:
 - Key connector and feeder pipelines that would allow more CO₂ to flow into North Dakota from the surrounding region
 - A rail CO₂ network that would allow the movement of shipments from dispersed locations around the nation into the state.
- The need for transloading and temporary storage facilities and integrated multipurpose hubs through which CO₂ could be moved, originated, or terminated.
- Potential suppliers of substantial quantities of CO₂ outside of North Dakota that do not have pipeline connections but which have railroad service and could, therefore, start shipping CO₂ into the state immediately.
- The need for possible spur tracks within North Dakota, that would allow railroads to directly serve hubs and distributions centers where direct connections to Class I railroads do not exist.
- The railcar fleet (which is privately owned) and must be expanded to move substantial quantities of CO₂ by rail.

NDSU Upper Great Plains Transportation Institute 2023-2025 Budget Request: Summary

Purpose (N.D.C.C 54-53-03): “Conduct and supervise research in the field of transportation and logistics in order to facilitate acquisition of a wider knowledge and understanding of marketing factors associated with the geographical location of the state of North Dakota and the upper great plains in the field of transportation and their influence on the socioeconomic systems of the state, region, and country.” UGPTI’s research areas “must include the study of commodity and other freight movements into and out of the state in order to better know and understand the various factors affecting the marketing of area products and services.”

Administration (N.D.C.C 54-53-01: Administered by and in conjunction with NDSU.

Advisory Council (N.D.C.C 54-53-02): Consult with the Institute in matters of policy and “in the development of transportation in the state of North Dakota.”

Programs, Centers, and Focus Areas

- | | |
|-------------------------------------|------------------------------------|
| ▪ Advanced Traffic Analysis | ▪ DOT Support Center |
| ▪ ND Local Technical Assistance | ▪ Tribal Technical Assistance |
| ▪ Western ND Transportation Liaison | ▪ Commercial Vehicle Safety |
| ▪ Small Urban & Rural Mobility | ▪ Transportation Safety & Security |
| ▪ Road & Bridge Needs Assessment | ▪ Agricultural Freight |
| ▪ Mountain-Plains Consortium | ▪ Transportation Learning Network |
| ▪ Advanced Technologies | ▪ Grade Crossing Safety |

Biennial Road and Bridge Needs Assessment. The study included 71,808 miles of county, township, and tribal road, including 5,843 miles of paved county road and 56,656 miles of gravel road, and entailed traffic data collection and road surface condition assessments for more than 2,750 miles of paved county road. A survey was administered to each county to determine blading and gaveling practices, the sources and costs of gravel, and other cost factors needed for the unpaved portion of the road analysis. In addition, the current conditions of 2,336 bridges on county roads were assessed.

Road & Bridge Asset Management Program: Stores and displays information on road surface type, current condition, shoulder width, subgrade strength, and other design features, as well as traffic, construction history, and improvement plans. A pavement condition forecasting procedure allows counties to project conditions of roads for up to 35 years. Recent enhancements include the incorporation of emergency-related projects such as flooding (so the public can see where roads are closed), a load restriction web-map linked to the NDDOT’s Traveler Information Map that allows truckers to view state and local road restrictions on one web-based map, and an inventory and map of bridges and minor structures.

Tribal Technical Assistance Program Center: Selected by Federal Highway Administration as the Northern Region Center.

One-Time Funding: The \$225,000 in one-time funding provided by the Legislature has been used to leverage \$336,000 in Federal grants for research projects that lay the groundwork for artificial intelligence solutions based on remote sensing data collected from drones, assess the potential for growth in freight deliveries by drones, and examine autonomous aircraft logistics.

Budget as Approved by House of Representatives

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Table 2. Adjustments to Appropriations in HB 1020

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<i>Source</i>	<i>General Funds</i>	<i>Special Funds</i>

In addition to the \$543,904 increase in base funding, the House of Representatives appropriated \$398,450 of one-time funding for a Multimodal CO₂ Transportation Study. In addition, the increase of \$1,058,021 in estimated income shown in Table 1 includes \$423,600 of one-time special funds from the Strategic Investment and Improvements Fund to establish a **Transportation Data Intelligence Center**. The funds would allow UGPTI to repurpose and equip a room to receive, process, archive, and analyze data from field sensors, vehicles, and many other sources. With the Transportation Data Intelligence Center, UGPTI can perform advanced data analytics, develop artificial intelligence solutions and tools, contribute timely transportation information to travelers and service providers, train students in artificial intelligence and automation, and compete more effectively for federal funds.

The **Freight Transportation & Logistics Program** would allow UGPTI to conduct surveys and publish reports each biennium about the transportation patterns and needs of agricultural processors, shipments from farms to elevators; inbound and outbound shipments to and from manufacturing plants by mode and shipment type, as well as assessments of the quality of transportation services provided; and information on commercial trucking in North Dakota. In addition to this detailed information, the reports would include assessments of the transportation challenges and needs facing each sector.

Multimodal CO₂ Transportation Study. This one-time request of \$398,450 would fund a multimodal study of CO₂ transportation options, including pipeline, railroad, and local delivery options. In this effort, UGPTI would collaborate with pipeline operators, Class I and regional railroads, logistics and transload companies, potential supply-chain partners, and state agencies, including the Departments of Agriculture, Commerce, and Transportation and the Oil and Gas Division. The study would include analysis of key connector and feeder pipelines that would allow more CO₂ to flow into North Dakota from the surrounding region, a rail CO₂ network that would allow the movement of shipments from dispersed locations around the nation into the state, and transloading/temporary storage facilities and integrated multipurpose hubs through which CO₂ could be moved, originated, or terminated. Potential suppliers of substantial quantities of CO₂ outside of North Dakota that do not have pipeline connections but which have railroad service will be identified in the study, as these suppliers could start shipping CO₂ into the state immediately.

NDSU UPPER GREAT PLAINS TRANSPORTATION INSTITUTE

Upper Great Plains Transportation Institute, North Dakota State University, Fargo • 701.231.7767 • www.ugpti.org

October 2021

Mission: Providing innovative transportation research, education, and outreach that promote the safe and efficient movement of people and goods.

- Research - Conducting applied and advanced research in highway, transit, rail, air, and waterway transportation that addresses the critical issues of the state, region, and nation.
- Education - Educating the transportation workforce of tomorrow through multidisciplinary curricula that focus on transportation economics, management, infrastructure planning, mobility, and supply chain logistics.
- Outreach - Improving the skills and knowledge of the existing workforce through training, technical assistance, and the transfer of research results to practitioners.

The UGPTI was created in 1967 at NDSU by the North Dakota Legislature. It now has an annual budget of more than \$11.6 million. Approximately 40 staff on campus at NDSU in Fargo and in Bismarck. The UGPTI also engages about 100 graduate and undergraduate students in its programs.

Director Denver Tolliver, (701) 231-7767, www.ugpti.org • Email: denver.tolliver@ndsu.edu

PROGRAM AREAS

ESTABLISHED PROGRAMS WITHIN UGPTI WITH DEDICATED FUNDING AND EXPERTISE.

Advanced Traffic Analysis Center (ATAC) collects and analyzes traffic data to support decision makers who plan, operate, and fund transportation systems at the local, regional, and state level. Primary areas of work include intelligent transportation systems, traffic operations, and metropolitan transportation planning and travel demand modeling.
Contact: Bradley Wentz, (701) 231-7230, www.atacenter.org • Email: bradley.wentz@ndsu.edu

Center for Surface Mobility Applications and Real-time Simulation environments (SMARTSe) applies advancements in sensing, wireless communications, mobile computing, data science, and cybersecurity to advance multimodal and intermodal transportation system efficiencies, responsiveness, reliability, sustainability, safety, and security.
Contact: Raj Bridgelall, (408) 607-3214, www.ugpti.org/smartse/ • Email: raj.bridgelall@ndsu.edu

Commercial Vehicle Safety Center (CVSC) is a point of contact for universities, law enforcement, and driver licensing agencies looking to establish partnerships to improve commercial vehicle safety. CVSC sponsors webinars and provides resources in addition to conducting research and analysis. Research focuses on analyses intended to identify unsafe commercial vehicles, drivers, and companies, as well as streamlined methods to provide this information to state and federal safety enforcement specialists.

Contact: Brenda Lantz, (303) 871-7773, www.ugpti.org/outreach/cvsc/ • Email: brenda.lantz@ndsu.edu

DOT Support Center (DOTSC) provides engineering design assistance and transportation information technology support to transportation managers to ensure the safe and efficient movement of people and goods. Undergraduate engineering students in the center work under the direction of DOT engineers to prepare plans, estimates, and studies for real world projects. Computer science students provide IT support and assist staff in the development of applications such as a local road surface selection tool, the online ND Truck Weight Calculator, and the Geographic Roadway Inventory Tool (GRIT).

Contact: Bradley Wentz, (701) 231-7230, www.ugpti.org/dotsc/ • Email: bradley.wentz@ndsu.edu

Mountain-Plains Consortium (MPC) conducts research, education, and technology transfer related to transportation challenges and opportunities in the Upper Great Plains and Intermountain West. NDSU, via UGPTI, is the lead university in this eight-university consortium. MPC is a competitively selected University Transportation Center sponsored by the USDOT.

Contact: Denver Tolliver, (701) 231-7190, www.mountain-plains.org • Email: denver.tolliver@ndsu.edu

ND Local Technical Assistance Program (NDLTAP) fosters safe, efficient, environmentally sound and cost effective highway, road, and street systems by exchanging technology with local units of government and the transportation community through training, technical assistance, and information services. Key areas for hands-on, online, and distance training include safety, gravel road management, construction topics, rural road maintenance, and asset management.

Contact: Dale Heglund, (701) 318-6893, www.ndltap.org • Email: dale.heglund@ndsu.edu

Rural Transportation Safety and Security Center (RTSSC) promotes and enhances the region's transportation safety and security through research, education, and outreach. Staff members conduct safety analyses to evaluate and guide local, state, and federal initiatives. RTSSC's research tracks trends in road safety factors, such as impaired drivers, youthful drivers, and occupant protection.

Contact: Kimberly Vachal, (701) 231-6425, www.ugpti.org/rtssc/ • Email: kimberly.vachal@ndsu.edu

Small Urban and Rural Center on Mobility (SURCOM) increases the mobility of small urban and rural residents in the United States and abroad through innovative research, education, training, and outreach. Key areas for training include leadership and management. Recent research has focused on mobility for those aging in place, estimating demand for intercity bus services, bike share impacts on transit, and mobility needs in rural communities.

Contact: Jill Hough, (701) 231-8082, www.ugpti.org/surcom/ • Email: jill.hough@ndsu.edu

Transportation Learning Network (TLN) supports safe and efficient transportation through a network of people and technology that serves members by enhancing communication, workforce development, education, professional development, technology transfer, and research. TLN initiatives focus on assuring that DOT employees and others in the transportation workforce are prepared to implement new technology, work safer, and complete technical tasks accurately and efficiently. TLN is a collaborative effort of MPC universities and participating DOTs.

Contact: Chris Padilla, (701) 202-5730, www.translearning.org • Email: chris.padilla@ndsu.edu



OFTEN INVOLVE EXPERTISE FROM MORE THAN ONE PROGRAM WORKING COLLABORATIVELY ON KEY TRANSPORTATION ISSUES.

Agricultural freight movements of bulk commodities, production inputs, and processed products are critical to the economic vitality of North Dakota and the surrounding region. UGPTI conducts economic inquiry, marketing studies, and policy analysis to improve the competitiveness of the region's producers and businesses.

Contact: Kimberly Vachal, (701) 231-6425 • Email: kimberly.vachal@ndsu.edu
or Alan Dybing, (701) 231-5988 • Email: alan.dybing@ndsu.edu

Rural traffic analysis involves the use of detailed rural travel demand models to forecast traffic volumes on North Dakota's road network, helping estimate the impact to state, county, and local roads due to energy development, changing agricultural production and marketing practices, and other factors that influence transportation patterns.

Contact: Alan Dybing, (701) 231-5988 • Email: alan.dybing@ndsu.edu

Transportation Management Center developed in cooperation with the ND Department of Transportation will demonstrate the value of a centralized traffic management center by monitoring and reporting roadway and weather conditions and traveler information 24/7. Initially, the center will use the existing statewide camera and sensor network while increasing sensor density in selected corridors. Plans call for integration of data sensors and the development artificial intelligence/machine learning models to process traffic volume, speeds, road conditions, and incidents in real-time from the vast amount of video sensors across the State.

Contact: Bradley Wentz, (701) 231-7230 • Email: bradley.wentz@ndsu.edu

Transportation Infrastructure and Safety research focuses on preserving and better utilizing the existing transportation infrastructure. A focal point is traffic and infrastructure condition monitoring via improved low-cost sensor technologies. Additional work focuses on providing a decision support system for preserving and improving infrastructure by advancing predictive modeling performance via advanced statistical modeling or machine-learning/deep-learning techniques. Potential applications include enhancing safety at highway-rail grade crossings and improving safety related to other elements of road and railroad infrastructure.

Contact: Pan Lu, (701) 212-3795 • Email: pan.lu@ndsu.edu

Township Transportation Funding Program will coordinate the work of assisting single and multiple townships to advance an integrated local transportation system through leveraged funding to advance and improve the movement of agriculture, energy, and commerce throughout the state. A major part of the effort is to seek grants in partnership with the ND Department of Transportation to match a \$10 million appropriation by the ND Legislature.

Contact: Tim Horner, (701) 391-9787 • Email: timothy.horner@ndsu.edu

Tribal Outreach focuses on improving safe transportation of people and goods on tribal reservations to enhance livability, community, and cultural values through increased accessibility to employment, workforce development opportunities, education, healthcare, and housing.

Contact: Joy Annette (701) 231-8301 • Email: joy.annette@ndsu.edu

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