Chapter 7. Issues and Industry Advancements

7.1. Introduction

This chapter examines key issues and advancements that may influence the future of aviation in North Dakota. By identifying and evaluating these factors and their potential influence on the future system, the NDSASP's recommendations can be tailored to address potential needs of the system to successfully adapt to the full range of forces shaping the aviation landscape. The following issues and advancements are explored in this chapter:

- 7.2. Advanced Air Mobility
- 7.3. Emerging Aviation Fuel Sources
- 7.4. Air Traffic Control Modernization
- 7.5. Aging Fleet and Pilot Population
- 7.6. Aviation Professional Shortage
- 7.7. Commercial Service Access
- 7.8. Economic Conditions and Impacts on Buying Power
- 7.9. Revenue Producing Projects
- 7.10. Summary

7.2. Advanced Air Mobility

Advanced Air Mobility (AAM) is the emerging aviation ecosystem that uses next-generation aircraft and technology, as well as new business models to move people and cargo efficiently. The following sections summarize the AAM ecosystem, current policy and regulatory developments, existing AAM activities in the state, key challenges, and state-level considerations tailored for future full adoption of AAM in North Dakota.

7.2.1. AAM Ecosystem Overview

The AAM ecosystem encompasses several aircraft types including electric vertical takeoff and landing (eVTOL) aircraft, electric or hybrid fixed-wing aircraft, short takeoff and landing (STOL) aircraft, larger remotely piloted cargo drones, and autonomous uncrewed aircraft systems (UAS). These platforms use battery-electric, hybrid-electric, or hydrogen-based propulsion and are designed for quieter, lower-emission operations than conventional helicopters and general aviation (GA) aircraft.

Operators and system participants include original equipment manufacturers (OEMs), UAS operators, VTOL service providers, oil and gas companies, airport and heliport owners, and federal and state aviation and transportation agencies responsible for planning, permitting, and regulating new infrastructure. The ecosystem anticipates a progression of automation from piloted aircraft to simplified vehicle operations, to remotely piloted fleets, and ultimately to highly autonomous systems capable of making decisions in normal and off-nominal conditions.

Economic benefits of AAM are expected to include reduced operating costs, especially those associated with helicopters but also other GA aircraft due to lower maintenance and fuel requirements, as well as automation-driven labor efficiencies. Additional benefits include noise reduction, improved mobility, and potential congestion relief. For an energy intensive state like North Dakota, AAM offers opportunities for productivity and safety improvements, job creation, workforce development, and the attraction of private capital and OEM activity.

Several use cases for AAM operations are shown in **Figure 7-1**. Rapid innovation is occurring in small UAS, which are already conducting real-world missions such as medical package deliveries, infrastructure inspections, last-mile retail delivery, and disaster response. These operations currently occur primarily under visual line-of-sight (VLOS) rules, with waivers enabling beyond-visual-line-of-sight (BVLOS) operations.

Figure 7-1. Example AAM Use Cases

Sources: Marr Arnold Planning: Open AI, 2026.

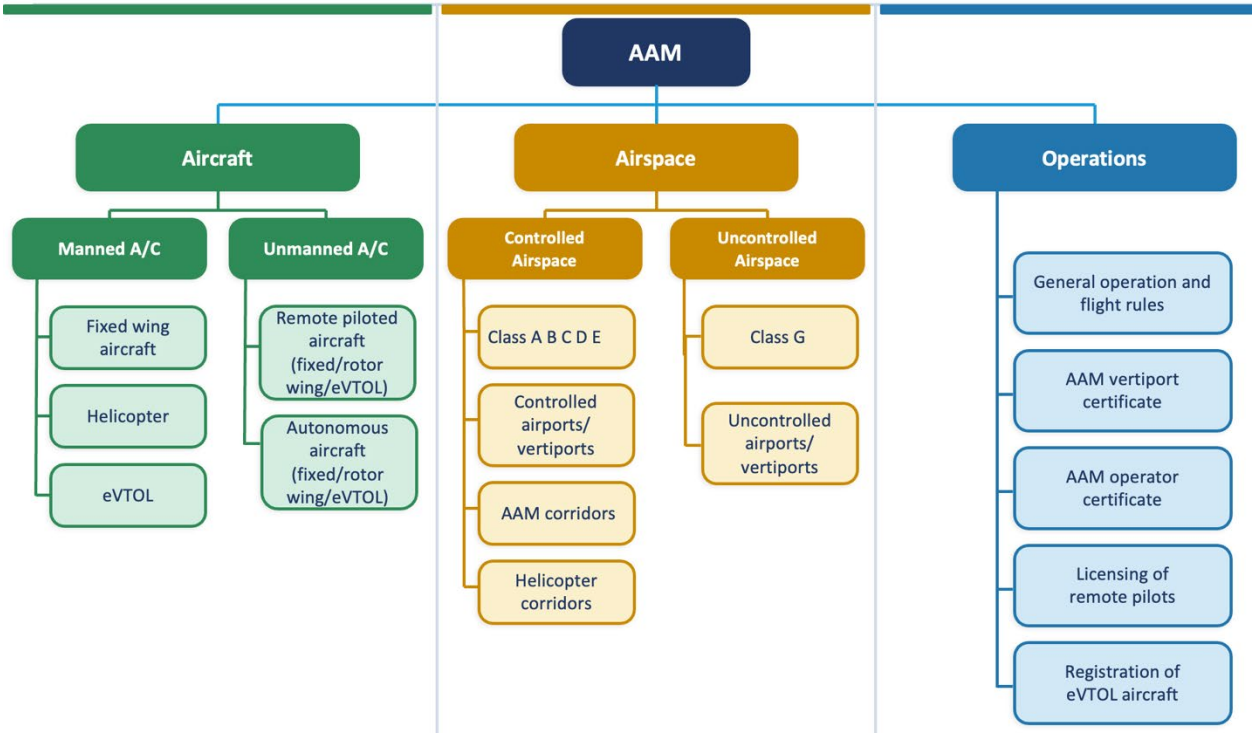
Larger VTOL and eVTOL systems are progressing toward certification, however, passenger carrying VTOL aircraft have not yet been certified at the time of writing. As a result, early adoption is expected to focus on cargo and specialized missions before passenger services become operational.

7.2.2. Policy and Regulatory Development

Nationally and globally, AAM is transitioning from concept development to early operational implementation. **Figure 7-2** illustrates a typical AAM ecosystem from a regulatory perspective. Regulations across the world are currently being developed related to three main categories: aircraft, airspace, and operations. In the U.S., federal strategy documents describe a phased approach that starts with piloted operations using existing airports and heliports, progresses to

expanded operations with new vertiport infrastructure, and ultimately enables broader deployment across selected corridors and use cases.[1] Widespread operations in multiple urban and rural regions are generally envisioned around 2030 as regulations, infrastructure, and automation mature.

Figure 7-2. AAM Ecosystem

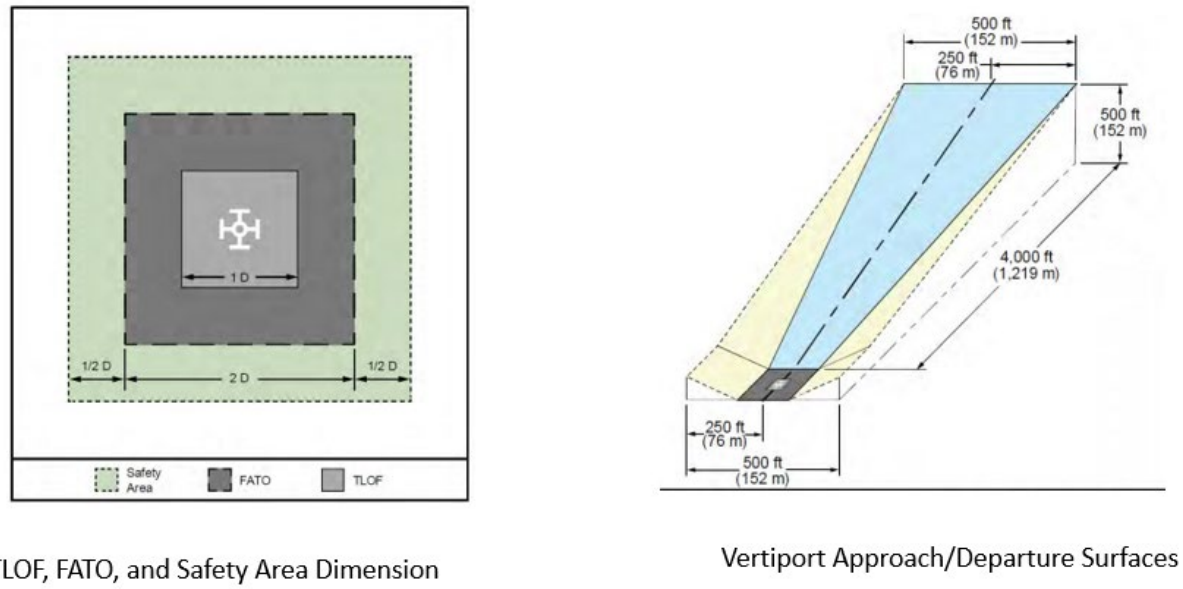


Source: Transportation Research Interdisciplinary Perspectives (TRIP) Volume 24, March 2024: Advanced Air Mobility: A comparative review of policies from around the world – lessons for Australia, 2025; Marr Arnold Planning, 2026.

Federal Aviation Administration (FAA) Engineering Brief (EB) 105A provides preliminary recommendations for vertiport siting and design (see **Figure 7-3**), with a more performance-based advisory circular expected as aircraft performance data becomes available. Near-term federal strategy emphasizes a “crawl-walk-run” approach that prioritizes the incorporation of vertiports into airport master plans and airport layout plans (ALPs) and early airspace determinations through FAA approval processes. The first U.S. vertiport with an early conditional approach is located at Allen C. Perkinson Blackstone Army Airfield in Virginia.

[1] U.S. Department of Transportation, Advanced Air Mobility Interagency Working Group, “The Advanced Air Mobility Comprehensive Plan: LIFTing AAM to Maturity in the United States,” U.S. Department of Transportation, December 17, 2025, https://www.transportation.gov/sites/dot.gov/files/2025-12/AAM%20Comprehensive%20Plan%202025.pdf.

Figure 7-3. FAA EB 105A Guidance on Vertiport Dimensions and Approach Surfaces



TLOF, FATO, and Safety Area Dimension

Vertiport Approach/Departure Surfaces

Source: FAA Engineering Brief 105A, 2024.
Note: TLOF = Touchdown and Liftoff area; FATO = Final Approach and Takeoff area

Internationally, regulators and industry stakeholders are advancing certification pathways for eVTOL and AAM aircraft, establishing demonstration corridors, and testing urban and regional use cases in Europe, Asia and the Middle East. Many countries are beginning to align drone regulations, digital traffic management (such as uncrewed aircraft system [UAS] traffic management [UTM] and U-space), and sustainable aviation policies to support integration of crewed and uncrewed AAM operations into existing airspace.

7.2.3. AAM Activities in North Dakota

North Dakota has been closely monitoring the development of AAM and has been at the forefront of supporting the use of AAM and UAS. Many of the initiatives in the state (private, military, federal, and university) work in unison to support advancements in UAS and future AAM operations. Through these initiatives, the state not only advances UAS technology and prepares for AAM implementation but also contributes to the economic development of North Dakota by fostering innovation, workforce development, and industry partnerships in this evolving sector.

7.2.3.1. Northern Plains UAS Test Site

In 2013, the FAA selected Grand Forks as one of seven UAS test sites in the U.S. The Northern Plains UAS Test Site (NPUASTS) is a national center for UAS research, testing, and commercial operations. The state and other private partners have also invested in infrastructure to support the research. A few key initiatives at the test site include:

- **BVLOS Operations:** Vantis, operated by the NPUASTS, is a BVLOS UAS network of shared infrastructure designed to let drones fly safely beyond the operator's line of sight without requiring each company to build its own expensive equipment and obtain separate approvals. Vantis includes a system of ground-based radars, command-and-control radios, and data links across North Dakota, all tied into Mission and Network Operations Centers that manage traffic and safety. Vantis is the first system of its kind in the U.S.
- **Radar Data Pathfinder Program:** In 2024, the FAA granted the test site access to raw, unfiltered surveillance radar data used in monitoring civil airspace. This is the first time the FAA has allowed surveillance radar data to be used for aviation research and standards-setting.
- **North Dakota Drone Replacement and Secure Fleet Modernization Program:** Administered by NPUASTS, this initiative assists state agencies and North Dakota University System entities in replacing legacy UAS with NDAA-compliant platforms. The program covers the cost of replacement hardware, critical accessories, and operator training while requiring agencies to relinquish and properly decommission non-compliant systems. By accelerating the transition to compliant, secure UAS and enhancing integration with Vantis BVLOS infrastructure where applicable, the program reduces cybersecurity and supply-chain risks, strengthens operational reliability.
- **Multifaceted Partnerships**: The test site supports FAA, NASA, Department of Defense, universities, and private industry partners with testing on autonomy, air traffic integrations, and safety standards.

7.2.3.2. Grand Sky

Grand Sky is one of first UAS research and development park/innovation hubs in the U.S. Located on the Grand Forks Air Force Base (GFAFB), an Enhanced Use Lease with the U.S. Air Force and Grand Forks County enables commercial UAS operations on active military property. A Joint Use Agreement was also secured, granting access to base runways, air traffic control, and the base's raw radar feed needed for advanced detect-and-avoid and BVLOS operations. The two largest tenants are Northrop Grumman and General Atomics Aeronautical Systems. Both tenants work closely with GFAFB to support large UAS surveillance and reconnaissance aircraft including Northrop Grumman's RQ-4 Global Hawk and MQ-4C Triton and General Atomics' MQ-1 Predator and MQ-9 Reaper.

Photo: Grandskynd.com

Project ULTRA, short for UAS Logistics, Traffic, Research, and Autonomy, is a recent initiative launched by Grand Sky, Grand Forks County, and the NPUASTS. Project ULTRA is a collaborative effort involving federal organizations and private entities such as Department of Defense, NASA, Air Force Research Laboratory (AFRL), and MITRE that aims to use UAS technology to revolutionize logistics and traffic management within the National Airspace System (NAS).

7.2.3.3. Military

There are several military missions in North Dakota that are supported by UAS for intelligence, surveillance, and reconnaissance. The 319th Reconnaissance Wing located at GFAFB supports worldwide missions by the RQ-4 Global Hawk, a high altitude, long endurance military UAS. The GFAFB provides aircraft maintenance, command-and-control, and infrastructure needed for training and testing of the Global Hawk. In addition, the primary mission of 119th Wing of the North Dakota Air National Guard, located at the Fargo Air National Base, is to provide trained and ready airmen to execute precision attack and reconnaissance of the MQ-9 Reaper, an armed, remotely piloted UAS aircraft. Both units coordinate closely with the University of North Dakota's (UND's) UAS program as well as the NPUASTS and Grand Sky.

7.2.3.4. University Research

UND, which has emerged as a national leader in UAS innovation and research, was designated as a Department of Defense Center of Excellence for uncrewed aerial vehicles (UAV) education in 2006, and has fostered collaborations across engineering, aviation, and behavioral sciences to advance UAS technologies. The university was the first to offer a four-year accredited degree in UAS operations, providing students with specialized tracks in low and medium/high altitude UAS applications. Additionally, UND Aerospace's UAS Test Range at Gorman Field serves as a valuable facility for testing and training new UAS technologies, supporting BVLOS operations and real-time surveillance.

UND's UAS research spans critical areas including NAS integration, command-and-control systems, artificial intelligence, cybersecurity, and edge computing. The university has pioneered developments in BVLOS operations and detect-and-avoid technologies, contributing to the safe integration of UAS into civilian airspace. Collaborations with industry partners such as Vigilant Aerospace Systems have furthered advancements in UAS traffic management and counter-autonomy measures.

7.2.3.5. Agriculture

North Dakota is playing a crucial role in advancing the adoption of UAS and other technologies in agriculture, positioning North Dakota at the forefront of AgTech innovation. The North Dakota Aeronautics Commission began issuing licenses to uncrewed aerial applicators in 2022. In 2025, there were 32 licensed uncrewed aerial applicators in North Dakota. These operators cover over 100,000 acres per year, highlighting the growing importance of UAS in modern agriculture practices.

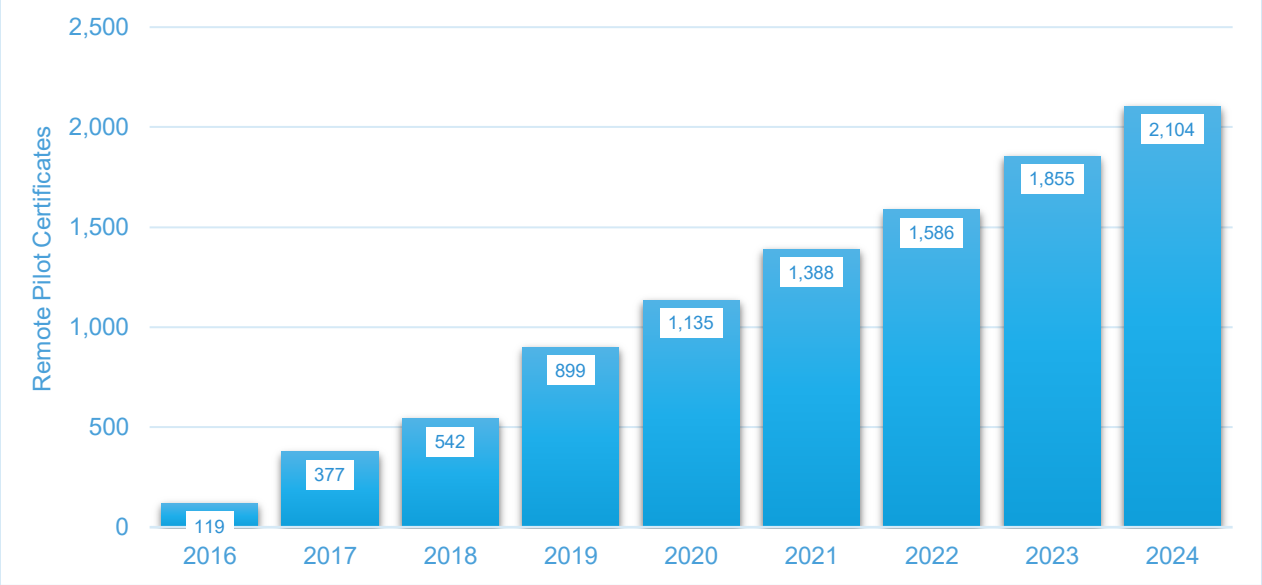
Grand Farm, a 590-acre agricultural innovation hub near Casselton, serves as a testbed for agricultural technologies. Grand Farm offers growers, researchers, startups, corporations, and policymakers the ability to address challenges in modern farming through the development and real-world testing of precision agriculture tools. This includes AAM and UAS, which will enhance efficiency and sustainability in agricultural practices. The state recently funded a $300,000 initiative at Grand Farm to deploy drones equipped with artificial intelligence to detect noxious weeds. This research could eventually provide farmers with advanced tools for early detection and management of invasive species. Separately, Grand Farm has received $11 million in federal funding through a multi-year

United States Department of Agriculture (USDA) Agricultural Research Service (ARS) cooperative agreement with North Dakota State University to support national-scale testing and validation of emerging precision agriculture technologies, which may include drones and other UAS–related applications.

7.2.3.6. Certified Remote Pilots

In addition to the initiatives noted above, remote pilots in North Dakota have been growing rapidly in recent years. To fly a drone under the FAA's Small UAS Rule (Part 107), a Remote Pilot Certificate must be obtained from the FAA. This certificate demonstrates an operator understands the regulations, operating requirements, and procedures for safely flying drones. **Figure 7-4** presents the growing number of certified remote pilots in North Dakota since the introduction of Part 107 in 2016. In 2024, there were over 2,100 remote pilots in the state, up from 899 just five years early, representing an increase of 134 percent or 19 percent per year on average. The number of remote pilots is expected to continue to grow rapidly as technology continues to expand.

Figure 7-4. Remote Pilots in North Dakota



Sources: FAA U.S. Civil Airman Statistics, 2025.

7.2.4. Ongoing Challenges

Table 7-1 presents a timeline of the greatest challenges in the implementation of AAM that are likely to occur over the next 20+ years as it becomes more prevalent.

Table 7-1. Timeline of Challenges to Implementing the AAM Ecosystem

Near-Term (Now – Late 2020s)	Mid-Term (Early – Mid-2030s)	Long-Term (Beyond Mid-2030s)
Regulatory & Certifications Establishing certification standards for new aircraft and systems while clarifying regulatory pathways for both crewed and uncrewed VTOL operations that can safely integrate with existing aviation.	**Scaling Operations** Managing substantially higher traffic volumes near major airports and population centers without overloading air traffic controllers, potentially requiring advanced airspace management tools and digital "master control room" concepts to handle increased system complexity.	**Full Autonomy Integration** Achieving widespread, routine integration of highly autonomous AAM systems into the National Airspace System while maintaining or improving current safety levels across all operations.
Physical Infrastructure Addressing vertiport siting constraints both on and off airports, ensuring compliance with FAA EB 105 guidance, providing sufficient electrical power and charging infrastructure, planning for fire and emergency response (particularly for battery systems and elevated structures), and preserving safe approach and departure paths with adequate separation from existing traffic. Infrastructure must also accommodate proper TLOF and FATO dimensions.	**Technology Transition** Transitioning from predominately piloted operations to remotely piloted and increasingly automated fleets which requires robust detect-and-avoid capabilities, resilient communications infrastructure, and comprehensive cybersecurity protections to ensure safe autonomous operations.	**Energy Infrastructure** Ensuring sufficient energy supply and distribution infrastructure, including expanded grid capacity, high-power charging networks, energy storage solutions, and potentially hydrogen production and distribution infrastructure to support large-scale AAM operations.
Community & Integration Managing community concerns related to noise, visibility, safety, privacy, security, and land use compatibility, while ensuring equitable access to AAM services. Early operations must integrate safely with legacy aviation operations using existing airports and heliports.	**Business Viability** Establishing sustainable business models as operators face significant investments in aircraft and infrastructure before demand is fully mature and public acceptance is established, creating financial risk during the scaling phase.	**Urban Planning Integration** Integrating AAM into comprehensive long-range land use, zoning, and transportation planning to ensure vertiports are equitably located, well connected to other transportation modes, and managed to mitigate cumulative impacts of noise, visual presence, and privacy concerns across communities.

Source: Marr Arnold Planning, 2025.

7.2.5. North Dakota Implementation Considerations

Recognizing the ongoing challenges noted in **Table 7-1**, North Dakota can continue to build on its AAM ecosystem by further addressing airspace integration, regulation, workforce development, education, infrastructure, and funding, while anchoring implementation in early, high-value use cases. Early UAS use cases in the state have included precision agriculture; energy and infrastructure inspections for pipelines, power lines, and other critical infrastructure; and there are near-term opportunities for VTOL cargo operations to quickly move time critical material.

By blending national and global AAM trends with North Dakota-specific priorities, the state can develop a phased, opportunity-driven plan for advancing AAM. The following could be considered:

- **Airspace and Regulatory Environment:** North Dakota should plan for AAM integration within low-altitude airspace already used by GA, agricultural aircraft, and advanced UAS test operations. Building on what has been developed so far with Vantis, priority actions include identifying additional AAM corridors for cargo and passenger operations, aligning these corridors with existing BVLOS infrastructure, and coordinating with the FAA on procedures, approvals, and airspace protections.
- **Workforce and Education:** AAM will create demand for a diverse workforce including pilots and remote operators, UAS and AAM maintenance technicians, electrical and battery specialists, emergency responders trained in battery and hydrogen safety, and planners and engineers experienced in vertiport design and airspace procedures. North Dakota's universities and technical colleges can expand or adapt existing programs in UAS operations, electric propulsion, autonomy, cyber-physical security, and AAM-specific fire and rescue procedures, leveraging the state's established UAS education and research capacity.
- **Vertiport Siting and Airport Readiness:** FAA EB 105A guidance can be applied to the strategic use of existing public-use airports and heliports where capacity and clear approach paths exist, while planning for potential new vertiports near employment centers, medical facilities, industrial sites, and multimodal transportation nodes. For North Dakota, this includes:
    - Evaluating public-use airports and key private facilities for TLOF and FATO layouts, safety areas, charging infrastructure, maintenance facilities, and basic passenger or cargo handling areas
    - Incorporating winter operations, de-icing, and snow removal into vertiport design and access planning, including reliable all-season ground connectivity
    - Developing state-level siting criteria that aligns with federal guidance while addressing emergency access, airspace integration, land use compatibility, and multimodal connectivity
- **Funding and State Policy Tools:** While most vertiport capital is expected to come from private resources, targeted federal and state funding can support planning and initial deployments. North Dakota can pursue federal grants, enable public-private partnerships (P3s) that support private vertiport development, and clarify state-level permitting roles and processes for vertiports.

- **Research, Testing, and Training:** The state can support continued expansion of UAS test ranges and university labs to encompass AAM and VTOL platforms, autonomy, BVLOS operations at scale, cold-weather performance testing, and responding to inquiries from OEMs and operators seeking realistic test environments.
- **Public Engagement and Statewide Framework:** North Dakota would benefit from the development of a statewide AAM blueprint that articulates shared goals for economic growth, workforce development, rural connectivity, and public-good missions and provides consistent guidance to local governments, airports, and industry on siting, zoning, noise, and other considerations. The state should establish ongoing public education and stakeholder engagement processes to address concerns related to safety, privacy, and noise, and to ensure that communities, particularly rural and tribal communities, help shape AAMs development and expansion in the state.

7.3. Emerging Aviation Fuel Sources

Over the last 20 years, strides have been made toward the development of alternative aviation fuels. Despite the U.S. recently moving away from sustainability efforts, including the withdrawal from the Paris Agreement in early 2025 and vacating the U.S.'s previous commitment to achieve net-zero emissions by 2050, the momentum and advancements in place to move towards the adoption of alternative fuels continue. This topic briefly explores the types of alternative fuels, current initiatives in North Dakota, and future implications of alternative aviation fuels in the state.

7.3.1. Types of Emerging Fuel Sources

Key emerging aviation fuel options include electric propulsion, Sustainable (or Synthetic) Aviation Fuel (SAF), hydrogen, and unleaded avgas substitutes. Each of these are subsequently described.

7.3.1.1. Electric

Electric propulsion is the alternative fuel source maturing the fastest at the smallest scale with zero in-flight carbon emissions. The biggest challenge electric aircraft manufacturers face is the development of high-density batteries. Manufacturers continue to struggle to develop batteries which can run for long distances. The batteries also do not have a long shelf life, which is restricting electric aircraft market growth. Large improvements in battery chemistry are still needed. In addition, charging stations and charging capabilities at airports need to be in place to ensure successful transition from current fossil fuel sources.

Recognizing these limitations, a shift towards hybrid designs is occurring. For example, Heart Aerospace has developed a 30-seat hybrid plane that would be powered by batteries but carrying fuel as backup. This makes the aircraft lighter and less costly to operate and would allow for more potential passengers. The hybrid

ES-30 Photo: Heart Aerospace.com

system would be all-electric from takeoff to landing but can switch to turbine if longer distances are needed or if there is a diversion.

Several other companies, including Beta Technologies and Electra are also pursuing hybrid aircraft that will allow for improved emissions as well as longer ranges. A hybrid system provides additional opportunities for small regional commercial aircraft and GA aircraft to take advantage of electrification. Bemidji Aviation Services, a Part 135 air cargo carrier that operates in the Upper Midwest including to airports in Fargo and Bismarck, is exploring the integration of Ampaire's Eco caravan into their cargo operations. The Eco Caravan is a Cessna 208B Grand Caravan aircraft, retrofitted with a hybrid electric powertrain system.[2]

7.3.1.2. Sustainable (or Synthetic) Aviation Fuel (SAF)

SAF refers to drop-in fuel replacements made from non-petroleum renewable (e-fuels) or waste feedstocks. SAF has a much lower carbon intensity compared to fossil jet fuel, reducing carbon emissions by up to 80 percent. SAF can be blended with conventional Jet A fuel and used in existing turbine engines without modifications. There are currently 11 certified SAF pathways that produce fuels for aircraft, and their acceptance is on the rise. However, SAF supply is still extremely limited and costly. The International Air Transportation Association (IATA) estimates that SAF production will reach 0.6 percent of global jet fuel use in 2025.[3] Availability is typically limited to major airports, and the full rollout will take many more years. High costs are also a barrier as SAF typically sells for two to six times the price of conventional Jet A.

7.3.1.3. Hydrogen

Hydrogen is a zero-carbon renewable fuel in the development phase. It can power aircraft with fuel cells that convert hydrogen to electricity onboard or combustion in modified jet turbine engines. The only exhaust from hydrogen is water vapor. Hydrogen requires aircraft redesign and infrastructure including liquification, storage, and fueling which does not yet exist at airports. Although hydrogen systems remain a longer-term option, several manufacturers plan for hydrogen aircraft in the 2030s/2040s including Airbus ZEROe and ZeroAvia's hydrogen-electric prototype planes.

Airbus ZEROe Photo: Airbus.com

7.3.1.4. Unleaded Avgas

In 2023, the U.S. Environmental Protection Agency (EPA) found that lead emissions from piston aircraft contribute to air pollution and are a public health concern.[4] This determination has

[2] Ampaire, "Eco Caravan," https://www.ampaire.com/vehicles/eco-carava
[3] International Air Transport Association (IATA), "Net Zero 2050: Sustainable Aviation Fuels (SAF) Fact Sheet," IATA, December 2025. https://www.iata.org/en/iata-repository/pressroom/fact-sheets/fact-sheet-sustainable-aviation-fuels/
[4] U.S. Environmental Protection Agency, "Regulations for Lead Emissions from Aircraft," EPA, updated May 27, 2025, https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-lead-emissions-aircraft

helped solidify the need for an unleaded avgas option and regulatory action. The FAA's Eliminate Aviation Gasoline Lead Emissions (EAGLE) initiative is actively working to end the use of leaded avgas by 2030, even amidst program reviews. The FAA has certified two unleaded fuels (UL) including General Aviation Modifications, Inc.'s (GAMI) 100-octane G100UL and lower octane UL94. A drop-in replacement fuel candidate is also being evaluated under the FAA's Piston Aviation Fuels Initiative (PAFI). In early 2026, the FAA published a four-phase draft plan for the transition to unleaded fuels by 2030.[5]

Commercial availability of unleaded fuels is increasing but it is still considered in development and testing and not widely available. UND transitioned its flight training fleet to UL94 unleaded avgas in 2023 to be a test case, leading sustainability efforts for the industry. However, after several months, the program returned to 100LL due to engine valve seal wear issues. This attempt confirmed that there is still work to be done before the wide availability of unleaded avgas comes to fruition.

7.3.2. Current Initiatives in North Dakota and Future Implications

Each of the emerging alternative fuels needs to prove their commercial viability and safety, and much work still needs to be done. Although the timing on the efforts is still in flux, these new fuel types will likely impact all sectors of aviation in North Dakota over the next several decades. North Dakota is a heavily rural, agriculture-based economy and its eight commercial service and remaining GA airports connect remote and rural areas of the state to the nation and beyond. New fuel sources will support businesses, both existing and new, and improve quality of life. In addition, North Dakota created a Priority Climate Action Plan in 2024, which focused on sustainability efforts and aiming for carbon neutrality by 2030.

Pipistrel Velis Electro Photo: Frank Galella, AIN

GA has a pivotal role in the early phases of alternative aviation fuels, especially electric aircraft. The first uses of electric aircraft will likely be for short missions such as flight training, aerial application, air ambulance, and other GA flights. The Pipistrel Velis Electro is the first certified fixed wing, battery-electric GA aircraft used for pilot training.[6] With one of the leading flight schools in the country located at UND, North Dakota could be poised to support these electric aircraft. UND examined the challenges of integrating electric aircraft into collegiate flight training programs in the paper "Technical and Regulatory

[5] Federal Aviation Administration. *Draft Transition Plan to Unleaded Aviation Gasoline – For Public Comment.* Version 1.02, January 2026. Federal Aviation Administration. https://www.faa.gov/aircraft/draft_docs/draft_unleaded_avgas_transition_plan
[6] General Aviation Manufacturers Association (GAMA), "Recommendations for Accelerating the Development of the Electric Aviation Sector in Europe," Advanced Air Mobility Series white paper, April 2024, https://gama.aero/wp-content/uploads/GAMA-White-Paper-on-Electric-Aviation-2024-April.pdf

Factors of Adopting Electric Training Aircraft in a Collegiate Aviation Setting" published in 2023.[7] The research includes several key findings:

- **Regulatory Requirements:** Updated regulatory frameworks are needed to accommodate electric aircraft in flight training programs including certification processes and operational guidelines specific to electric propulsion systems.
- **Battery Performance and Charging Infrastructure:** There are challenges related to battery duration and turnaround times. An efficient charging infrastructure is needed to support the operational needs of electric aircraft in training environments.
- **Environmental and Operational Considerations:** Temperature variations and the impact of multiple charge-discharge cycles per day could influence the performance and maintenance requirements of electric aircraft.
- **Course-Level Implementation:** The Certified Instrument Flight Instructor (CIFI) course may be a suitable starting point for integrating electric aircraft. These courses typically involve shorter flight durations, aligning well with the capabilities of current electric aircraft.
- **Maintenance and Training Implications:** Specialized maintenance training and the development of curriculum materials to support the adoption of electric aircraft will be imperative.

North Dakota's major industries of agriculture and energy are poised to support alternate fuel supply chains. Gevo Inc. purchased an ethanol plant in Richardton for $210M in 2025 to convert bioethanol fuel from feedstocks to SAF.[8] If realized, this could be the first fully integrated SAF production plant in the U.S. converting crops to aviation fuel. In 2026, Gevo announced it is evaluating a significant expansion of its Richardton facility that would double low-carbon ethanol production and increase carbon capture capacity, further positioning North Dakota as a key hub for future sustainable aviation fuel production.[9] The state is also abundant with wind and natural gas which could allow for future opportunities in hydrogen production or SAF. UND's Energy and Environmental Research Center (EERC) published the "Hydrogen Energy Road Map" in 2024 which outlined how North Dakota's natural resources could be converted to hydrogen and what is needed in terms of infrastructure, transportation, storage, and costs to get there.[10]

Adapting to new fuels will likely require state and local investment. Introducing unleaded avgas, SAF (would require tanker or pipeline delivery), or hydrogen (would require cryogenic tanks or high-pressure infrastructure) would need major infrastructure changes and investment. Electric charging needs, such as power connections and chargers, are more straightforward investments, albeit still costly. Policymakers and airports should plan to support fuel diversity so

[7] Nick Wilson, Lewis Archer, Ryan Guthridge, et al. "Technical and Regulatory Factors of Adopting Electric Training Aircraft in a Collegiate Aviation Setting" (2023). *Aviation Faculty Publications*. https://commons.und.edu/avi-fac/63
[8] Evan Butow, "North Dakota poised for first integrated U.S. jet fuel plant from bioethanol," *AgWeek,* July 2, 2025, https://www.agweek.com/agribusiness/north-dakota-poised-for-first-integrated-u-s-jet-fuel-plant-from-bioethanol
[9] Gevo, "Gevo Announces it is Developing Plans for Major Ethanol Expansion at Richardton, North Dakota Facility", https://investors.gevo.com/news-releases/news-release-details/gevo-announces-it-developing-plans-major-ethanol-expansion, March 30,2026.
[10] Energy & Environmental Research Center (EERC), University of North Dakota, "Hydrogen Energy Roadmap: Hydrogen and North Dakota's Energy Future," Final Report, revised June 30, 2024, North Dakota Industrial Commission, https://www.ndic.nd.gov/sites/www/files/documents/Oil--Gas-Research-Program/Grant-Rounds--Final-Reports/Approved-Projects/Grant-Rounds-59-50/FR-G-54-105.pdf

pilots at both rural and more urban communities in the state have options. In addition, with the legal, business, and tax policy needed to support these new fuel alternatives, the state can remain at the forefront of energy production to grow the North Dakota economy.

7.4. Air Traffic Control Modernization

In the early 2000s, the U.S. Department of Transportation (USDOT) published the *Integrated Plan for the Next Generation Air Transportation System (NextGen)*, a framework for bold changes to the NAS aimed at moving ground-based radar air traffic control to satellite-based navigation and surveillance, data-driven traffic management, and more automated decision support. This was the beginning of a generational shift: one that set the FAA on a two-decade journey to modernize air traffic management, evaluate safety, enhance efficiency, and build the infrastructure needed to support the future of aviation[11]. This transformation is especially consequential for aviation dependent states like North Dakota, where both traditional airport operations and emerging technologies like UAS/BVLOS operations rely on a modern, resilient air traffic system to support economic growth and integration of new technologies.

7.4.1. Modernization Efforts to Date

FAA's air traffic control (ATC) modernization mission has evolved from incremental radar-based upgrades to large, system transformation under NextGen and now the Brand New Air Traffic Control System (BNATCS) program. Launched in December 2025, BNATCS replaces NextGen and has the goal of implementing a new air traffic control system by the end of 2028.[12] **Figure 7-4** presents key milestones in the modernization of the air traffic control system.

[11] Federal Aviation Administration (FAA), "NextGen Final Report 2025," January 7, 2026. https://www.faa.gov/nextgen/NextGen-Final-Report-2025.pdf
[12] FAA, "Brand New Air Traffic Control System (BNATCS) Fact Sheet," December 4, 2025. https://www.faa.gov/newsroom/brand-new-air-traffic-control-system-bnatcs-fact-sheet

Figure 7-5. Air Traffic Control Timeline of Modernization Efforts

Early Modernization (1980s-1990s)

- Incremental ground-based radar and equipment upgrades
- Shift from analog to digital automation
- Installation of advanced displays and system integration to improve efficiency
- Transitioning from ground-based navigation to satellite navigation (GPS) beginning in late 1990s
- Introduction of Traffic Alert and Collision Avoidance System (TCAS) and conflict alert systems

NextGen Advancements (2000s-2025)

- Integration of airport infrastructure upgrades, new technologies and procedures, safety and securety enhancements
- System Wide Information Management (SWIM) which streamlined data sharing
- Performance Based Navigation (PBN) using satellite-based guidance
- Automatic Dependent Surveillance-Broadcast (ADS-B) for surveillance rooted in satellite technology
- Data Communications (Data Comm) for controller-pilot data link
- En Route Automation Modernization (ERAM) and tools for controllers to manage higher volumes of traffic and flight data and provide operational resilience

Emerging Direction of Modernization (2025-forward)

- Introduction of the Brand New Air Traffic Control System (BNATCS)
- Replace legacy systems with digital, data-driven infrastructure
- Modernizing for a flexible, future-ready airspace
- Integrate new aircraft types within Advanced Air Mobility (AAM)
- Connecting people, data, and workflows in real time

Source: Marr Arnold Planning, 2025.

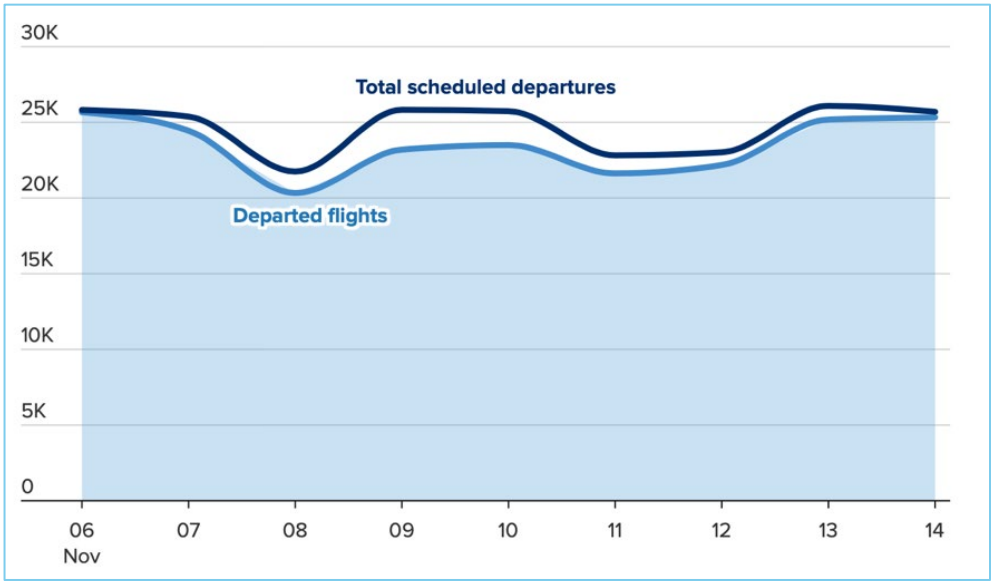
Today's air traffic management (ATM) remains a patchwork of legacy infrastructure that still relies heavily on ground-based radar and navigation beacons to define fixed airways knowns as 'victor routes' for low altitudes and 'jet routes' for high altitudes. With many areas of the nation's airspace, aircraft are guided by voice radio communications and manual controller coordination with procedures that haven't been changed since 1960s.[13] In recent years, the Government Accountability Office (GAO) has urged the FAA to act on recommendations to better manage risks and improve their modernization efforts as a direct result of a nationwide ground stop for departures on January 11, 2023, due to a failure in its Notice to Air Missions (NOTAM) system

[13] Northern Plains UAS Test Site (NPUASTS), "The Future of Air Traffic Management: Why Modernizing Our Safety Systems Starts Now," May 8, 2025. https://www.npuasts.com/news/article/the-future-of-air-traffic-management-why-modernizing-our-safety-systems-starts-now

which provides essential safety information to pilots.[14] The failure stemmed from the unintentional deletion of critical database files during maintenance, thus highlighting issues with aging systems and procedures and causing thousands of flight delays and cancellations before the system was restored.

Since that time, two key inflection points have had a significant influence on the direction the FAA is taking to modernize the ATC system. The first occurred in late January 2025 when American Airlines Flight 5342 and a U.S. Army helicopter fatally collided midair over the Potomac River near Ronald Reagan National Airport at an estimated altitude of 300 feet, killing 67 people. As the deadliest air disaster since September 11, 2001, the accident pushed modernizing the air traffic control system to the forefront of the nation's attention. As a direct result, Congress included a $12.5 billion down payment for the FAA to overhaul the ATC system as part of the One Big Beautiful Bill Act (OBBBA) which was signed into law in July 2025. The second critical event occurred 11 months later when the FAA mandated flight reductions of between four (4) percent and 10 percent at 40 major airports due to ATC staffing issues related to the U.S. government shutdown and ATC staff working without pay. The mandated reductions lead to thousands of daily flight cancellations and significant travel disruptions between November 6-14, 2025, as shown in **Figure 7-5**.

Figure 7-6. Canceled Departures at U.S. Airports During the Government Shutdown (November 2025)



Sources: Cirium and CNBC, 2025.

[14] Government Accounting Office (GAO), "Air Traffic Control: FAA Actions are Urgently Needed to Modernize Systems" Report GAO-25-108162, March 4, 2025. https://www.gao.gov/products/gao-25-108162; "Air Traffic Control: FAA Actions are Urgently Needed to Modernize Aging Systems." Report GAO-24-107001, September 23, 2024. https://www.gao.gov/products/gao-24-107001

The announcement of the BNATCS is FAA's response to these events and the program has the ambitious goal of replacing outdated infrastructure including radar, software, hardware, and telecommunications networks within a few years' time. The program consists of five categories: communications, surveillance, automation, facilities, and Alaska. The FAA states that the system "will provide new and more reliable systems that will reduce equipment-related delays throughout the NAS." Critical actions that will be undertaken include:[15]

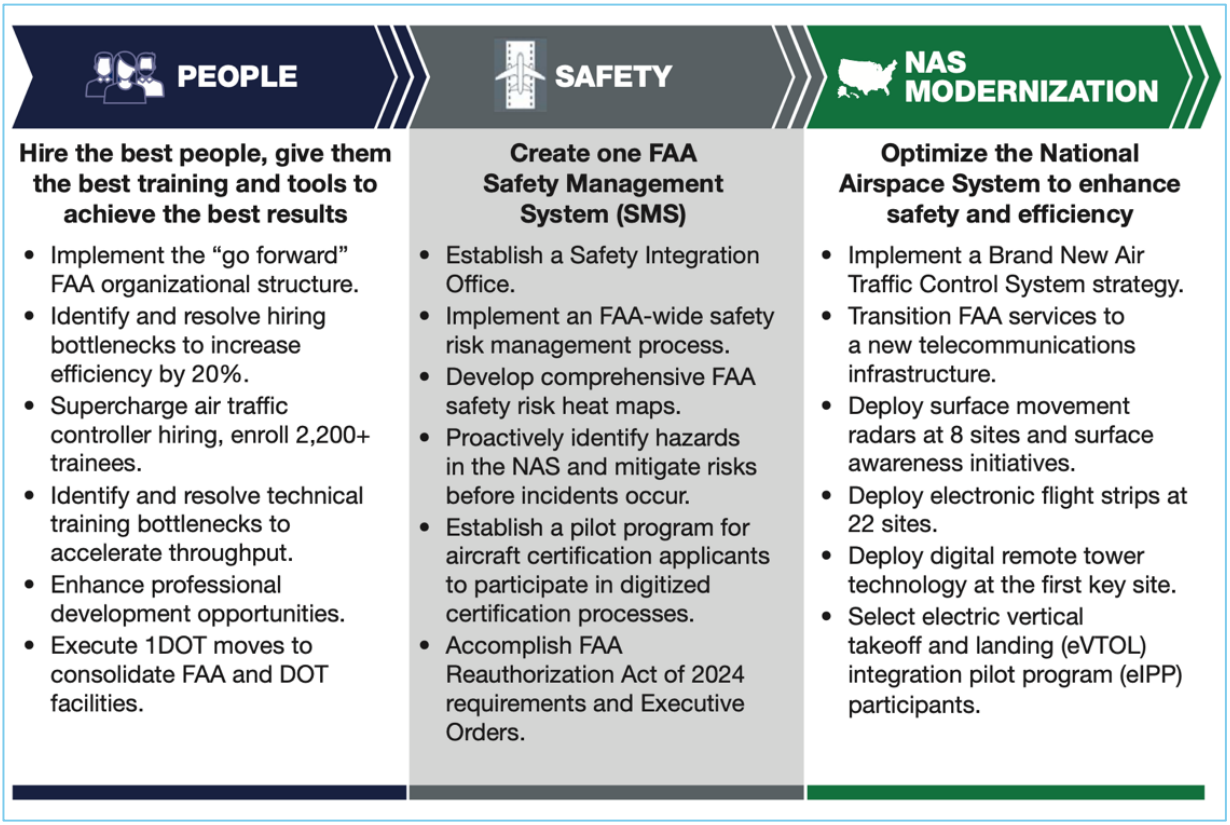
- Replacing old telecommunications with new fiber, wireless, and satellite technologies at over 4,600 sites
- Installing 25,000 new radios and 475 new voice switches
- Replacing 618 radars
- Addressing runway safety by increasing the number of airports (200) with Surface Awareness Initiative
- Build six (6) new Air Traffic Control Centers (ATCC) and replacing towers and Terminal Radar Approach Control facilities (TRACONs)
- Installing new hardware and software for air traffic facilities to create a common platform system through towers, TRACONs, and centers
- Address challenges faced in Alaska by adding 174 new weather stations

7.4.2. Current Modernization Activities

To assist the FAA with implementing the BNATCS, the agency published a new strategic initiative called *Flight Plan 2026* aimed at building public trust through transparency and accountability. The plan places significant focus on workforce and training, safety and technology, and continued NAS modernization including selecting participants for AAM pilot programs (**Figure 7-6**). The USDOT and FAA announced in January 2026 that the FAA will begin replacing the nation's aging radar system in early 2026. Replacing this network of ground-based radars will enhance the safety and efficiency of the NAS which is vital for detecting and tracking aircraft. The FAA estimates up to 612 radars will be replaced by June 2028.

[15] U.S. Department of Transportation (USDOT), "US Transportation Secretary Sean P. Duffy Unveils Plan to Build Brand New State-of-the-Art Air Traffic Control System," May 8, 2025. https://www.transportation.gov/briefing-room/us-transportation-secretary-sean-p-duffy-unveils-plan-build-brand-new-state-art-air

Figure 7-7. FAA Flight Plan 2026 Pillars



Source: FAA, 2026.

While not formally a component of the BNATCS program, the FAA's Remote Tower Program is aligned with the same overarching modernization effort and goals of the BNATCS. The program has been in a relatively slow-moving test and evaluation phase since it was established by Congress in 2018. A draft Remote Tower Siting Order is currently under development and is being modeled after FAA Tower Siting Order JO 6480.4 and the new VISTA process used for brick-and-mortar towers.

To accomplish Flight Plan 2026, there are several top concerns that industry stakeholders and legislative leaders have voiced. The first and immediate concern revolves around the ability to integrate new digital, networked tools with updated radar systems and legacy automation platforms that will be expanded. Legislative oversight reports have emphasized the need for stronger cyber defenses and clearer lines of accountability for vendors as the system moves toward more software-driven operations. The next area of concern is the availability of funding and associated cost risks with the size and scope of this program. Multi-year appropriation uncertainty raises fears that Congress may not be able to sustain the level of investment (a total funding of $31.5 billion) needed to complete the modernization, leading to delays, cost overruns, or a partially deployed system as the BNATCS essentially compresses a 20-year plan into only

2-3 years.[16] The last area of shared stakeholder concern is the FAA's ability to hire and train the next generation of ATC staff while sustaining integrity of the NAS. As discussed subsequently in this chapter, there are significant workforce challenges facing air traffic control from a shortage of 3,000 controllers[17] and overworked staff to a high attrition rate and a wave of retirements to rigorous multi-year training and growing air traffic demands.

7.4.3. Implications and Opportunities for North Dakota

Modernization of the air traffic control system directly supports North Dakota's growth as a UAS hub, improves service for its traditional aviation network, and positions the state to capture more traffic and investment as the NAS becomes more digital and automated. It affects everything from how Grand Forks' UAS ecosystem integrates with the national system to how reliably and efficiently small communities receive air service.

The NPUASTS is one of the FAA's designated test ranges used to generate data and concepts for safe integration of drones into the modernized NAS. Current efforts at NPUASTS include the Radar Data Pathfinder Program which is validating how existing ground-based radar assets can detect and track low altitude UAS operations. This program will help transform radar coverage maps from theoretical assumptions into operational safety nets for BVLOS flights. The Vantis program is proving to be model architecture for UTM and is a system that provides reliable command-and-control, real-time situational awareness, and surveillance services that mirror what traditional ATC offers to crewed flights. Finally, NPUASTS is bridging the gap to modernization by helping operators and manufacturers meet FAA regulatory expectations for new aircraft, flight profiles, and operational concepts.

In January 2025, UND was selected by the FAA to become the next school for their Enhanced Air Traffic – Collegiate Training Initiative (AT-CTI) program. UND offers a B.S. in Aeronautics with a major in Air Traffic Management that prepares graduates for ATC careers. Under this program, students will complete the FAA Academy curriculum on campus, and if they pass the Air Traffic Skills Assessment and meet other medical and security requirements, they can bypass the Academy and move directly to on-the-job training at facilities. This significantly accelerates the air traffic controller pipeline. Additionally, UND Aerospace emphasizes 'next-generation' skills that include radar and tower operations, safety management, and exposure to emerging concepts like UAS and AAM, all of which provide graduates with evolving technology and operational concepts related to the FAA's modernization programs.

[16] USDOT Office of Inspector General (OIG), "DOT's Top Management Challenges FY2026," January 6, 2026. https://www.oig.dot.gov/sites/default/files/library-items/DOT's%20Top%20Management%20Challenges%20Report%20FY26.pdf
[17] USDOT, "ICYMI: US Department of Transportation Secretary Sean P. Duffy Joins Meet the Press," May 12, 2025. https://www.transportation.gov/briefing-room/icymi-us-department-transportation-secretary-sean-p-duffy-joins-meet-press

7.5. Aging Fleet and Pilot Population

The aviation industry, both commercial service and GA, is facing a unique convergence of challenges, as aging aircraft fleets coincide with a wave of pilots nearing retirement. The COVID-19 pandemic only highlighted these challenges, exposing vulnerabilities in workforce pipelines and the need for long-term investment in aircraft modernization. As travel demand returned post-COVID, the shortage of qualified pilots and mechanics, combined with the high costs of replacing or retrofitting older aircraft, has placed additional strain on operators, particularly those serving small and rural communities.

The advancement of automation and AAM will also undoubtedly reshape the aircraft fleet and the need for pilots over the next several decades. More automation is planned for cockpits with pilots acting more like system managers and single-pilot cruise operations are on track to start appearing in the 2030s. Faster adoption of this technology will likely first occur for cargo, military, and remote operations. Zero-pilot passenger flights are not as likely to be near term although many eVTOL manufacturers desire fully autonomous activity. Despite the potential long-term implications of automation, the pilot shortage is expected to remain severe over the next decade and it anticipated that airlines will need to aggressively hire trained pilots through the early 2030s.

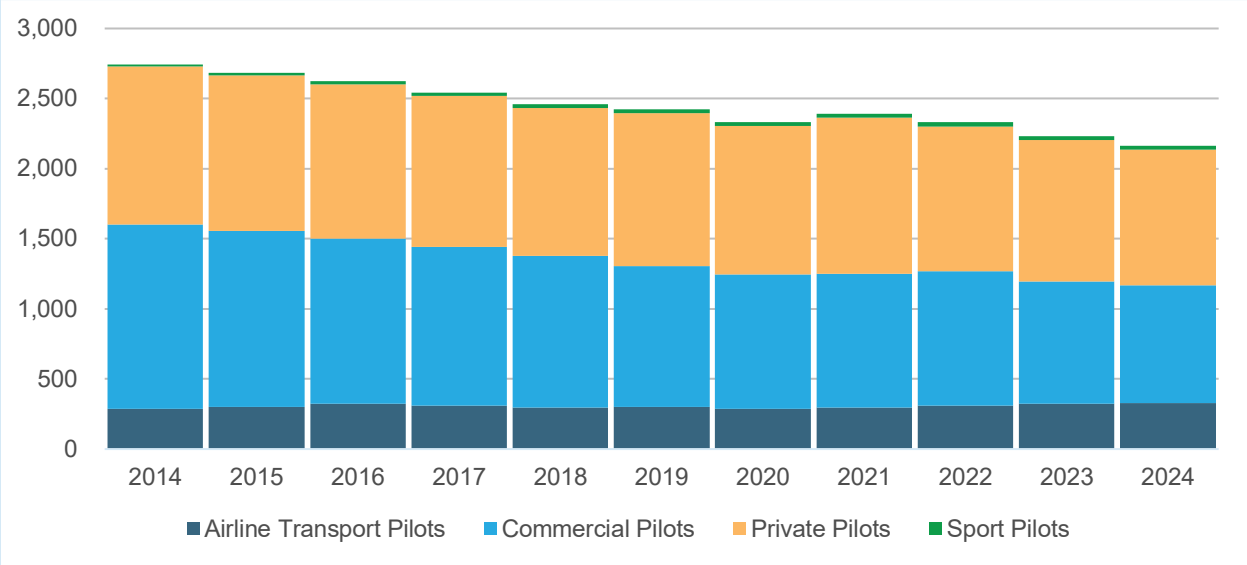
7.5.1. Aging Pilot Population

According to the Regional Airline Association (RAA), in 2023, the average pilot was 51 years old, with 14 percent of commercial pilots retiring in the next five years, and half of the workforce forced to retire in 15 years.[18] Pilots over 50 years old accounted for 59 percent of the airline transportation pilot certificates in 2024. The GA pilot pool is also aging, and most newly licensed pilots are opting to fly for airlines, instead of choosing GA pathways. In North Dakota, several aerial applicators based at rural airports have expressed concern about their companies' future as they approach retirement and note a shortage of younger pilots to take their place.

One of the key reasons for the pilot shortage is the retirement of senior aviators, many of which were furloughed or took early retirement during the pandemic. According to FAA's U.S. Civil Airman Statistics, there was a decline in nearly all pilot certifications between 2010 and 2022 with an overall decline of five percent over the 12-year period. Largest declines were in private and commercial certificates.[19] This trend has been witnessed in North Dakota as well. **Figure 7-8** presents the decline in active pilots in North Dakota in the most recent 10 years (2014-2024). Commercial pilots in North Dakota fell 35 percent over the last decade, while private pilots were down 18 percent during this period.

[18] Regional Airline Association (RAA), "Small Community Air Service Trends Update (4Q23)," RAA, October 2023, https://www.raa.org/wp-content/uploads/2023/12/4q23-Small-Community-Air-Service-V2.pdf.
[19] Federal Aviation Administration. *FAA Aerospace Forecast: Fiscal Years 2023–2043*, May 8, 2023, https://www.faa.gov/dataresearch/aviation/aerospaceforecasts/faa-aerospace-forecast-fy-2023-2043

Figure 7-8. Active Pilots in North Dakota



Sources: FAA U.S. Civil Airman Statistics, 2025; North Dakota Aeronautics Commission, 2025.
Note: Excludes remote and student pilots

The U.S. Department of Employment and Economic Development projects that the aviation industry will have more than one million job openings in the next 10 years. Government and industry forecasts anticipate critical shortages in the next two decades as 10,000 baby boomers become eligible to retire each week.[20]

7.5.2. Aging Aircraft Fleet

In terms of the commercial fleet, there were more than 30,000 aircraft in operation worldwide in 2023. Of these, over 10,000 or one-third are more than 20 years old.[21] The average maintenance cost for a commercial aircraft is about $1 million per year, and this cost increases as the aircraft ages. While airlines were recovering from the pandemic, they lost more than $10 billion due to maintenance and repair issues. This cost is expected to continue rising in the coming years. Commercial fleets in North America also tend to be slightly older, partly due to aging regional jets which continue to be the most effective aircraft to serve smaller routes, like many in North Dakota. Airlines must make difficult financial decisions as they balance managing aging fleets with new aircraft orders.

Long-term investment in aircraft modernization presents significant financial and operational considerations for the aviation industry. As aircraft age beyond 20 years, maintenance costs

[20] National Academies of Sciences, Engineering, and Medicine, ACRP Web-Only Document 28: Identifying and Evaluating Airport Workforce Requirements, Transportation Research Board, Washington, DC, November 2016, https://nap.nationalacademies.org/catalog/27193/identifying-and-evaluating-airport-workforce-requirements
[21] Edward Hardy, "The Challenges of Ageing Fleets in the Modern Era," Air Cargo Week, December 11, 2023, https://aircargoweek.com/the-challenges-of-ageing-fleets-in-the-modern-era/

increase substantially while fuel efficiency declines. Operators must balance the costs of maintaining existing fleets against investments in new aircraft or major retrofit programs. For regional carriers serving markets like North Dakota, the challenge is compounded by limited aircraft options suitable for smaller routes and manufacturing backlogs that extend delivery timelines for new aircraft by several years. The decision to modernize involves evaluating maintenance cost trajectories, aircraft utilization rates, available financing, and the timeline for new aircraft availability.

The general aviation sector faces similar modernization challenges. In 2023, the FAA noted that the U.S. GA fleet of 150,000+ aircraft has an average age of more than 50 years old.[22] The GA fleet is being flown beyond the flight hours and years originally intended, and airworthiness safety become increasingly important. Cockpit modifications as well as new avionics and routine upgrades can extend the life of a GA aircraft and will become increasingly important with the modernization of the air traffic control system.

Aging aircraft present several key concerns related to safety, reliability, and operational costs. As an aircraft accumulates years in service, they face a variety of maintenance challenges. Since the pandemic, an aging aircraft fleet has forced aircraft maintenance, repair, and overhaul (MRO) providers to adjust their strategies to address the challenges of servicing older aircraft. Large investments in maintenance programs and technology upgrades to remain as safe as possible are paramount. The challenge is compounded by manufacturing constraints with current aircraft order backlogs exceeding 17,000 units globally and delivery timelines extending 11 to 14 years at today's production rates.[23] This shortage means that even existing orders are insufficient to replace aging aircraft on normal retirement schedules, forcing operators to extend the service life of older fleets while waiting for new deliveries that may not arrive until the early 2030s.

Fleet modernization also plays a critical role in supporting the FAA's ongoing ATC modernization efforts. Modern aircraft equipped with updated avionics, ADS-B transponders, and digital communication systems are essential for integrating with newer air traffic management technologies. As the FAA invests in modernizing ATC infrastructure and implementing performance-based navigation procedures, aging aircraft lacking compatible avionics create operational inefficiencies and limit the full benefit of these systemwide improvements. Without aircraft modernization keeping pace with ATC system upgrades, the aviation system cannot fully leverage the capabilities of modern air traffic management.

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[22] Federal Aviation Administration, *Best Practices Guide for Maintaining Aging General Aviation Airplanes*, FAA Small Airplanes Continued Operational Safety booklet, September 2003, https://www.faa.gov/sites/faa.gov/files/aircraft/air_cert/design_approvals/small_airplanes/aging_air_booklet.pdf

[23] International Air Transport Association, *The Global Commercial Aircraft Fleet,* August 2025. https://www.iata.org/en/iata-repository/publications/economic-reports/the-global-commercial-aircraft-fleet/

7.5.3. Supporting Aging Pilots and Fleets

The aging pilot population and aircraft fleet impacts many aviation sectors in the country and in North Dakota and have a ripple effect on other aviation-reliant sectors. The main concern is not about an aging pilot population operating safely, but regarding the workforce pipeline and whether there are enough new pilots to replace retiring older pilots. To help address these concerns, pilot training in North Dakota has grown dramatically, with student certificates up 165 percent over the last 10 years. In 2024, there were 1,997 student pilots registered in the state compared to 794 in 2014. North Dakota is actively investing in aviation education and training, with major institutions and the state supporting training programs. These include:

- **UND Expansion:** Enrolled over 1,200 total aviation students in 2024,[24] producing approximately 250 certified pilots a year with an 85 percent placement rate into airlines, corporate aviation, and military jobs.[25] Expanded flight training capacity by increasing its fleet,[26] purchasing new simulators and partnering with airlines and the military.
- **North Dakota State College of Science (NDSCS) Aviation Technology Program:** Launched in 2025, the FAA-certified program in Fargo expands the state's capacity to train aircraft maintenance technicians and is addressing the growing demand for qualified personnel to service both aging aircraft and modern systems.
- **North Dakota Aeronautics Commission (NDAC) Flight Training Assistance Program (FTAP):** Reimburses instructors' transportation, meals, and lodging to serve rural areas, having supported 300+ students at more than 20 airports since 2020 and boosting local student starts by 40 percent.
- **High School Education Programs:** NDAC has an integral role in advancing aviation education in North Dakota. NDAC provides aviation education assistance and grant funding to support aviation-related coursework at high schools across the state. These programs introduce students to aviation concepts, career pathways, and foundational technical training. Distance learning options are also available, allowing students from rural and remote areas to participate as well.

To further bolster aviation workforce pipelines, NDAC can continue to partner with universities, technical colleges, and high schools to expand aviation programs and introduce early-career pathways. State-funded scholarships, loan repayment/forgiveness, and employer training grants help reduce the high cost of flight training and attract new entrants. North Dakota may also benefit from evolving workforce development opportunities, including apprenticeship models for aviation maintenance and career and technical education programs, offered through the North Dakota Department of Career and Technical Education that emphasize skilled trades and early aviation training.

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[24] University of North Dakota, Department of Aviation Fact Sheet, Accessed October 2025. https://www.gocivilairpatrol.com/media/cms/UND_aviation_Program_08FDB7AC02593.pdf

[25] University of North Dakota, "Student Achievement Data," John D. Odegard School of Aerospace Sciences, last updated November 28, 2025, https://aero.und.edu/aviation/student-achivement-data.html

[26] Piper Aircraft, Inc., "Piper Aircraft Awarded Its Largest Domestic Trainer Order in Company History from the University of North Dakota," press release, July 22, 2025, https://www.piper.com/press-releases/piper-aircraft-awarded-its-largest-domestic-trainer-order-in-company-history-from-the-university-of-north-dakota/

These measures position North Dakota ahead of national trends, where FAA forecasts demand for 17,000 new pilots yearly through 2043.

To address the challenges of an aging fleet, the state could consider the following:

- **Comprehensive Maintenance Programs:** Work with existing aircraft maintenance shops or programs (or bring in new programs) that go beyond standard regulatory requirements to ensure proactive measures are taken, especially with older aircraft. Support upgrades to maintenance facilities at airports to ensure they can service both aging legacy aircraft and new aircraft with advanced systems.
- **Specialized Training:** Invest in additional training programs to promote technicians and engineers that are skilled in working with aging aircraft to ensure they are knowledgeable about working on older models of aircraft. This training is in addition to new training needed to address emerging aircraft technologies. Support partnerships between maintenance training programs, operators, and maintenance facilities to create coordinated training and resource sharing opportunities.
- **Ag Applicator Incentives:** Provide a state tax credit or low-interest loans for fleet modernization, state scholarships or service-commitment reimbursement programs for ag pilot certification, and recruitment pipelines to sustain and grow the ag aircraft and pilots in North Dakota that are critical to treating cropland.

7.6. Aviation Professional Shortage

The aviation industry encompasses a wide variety of jobs that often rely on a highly skilled workforce. Workforce shortages have impacted aviation in North Dakota and throughout the U.S. over the last decade with declining numbers of key jobs. As discussed in the prior section, the pilot shortage has led to a boom in flight training driven by a peak in airline pilot hiring due to worldwide airline growth and early retirements during and post-COVID. Although pilots, flight attendants, and air traffic controllers are often the most recognized jobs in the industry, additional aviation-related jobs support airport operations or are in manufacturing, aircraft MRO organizations, or cluster industries that provide parts and services to the aviation and aerospace industries.

The U.S. economy is experiencing increased air travel demand growth faster than economic growth now that the U.S. has recovered from the pandemic. In addition, a record number of aircraft deliveries are anticipated in the next 10 years, despite continued supply chain disruptions. A prior section discussed that even with the projected number of aircraft deliveries, there will be fewer commercial aircraft in the fleet as the new deliveries will not replace all that are currently in the commercial fleet. In *Pilot and Technician Outlook 2025-2044*, Boeing estimates that over 2.3 million new personnel (pilots, maintenance, cabin crew members) are needed globally over the next 20 years. In the U.S., this translates to 435,000 new jobs by 2044, representing approximately 18.4 percent of the global need.

7.6.1. Key Shortages

The pilot shortage is just one of many aviation employment challenges the industry is grappling with. It is estimated that maintenance technicians have a current shortage between 12,000 to 18,000 employees[27] and air traffic controllers are short about 3,000 employees.[28] These shortages are likely to cause continued flight delays and cancellations across the system. The advancement of UAS and AAM will likely amplify these shortages as trained pilots, technicians, and mechanics will also be needed to support this emerging technology.

Two out of five U.S. mechanics will reach retirement age by 2031. While supply is growing, with record numbers of new mechanic certificates in 2023 and 2024, demand is expected to grow faster.[29] According to a survey by Oliver Wyman, a shortage of aviation maintenance workers will persist over the next 10 years and likely peak in 2027, with an estimated shortfall of around 25 percent of the needed workforce.[30] Oliver Wyman research also highlights the need for a specialized support ecosystem for AAM, emphasizing that the workforce crunch affects the ability to support these new, innovative aircraft. While all players in the industry will be impacted, the largest impact will be to independent MROs and regional airlines, which are often the entry point for training. Larger companies and airlines are offering higher salaries and often looking to fill positions from retirements. This means smaller businesses with tighter margins will feel the most impact.

7.6.2. Aviation-Related Workforce Challenges in North Dakota

The North Dakota aviation workforce drives $XX billion in annual economic activity, including ag aviation treating 5.5 million acres in 2024 via 183 agricultural aircraft.[31] However, North Dakota has experienced the effects of workforce challenges and is working to address them to support the aviation industry with a skilled workforce capable of supporting smooth operations and continued growth statewide.

7.6.2.1. Survey Findings

As part of this study, NDAC gathered information on how aviation in the state has been impacted by the limited availability of qualified workers. Both airport management and airport

[27] Aaron Karp, “Aviation Maintenance Technician Shortage Threatens Post-COVID Rebound,” Avionics (digital edition), March/April 2023, https://interactive.aviationtoday.com/avionicsmagazine/march-april-2023/aviation-maintenance-technician-shortage-threatens-post-covid-rebound/

[28] Gregory Wallace, “America hasn’t had enough air traffic controllers for more than a decade,” CNN (Travel), May 14, 2024, https://www.cnn.com/travel/article/faa-traffic-controllers-shortage/index.htm

[29] Aviation Technician Education Council (ATEC) and Oliver Wyman Vector, *2025 Pipeline Report: New Mechanic Certificates Jumped in 2024, but Technical Workforce Gap Concerns Remain*, ATEC, September 18, 2025, https://assets.noviams.com/novi-file-uploads/atec/Pipeline_Report_2025_web_optimized.pdf.

[30] Derek Costanza, Brian Prentice, et al., *Not Enough Aviation Mechanics: Aviation Technician Workforce Analysis*, Oliver Wyman, January 2023, https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2023/jan/Not%20Enough%20Aviation%20Mechanics%20-%20AMT%20report.pdf

[31] North Dakota Aeronautics Commission, “ND Aerial Applicators Provide Record Service to 5.5 Million Acres in 2024,” news release, January 7, 2025, https://aero.nd.gov/news/nd-aerial-applicators-provide-record-service-to-55-million-acres-in-2024/

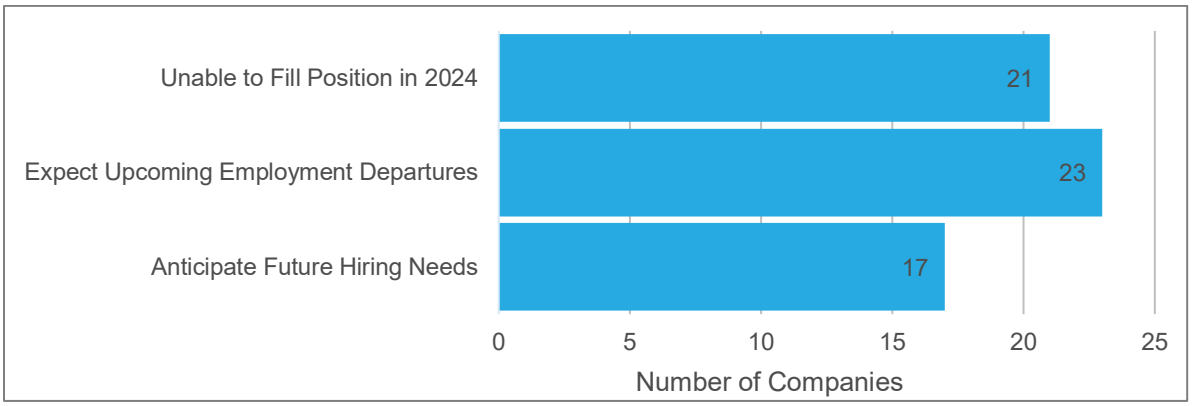
tenants were asked about workforce shortages and challenges they are encountering. The following questions were posed to both airport sponsors/management and airport tenants:

- Were there job positions that you were unable to fill in calendar year (CY) 2024? If yes, please provide the role of the positions that you could not fill and indicate if you are still trying to fill this position.
- Are you aware of any upcoming employment departures? If yes, please provide the role of the position leaving the airport and indicate the timing that this departure is expected to occur.
- Are you aware of any future hiring needs? If yes, please provide the role for the upcoming position/s and when you expect the position to be open.

Five airport managers/sponsors noted that they were unable to fill positions in the last year. Snow removal and airport maintenance were the most common unfilled positions. One airport noted the difficulty in filling their airport director job in the last year. Several airports also noted upcoming employment departures. These openings are in the areas of airport management, seasonal mowing, and airfield operations.

On-airport business tenants also reported workforce challenges. Of the 228 businesses located at North Dakota airports, approximately half answered the survey questions related to workforce challenges. Nearly 20 percent of those respondents noted that they experience challenges related to finding and maintaining employees. These businesses currently have 570 employees (383 full-time and 187 part-time). **Figure 7-9** highlights the number of businesses that reported various types of workforce challenges. Several tenants noted multiple types of challenges.

Figure 7-9. North Dakota Airport Tenants That Identified Various Workforce Challenges

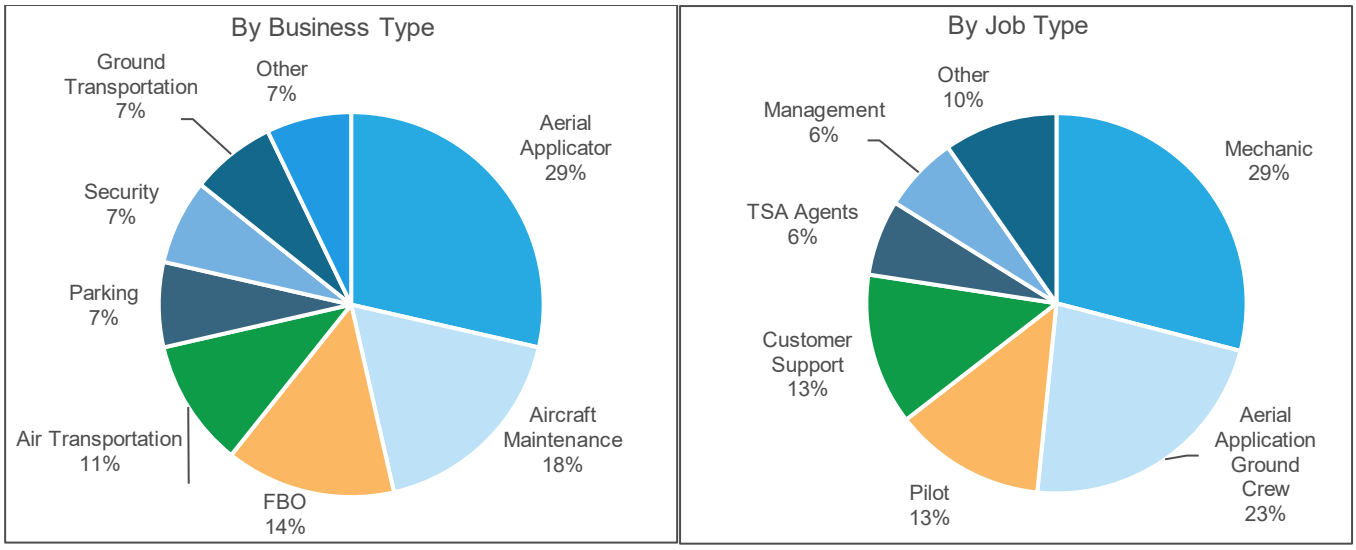


Source: North Dakota AEIS Airport Tenant Survey, 2025.

Figure 7-10 presents a summary of the survey results of the companies that responded “Yes” to having workforce challenges. Aerial applicators, aircraft maintenance companies, and fixed-base operators (FBOs) represent the largest types of businesses that are experiencing or anticipating challenges. Aircraft maintenance shops and FBOs (or 29 percent of respondents) identified difficulties finding mechanics and flight line technicians. Aerial applicators, which

accounted for the largest group of businesses that responded, noted that they struggle to find and maintain ground support/loaders as well as skilled pilots/sprayers.

Figure 7-10. North Dakota Airport Tenants that Identified Workforce Challenges, by Business Type and by Job Type



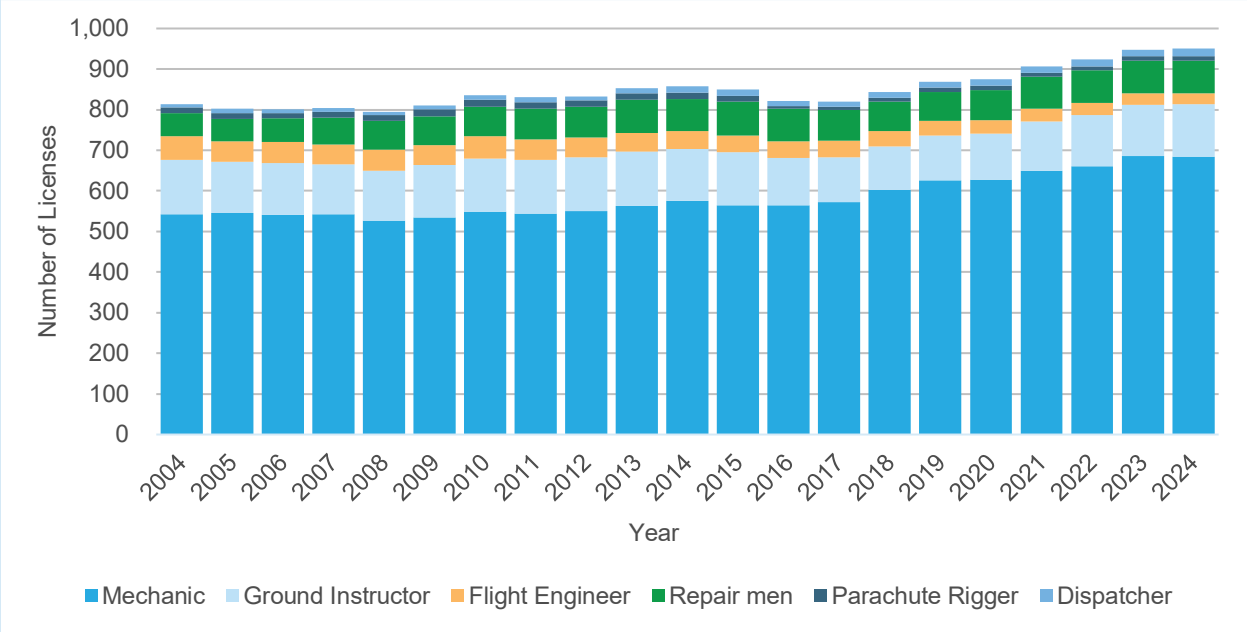
Source: North Dakota AEIS Airport Tenant Survey, 2025.

For additional detail on the estimated economic impacts associated with workforce development challenges in North Dakota, please refer to **Section 9.X** of **Chapter 9. North Dakota Aviation Economic Impact Study**. This section uses the survey data summarized here to quantify the economic activity lost due to unfilled positions within the state's aviation industry

7.6.2.2. Non-Pilot Licensed Airmen in North Dakota

The survey results indicate the need for additional licensed mechanics in the state as well as several other key aviation jobs. **Figure 7-11** highlights the number of licensed airmen (non-pilots) in the state over the last 20 years as reported by the FAA. Mechanics make up the largest percentage of non-pilot licensed airmen (62 percent in 2024), with ground instructors ranking second. Between 2004 and 2017, the number of licensed mechanics in the state fluctuated between 530 and 575 per year. In 2018, the number exceeded 600 and has continued to grow, reaching 685 licenses in 2024. This was likely due to several initiatives in the state, as discussed in a subsequent section. However, the survey results show that additional mechanics in the state are needed to support airport tenants.

Figure 7-11. North Dakota Non-Pilot Airmen Certificates by License Type



Sources: FAA Airmen Certification Database, NDAC. 2025.
Note: The number of mechanic licenses issued was revised based on NDAC data.

7.6.2.3. Barriers Facing New Commercial Pilots in North Dakota

During the NDSASP Technical Advisory Committee (TAC) meeting held in February 2026, committee members discussed barriers facing new commercial pilots in North Dakota. While the pilot shortage is often framed as a pipeline supply problem due to aging pilots, structural barriers also limit how quickly, and easily, certificated commercial pilots can enter the workforce. Several challenges relevant in North Dakota were noted:

- **FAA Regulations:** The 1,500-hour requirement to obtain an Airline Transport Pilot certificate has added more than two years and $100,000 in costs and made it more difficult to obtain certification.
- **Financial Burden:** The cost to obtain certification remains a significant deterrent.
- **Insurance Requirements:** Insurance requirements for operators and pilots is an additional barrier due to substantially higher premiums. This is a burden not only for new pilots but also can deter small operators from taking on and developing entry-level commercial pilots.
- **Rural Environment:** It is difficult for the state to competitively recruit and maintain young pilots (as well as other aviation professionals) due to the rural nature of the state and the remote location of many aviation jobs.

7.6.3. North Dakota Initiatives

A critical component of addressing workforce challenges is ensuring there are adequate staff with the required training and talent to fulfill the existing needs of employers as well as being prepared for future industry workforce needs. North Dakota has already taken several steps to strengthen aviation workforce pipelines statewide. The state has several schools that provide

aviation-related training and education. Although a number of these schools are standalone programs, many of them are associated with colleges/universities.

UND's Aerospace School is a leader in the state, and across the country, in training future pilots and air traffic controllers. As previously noted, UND was recently selected by the FAA to be a part of the Enhanced Air Traffic-Collegiate Training Initiative (AT-CTI) to offer a program that will allow students to obtain the endorsement certificate to allow them to go directly to an FAA facility for air traffic controller training upon successful completion.

North Dakota State College of Science (NDSCS) launched a new FAA-certified Aviation Maintenance Technology program in Fargo in 2025, marking a significant development in the state's aviation education landscape. This program is North Dakota's only FAA Part 147-certified Aviation Maintenance Technology program, aimed at addressing regional and national workforce needs for highly trained aircraft maintenance technicians. The NDSCS program was made possible due to start-up grant funding from the FAA Workforce Development Program and aviation education grant funding from NDAC.

The North Dakota Aviation Association (NDAA) plays a pivotal role in supporting aviation education and workforce development across the state. One key initiative is the Fly-ND Career Expo, an annual event that introduces high school and college students to the wide range of opportunities in the aviation industry. NDAA also provides scholarships to students pursuing post-secondary education in aviation-related disciplines. NDAA's scholarship program, along with its career expos and educational outreach, has received national recognition, including the National Business Aviation Association's Outstanding Excellence by a Local or Regional Group Award, highlighting the association's commitment to cultivating the next generation of aviation professionals.

NDAC prioritizes the support of future aviation workforce needs through strategic investments in education. The aviation education initiatives have seen tremendous growth and success during the current biennium, providing $400,000 in aviation education assistance and grant funding. Aviation programming at North Dakota high schools is currently available at eight cities across North Dakota, with aviation-related courses provided in Williston, Watford City, Minot, Bismarck, Jamestown, Kindred, West Fargo, and Grand Forks. Distance education is also available to ensure that all high school students, regardless of location, have access to aviation learning opportunities.

7.6.4. Federal, Professional Organization, and Other State Initiatives

As air travel demand continues to increase, it is critical the aviation industry makes concerted efforts to navigate these challenges. Strategic efforts in recruitment, training, and fostering a resilient and intelligent workforce can contribute to the safe and efficient operation of air transportation systems while driving innovation and growth within the aviation industry nationwide. Many programs and initiatives related to workforce development have been

developed at all levels within the aviation industry to reduce burdens experienced in the industry. Airlines and private companies support workforce development by funding pilot and maintenance training programs, university and technical school partnerships, tuition assistance, and structured career pathways designed to recruit, train, and retain the next generation of aviation professionals. Many other organizations are making a concerted effort to improve the workforce pipeline. These efforts are described in the following subsections.

7.6.4.1. Federal Initiatives

Federal programs, legislation, and agency efforts are strengthening the pipeline of pilots, maintenance technicians, air traffic controllers, and other aviation professionals. FAA Workforce Development Grants are funding scholarships, training programs, infrastructure improvements, and research initiatives, benefiting individuals and organizations involved in aviation education and training. UND has been a grant recipient and is currently using their grant to engage science, technology, engineering, and math (STEM) teachers by giving them the tools to teach students about careers in aviation and provide hands-on flight experiences.

Several legislative proposals are aimed to expand workforce programs. They include:

- **Aviation Workforce Development Act** seeks to address aviation workforce shortages by expanding 529 College Savings Plans to cover education and training expenses for commercial pilot and aviation maintenance programs, making aviation careers more financially accessible.
- **Aviation WORKS Act** proposes funding for aviation workforce development, expanded grants, and the establishment of programs for aviation manufacturing alongside pilots and maintenance technicians.
- **AIRWAYS Act** will offer grants for education, recruitment, and workforce development across pilots, maintenance, and manufacturing sectors, with a focus on underrepresented communities.

7.6.4.2. Aviation Industry Professional Organization Initiatives

The two largest aviation industry professional organizations, Aircraft Owners and Pilots Association (AOPA) and National Business Aviation Association (NBAA), have programs in place to support workforce development. AOPA has several initiatives including “You Can Fly,” a program that allows the ability to pursue several specific, yet different approaches related to building the pilot and aviation community and “High School Initiative” that utilizes STEM-based aviation education to teach students over a four-year program that follows tracks for both piloted and uncrewed aircraft systems or drones. In addition, the AOPA Foundation provides more than $1 million in scholarships for flight training.

NBAA efforts include “Collegiate Connect“ which is aimed at growing the workforce by conducting a series of panel discussions and educational sessions to share job search and networking strategies; aviation career fairs to inform students about career opportunities throughout aviation including business aviation; professional development programs focused on advancing their careers in corporate/business aviation; and other on-demand education

programs that allow members to take advantage of computer based educational programs for professional development.

There are more than a dozen other professional aviation organizations that provide workforce development programs and resources geared at continuing to develop the current workforce as well as growing the future workforce by expanding the depth of subject areas, incorporating airport-specific topic areas, and encouraging and strengthening collaboration between industry and academia.

7.6.4.3. Other State Initiatives and Best Practices

Many states also have initiatives in place to support aviation workforce shortages and workforce development. A few are highlighted here.

- **Alabama:** Alabama Department of Commerce's Workforce Development Division works with aerospace and aviation companies to assist with new start-ups and expansions. The organization provides services at no cost to the companies or trainees and include recruiting, assessing, and training new and existing employees. They work to provide job specific and customized training to meet the individual needs of the companies. The state also has several programs geared towards students including:
    - **Flight Works Alabama:** Supports the education center located in Mobile near the Airbus manufacturing plant that hosts school field trips, tours, and provides learning programs like FlightPath9 and We Build It Better. FlightPath9 is a pre-employment program for high school seniors that covers skills and certifications for an aviation career. We Build It Better provides classroom kits to instruct middle school students in work skills including project design, electrical wiring, fiber optics, and coding.
    - **Boeing's FlexFactor Program:** Launched in 2018, Boeing developed this program to build awareness among high school and college students about career paths in the advanced aerospace manufacturing sector.
    - **Alabama Aerospace and Aviation High School (AAHS):** AAHS welcomed its first class of students in 2022 and provides industry and career training and experience in aviation and aerospace.
- **Colorado:** The Colorado Aviation Education Grant Program is the state's answer to helping fill workforce development gaps. The program is geared towards science, technology, engineering, arts, and math (STEAM) education opportunities at established and accredited educational organizations. Examples of grants awarded in fiscal year (FY) 2024 include:
    - **AIMS Community College:** Updating UAS fleet to provide greater student accessibility and opportunity in the fields of film, construction, inspection, and precision agriculture.
    - **Colorado Northwest Community College:** New crew-resource management (CRM) simulator.
    - **Colorado Pilots Association:** Technology upgrades for laptop computers and a projector that is needed for providing mountain flying course to pilots.
    - **District 11 CTE Aviation Pathways Program:** Aircraft engine, instrumentation, or avionics equipment to complete course work for a full aircraft maintenance program that will allow for hands-on training in aircraft construction which is to be built by students in the classroom.

- **Eagle County Regional Airport:** Redbird TD2-S Flight Simulator with table, horizontal side monitors, and shipping costs which will permit logbook entry pilot training during non-flyable weather days.
- **Legacy High School:** E6B Flight Computers and micro plotters that will assist students to obtain a private pilot certificate and/or Part 107 drone certification.

- **Kansas:** In early 2023, the Kansas Department of Commerce introduced the Aviation Learning Opportunities & Funded Training (ALOFT) Program whose goals are to increase training and development opportunities within the Kansas aviation industry, increase capacity of aerospace and aviation manufacturers, increase service of local airports via expansion of facilities that provide for additional staff and training opportunities, and use funding to leverage additional workforce investment in aviation and aerospace by requiring a 25 percent match. In June 2023, Department of Commerce awarded nearly $20 million in aviation workforce development grants to seven recipients to use over the next two years to provide construction on-site training facilities and service expansions; third-party and vendor training costs on machinery and equipment; machinery and equipment for training, salaries directly related to training, youth training services, and costs related to early interest development in aviation and aerospace industries; and course development costs and services for development of in-house training, marketing, communication, and activities to attract talent to aviation and aerospace industries
- **Oklahoma:** Oklahoma's Aerospace and Aeronautics Commission has a robust aerospace and aviation education grant program that addresses workforce challenges in the industry by introducing Oklahoma students to the array of STEM careers. Additionally, the Commission partners with Oklahoma's Department of Commerce in the delivery of the Aerospace Commerce Economic Services (ACES) program which seeks to grow and develop the aviation and aerospace industry. The Commission allocated over $1 million to AOPA schools, aerospace programs, and aviation-centric organizations in 2024. Recent legislative developments include the establishment of the Aero Student Pathways for Aerospace Careers and Education (AeroSPACE), a program to bolster aerospace educational efforts and align curricula with the workforce needs of the aviation and aerospace sectors. The Commission's Aero Education Program includes competitive grant awards, provisions for high schools offering the AOPA "You Can Fly" curriculum, support for classroom laboratories dedicated to aviation and aerospace education, and the continuation of key aerospace education events.

7.6.5. Addressing Workforce Challenges

Solving workforce shortages requires multiple solutions, from many different angles. Amid the turbulence of the aviation workforce shortage, there are bright spots ahead including legislative actions, innovation in training and recruitment, new technological advancements, and an overall robust economy. Airlines are increasing pay for pilots and mechanics and creating flight schools. However, there is more work to be done to boost employment in aviation fields. For aviation mechanics, there is a new labor landscape that competes with broader high-tech industries as the industry shifts to digitization, handheld tech, and on the job training. Higher pay, benefits, and better work life balance must be offered by MROs and other companies.

Recruiting for aviation jobs should start early, at the middle school or high school levels, through curriculum, internships, and scholarships. National and state programs are supporting many industry workforce development initiatives to attract young people into aviation careers.

North Dakota has taken a meaningful step in recognizing aviation as a workforce priority. Commercial pilots, air traffic controllers, aircraft mechanics and service technicians, and civil engineering (airports) are all included on the state's annually updated *In-Demand Occupations List* which is published by the Governor's Workforce Development Council. By pursuing training in one of these designated fields, individuals qualify for funding assistance through the federal Workforce Innovation and Opportunity Act (WIOA) which includes career planning, training support, and on-the-job training reimbursements of up to 50 percent of wages. Scholarships and loan repayment options are also provided to students pursuing careers included on the *In-Demand Occupation List* through the ND Career Builders program.[32] NDAA also offers scholarships for students pursuing post-secondary aviation education in professional pilot, aviation maintenance, aviation engineering, unmanned aircraft systems, aviation management, and air traffic control.

To address the barriers in North Dakota for new pilots noted by the TAC (refer to *Section 7.6.2.3*), the state could explore the following strategies:

- **Financial Access:** In addition to the scholarship and loan programs in place, NDAC, in coordination with the Bank of North Dakota, could develop low-interest aviation training loans and loan forgiveness programs tied to in-state service commitments.
- **Flight Hour Pathways:** The state's rural nature can provide natural flight hour-building opportunities. Agreements between state agencies and low-time commercial pilots could create paid pathways to ATP flight hours while serving state needs. Examples areas include aerial surveying, wildlife monitoring, and infrastructure inspection.
- **Insurance Cost Mitigation:** NDAC could explore a state-backed aviation insurance pool modeled on existing agricultural pool mechanisms to spread the risk and reduce individual premiums. Insurance premium tax credits for operators who hire and develop early-career pilots could further reduce the financial burden.
- **Employer and Pipeline Incentives:** WIOA on-the-job training reimbursements and workforce training tax credits should be actively marketed to local talent in North Dakota. Agreements between high school aviation programs and UND's Odegard School, combined with rural placement incentives for graduates who commit to working in North Dakota companies could create a more continuous pipeline from early aviation exposure through ATP certification and ultimately career placement.

In addition, North Dakota can consider best practices from other states to look to build on its already expansive existing aviation and aerospace initiatives to develop additional programs to continue to build a skilled and sustainable aviation workforce.

[32] North Dakota University System, ND Career Builders. (Accessed March 2026) https://ndus.edu/paying-for-college/career-builders

7.7. Commercial Service Access

Having access to the national air transportation network via commercial air service is a key driver of economic activity and jobs in many small communities. Air service allows small communities to attract investment, create and retain jobs, and support tourism and business. Flights from small communities to hub airports allow for one-stop service to cities around the world.

Since airline deregulation in 1978, small communities, including those in North Dakota, have struggled to maintain and expand commercial airline service. Each of North Dakota's eight commercial service airports are considered to serve a small community[33]. The economics of service to small cities are challenging to overcome. As airlines continue to look for ways to increase revenue and decrease costs, communities, especially those whose service is provided by a single carrier, find themselves at risk. Regional airline service and the small airports these carriers serve are the most susceptible to economic dips. In turn, reduced air service can limit economic development, deter business investment, and restrict mobility for residents, making small communities less competitive and limited in their ability to sustain population and business activity.

7.7.1. Challenges in Small Community Air Service

There are several factors that have contributed to the challenges of supporting air service at small communities over the last several decades. Even more recently, between 2018 and 2023, mean total departures from small communities nationwide decreased by 14 percent, from 2,235 to 1,919 flights.[34] The factors for this decline include:

- **Passenger Leakage:** Passengers often drive to airports farther away to access lower fares, better flight times, more frequent flights, or direct service. It is difficult to regain passengers that have become accustomed to driving to access air service.
- **Declining Population:** Declining populations in small communities significantly undermine local air service. As populations shrink, demand for flights decreases, making routes less profitable and less attractive to airlines. This often leads to reduced flight frequency, fewer nonstop destinations, and even the loss of all commercial air service in the most affected communities.
- **Higher Fuel Costs:** Fuel accounts for up to 40 percent of an airline's expenses. Any increase in fuel costs in turn will increase the operational expenses for airlines. When fuel prices rise, small community routes (which already operate on thin profit margins) become even less economical. To offset the pressure, regional airlines may reduce service or increase fares.

[33] According to United States Government Accountability Office Report, *Commercial Aviation- Trends in Air Service to Small Communities,* a small community is defined to have a Census-reported statistical area population in the bottom 20 percent of all communities in the U.S. This equates to the 218 least populous communities with commercial airline service.
[34] United States Government Accountability Office, *Commercial Aviation: Trends in Air Service to Small Communities,* GAO-24-106681 (Washington, DC: U.S. Government Accountability Office, September 25, 2024; revised January 9, 2026), https://www.gao.gov/assets/gao-24-106681.pdf

- **Fleet Reduction in Small Aircraft:** The trend in strong growth of the 37-50 seat regional jet (RJ) in 1990s and early 2000s to replace turboprop aircraft in small markets ended following the spike in jet fuel costs during 2007-2008. It became no longer economically viable to fly small RJs to provide service to many short-haul markets such as a small market to the nearest airline hub airport. Average aircraft capacity in regional airlines continued to rise from 51 to 64 seats between 2007 and 2019, meaning smaller regional turboprops and RJs have been phased out in favor of larger RJs. The 50-seat aircraft continue to be the only aircraft type serving many small communities in the Essential Air Service (EAS) program, including those in North Dakota.
- **Pilot Supply:** As discussed in prior sections, there is an ongoing pilot shortage that has been impacting air travel over the last 10 years and there appears to be no end in sight due to the number of existing pilots reaching the mandatory retirement age of 65, expensive training, and FAA requirements that make it difficult to become a pilot. In 2013, the FAA published a rule requiring airline pilots to have at least 1,500 hours of flight time, up from a previous minimum of 250 hours before a pilot can fly commercially. That extra flight time added two years of training and more than $100,000 in expenses over and above student and airline expectations prior to the FAA ruling. Regional airlines continue to face the brunt of the pilot shortage as major airlines pull talent from regional airlines as major or legacy airline pilots retire, leaving regional carriers to scramble to find qualified people to fly their planes. It is anticipated that the regional carriers in the U.S. and the airports that depend on them will remain impacted by the shortage in qualified pilots as well as the pressure of higher pilot salaries and bonuses.
- **Technology Impact on Business Travel:** Over the past 30 years, the way companies conduct business has changed dramatically. Tasks that once required air travel and in-person meetings can now be accomplished through advanced technology and digital communication. Data sharing is nearly instantaneous, and even large-scale meetings can be held effectively online, a lesson learned well during and post-COVID. While these technological innovations have improved efficiency, they have also reduced demand for business travel, which once was the core of many airlines' operations. This has left small communities particularly affected by the decline in demand and therefore a more limited ability to support air service.
- **Shifting Corporate Travel:** Private aircraft travel for corporate purposes experienced a continued increase in demand even after the pandemic subsided, as business consumers valued its time savings and convenience over commercial airlines. Fractional ownership and jet card programs for companies such as NetJets and Flexjet have continued to grow as more corporate passengers shift from commercial flights to private options.

7.7.2. Federal Programs Supporting Small Communities

There are several government programs that help to support or improve scheduled passenger service in smaller communities.

7.7.2.1. Essential Air Service (EAS)

EAS helps subsidize air service to eligible small communities across the U.S. and is a critical tool for sustaining the viability of commercial air service in these markets including Jamestown, Devils Lake, and Dickinson in North Dakota. Due to continued soaring costs and fewer people flying from small airports, the sustainability of the EAS program is often in question, especially during a time when the federal government is looking to cut costs wherever possible. Total EAS

program expenditures have increased sharply since 2000. Annual spending is more than 10 times higher in 2024 ($591 million), compared to $50 million in 2000. Prior to COVID, in 2019, the program's total funding was $294 million, with subsidies doubling in 2024. In 2024, the three North Dakota airports in the program received a total of $20.6 million annually. SkyWest served each of the markets with service to Denver on 50-seat CRJ-200 aircraft.

With continued increases in the subsidies and limited increases in enplanement levels, some airports are dangerously close to exceeding the USDOT's per passenger subsidy caps which vary based on an EAS airport's distance from a medium or large hub airport. The continuation of the EAS program will continue to be under scrutiny in the future as the aircraft fleet available to serve EAS markets is aging with limited aircraft types to replace it and increasing airline labor/pilot costs.

7.7.2.2. Small Community Air Service Development Program (SCASDP)

Small communities (served by airports no larger than a small hub) can compete annually for SCASDP federal discretionary grants. Communities must apply for grants and identify air service deficiencies in the airport's air service and proposed solutions such as revenue guarantees, marketing assistance, start-up costs, and studies. Local, state, private, and/or in-kind contributions for the proposed project are encouraged. **Table 7-2** summarizes the SCASDP grants that have been awarded in North Dakota since 2020.

Table 7-2. Small Community Air Service Grants Awarded in North Dakota (2020-2025)

Community	Year	Grant Amount	Details
Grand Forks	2024	$1,000,000	Revenue guarantee and marketing to initiate and support new service by a major air carrier to a hub market, with a primary focus on service to Denver by SkyWest/United Airlines, Grand Forks' largest unserved market. The community is providing a generous local funding match.
Fargo	2023	$500,000	Revenue guarantee and marketing efforts to support new service on American Airlines to its Charlotte hub to increase connectivity to the eastern U.S., improve competition, and add downward pressure on fares. The community is providing substantial local funding for the project.

Community	Year	Grant Amount	Details
Williston	2022	$500,000	Revenue guarantee, marketing, and start-up costs to begin twice weekly service to Phoenix on Sun Country Airlines. The community is relatively isolated and experiences high air fares. The new service would benefit local industry, centered on the petroleum business. The community is providing substantial local funding for the project.

Source: FAA, 2025.

7.7.3. Addressing Air Service Challenges in Small Communities

The many challenges of maintaining and growing commercial air service in small communities will continue into the future. GAO Report 24-106681, *Commercial Aviation: Trends in Air Service to Small Communities*[35] outlines key realities of serving small communities and identifies options for air service improvements.

- Increasing pilot supply by revising the 1,500 flight hour requirement or raise the mandatory retirement age from 65 to 67
- Supporting the continued allowance for public charter operators to operate under Part 135 versus requiring them to operate under Part 121
- Minimizing the costs of current airline operations such as energy and maintenance costs through new AAM opportunities to serve small communities using electric or new propulsion technologies on shorter routes
- Modifying the EAS program by changing distance requirements, eliminating waivers, requiring matching funds, or opening the program up to more airports
- Modifying the SCASDP program by increasing funding, increasing flexibility, or offering larger grants
- Loosening restrictions on the use of airport revenue or increasing passenger facility charges (PFCs) to allow additional funding for air service development initiatives

Many of these ideas are federal policy considerations and it shows that the actions for the state and communities themselves to maintain and improve their air service are relatively limited. A community's air service is highly dependent on the local population. Pursuing economic development opportunities and expanding the local economic base goes hand in hand with improving air service in small communities.

7.8. Economic Conditions and Impacts on Buying Power

The economic environment facing airports today is defined by post-pandemic cost shifts rather than short-term price spikes, although these spikes can result in urgent response needs. National inflation has eased from its peak in 2022, but construction, labor, and materials now sit

[35] U.S. Government Accountability Office, *Commercial Aviation: Trends in Air Service to Small Communities [Reissued with revisions on January 9, 2026]*, https://www.gao.gov/products/gao-24-106681.

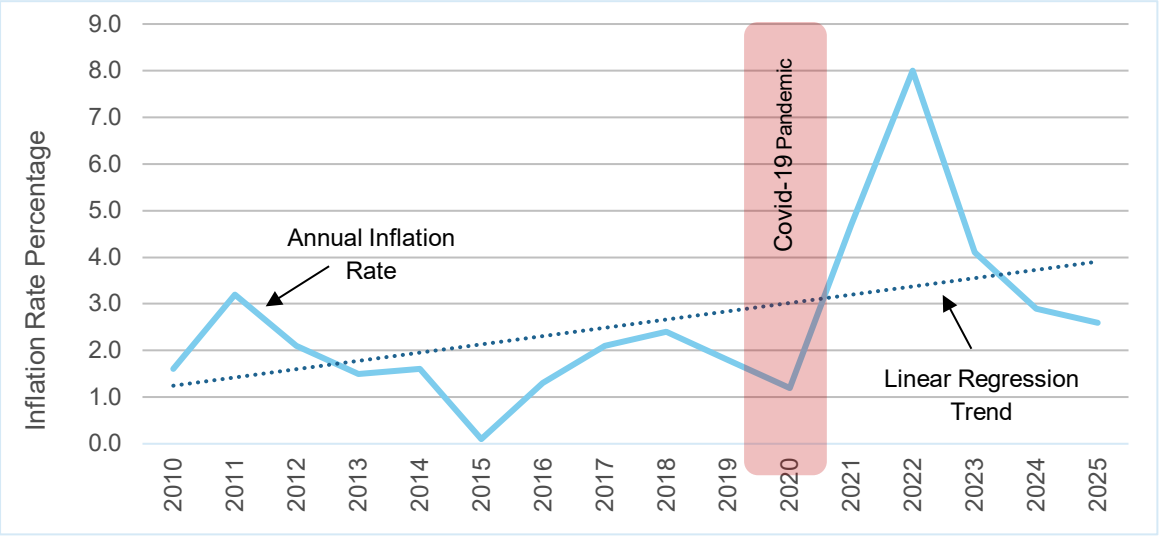
on a higher cost plateau, permanently raising the price of all areas of the aviation sector including airport infrastructure, aircraft operations, and materials.[36] For capital intensive programs like airfield and terminal projects, this means each appropriated dollar now builds less pavement, structure, and systems than it did a decade ago.

In May 2025, Moody's revised its outlook for the U.S. airport sector from stable to negative, citing higher operating and capitals costs, ongoing supply chain frictions, and pressure on construction inputs.[37] The result for airports is persistent cost pressure even as general inflation moderates.

7.8.1. Post-Pandemic Inflation Rates and Construction Costs

From 2015 through 2019, the U.S. economy experienced steady growth, low inflation, and relatively predictable construction markets which supported stable planning assumptions for airport capital programs. **Figure 7-12** shows how the COVID downturn in 2020 interrupted this environment, and the recovery in 2021-2023 pushed demand into supply-constrained construction, energy, and labor markets.

Figure 7-12. Historical U.S. Inflation Rates (2010-2025)



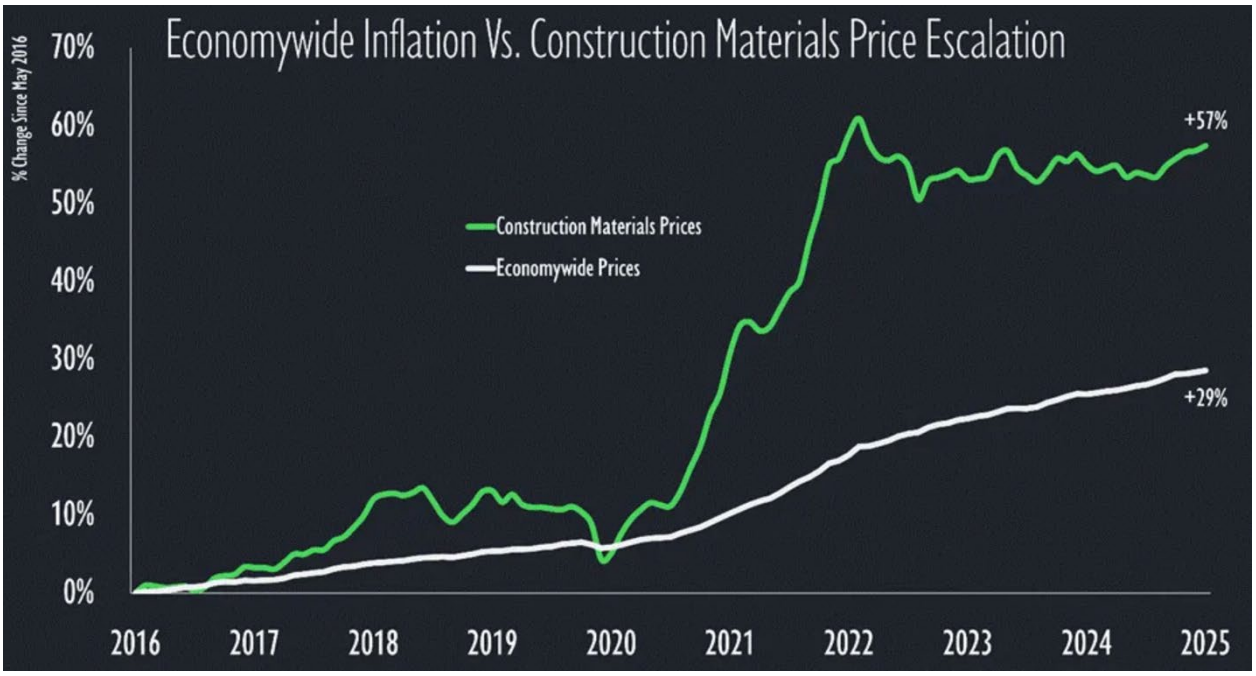
Sources: US BLS, 2026; Marr Arnold Planning, 2026.

Data from the U.S. Bureau of Labor and Statistics shows that while overall consumer prices have leveled off, construction material prices have broken from pre-pandemic trends and settled at a much higher level (**Figure 7-13**). The Producer Price Index series for asphalt, concrete, steel, lumber, and mechanical and electrical components illustrates that these inputs did not

[36] Torry, Torry (2026, Jan. 13). "Pace of Inflation Held Steady in December; Consumer Prices Up 2.7% on Year." *The Wall Street Journal*. https://www.wsj.com/erudeconomy/consumer-price-index-inflation-december-2025-5e292092
[37] Reed, Ted (2025, May 10). "Billion Dollar Airport Projects Face Inflation Cost Boosts, Report Says." *Forbes. https://www.forbes.com/sites/tedreed/2025/05/10/billion-dollar-airport-projects-face-inflation-cost-boosts-report-says/*

revert to prior norms but instead established a new, more expensive baseline. For long-lead time airport projects, this shift invalidates earlier cost estimates and compresses the scope of resulting deliverables given fixed funding programs.

Figure 7-13. Economywide Prices vs Construction Materials Prices (Percent Change between 2016 and 2025)



Source: Sage Economics, 2026.

7.8.2. Airport Construction and Buying Power

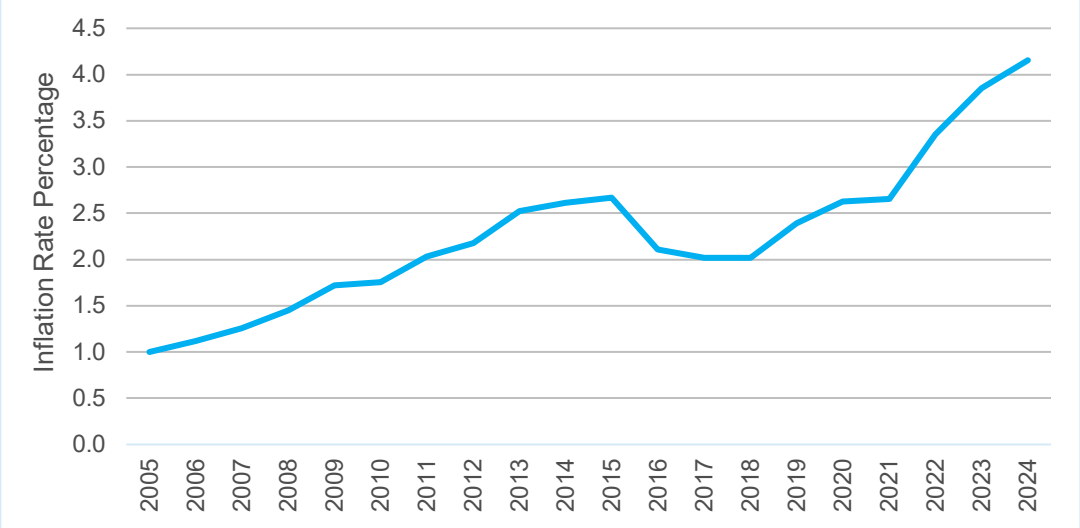
For airports, the practical effect of this environment is a measurable loss of construction buying power. Projects that once fit comfortably within capital improvement plans (CIPs) now require larger total budgets, expanded contingencies, or substantial changes in phasing and scope. In many markets, limited contractor capacity and labor shortages amplify these pressures, with a small increase in project demand triggering disproportionately higher bids.

Federal funding has not kept pace with this cost reset. Formula entitlements and discretionary grants have grown only modestly, and the federal cap on PFCs has remained unchanged since 2000, even as unit costs for runways, taxiways, and terminals have risen dramatically. As a result, the same grant or PFC revenue stream that once covered a major rehabilitation or terminal project, may now fund only a portion of the same project. This situation forces sponsors to defer work, pursue additional local financing, or accept a reduced project footprint.

In North Dakota, construction cost index data shows that typical airport projects in 2024 cost nearly four times what comparable work required in 2005 (**Figure 7-14**). The data shows a spike in the cost index of 56 percent since 2021, post COVID. This escalation has outpaced growth in

state aviation revenue, eroding the real value of NDAC's grant programs and narrowing the range of improvements that can be advanced in any given year.

Figure 7-14. Historical North Dakota Construction Cost Index Data (2005-2024)



Source: NDAC, 2025.

7.8.3. Capital Planning and Delivery Impacts

These conditions are reshaping how airports plan and deliver capital programs. Long range plans and CIPs developed under pre-2020 cost assumptions increasingly underestimate what it will take to execute projects once they reach construction. Sponsors are responding by:

- Elevating safety, compliance, and asset preservation work ahead of capacity or revenue generating projects.
- Breaking larger projects into phases that can be aligned with available funding cycles.
- Increasing contingency allowances and adjusting bid timing to manage volatility.

The 2025 Airports Council International-North America (ACI-NA) *Airport Infrastructure Needs Study* estimates nearly $174 billion in U.S. airport infrastructure needs for 2025-2029, up more than 15 percent from the previous five-year estimate.[38] A significant portion of this increase reflects projects that have become more expensive over time or were previously postponed due to funding gaps. Each year of delay tends to raise total cost, reinforcing a cycle where unfinished work erodes future buying power and enlarges the backlog of projects.

[38] Airports Council International-North America, Modern Airports for a Stronger America: Unlocking Opportunities to Meet Soaring Demand – U.S. Airport Infrastructure Needs 2025-2029. https://airportscouncil.org/wp-content/uploads/2025/03/2025-Infrastructure-Needs-Study.pdf

7.8.4. Implications for North Dakota

North Dakota's commercial service and GA airports are experiencing these dynamics in distinct ways. For commercial service airports, higher unit costs for terminals, aprons, and airfield systems are constraining the ability to move forward with modernization and capacity projects while also addressing safety and regulatory requirements. Projects that were once achievable with a combination of federal grants, state support, and reasonable local match may now require additional debt or substantial re-scoping. Higher interest rates further increase the full-life cost of borrowing for major facility upgrades.

GA airports, which rely more heavily on fixed federal and state programs and have limited local revenue capacity, face tighter tradeoffs. As construction costs climb, the same state grant now covers fewer linear feet of pavement, fewer hangar positions, or a smaller share of lighting and navigational aid upgrades. Sponsors may struggle to assemble required local matches, leading to deferred pavement rehabilitation, prolonged use of aging facilities, and rising lifecycle costs as assets deteriorate faster than they can be renewed.

For NDAC, the central issue is that program dollars no longer translate into the same level of system. Even if annual appropriations and dedicated aviation revenues hold steady, higher construction costs reduce the number and scale of projects that can be supported each year. As a result, NDAC must make harder choices among safety critical needs, preservation work, and strategic investments that support capacity and economic development.

Rising project costs also increase pressure on state participation levels and matching policies. As airport sponsors are finding it more difficult to fund local shares, particularly at smaller GA facilities with limited revenue and tax bases, this can lead to more frequent requests for higher state cost shares, additional phases, or schedule adjustments to keep projects viable within realistic local constraints. At the same time, NDAC faces growing exposure to deferred maintenance at airports that depend on state aid to keep pavements, lighting, and basic facilities in serviceable condition. Prolonged deferral of these projects can accelerate deterioration, force more extensive reconstruction later, and ultimately require larger program commitments in future years.

Taken together, these trends shift NDAC's challenge from simply distributing available funds to actively managing the effectiveness of each dollar invested. Program design, prioritization criteria, cost-share policies, and project timing will all play a larger role in determining how much useful infrastructure can be delivered under current and projected revenue streams.

7.9. Revenue Producing Projects

Airport development in North Dakota is funded through a combination of federal, state, local, and private sources, each with specific eligibility requirements and limitations. One of the key challenges airports face, especially GA airports, is securing funding for revenue producing

projects such as hangars and fuel facilities. These facilities are essential for long-term financial self-sustainability. Because federal and state grants include assurances that airports should work toward self-sufficiency, the inability to fund revenue producing facilities like hangars and fuel facilities creates a direct conflict between policy expectations and available funding tools.

The FAA supports airport infrastructure through the Airport Improvement Program (AIP), funded by the Airport and Airway Trust Fund (AATF) and supplemented by the General Fund. AIP grants typically cover 90 percent of eligible costs and are prioritized by safety and operations related projects like runways, taxiways, and lighting. As a result, revenue generating facilities like fuel farms, hangars, and terminal leases, are often ineligible or ranked at the bottom of a funding priority list, even though they are critical to an airport's ability to increase revenues and move toward financial self-sufficiency.

At the state level, NDAC provides grants for airports using aviation-related tax revenues. While the state can support up to 50 percent of the local match for eligible projects, funding for revenue producing facilities requires additional documentation (a business plan and proof of land control). Airports may also apply for low-interest loans through the Bank of North Dakota (BND) Infrastructure Revolving Loan Fund. These loans can fund a wide range of projects, including revenue producing infrastructure. However, sponsors must first pursue all available federal and state grant options because the BND program serves as a gap-filler but requires upfront local commitment and long-term repayment planning.

7.9.1. Revenue Producing Facilities at Airports

Commercial service airports generate revenue from a variety of aeronautical and non-aeronautical sources, including but not limited to the following:

- **Terminal Facilities:** Airline ticket counters, baggage handling areas, airline offices, lounges and staff spaces leased to airlines
- **Retail and Concessions:** Restaurants, food and beverage outlets, shops, duty-free stores, and other concession spaces leased to concessionaires located within terminals
- **Car Rental Facilities:** On-airport car rental counters and parking
- **Parking Facilities:** Short and long-term parking garages and surface lots for passengers and visitors
- **Hotels:** Hotels on or adjacent to airport property
- **Advertising Spaces:** Digital and static advertising displays in terminals, garages, and common areas
- **Aircraft Services:** Landing fees, gate fees, hangar space rentals, aircraft maintenance, and fueling services
- **Ground Transportation Network Companies (TNCs):** Limited ground-access revenues derived from contractual agreements with rideshare providers, subject to state-level regulatory frameworks

GA airports tend to focus on aeronautical revenue sources related to aircraft and services. Examples of these revenue sources include but are not limited to:

- **Hangars and Tie-Downs:** Rentals or leases for aircraft storage
- **Fuel Flowage Fees:** Charges based on the amount of fuel sold
- **Aircraft Parking and Storage:** Daily or monthly fees for transient or based aircraft
- **Ground Leases:** Renting airport land or buildings for aviation-related or compatible non-aviation businesses such as classrooms, MROs, aircraft manufacturing, or AAM-related businesses.
- **FBOs:** Service providers offering fueling, maintenance, and other aircraft support
- **Non-Aeronautical Revenues:** Advertising, automobile parking, non-aviation compatible leases like solar farms or natural resource extraction (i.e. oil and gas), agriculture/farming leases (i.e. growing crops or grazing cattle) on airport property

While both types of airports generate revenue, commercial airports typically have more diversified revenue streams due to passenger volume and more business activity, where GA airports rely on traditional aircraft-related revenue fees. Essentially, the types of revenue generating facilities at commercial airports center more on passenger and airline services (terminals, retail, parking), while GA airports depend heavily on aviation infrastructure such as hangars, fuel, and ground leases. Both types of airports take advantage of available opportunities to maximize revenue from aeronautical and non-aeronautical sources; however, those sources vary widely depending on the community. These differing revenue profiles shape how airports experience funding constraints and where targeted state support can have the greatest impact.

7.9.2. Challenges Funding Revenue Producing Projects

Airports face substantial challenges when trying to finance revenue generating infrastructure. Many rely on a small number of funding sources including AIP grants, PFCs at commercial service airports, tenant rents, and fuel-related revenues. These sources have remained largely unchanged for decades. The federal cap on PFCs has not increased in over 20 years, leaving this funding mechanism behind inflation and the escalating cost of infrastructure development.[39] At the same time, airport construction costs have risen sharply, nearly 40 percent since 2012, outpacing general inflation which has increased 27 percent over the same period.[40]

Labor shortages, supply chain challenges, and cost escalation further constrain budgets, leading airports to delay or scale back maintenance and capital development projects that could otherwise enhance their revenues. Even when federal and/or state grants are secured, the need for local matching funds can strain limited municipal budgets. For GA airports, these challenges are even more pronounced because they face additional barriers due to fewer revenue streams, tighter restrictions on federal eligibility, and disproportionately higher infrastructure costs relative

[39] Federal Aviation Administration, *Passenger Facility Charge (PFC) Program*, FAA, last updated December 31, 2025, https://www.faa.gov/airports/pfc
[40] Airports Council International – North America (ACI-NA), 2023 *U.S. Airport Infrastructure Needs Report: Growing Needs Heighten Urgency to Modernize America's Airports*, March 2023, https://airportscouncil.org/wp-content/uploads/2023/03/2023ACI-NAInfrastructureNeedsReportFINAL.pdf

to their size. Collectively, these factors make it difficult for airports to invest in facilities that could strengthen their financial sustainability and support long-term growth.

7.9.3. North Dakota Implications and Opportunities

The funding challenges that are experienced at the national level and discussed above, are very relevant to North Dakota's public-use airports. A top concern for NDAC and airport sponsors is how to move hangars, fuel facilities, and other revenue producing projects up the funding priority ranking system due to their current low position in the scheme of project priorities. NDAC's coordinated federal, state, and local investments do help address many infrastructure needs. However, the challenges of balancing fiscal pressures and sustaining local revenue streams impact the ability of airports, especially GA, to finance crucial revenue producing projects.

With traditional funding sources remaining tight, airports over the past two decades have increasingly reduced their reliance on local municipal subsidies to support operations and capital improvement projects. This shift aligns with FAA grant assurances and emphasizes the need for airports to operate more like independent enterprises than local government departments. Through effective business planning, forward-thinking investment strategies and diversification of revenue, airports can strengthen community partnerships, improve infrastructure efficiency and serve as economic engines within their region. The following subsections describe practical responses to the funding constraints and challenges outlined above, both at the airport and state levels.

7.9.3.1. Non-Aeronautical Revenue Opportunities at Airports to Encourage Diversified Revenue Streams

In addition to the aeronautical use revenue streams highlighted in the previous section, airports can also improve their financial sustainability by leveraging available or surplus land for non-aeronautical purposes, with differing requirements for airports included in the FAA's National Plan of Integrated Airport Systems (NPIAS). The potential strategies noted here not only diversify revenue streams but also help airports remain resilient to fluctuations in aviation activity. All proposed developments should carefully consider potential impacts to airport operations and facilities, and certain uses may require FAA approval for a change in land use. Potential opportunities include:

7.9.3.1.1. Commercial Real Estate Development

Strategic development of airport property for high-value commercial uses maximizes long-term returns. Proximity to transportation networks enhances market appeal, and profitability depends on demand, location, and accessibility. Common opportunities include:

- **Office Space:** Leasing land for office parks or developing facilities for lease directly to businesses
- **Logistics and Industrial Facilities:** Warehouses, distribution centers or light manufacturing operations that benefit from multimodal access

- **Hospitality and Retail:** Hotels, restaurants or retail centers serving both airport users and surrounding communities
- **Specialized Commercial Uses:** Conference or business centers located adjacent to airport facilities

7.9.3.1.2. Other Non-Aviation Uses

Additional non-aviation opportunities for generating non-aeronautical revenue (beyond those discussed in a prior section) include:

- **Energy Initiatives:** Installing solar arrays or rooftop panels to generate clean energy for on-site use or grid sale.
- **Educational Partnerships:** Leasing space for training academies, research labs, or aviation education centers that also support workforce development.
- **Sports Parks and Event Venues**: Repurposing old buildings or vacant land for recreation or community events to generate rental income and public engagement.
- **Agricultural Leases:** Using marginal or buffer acreage for farming or horticulture operations as a steady, low-impact revenue stream.

7.9.3.2. Best Practices for Funding Revenue Generating Infrastructure Projects

To successfully fund and develop revenue generating infrastructure facilities, airports should pursue strategies that balance financial sustainability with operational flexibility. The following practices help strengthen the overall funding mix, manage risk effectively, and align capital investments with market demand and long-range planning goals.

- **Optimize funding mix and capital structure:** Combine federal entitlements, state grants or loans, and local or private funds to reduce reliance on airport operating cash reserves.
- **Align debt with asset life and lease terms**: Structure hangar financing so that loan amortization matches the facility's useful life and lease duration, allowing long-term tenants to effectively retire project debt through rental payments.
- **Leverage ground leases and public-private partnership (P3):**
    - **Hangars:** Use ground lease structures that transfer capital costs and certain operating risks to private developers.
    - **Fuel systems:** Implement P3 arrangements where a developer finances and operates the system, recovers costs through user fees, and provides the airport with revenue or flowage fee payments while the airport retains oversight of operational standards.
- **Set market-based sustainable rates and charges:** Regularly review and adjust pricing to maintain competitiveness and ensure fair market value.
- **Update lease policies for long-term stability:** Ensure lease terms promote continuous reinvestment, tenant retention, and fiscal predictability.
- **Integrate projects into CIPs and Airport Layout Plans (ALPs):** Continue to coordinate infrastructure development with overarching airport and system planning documents to maintain regulatory compliance and project readiness.

7.9.3.3. Non-Traditional and Federal Funding Opportunities

In addition to traditional FAA and state funding mechanisms, airports can expand their financial strategies by pursuing non-traditional federal programs designed to support community, transportation, and economic infrastructure. These programs are administered through federal

agencies outside of the FAA and can help fund revenue generating or self-sustaining airport projects, particularly at GA or rural facilities. Leveraging such programs can reduce reliance on limited aviation grant resources, accelerate project delivery, and enhance the overall economic impact of airport investments.

- **Congressional Earmarks**: Airports may also pursue congressionally directed funding (earmarks), known as Community Project Funding (CPF) in the House and Congressionally Directed Spending (CDS) in the Senate, to advance priority airport infrastructure projects. While earmarks are not always available, they are currently being included in many appropriations bills and may offer another federal funding option. As highlighted in a recent National Association of State Aviation Officials (NASAO) report, the FY 2026 Transportation HUD bill includes a substantial level of earmark support, with $542.4 million dedicated to airport related earmarks out of $577.4 million in supplemental discretionary airport infrastructure grants. Notably, $368.7 million of this FY 2026 funding is derived from unspent Investment Infrastructure Jobs Act (IIJA) resources. These earmarks can support a broad range of capital improvements, including terminals, hangars, access roads, and safety or economic development projects, and can help airports move forward with initiatives that may not be competitive under traditional federal grant programs.
- **U.S. Department of Agriculture Rural Development Community Facilities Direct Loan & Grant Program:** This program provides affordable financing for essential community facilities in rural areas with populations under 20,000 residents. Eligible projects could include airport terminals, hangars, or safety-related improvements that enhance community access and supports essential services at rural airports.
- **U.S. Department of Commerce- Economic Development Administration (EDA):** The EDA offers competitive funding through various programs, including the Public Works Program announced via Notices of Funding Opportunity (NOFOs). These grants support projects that strengthen regional economies, create jobs, and upgrade infrastructure in distressed communities. Airports advancing projects that align with local or regional economic development strategies like new hangar complexes or industrial park access improvements, may be well-positioned for consideration.
- **U.S. Department of Transportation- Build America Bureau:** The Transportation Infrastructure Finance and Innovation Act (TIFIA) Rural Project Initiative (RPI) provides low-interest loans for rural transportation infrastructure projects valued between $10M and $100M. Eligible projects may include access roads, intermodal facilities, or other airport-related improvements that enhance connectivity and economic efficiency. The program's structure allows rural sponsors to pursue larger capital projects with flexible repayment options tied to project revenues.

7.9.3.4. Considerations for Enhancing the Project Priority and Evaluation Process

To better support airport development, NDAC could consider refining its prioritization framework to capture the full value of revenue generating and economically beneficial projects. Updating the scoring process to account for broader economic, capacity, and system benefits would help ensure that investment decisions reflect both statewide aviation system goals and local community priorities. The following policy-oriented methods could strengthen NDAC's project evaluation and ranking procedures:

- **Incorporate economic impact as a scoring criterion:** Award higher priority to projects that enhance airport financial sustainability, create local jobs, attract businesses, or expand the regional economic base.
- **Integrate flexibility for alternative funding participation:** Recognize projects that leverage supplemental sources (i.e. IIJA or Airport Infrastructure Grant [AIG] programs) to encourage financial innovation and project scalability.
- **Expand capacity and system performance metrics:** Adjust scoring to reflect how projects improve service availability or address geographic gaps in the aviation system. Examples include hangar construction projects that increase based aircraft capacity or new or updated fuel systems that enhance operational and service coverage.
- **Enhance alignment with statewide aviation goals:** Refine the scoring framework so that projects aligning with SASP objectives and goals (i.e. enhancing rural accessibility, supporting business aviation, or increasing airport resiliency) receive additional emphasis or higher point values within the project scoring process.

7.10. Summary

North Dakota's aviation system is poised for a transformative journey, marked by groundbreaking advancements and formidable challenges that will define its trajectory in the coming decades. AAM, emerging fuel sources, and ATC modernization through the BNATCS promise to revolutionize aviation operations, building on North Dakota's established leadership in UAS operations and aviation innovation. At the same time, the industry is confronted by substantial workforce shortages, an aging aircraft fleet requiring major capital investment, persistent challenges in maintaining small community air service, and rising construction costs that erode airport buying power and complicate funding for revenue-generating infrastructure.

Throughout this chapter, opportunities for policy development and programmatic support have been identified for consideration by NDAC. These include developing a statewide AAM blueprint and vertiport siting criteria, investing in alternative fuel infrastructure, expanding aviation education and workforce training programs, refining project prioritization frameworks to recognize economic impact, encouraging diversified airport revenue streams, and pursuing non-traditional federal funding sources. North Dakota's proactive approach, encompassing NDAC programs, university partnerships, private sector innovation, and military collaboration, has laid a robust foundation for tackling these challenges. As subsequent chapters of the NDSASP integrate these findings, the recommendations will ensure North Dakota's aviation system remains safe, effective, and responsive to the full range of forces shaping the aviation landscape.