FINAL REPORT

MHA Nation Drone Project:

Planning and Protocol Development

Strengthening Mobility and Revolutionizing Transportation (SMART) Grant

Recipient: Fund Number 69A3552341027

Recipient: Three Affiliated Tribes of the Fort Berthold Reservation

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Organization Preparing the Report: The Three Affiliated Tribes of the Fort Berthold Reservation and their partners at the University of North Dakota who subcontracted with the Nueta Hidatsa Sahnish College, the Northern Plains UAS Test Site, Airspace Link, and Thales.

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Abbreviations

AAM	Advanced Air Mobility
AS	Autonomous Systems
ASSURE	Alliance for System Safety of UAS through Research Excellence
BVLOS	Beyond Visual Line of Sight
CONOPS	Concept of Operations
Co-PI	Co-Principal Investigator
DOT	Department of Transportation
Elbowoods	Elbowoods Memorial Health Center
EO	Electronic Observers
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
GIS	Geographic Information Systems
IPBA	Institute of Policy and Business Analytics
IRB	Institutional Review Board
JDOSAS	John D. Odegard School of Aerospace Sciences
MHA Nation	Mandan Hidatsa Arikara Nation
MNOC	Mission Network and Operations Center
NAS	National Airspace Systems
NCE	No Cost Extension
ND	North Dakota
NHS College	Nueta Hidatsa Sahnish College
PI	Principal Investigator
Project	MHA Drone Project: Planning and Protocol Development
RIAS	Research Institute for Autonomous Systems
UAS OPERATOR	Remote Pilots in Control
R&ED	Research & Economic Development
SMA	Surface Maritime Airspace
SMART	Strengthening Mobility and Revolutionizing Transportation
SRMD	Safety and Risk Management Document
STEM	Science, Technology, Engineering, and Math
TAT	Three Affiliated Tribes
TERO	Tribal Employment Rights Office
Test Site	Northern Plains UAS Test Site
THPO	Tribal Historic Preservation Office
UA	Uncrewed Aircraft
UAS	Uncrewed Aircraft Systems
UND	University of North Dakota
VA	Veterans Administration
Valkyrie	Valkyrie UAS Solutions

Section 1 of 7: Executive Summary

The MHA Drone Project: Planning and Protocol Development Project Team developed a comprehensive plan for the use of drones to serve the Tribal members of the Three Affiliated Tribes (TAT) of the Fort Berthold Reservation (otherwise known as the Mandan Hidatsa Arikara (MHA) Nation) to increase access to medical care and equipment, and potentially other use cases with opportunities for application for Stage 2 funding. The Fort Berthold Reservation, a federally recognized Indian Tribe, is in north-central North Dakota (ND), within a rural, rugged landscape with heavy oil production, rough roads, and unforgiving weather.

The proposal goals and objectives were accomplished including: (1) identified additional use cases, which included completion of two surveys of stakeholder needs and perceptions and a summary report with the findings of six listening sessions that were shared broadly with key Tribal stakeholders; (2) developed a blueprint for a safe, efficient, and scalable network for use of drones on our Tribal lands, which was accomplished by conducting a beyond visual line of sight (BVLOS) demonstration of delivery of medication that provided the opportunity to gather gata to monitor the airspace system; (3) developed and implemented a robust workforce engagement plan, by finalizing an aeronautics articulation agreement between two educational grant partners with the primarily online program to begin in August 2025, offering three Drone Camps in 2023/2024/ 2025, and teaching over 200 youth at remote MHA Nation schools through a Drones in School effort; (4) ensured comprehensive community engagement and partnerships to support government to government relationships, by assembling and hosting monthly MHA Drone Advisory Board to guide efforts and testifying before the MHA Tribal Business Council to secure required resolutions including a corridor for drone delivery between two remote communities; and (5) explored the economic feasibility of drone use at-scale by completing a comprehensive economic analysis of costs and benefits. All goals are detailed in the full report to follow.

The key deliverables and outcomes of Stage 1 funding were (1) completion of planning and protocol development building knowledge of infrastructure needs through development of a prototype for a scalable BVLOS capability on our Tribal lands, (2) demonstrated commitment by enrolled Tribal citizens to secure the training and education to address the workforce needs for the future and support the Project, (3) a resolution from Tribal leaders to support the operation of the SMART Grant Team by ensuring access to required data with a commitment to adherence to privacy and (4) an economic analysis substantiated opportunities to address transportational needs in an economically feasible manner. To ensure strong deliverables, MHA Nation has partnered with the University of North Dakota (UND) and subsequent academic and research units, including the Research Institute for Autonomous Systems (RIAS), the Institute of Policy and Business Analytics, the John D. Odegard School of Aerospace Sciences (JDOSAS), the Nueta Hidatsa Sahnish (NHS) College in New Town ND, the Northern Plains UAS Test Site (Test Site), Thales, and Airspace Link (ASL).

Lessons learned will guide the submission of the Stage 2 funding request. The capacity of drones to address larger community needs, transportation concerns, safety and regulatory issues, and health and well-being can be realized, but only if formal infrastructure and leadership are in place. Effective engagement of diverse community stakeholders will increase the capacity for future drone use to support life-saving measures. The outcomes of the Project's Stage 1 efforts serve as a template for engagement with Tribal Nations. The goals described in the submission to DOT are technically and economically feasible and can be expanded in Stage 2.

Section 2: of 7: Introduction and Project Overview

Introduction of Overall Goals and Achievements

The overall goals of the MHA Drone Project were achieved. They developed an infrastructure plan to improve the safety and reliability of drone (uncrewed aircraft system, UAS) travel, rather than relying on risky ground transportation in our rural areas during inclement weather and oil-impacted traffic. That goal was achieved through the demonstration of a scalable, repeatable use case for UAS-delivered medication between two healthcare clinics at the MHA Nation—Elbowoods Memorial Health Center and Twin Buttes Field Clinic—during Stage 1 efforts. A summary of this proof-of-concept flight is provided (see Attachment A). The Project demonstrated the capacity to reduce congestion and delays for commerce, improve access to healthcare, and increase the resiliency of transportation systems.

The use of drone delivery, instead of ground transportation, will improve access to life-saving medications while enhancing safety and reducing pollution and waste. Emergency response can be improved by reducing congestion and increasing situational awareness of the best routes for emergency response. Section 3 of this report provides details on the demonstrations' success and lessons learned, which will be assessed in a Stage 2 submission. Throughout this document, readers will note the additional use cases identified by the community.

The Project goal of advancing workforce development to improve access to education and jobs was achieved through the collaborative engagement of numerous Tribal entities and employees. This included emergency responders, school superintendents/STEM teachers/career counselors who serve middle and high school students, healthcare administrators, the Boys and Girls Club of TAT, and the Nature/Science Camp through a partnership between the University of North Dakota (UND) and Nueta Hidatsa Sahnish College (NHS College). This established a framework for improving access to jobs, education, and essential services, including healthcare services. The Project expanded this goal beyond expectations, adding additional programs. This effort will contribute to the long-term economic competitiveness of the MHA Nation through plans to train UAS pilots.

Securing Stage 2 funding offers significant benefits to the Tribe and region by enhancing the capacity to access the statewide UAS BVLOS network (Vantis). This demonstrates the application of coordinated autonomy, unlike any other network in the United States. It will also advance the use of intelligent sensor-based infrastructure, systems integration, commerce delivery, and innovative use of aviation technology. For example, lessons learned from the Choctaw Nation, which provides a strong Tribal model, were implemented on our Tribal lands. Engagement and partnerships have been developed with the county-level Economic Development office to advance economic sustainability. The ongoing efforts to incentivize the private sector were facilitated through partnerships with Thales (a Vantis partner, as outlined in the report) and ASL. This partnership leveraged their expertise in Geographic Information Systems (GIS) and detection and avoidance, which was also part of the workforce expansion. Section 4 of this document provides a detailed cost-benefit analysis of the impact on various communities located on the MHA Nation.

MHA Nation subcontracted the total award to UND through a formal agreement signed by the Chair of the MHA Nation, Mark Fox, and the Tribal Business Council, which SMART grant officials approved. The Planning and Grants Office at MHA Nation managed the Project's finances in collaboration with the UND Post-Awards in the Office of Research and Economic Development and the Principal Investigators (PIs) and Co-PIs at UND.

To support this effort, an initial Project goal was to develop a team with expertise in autonomous systems and community engagement personnel to support government-to-government efforts, accelerating the use of advanced UAS operations on Tribal lands. A formal assessment process, guided by the MHA Drone Assessment Team, conducted three studies that offered a range of

perceptions of drones, generally positive but underscoring caution about cost and privacy (see Attachments B, C, and D). Attachment D includes needs related to possible additional Stage 2 funding. The priority among Tribal members is to focus efforts on enhancing the lives of MHA Nation members by expanding access to emergency services, public safety, nutrition, and healthcare.

In summary, the specific technology-driven goal was achieved by establishing BVLOS UAS delivery capabilities. The key objectives include demonstrating the economic, environmental, and equitable advantages of BVLOS UAS operations and utilizing these capabilities to improve access to critical medical supplies in areas with limited transportation. To support this effort, the Project Team created and executed a safety case to enable operations, securing Federal Aviation Administration (FAA) approval, engaged stakeholders to identify transportation barriers, and built workforce capacity.

Test flight for proof-of-concept over the Missouri River

Real World Issues and Challenges At-Scale

The real-world issues and challenges addressed by the Project included transportation barriers for the citizens of the MHA Nation. We reside in a remote rural region of North Dakota (ND), where access to medications and other basic lifesaving and emergency support is limited due to transportation barriers. This Department of Transportation (DOT) SMART grant Project built a sustainable foundation for integrating UASs that are repeatable and scalable to support life-saving deliveries. Additional use cases were identified through extensive community research and listening sessions. Specifically, the Stage 1 effort demonstrated the capacity of drones at scale to ensure improved delivery of medications between Twin Buttes, ND, and New Town, ND, across the Missouri River. Information about this Project can be found on the following Project website.

The foundation for this success was built on a partnership between our Tribal government and its people, industry, academics, and healthcare systems. The effort began on August 15, 2023, and ended on June 30, 2025, with a total award of $1,966,345. The initial 18 months were extended with a no-cost extension until June 30, 2025, for an additional 4.5 months to expand scalability and support additional workforce, including hosting additional Drones in School events, community advisory board meetings, site survey for additional launch and recovery sites, and an additional community perception survey.

Community Impacted by At-Scale Implementation

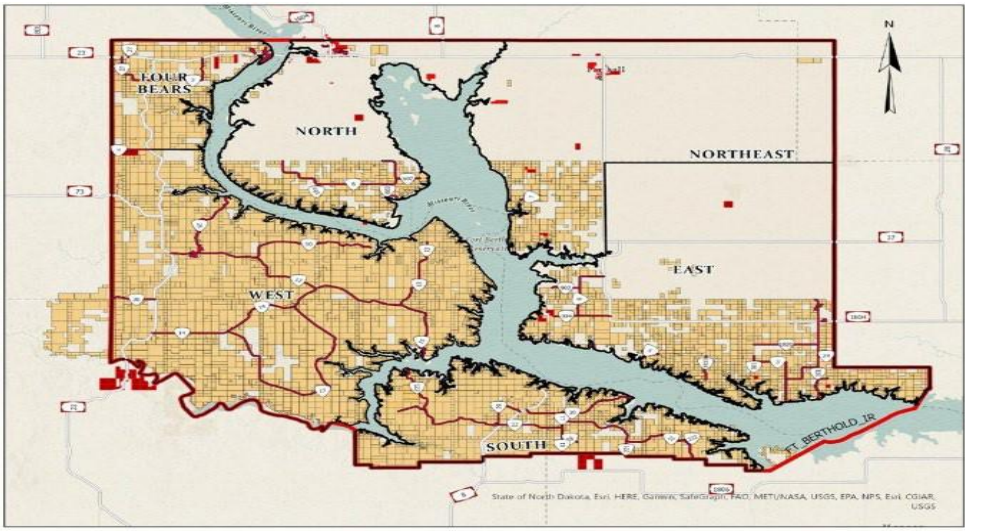
The communities impacted at scale are located within the Three Affiliated Tribes (TAT) of the Fort Berthold Reservation and the MHA Nation. TAT's lands are located along both sides of the Missouri River (Lake Sakakawea). Historically, the native lands of the Mandan, Hidatsa, and Arikara (MHA) Nation people extended from ND across the Missouri River basin through western Montana and Wyoming. A comprehensive history of the MHA Nation's geography is provided at the History of MHA Nation page. The landmass includes wide-open plains and grasslands that border six ND counties, including McLean, McHenry, Mountrail, Dunn, Mercer, and Ward. Our mineral-rich lands encompass 988,000 acres, of which 457,837 acres (about half the area of Rhode Island) are owned by Native Americans, either as individual allotments or communally by the Tribe. The Tribal governing structure includes six segments, each with democratically elected officials who serve on the Tribal Business Council and are assigned to sub-committees. The Tribal Business Council has

been informed about the MHA Drone Project efforts and has unanimously supported the Tribal resolutions referenced throughout this document and provided in the attachments.

Our ground transportation involves driving in rural areas with rugged landscapes and on roads with heavy oil production traffic. The significant oil traffic is due to the large oil reserves located beneath our reservation land, primarily from the Bakken Formation. This, combined with frequent inclement weather, makes travel difficult, especially during the winter months. The application of UAS technology will enable the transportation of medical and commercial goods and resources across Tribal lands, bypassing ground transportation because of limited access to a single bridge across the Missouri River—US Interior on Fort Berthold and the Bakken Oil Field.

History of the Impacted Communities

The SMART grant funding helped address a significant transportation barrier caused by the flooding of our lands by the United States Army Corps of Engineers in the 1950s. The Garrison Dam was built in the Upper Missouri River as part of the Pick-Sloan Plan, which created Lake Sakakawea, a reservoir lake extending across five counties on and off the reservation. Due to the flooding, reliance on a single one-mile-long bridge connecting six segments of the MHA Nation created the unfortunate reality of extensive travel and backtracking to cross the bridge, meet basic needs, and access emergency response and medications at the core healthcare center. Elbowoods Memorial Health Center (Elbowoods). Elbowoods has a PL-638 Contract with the Indian Health Service for the MHA Nation and is in New Town, ND, so it is Tribally driven. Collaboration between UND and Elbowoods leadership was critical to the Project's success.



MHA Nation, Geographic Information Systems - MHA Nation

Elbowoods offers a broad array of healthcare services, including behavioral healthcare, purchase and referral services, dental services, optometry, radiology, pharmacy, laboratory services, and diabetes wellness supports. This facility serves enrolled Tribal members in six segments, including the West Segment (Mandaree), East Segment (White Shield), Northeast Segment (Parshall/Lucy Mound), Four Bears Segment (Four Bears), South Segment (Twin Buttes), and the leading clinic. The clinics aligned with Elbowoods are in Mandaree, Parshall, White Shield, and Twin Buttes, all of which are a distance from the leading clinic in New Town. The Tribes have a healthcare support outreach office in Bismarck, ND, Sage Coulee Outreach and Wellness Facility, that offers health and behavioral health services, wellness resources and support, and community events. The driving time between Bismarck to New Town is two hours and 25 minutes one-way when the weather and roads are passable. This funding expedited the expansion of access to healthcare. It explored interest in

additional use cases by coordinating autonomous systems that would have otherwise taken years torealize, if ever. The Project offered a structure for economic analysis using autonomous systems with monthly updates to grant partners and critical stakeholders to ensure accuracy. The financial analysis identified the most significantly isolated communities as Twin Buttes and White Shield. Ultimately, the focus was on the costs and benefits of integrating UAS and Advanced Air Mobility (AAM) vehicles to facilitate the efficient movement of goods and people. Lessons learned will contribute to a comprehensive statewide or regional transportation network.

Additionally, future opportunities exist for consideration of the use of ground autonomy to increase access to food (including a 250-head bison herd in Twin Buttes to be expanded to 400 head and the Native Green Grow (NG2), which is a large greenhouse project near Parshall, ND, to support Indigenous food sovereignty). Autonomous ground transportation is a pending opportunity for consideration in Stage 2 funding, given that the entire Fort Berthold Reservation is a food desert.

Elbowoods Memorial Health Center Chief Medical Officer, Chief Executive Officer, and Project PI.

Additionally, the need for UAS to assess the safety of the bridge connecting all segments will be critical in Stage 2 funding, given the reliance on a single bridge.

Given our challenging geography, creating the opportunity for the MHA Nation to coordinate autonomous systems could dramatically improve commercial access to resources through sensor-based infrastructure. This includes expanding the capacity for system integration of airspace, which is uniquely available in North Dakota through MHA Nation's partnership with the Test Site, which works hand in glove with the Federal Aviation Administration (FAA).

Community Stakeholders' Meaningfully Involved

The Director of Planning and Grants at MHA Nation oversaw budget monitoring and invoice oversight, ensuring adherence to deliverables and alignment with expenses; supported community engagement; attended SMART Grant training sessions; and monitored informational updates from DOT SMART grant officers. She served as a liaison to the MHA Nation Tribal Business Council, supporting media and outreach. She guided all grant-related efforts in collaboration with the PI and Co-PI at UND and with post-award staff in the Division of Research & Economic Development at UND.

The Director of Health Administration at Elbowoods provided in-kind support and guidance. The Health Administrators contributed to the Project, serving as a liaison to the Tribal Business Council, providing pharmaceutical data to guide use case needs and examine economic viability, guiding community outreach efforts, serving as a member of the MHA Drone Advisory Board, and serving as a liaison for the community information exchange office located in the North Segment (New Town). Elbowoods Mission.

MHA Nation NHS College at the first SMART grant meeting in Washington, D.C.

Community Stakeholder Involvement in Determining Benefits

The Project established an MHA Drone Advisory Board to guide efforts to ensure Tribal Sovereignty and engagement. The Board was actively involved in determining program benefits through monthly meetings and provided some caution about privacy. The members and their titles on the Board are provided in the report (see Attachment E). They supported all efforts to foster government-to-government relationships and offered critical advice.

The Director of the Emergency Operations Center provided guidance on search-and-rescue needs for future use cases and assistance with Emergency Responder Training (see Attachment F). Significant community engagement has occurred through on-site visits and public education, with Project Team members offering eight training events. Combined with the training was attendance at community events. For example, the PI at UND and Implementation Team lead attended the Tribal Elder event in July 2024, hosted by an Advisory Board member, as well as the grand opening of a new Emergency Operations Center in New Town. An attorney for MHA Nation who served on the Advisory Board provided the Project guidance on legal implications and resolutions to the partners.

Funding Partners

MHA Nation supported the sub-contract to the UND, including the Research Institute for Autonomous Systems (RIAS), the Division of Research and Economic Development (R&ED), the John D. Odegard School of Aerospace Sciences (JDOSAS), and the Institute of Policy and Business Analytics, given extensive expertise and long-term existing relationships with this state institution and a host of collaborative programs. The President of UND, Andrew Armacost, monitored efforts and engaged in conversations with the MHA Nation Chair, Mark Fox, of the Tribal Business Council to ensure a continued positive relationship. The Project hired graduate and undergraduate students attending UND who are enrolled members of the MHA Nation who have contributed to the Project. They, and their relatives, have been critical in efforts to support community collaborations and to determine needs. MHA Nation leveraged UND's depth and breadth of experience in applied research, leadership/grants support, and autonomous systems to ensure success. Another partner, NHS College, a public Tribal land-grant college chartered by the TAT of the Fort Berthold Reservation, achieved deliverables by providing resources of the Tribal College, managing data, and offering expertise and leadership. UND also subcontracted with the Test Site, which partnered with Airspace Link and Thales. Airspace Link, in turn, contracted with a vendor, Valkyrie UAS Solutions, to conduct proof-of-concept flights. UND executed formal sub-contracts to all partners in collaboration with the MHA Nation. The sub-contracts were based on the deliverables identified in the funding submission. Valkyrie was selected as the vendor through a formal vetting process using the expertise of the MHA Drone Implementation Team. Another vendor, DeTect, volunteered to provide access to radar data for proof-of-concept flights. They offered two mobile radar units from

Panama City, Florida. The radar equipment was in New Town and Twin Buttes during the use case, and UND provided access to another radar truck built by DeTect located in Mandaree. This required significant collaboration and trust in the partnerships.

Photo: Project Staff at Second Drone Camp and Search and Rescue at the Earth Lodge Village in New Town in front of UND mobile radar truck.

The Project Team oversaw four tiers of engagement, including (1) conducting needs assessments/determining use cases, (2) economic modeling/cost/benefit analysis, (3) workforce development and training, and (4) implementation of use cases and impact evaluations. Each tier had a committee structure with a convenor, and the teams met weekly or biweekly to leverage their expertise in data gathering, workforce capacity development, and engaging potential industry partners for the proof-of-concept use case.

UND assisted the MHA Nation in building a foundation for expanding research capacity in UAS/Autonomy and mobility across the Surface-Maritime-Airspace (SMAS) domain and in satellite architecture for commercial applications. The Project's collaboration with the Test Site and Thales facilitated access to the Vantis Network. The MHA Drone Team included providers who assessed the capacity for integrating airspace with the MHA Nation. With over 3,000 miles of BVLOS airspace, Vantis utilizes a Mission Operations Center (MNOC) to detect and avoid surveillance. The FAA recognizes Vantis through a Letter of Approval obtained via the Near-Term Approvals Process. It serves as a Supplemental Data Service Provider, enabling safe, efficient, and scalable UAS operations.

Mobile radar used in the demonstration of the use case of medical delivery in New Town, ND, and two staff members.

Subcontractors to UND provided expertise for BVLOS testing and operation. Hence, a critical resource for the MHA Nation is the Vantis radar network, with radar installed near Tribal lands in western ND, as a future resource in possible Stage 2 funding. Valkyrie, discussed in further detail in Section 3, informed the flight narratives, the Concept of Operations (CONOPs) (see Attachment G), the Safety and Risk Mitigation Document (SRMD) (see Attachment H), and the regulatory pathways. The partners were responsible for data collection and distribution, as well as for evaluating flight-test success.

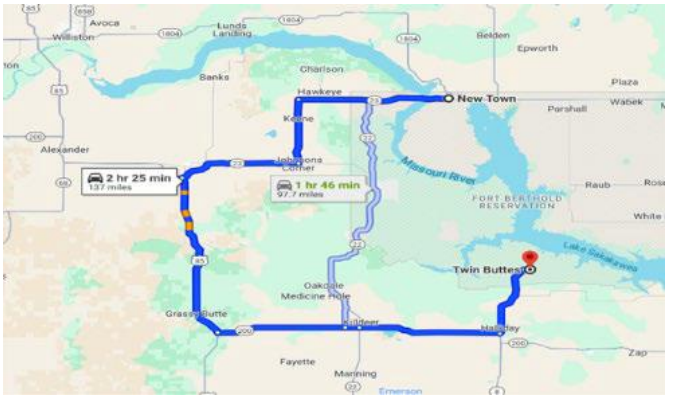
UND and NHS College provided support for aims identified with the workforce component to advance local capacity in autonomous systems and support local communication efforts. They hosted the Project's web page at the link provided above. NHS College grant staff were “on the ground” on Tribal lands to sponsor and support networking events. The PI from the NHS College had a host of alumni from the Tribal College who engaged and supported this effort. This included their support in working with high school and middle school students. They also approved a UAS Drone certification program in collaboration with UND. They provided Project guidance, collaborated with UND on assessment efforts, and supported engagement with the Tribal Council. NHS College administered a Project Facebook page, hosting a Facebook Live demonstration at Drone Camp 2 for search and rescue and a use-case demonstration of medical delivery. They also continued to help plan and evaluate Stage 1 flight test demonstrations and implementation.

At-Scale Implementation

The MHA Nation and its partners have demonstrated a proof-of-concept in Stage 1 for transporting medical samples and medicines between the clinics of Twin Buttes, ND, and New Town, ND. A direct flight option between New Town and Twin Buttes using UAS can save upwards of 2.5 hours of ground-vehicle round-trip transportation between the two clinics.

Additionally, the use of UAS can increase access to critical medical services when ground transportation is not possible due to road and bridge closures following accidents, inclement weather, or a patient's lack of transportation. The Tribal Leadership from the Twin Buttes and New Town segments was crucial to the Project's success through their engagement, representation of personnel on the MHA Drone Advisory Board, and participation in listening sessions and surveys. Descriptions of lessons learned that will inform Stage 2 funding requests are provided throughout this report.

The map below shows the ground transportation routes between New Town and Twin Buttes used in the proof-of-concept. The dark blue represents the driving route. The Tribal Business Council approved the use of this corridor (generally the light blue route below) for the flight, in collaboration with the GIS Office at MHA Nation, through Tribal Resolution number 24-155-FWF, to ensure the protection of historical and cultural sites in the selected corridor (see Attachment I).



Depiction in ground transportation route from New Town to Twin Buttes in dark blue

Technology Usage

MHA Nation is developing a comprehensive plan to address these geographical challenges by considering establishing a central UAS Office in New Town, ND. The MHA Drone Team is assisting with this effort relative to additional infrastructure needs. The goal is to enhance the lives of the citizens of the MHA Nation by incorporating coordinated automation, sensor-based infrastructure, systems integration, commerce delivery/logistics, and innovative aviation technologies. At-scale implementation of technology usage is further discussed throughout this implementation report.

Stage 1 Activity Summary and Anticipated At-Scale Implementation

The data-gathering process was significant. For example, a 26-question survey was conducted to assess the perceptions of the proof-of-concept use case and lessons learned. A link to the online survey in Qualtrics was sent to the subcontractors, community members, Tribal stakeholders, and healthcare to determine their perceptions of the Flight Operations, Safety & Risk Management, Flight Crew, Radar/Surveillance Observers & Visual Observers, Post-Flight Debriefing/Operation Observation, Community Engagement & Interaction, and overall Experience & Recommendations. The results are included in the proof-of-concept section and will guide the request for Stage 2 funding.

To secure additional community feedback, the Assessment/Use Case Team conducted a comprehensive opinion survey on perceptions and needs related to the use of drones/UAS, gathering both quantitative and qualitative data. Perceptions were generally positive, with strong suggestions regarding privacy and cost. The findings are titled "Assessment of Drone Potential and Barriers for MHA Nation: Opinion Survey." The survey questions were guided by an extensive listening session in January 2024 that included seven listening sessions in all six Tribal segments of New Town, Twin Buttes, Mandaree, Four Bears, White Shield, and Parshall, as well as Bismarck's Sage Coulee. A summary of the Listening Session is included in this document and is shared widely in all public meetings. On June 26, 2025, a final meeting took place with key stakeholders at Elbowoods Memorial Health Center to assess Tribal needs for the Stage 2 funding request, including a final survey suggested by Tribal leaders in Qualtrics. The purpose of the study was to identify needs related to technology and workforce, as well as existing resources to support Stage 2. (see

Attachments B, C, and D provide assessment information.

Community members in Twin Buttes ND, for a Listening Session, January 2025

The technical goals were to advance the acquisition of resources at MHA Nation, including 1) a blueprint for scalable BVLOS operations systems in rural areas leveraging existing physical and digital infrastructure, 2) a Ground-Based Radar Network and radio communication system for detection and avoidance, 3) user interface software for BVLOS operations, and 4) packaging/payload systems for medical delivery. These elements support system integration, commerce delivery, logistics, and implementation of innovative aviation technology. Of note, future use will require attention to Health Insurance Portability and Accountability Act requirements.

In Stage 1, MHA Nation focused on broad planning goals by exploring additional use cases, expanding workforce development, forming partnerships, conducting economic analyses, and demonstrating a BVLOS proof-of-concept flight for medical delivery. Stage 1 provided a blueprint for activities during the no-cost extension (NCE) for a scalable BVLOS system model in rural areas, such as North Dakota, utilizing the potential of existing physical and digital infrastructure provided by the Vantis Network. The Stage 2 funding request will build on this technical approach, utilizing FAA-approved technology for aircraft detection, tracking, and communication with other UASs to ensure safety. The preliminary feasibility analysis determined the Project's potential to establish a safe, efficient, and scalable network within the MHA Nation Tribal lands.

As a result, the focus of the Stage 2 request to DOT will shift to scaling up technology by installing infrastructure and operating commercial flights, to ensure system integration to maximize the expertise of vendors and partners in the UAS industry. As mentioned, the community's physical attributes are unique, with a single bridge connecting the entire population of the MHA Nation. This population relies on a one-mile-long bridge that, if not secure, poses a risk to their health and safety. Preliminary data on bridge safety is available at UND in the College of Engineering and Mines, hosted by the North Dakota Advanced Transportation Infrastructure Center (ATIC), which works closely with the North Dakota DOT to advance transportation expertise, science, technology, and education in ND. ATIC UND has agreed to participate in the Stage 2 funding, if requested, to bring their knowledge and background. In Stage 2, collecting data on bridge stability will reduce transportation safety risks.

The Project will develop a technical approach to monitoring airspace using sensory integration for data collection. This will build on the work in Stage 1 with a replicable, sound risk mitigation plan, provided that a Part 107 waiver is approved that allows BVLOS flight without ground radar support. In Stage 1, radar data were gathered by DeTect and UND, using their mobile units. However, to

implement at scale with a larger operational footprint and more frequent flights, airspace monitoring through sensor integration will be included. This will enable data collection on air and ground risks and establish patterns to support operational planning and airspace management.

To be successful, MHA Nation will require access to a skilled workforce identified in Stage 1, supported by a sustainability plan through an articulation agreement. With access to Stage 2 funding, installing ground-based radar systems, securing and accessing communication devices to connect UASs to an established network, and expanding capacity in GIS and a mission planning/community portal for flight planning and management would be advantageous to the further development of the MHA Nation.

The operator's workstation inside the MNOC for monitoring and controlling drones.

Vantis hosts the MNOC in Grand Forks, ND, where UND is located, and is administered by the Test Site. It can oversee missions, ensuring that airspace safety is maintained and that ground operations are not adversely affected, as part of a potential large-scale implementation. MHA Nation's key stakeholders who toured the MNOC were reassured of the capacity to expand the ground radar system across MHA Nation as they visualized its capabilities for detection and avoidance, combined with a UAS Operator with proven expertise in medical supply delivery and air carrier certification. This access can support scalable and routine BVLOS operations.

Community Impact in the Context of Goals

Using UASs for supply delivery is not a new concept in the U.S. airspace system. However, MHA Nation's approach to developing a repeatable, scalable process that effectively leveraged partnerships and engaged the community at high levels in Stage 1 was innovative. The high level of community engagement in Stage 1 supported continued engagement and additional workforce training and development. Stage 2 will continue to use the Advisory Board established in Stage 1 as an example of existing infrastructure.

Stage 1 Community Engagement

The community has been actively involved through monthly virtual and onsite MHA Drone Advisory Board meetings with Tribal leaders, as well as monthly all-team meetings among team partners. The Boys and Girls Club of TAT (Three Affiliated Tribes) co-sponsored three Drone Camps with the Project Team in 2023, 2024, and 2025 (see Attachments J and K) for information. NHS College members and Boys and Girls Club participants also took part in a proof-of-concept flight in September 2024.

Dr. Kerry Hartman, PI at NHS College, demonstrates use of drones to support workforce development.

Identified use cases, operational locations, and support infrastructure, including workforce, to ensure that UAS deployment meets the needs of the MHA Nation. While Stage 1 primarily evaluated medical supply delivery and conducted proof-of-concept flights, the infrastructure developed could support and expand various future uses and operational concepts, with many needs identified in the assessment/use case process. UAS are currently used at the GIS/Water Resources Office at MHA Nation. That office provides maps and data using the latest ArcGIS software and drone technology. Future workforce efforts must include a direct partnership with GIS/Water Resources to ensure collaboration.

UND staff hosting Drone Camp 2025

Stage 1 Workforce Development

Stage 1 included planning and capacity building to expand the aeronautics workforce among MHA Nation Tribal members through the partnerships described above. The ongoing goal is to create

high-quality jobs in the UAS industry, which include formal training programs to advance economic development. To that end, a nine-credit certification program, Drone Camps, and Drones in School (see Attachment L) were implemented (see Attachments J-M for details on the Drone Certification curriculum). UND, MHA Emergency Response Center, and NHS College collaborated to offer emergency responder training through the Alliance for System Safety of UAS via the Research Excellence (ASSURE) Safe Federal Emergency Management Agency (FEMA) program (Attachment N provides a review of ASSURE efforts). The workforce team also successfully executed the Drones in School Project in November 2024 and April 2025.

RIAS Drones in School Staff

Drones in School provided an opportunity for middle and high school students in New Town, Twin Buttes, and White Shield, ND, to apply real-world search pattern techniques. They used drone technology to simulate early wildfire detection by identifying and plotting wildfire coordinates in GIS software. Students gained hands-on experience with critical tools used in the field, enhancing their understanding of the vital role of AS and their relationship to Science, Technology, Engineering, and Math (STEM) learning. This exercise aligned with recent significant wildfires at the MHA Nation in October 2024. The training also included a demonstration of infrared sensing. Opportunities for UAS careers, including transportation-related areas, were also presented to the students to build interest in future workforce opportunities. UND students employed on the Project who are also enrolled as Tribal citizens aided this effort and served as role models.

Proof-of-Concept Platform and UAS Flight Operational Staff

Stage 1 Proof-of-Concept

The Implementation Team tested a real-world route using the selected UAS platform to deliver medical supplies between New Town and Twin Buttes, ND. Project partners conducted a live flight demonstration in September 2024 to demonstrate that the UAS can complete the route safely. The proof-of-concept involved multiple flight crews and visual observers. A radar system collected data to inform future operations, expecting that large-scale operations would use Remote Pilots in Control (UAS Operator) and electronic observers (EO) via Vantis or similar systems, thereby reducing the number of required personnel. The prototype UAS carried simulated payloads. In contrast, Stage 2 will involve flights with actual critical medical resources, using a single flight team and electronic observers (EO) with essential infrastructure (e.g., radars, radios, landing zones, and charging stations).

Stage 2 Expansion

The Stage 2 proposal will request funding to scale up operations by increasing the number of UASs for various transportation-focused uses, expanding the BVLOS waiver area to cover more of MHA Nation, and considering the use of the Vantis system to enable routine operations, as well as developing training programs for operating and maintaining UAS platforms. Ongoing evaluation of needs and innovation opportunities will drive continuous improvements and support sustainability. Government-to-government relationships will be expanded through ongoing engagement with the established MHA Drone Advisory Board, including online and in-person meetings. Additionally, Stage 2 will request funding for a Tribal Liaison to ensure “boots on the ground”.

Final Project Activity

Attendance at Tribal Business Council and Tribal Council Sub-committee meetings, including Natural Resources and Health and Human Services, was critical to assuring stakeholders and leaders were informed and received feedback and direction from the MHA Tribes. Tribal Business Council meetings are covered live on a local tribal radio station, KMHA. Direct and focused correspondence with Segment Tribal Chairs in New Town and Twin Buttes also occurred.

The MHA Drone Economic Team has developed an economic impact model to assess the potential effects of UAS implementation, including the creation of new businesses and changes in delivery and supply chains. This includes an examination of the risk of travel on rural lands, which could lead to increased mortality. The MHA Drone Grant/Stage 2 Proposal Team will continue to assess the sustainability of current and future use cases aimed at improving the overall quality of life for MHA

Tribal members, including a range of options to explore economic feasibility with a focus on enhancing the quality of life.

Former and ongoing efforts include the preparation and execution of data management and evaluation reports, securing a Tribal Resolution for the study, and obtaining protocol approval from UND's Institutional Review Board (IRB # 0006181), and a Reliance Agreement dated June 26, 2024, (see Attachment O) for approval from the Tribal Health & Human Resources Committee to conduct this effort. MHA Nation, UND, and NHS College have provided this information to the Test Site, along with industry partners. The Tribe and its partners will continue to develop CONOPs, SRMD, and regulatory pathways for future flights. The Test Site and ASL have verified various data sources, such as GIS maps and historical weather data, to plan suitable future flight routes and emergency contingencies that account for efficiency, safety, and cultural considerations. The team has worked with key Tribal stakeholders, including the Senior Science Advisor at MHA Nation and NHS College, to ensure Tribal data sovereignty in storage and access. The Senior Science Advisor attended the bi-weekly meetings with the FAA to understand better how to secure a waiver to fly BVLOS for the use case and the importance of radar data, bringing valuable expertise to potential Stage 2 efforts.

Program Activities, Key Milestones, Barriers Specific to Milestones

The following milestones were achieved:

- Identification of additional corridors to use for deliveries with a focus on the protection of sacred sites by working collaboratively with the Tribal Business Council, Tribal Historic Preservation Office (THPO), Area Tribal Water Resources/GIS Office, and their representatives (February 15, 2025, to June 30, 2025). A proof-of-concept was conducted during a site visit the week of July 16, which included ground risk analysis and meetings with the Tribal Historical Preservation Office (THPO). A Tribal Resolution was approved in May 2024 (NO. 24-155-FWF) approving the corridor for the proof-of-concept flight. This included the identification of infrastructure locations (launch and recovery), (January 1, 2024, to July 31, 2024), and extended to June 30, 2025.
- For the use case, the coverage area was a 2-mile-wide corridor of a direct line between Twin Buttes, ND, and New Town, ND clinics. Additional radar locations were identified to enable future surveillance coverage of the operational area. More information on this is found in Section 6 (January 1, 2025, to June 30, 2025).
- An analysis of additional takeoff/recovery site plans for UAS operating at MHA, in conjunction with the radar location analysis for the use-case needs, was identified. This analysis is presented in greater detail in section 6, and the full report is available from DOT if desired. For example, construction that was not completed due to rain during the proof-of-concept flight required the team to move the launch location to Elbowoods. Extensive radar data was gathered by DeTect Radar Systems, which volunteered to provide two mobile radars and supported data access through three mobile radar trucks. (February 15, 2024, to June 30, 2025).
- Economic Impact included cost benefits and economic feasibility. (January 1, 2024 to January 31, 2025): Section 4 will provide the latest information relative to financial capacity. We estimated price points based on current financial information and will continue to adjust price points in Stage 2. The barriers identified include determining what constitutes "at scale," the costs associated with radar, a price point for accessing the Vantis Network, and the cost of purchasing UAS vs. leasing. The drone used for the proof-of-concept flight, Swoop-Aero, began a liquidation process shortly after, with the vendor Valkyrie purchasing the products. Several grant team members attended a presentation by the Choctaw Nation at the 2025 Xponential/AUVSI in Houston, Texas, in May 2025. (January 1, 2024, to June 30, 2025)
- Implementation Plan included Concept of Operations, Safety Risk Management Document (SRMD). The Implementation Plan for the proof-of-concept was completed on October 1, 2024. Valkyrie completed the Concept of Operations in preparation for the proof-of-concept flight by August 30, 2024. The SRMD was finalized in September 2024.
- Workforce Development Plan included aeronautics articulation agreements, Drone Camps, and implementation of training programs (August 15, 2023, to February 15, 2025). An articulation agreement between UND and NHS College was completed to enhance workforce capacity at the MHA Nation. A collaboration with MHA Nation Public Schools has been established to create workforce development pathways, including the Drones in School effort. These efforts were completed in partnership with the Boys and Girls Club of the Three Affiliated Tribes (TAT).
- Established government-to-government relationships between partners and MHA Nation (August 15, 2023, to February 15, 2025): This occurred through numerous engagements across stakeholder groups, including establishing an MHA Drone Advisory Board that involved key leaders, Tribal Elders, Tribal GIS specialists, emergency responders, and workforce development and economic development leaders. Advisory Board sessions were held monthly online, with face-to-face meetings on July 17, 2024, and May 1, 2025. At the July 2024 meeting, 35 key stakeholders attended a Stage 2 planning meeting, followed by a survey conducted as Attachment D.
- Additionally, listening sessions were hosted at all six segments, and in Bismarck, ND, in January 2024, where many MHA Tribal members shared perceptions about drone use. The listening session

report was shared with the Tribal Council and Elbowoods Memorial Health Center leaders to guide policy and planning development. Collaboration between UND, NHS College, and the MHA Nation has been ongoing. For example, on September 11, 2023, the MHA Nation Tribal Business Council voted to approve the release of a video message about the Project, compiled by UND, for an event entitled Wake-up-to-UND. The video is subject to MHA Nation copyright verification of ownership rights to TAT.

- NHS College, the Boys and Girls Club of TAT, UND, and industry partners offered three successful Drone Camps. UND provided T-shirts to all staff to identify their presence as part of the Drone Team (see Attachments J, K, and L). The effort featured stations where participants learned to fly drones safely and with precision. The three Drone Camps were all held at the Earth Lodge Village and provided youth with an opportunity to explore higher education options. The third Drone Camp encouraged a more robust engagement in flying larger drones. The Drone Camp's model, based on feedback from previous youth participants, incorporated activities of flying drones to replicate current commercial UAS operations. On July 18, 2024, the event included a demonstration of radar for detection and avoidance. It also provided a simulation of search and rescue for a drowning incident and access to the mobile radar truck.

RIAS UAS Pilot demonstrates IR flight to students.

Tribal sculpture art at Earth Lodge Village and MHA Interpretative Center

- Proof-of-Concept UAS Live Demonstration Flight (September 18-19, 2024): The FAA waiver was approved on August 6, 2024, and a proof-of-concept flight occurred during the week of September 16, 2024.
- Evaluation of Lessons Learned and Future Use Cases (Sept 20, 2024 to June 30, 2025): The team met regularly to develop future use cases with a focus on transportation needs. The Listening Sessions made extensive use of case requests and Survey Findings.
- Stage 2 Submission (TBD): A strategically focused team has been established to apply for Stage 2 funding, based on lessons learned, to include additional partners. Consideration has been given to integrating all partners into the existing transportation system and refining the concepts learned in Stage 1 for replication by others. It was decided to defer the first submission window until after the Project conducted post-proof-of-concept flight analysis to provide supporting results that strengthen our submission and ensure scalability. The MHA Nation Tribal Business Council granted a Tribal Resolution for approval to apply for Stage 2 funding, which is attached as No. 24-312-FWF approved on October 21, 2024 (see Attachment S).

Social and Other Media Presence

MHA Nation, NHS College, and UND have provided and supported significant media requests regarding the opportunities and accomplishments of the MHA Drone Project, in partnership with Tribal and statewide media outlets, including print, radio, and television. Support through the Tribal Chair's office has included assistance from the CEO to the Tribal Chair for the proof-of-concept flights and public events, the Public Relations/Special Events Coordinator, and the Director of Planning and Events. This occurs in collaboration with the Marketing Specialists at NHS College to ensure media coordination of press releases. UND Today, UND's official online source supporting strategic goals, released three stories vetted by the grant team and the Tribe to inform the public. The Project fund number and acknowledgment of DOT SMART GRANT (note in all branded attachments) are provided in all public media releases and public-facing materials that were explicitly branded for the Project, as noted in several attachments. Social media has been managed by the NHS College, with live streams of the proof-of-concept flights hosted on Facebook Live. NHS College hosts the web page.

The Project attracted considerable attention. Below is a list of presentations, media coverage, and Tribal Resolutions that support this effort. Many of these resources are behind a paywall, so public access is not available. When available, a link is shared:

- **UND Today**, *The Federal Grant to Support Medicine Deliveries by Drone,* March 22, 2023. UND supports delivery of medicine at MHA
- **The Forum of Fargo/Moorhead**, *Lake Sakakawea Hinders Medicine Access at Fort Berthold. How drones Could Offer a fix,* May 27, 2023.
- **The Bismarck Tribune,** *MHA Testing Drone Delivery of Medicine with the Help of a 2-million-Dollar Federal Grant,* June 4, 2023.
- **UND Today**, *MHA, and UND Drone Research at the 2023 NHS College Culture and Nature Camp*. The release of this video was approved by the Executive Committee of the Tribal Council on September 11, 2023. This was shown at an event entitled Wake Up to UND by UND President Andy Armacost, on September 27, 2023. https://www.youtube.com/watch?v=_Iou8WZp6H
- **KFYR TV,** *Drone Program in New Town Aims to Improve the Delivery of Essentials to Rural areas,* October 20, 2023.
- **Presentation at AUVSI** (Association for Unscrewed Vehicle Systems International) Exponential 2024 in San Diego entitled *Transforming Healthcare Access: MHA Nation's Drone Delivery Initiative,* (Seminole and Johnson), April 23, 2024.
- **MHA Tribal Nation Resolution No 24-155-FWF** of the Governing Body of the Three Affiliated Tribes of the Fort Berthold Indian Reservation entitled *MHA Drone: Planning and Protocol Development Use Case*, May 7, 2024.
- **Nueta Hidatsa Sahnish College provided a live Facebook feed,** *MHA DOT DRONE Demonstration – of Use Cases of Search and Find,* and another delivery of a dog biscuit to a dog on site, July 18, 2024.
- **KFYR TV,** *Drones Enhance Medical Service for Tribal Nations in the Midwest,* July 18, 2024.
- **KX News.** *UND Staff Teaches Kids the Benefits of Drones with SMART Grant,* July 18, 2024.
- **UND Today,** *From the Clinic to the Doorstep: Grant Aims to Deliver Medical Supplies by Drone*, July 30, 2024. UND Workforce and Proof-of-concept
- **2024 Tribal Leaders Summit**: *MHA Development Model: Improving Tribal Health and Economic Wellbeing Using Drones* in Bismarck, (Seminole, Flynn, Askelson), September 5, 2024
- **MHA Times,** *MHA Drone Project Completes Historic Flight*, with a photo of an honoring ceremony with traditional star quilts and blankets on September 25, 2024
- **MHA Tribal Radio** covered MHA Proof-of-concept flights on September 18 and 19, 2024.
- **KX New: produced** *Celebrating Native American Heritage: MHA Drones* and *UND Staff Teaches Kids the Benefits of Drones with Smart Grant*; July 18, 2024
- **KX News:** *MHA Nation Takes Flight with Medical Drone Deliveries*. September 4, 2024.
- **Minot Daily News**: *MHA Nation's Drone Project Takes to the Skies,* September 16, 2024.
- **KFYR TV**: *Drones Enhance Medical Service for Tribal Nations in the Midwest* and *MHA Nation Launches Drones to Deliver Medication from New Town to Twin Buttes,* September 19, 2024.
- **KFYR**: *MHA Launches Drones to Deliver Medicine from New Town to Twin Buttes*, September 19, 2024, featured on DOT SMART Grant page https://www.transportation.gov/grants/smart/2022
- **KXNET**: *MHA Nation Takes Flight with Medical Drone Deliveries,* September 26, 2024.

- **Bismarck Tribune:** *MHA Medical Project Task to Flight, Demonstrates Delivery Capabilities in Rural North Dakota,* September 21, 2024
- **Bismarck Tribune:** *Editorial: Drone Project has Potential to Save Lives.* September 25, 2024.
- **UND Today**: *Successful Drone Test Flights Advance Medical Delivery*, October 10, 2024. *Success Proof-of-concept Flight MHA Nation*
- **MHA Nation Tribal Resolution NO 24-312.FWF***: Approval to Apply for SMART Stage 2 Implementation Grant,* October 21, 2024. 2024 Tribal Resolutions MHA
- **North Dakota Living:** *High Flying Medicine: Tribal College Explores Drone Technology and Training,* February 4, 2025. High Flying Medicine MHA
- **Xponential Presentation**: Establishing Advanced UAS Operations: Lessons Learned from North Dakota, AUVSI, Houston, TX, May 21, 2025.
- **UND McNair Scholars Defense, University of North Dakota Campus:** *Acceptability of Drone Use for Medical Use Case on Tribal Lands,* Eliana Malnourie, Sheila Hanson (mentor), and Thomasine Heitkamp (Project PI at UND). May 9, 2025.
- **UND Media Release**, *Third Annual MHA Drone Camp*. Media Third Drone Camp May 30, 2025
- **Prairie Public Radio**: *Drone Camp 3*, Copy/Cut Story Cover State-Wide by Todd McDonald, June 3, 2025.
- **NHS College hosted a Facebook page entitled MHA DOT Drone Project** with 437 followers. Facebook is the social media format used by many MHA Nation citizens. A live stream of the search-and-rescue exercise at Drone Camp 2 and the use-case demonstration between New Town and Twin Buttes occurred. Project partners and citizens posted positive comments.

UND MHA Drone Team presenting at 2025 AUSVI in Houston, Texas

The MHA Drone Team received significant support from the MHA Times, a newspaper read throughout the Tribal Nation. The local radio station, KMHA Radio, provided coverage of events and broadcast live Tribal Council meetings where resolutions were adopted. The engagement and support in media messages were positive, with citizens viewing this effort as historic and critical to

their future, particularly in terms of effective technology use. Coverage of the effort occurred throughout the state with a front-page article in Fargo, ND, and attention by UND in Grand Forks, ND, where UND is located. No negative media occurred. The Project was highlighted at various powwows hosted on Tribal lands in 2024. Comments on the Facebook page are also positive.

Technologies Deployed

Technologies used include coordinated autonomy, system integration, commercial delivery, and innovative aviation with BVLOS flights.

Previous DOT Funding

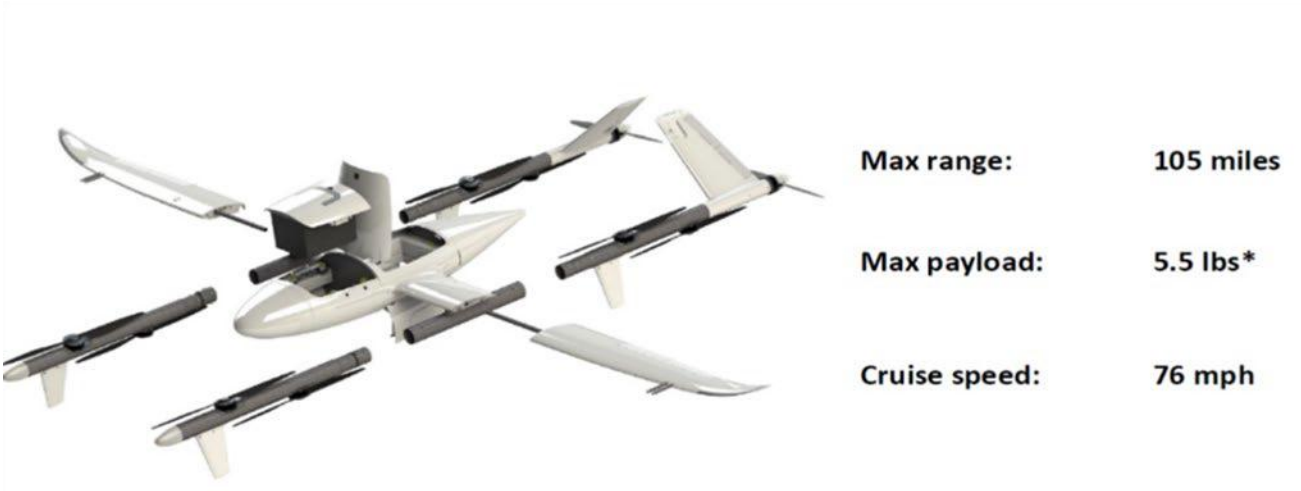
MHA Nation has not applied for United States Department of Transportation (USDOT) funding before.

Major Deviations

No significant deviations from the work plan described in the original proposal occurred. The proof-of-concept flight was successful and had high levels of community engagement. This was announced broadly to the public, and the MHA Drone Team hosted a significant community event beforehand. The only deviation from the notes is the continuation of work through June 30, 2025, approved via a non-cost extension (NCE), primarily due to weather constraints and delays in contract approval. The request was granted by DOT on February 3, 2025, and approved by the MHA Nation Tribal Chair.

Section 3 of 7: Proof-of-Concept or Prototype Evaluation Findings

The MHA Nation developed a plan to use a small class 1 UAS platform to serve a historically underserved population under 14 Code of Federal Regulations (CFR) Part 107. The aim was to demonstrate the capacity to improve access to medical care and equipment. As noted in Section 2, the Fort Berthold Reservation is in a remote and rural area of north central ND, which required extensive planning for the proof-of-concept flight. The MHA Nation secured permission, through a request submitted by Valkyrie, to fly BVLOS for the use case. Matador UAS Logistics, LLC (dba Valkyrie UAS Solutions – also referred to as Valkyrie), was contracted by UND on behalf of MHA Nation to provide the proof-of-concept flight for the transport of medication. Valkyrie's mission aligns directly with the project's aims, given its focus on strengthening communities, improving patient outcomes, and creating opportunities to help overcome inequities across rural America through advanced UAS and autonomous transportation solutions. Valkyrie, part of the Matador UAS Consortium, a group of over 45 industry, academia, and government agencies, works to advance critical use cases in rural communities.



Swoop Aero Kit B UAS platform

The Swoop Aero Kite B UAS platform was the aircraft flown for proof-of-concept flights. It was authorized under an international agreement to operate within the National Airspace System (NAS) and is used for medical missions. The Swoop Aero, an Australian company with aircraft operating on six continents, had missions similar to those of MHA Nation. Swoop Aero was acquired by Kite Aero in 2025.

Flight Summary

Valkyrie UAS Solutions accessed two Swoop Aero Kite Aircraft, along with associated ancillary equipment (batteries, charging stations), to conduct protocol flights from Elbowoods Medical Clinic in New Town, ND, to Twin Buttes, ND, along a 34-mile corridor. A copy of the FAA-approved BVLOS waiver was provided to all involved in flight operations.

Valkyrie accessed two Swoop Aero Kite Aircraft shipped from Australia and Virginia. One aircraft was shipped from Australia, and another was driven in a U-Haul from Texas by a flight operator. All shipping and delivery of parts were coordinated with the staff at the NHS College in New Town, ND. The aircraft's batteries arrived via a separate ground courier. Ancillary equipment, including necessary tools for battery construction, was shipped. Given New Town's rural nature, shipping services were limited, and deliveries arrived more slowly.

Pre-flight assembly began on September 11, 2024, with Valkyrie staff arriving in Stanley, ND (located 36 miles from New Town and 129 miles from Twin Buttes). MHA Nation Tourism provided access to the Earth Lodge Village to use for assembly. Due to the flights' rural locations,

extensive on-site assembly was required, which is not typically part of the Standard Operating Procedure (SOP). Valkyrie pilots assembled, inspected, and conducted a system of verification, including both hardware and software inspections, upon arrival and throughout the preparation and demonstration phase. They trained HUB Operators on September 15 and 16, 2024, who also served as Visual Observers, in New Town and Twin Buttes, ND. Once complete, Valkyrie conducted the Visual Line of Sight (VLOS) flight from Earth Lodge Village on September 16, 2024, at 10:10 am Central Time. The two-minute check flight in nominal weather conditions was successful, with no communication, battery, or operational errors reported. This provided confidence in the readiness for the proof-of-concept flight.

The launch location identified in the planning process for New Town was deemed a risk due to construction that was not yet complete. Therefore, the launch location was adjusted slightly to the Veteran's Administration (VA) parking lot, which was approximately 100' to the West and up a hill, mitigating the operations over people. The mobile radar truck was installed near the VA building as that location provided access to Wi-Fi and power by the VA.

UAS Operator Preflight of Platform prior to Proof-of-Flight

The first proof-of-concept flight between New Town and Twin Buttes was flown on September 17, 2024, at 10:25 am Central Time. The Test Site and Thales deployed seven Visual Observers (VOs) to enhance safety, who were scattered throughout the corridor with a map provided of their locations in (Attachment P). DeTect's two mobile radar systems were transported from Panama City, Florida. One was located in New Town next to the launch site, and another in Twin Buttes next to the landing site. UND provided access to a mobile radar truck in the rural area of Mandaree next to an oil field pad. The radar systems offered valuable information, including monitoring the airspace environment. They also provided data from the proof-of-concept flight, enhanced situational awareness, and access to a demonstration for the citizens of MHA Nation. This underscored the commitment to success by UND and DeTect.

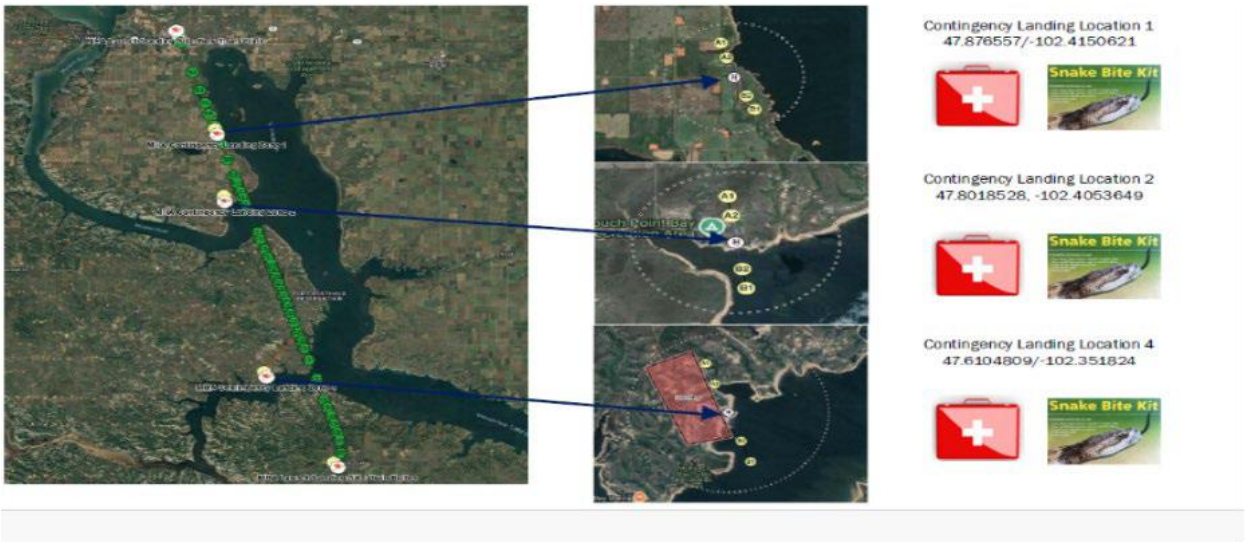
Launch and Recovery Area Satellite Images of Proof-of-concept Flight

The following are the data points for the flight:

- Time: 0.50 hours
- Weather Conditions: Dense Fog from 0600 to 1100/Delayed launch
- Communication Systems: Loss-Link notionally 22 seconds occurred due to rugged topography, Flight
- Battery: Landed at 54 remaining
- Flight Altitude: 300 ft/AGL
- Flight Airspeed: Average 55.5 Knots/ Highest 68 Knots

The aircraft launched and operated nominally for the 30-minute flight. However, during the inbound landing process at Twin Buttes, the aircraft could not locate the landing zone QR code. Per the SOP, the UAS landed at the alternative landing point, which was 50 yards away from the originally planned landing spot. Due to this anomaly, the return flight on September 17, 2024, from Twin Buttes to New Town was delayed to allow time for further analysis and troubleshooting.

Subsequent inspection identified that the landing locations and GPS did not load into the flight planning software, causing the aircraft to land in the incorrect location. The Valkyrie team, supported by Swoop Aero (OEM), identified and corrected the issue. Additionally, Valkyrie conducted a full aircraft inspection to ensure safety for the next flight on September 18, 2024.



Visual Observer Locations along the Proof-of-Concept Flight Route

The second proof-of-concept flight took place on September 18, 2024, at 9:35 am Central Time. Valkyrie flew the same flight path as the previous day.

Below are the data points for the flight:

- Flight Time: 0.66 hours
- Weather Conditions: Wind Speeds and Gusts at aircraft limits of 25 Knots
- Communication Systems: Negligible Loss Link in the Mil-Sec Range 1X event
- Battery: Landed at 46% remaining
- Flight Altitude: 300 ft/AGL
- Flight Airspeed: Average 53.5 Knots/ Highest 62 Knots

The aircraft launched and operated nominally for 39 minutes, including landing on target in Twin Buttes. Unfortunately, the aircraft could not return because there were no spare batteries. Below, Valkyrie explains why this occurred and why it was largely due to a transition to new batteries.

Following the landing at Twin Buttes, the team returned to New Town, where a debriefing was held at NHS College. Further debriefing by the Test Site also assessed perceptions regarding the use case (using a Qualtrics survey) that were shared at an all-team meeting a month later. Lessons learned and successes are provided throughout this report.

In summary, the proof-of-concept flights demonstrated a reduction in travel time from 1 hour and 45 minutes by car to an average of 30 minutes by drone, providing enhanced medical and emergency response support from New Town to Twin Buttes. With additional resources, the MHA Nation can build on the capacity developed in Stage 1 for drone healthcare delivery operations that will drive economic development and growth across the entire reservation.

Valkyrie Feedback

The following observations were provided to the MHA Nation from Valkyrie in a report at the end of the proof-of-concept flights. They noted that the shipping and assembly process consumed all spare parts and necessitated additional tooling, which took extra time. Once assembled, the aircraft required minimal maintenance and repair. They noted that access to batteries was another challenge due to several malfunctions because the batteries were being phased out. Aircraft manufacturers were acquiring new batteries; however, the flights occurred before the new batteries were tested. The risk was too significant to access the new batteries before completing the testing. Communications procedures operated nominally within the Valkyrie Waiver Parameter, with no issues to note.

Weather limitations had a negative impact on the proof-of-concept flights. For the first flight, the aircraft was ready for launch but had to wait for a weather window to open because a fog layer

reduced visibility below requirements. For the second flight, team members synchronized both the aircraft and weather availability, and adjustments were made. It is anticipated that during future daily drone delivery operations, the MHA Nation will be able to plan deliveries based on anticipated weather events.

Performance Metrics and Expectations

The following outlines the performance metrics in the CONOPS and the Implementation Plan, identified before the proof-of-concept flight. Regarding the broader CONOPS performance parameters, all operations were conducted with an FAA Part 107-trained and licensed Operator. Therefore, one Operator to one aircraft was available. A second Swoop Aero Aircraft was on standby. Flight plans were not filed with Air Traffic Control (ATC) because the contractor was flying under an FAA waiver. However, a permanent Notice to Air Missions (NOTAM) was published for the length of the waiver's authorization. No ATC liaisons were required. Two VOs, one at the take-off location and one at the landing location, were present.

During operations, Valkyrie provided two licensed pilots capable of performing flight operations and had two aircraft. During operations, NOTAMs were filed through Flight Services 24 hours before flight operations. One aircraft was available for operations, and one for back-up. Unfortunately, during assembly, one aircraft was damaged. Therefore, only one aircraft was available for flight operations.

HUB Operators were trained to assist with battery swaps, pre- and post-flight checks, payload changes as required, and to monitor air and ground launch and recovery operations. Two UND RIAS employees and one UND graduate student/MHA Tribal member, part of the SMART grant team, were trained as HUB Operators by Valkyrie. They conducted these duties for both the check flight and the proof-of-concept flights. Additional VOs were trained by personnel from the Test Site and Thales to perform the duties on the corridor during operations. Again, MHA Nation Tourism allowed the team to work out of the Earth Lodge Village, which provided excellent space for hosting community events, hosting the Drone Camps, and testing the Swoop-Aero.

The requirement for a 100-foot security perimeter at each launch/landing location was marked with cones. Only trained personnel were allowed within the perimeter to ensure all others, including domestic animals and wildlife, were at a safe distance.

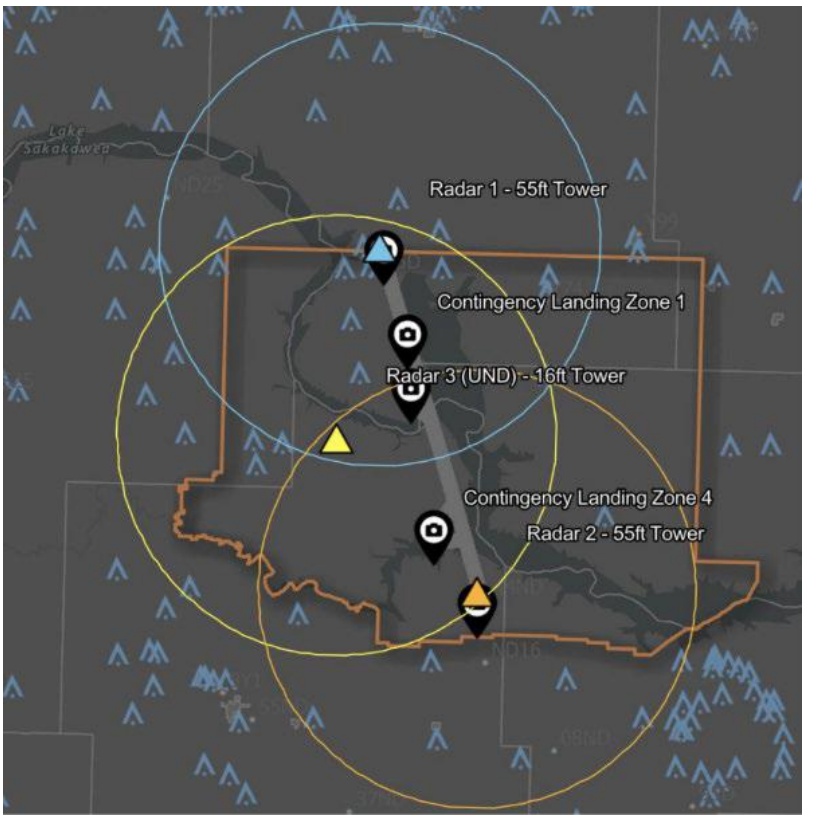
Readiness of demonstration at the Earth Lodge Village.

Valkyrie successfully requested relief from the following: Part 107.31 Visual Line of Sight Operations and Part 107.33 Visual Observers (b & c.2) in the CONOPs (see Attachment T). The intended daylight visual flight route to be flown from New Town, ND, to Twin Buttes, ND is 34 miles over the Fort Berthold Reservation. The entire route is in Class G airspace, within the boundaries of the Reservation, and within the state of North Dakota.

Given that oil and gas helicopters, crop-dusters, and the Minot Air Force Base frequently operate in this airspace, pre-coordination with these entities was conducted before the flights to mitigate risk. This occurred as prescribed and met expectations in the proof-of-concept flight.

The flight operations were designed not to operate directly over people under 200 ft AGL to comply with Part 107. However, 11 roads were crossed along the route, so communications about flight operations were provided to enhance transparency with the citizenry. The local radio station, KMHA, provided information and covered the flight live on September 18. Additional written communications were conducted in collaboration with the MHA Nation through the NHS College and the Tribal Chairman's office to residents, ensuring they understood the flight route and path, including contingency landing locations throughout the flight operations.

As noted, VOs were at the launch and landing locations, who communicated with the Remote Pilot in Command (UAS Operator) to avoid conflicts. NOTAMs were filed, and aviation radios were monitored in addition to the ADS-B monitoring, which was done before and during the flight.



Obstacles identified with associated heights and Contingency Landing Zones are depicted along the flight path.

During the two flights, Highway 23 needed to be crossed at takeoff in New Town, ND. This is a busy road typically accessed by many citizens and oil and gas employees. For future flights, it is best to have the UAS climb to an altitude that allows it to cross roads over heavily trafficked areas, and this should have been considered earlier in the planning process. This would also avoid the need for additional VOs to communicate vehicular traffic clearance in the future. Additionally, conversations with leadership at Elbowoods and the Emergency Response Operations were fruitful in securing an alternative location for future launches to address this concern.

The flight parameters approved were for the aircraft to operate visually in daylight between 130'-275' AGL within Class G airspace and to maintain a 3-mile buffer from the flight path as a risk mitigation method. The flight team identified alternate launch and landing sites during the site survey in July 2024. The actual flight was flown at 300 ft AGL.

During the concept flights, the aircraft remained on the flight plan at the prescribed altitude and airspeed. There were no in-flight emergencies or communication disruptions. Alternative landing locations along the route were added to the flight plan and displayed through the Remote Pilot Station (RPS) to the UAS Operator in case of an emergency but were not needed.

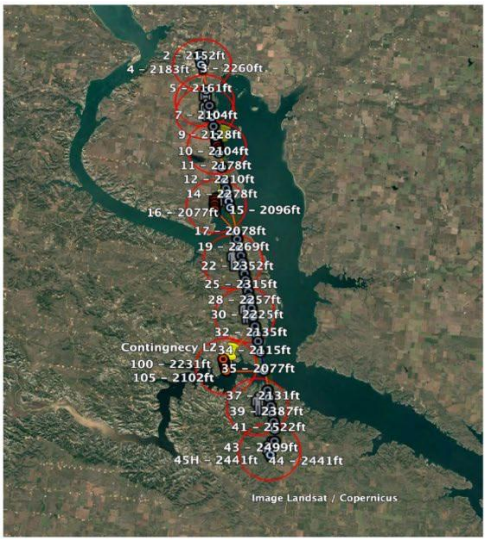
The only expectation not met for flight operations was during the landing phase of the first flight. The aircraft could not locate the landing target pad. A landing target is required for the UAS visual landing system. This allows the UAS to accurately identify the assigned landing location and conduct a safe and contained landing. Therefore, the UAS had to resort to GPS for its landing, resulting in the aircraft landing approximately 50 yards from the desired location.

Landing Target Pad on the left and the location where the RPA landed on the right.

The team was aware of weather restrictions when conducting UAS operations, both under Part 107 and within the operating limitations of the Swoop Aero. This would generalize to other small UAS. In the majority of commercial UAS operations, wind is the primary cause of delays. Most aircraft are restricted to air speeds of around 20 kts. Specifically for Swoop Aero, the primary concern was maximum wind speeds of 25 kts, including gusts. Additionally, operations were not permitted during rain. During the planning phase, the expectation for these flights was that high winds would be the biggest challenge. However, the reality was that VMC conditions for flights on both mornings were limited by fog, resulting in delays as the fog dissipated. The team identified that winds would pick up later in the day, potentially affecting later return flights.

The UAS Operator planned to have access to ASL's AirHub Portal for real-time weather alerts, operational-area advisory alerts, and data feeds, including advisories, FAA-provided data, and operational information in the area. During the actual flight, the pilot had access to this information. DeTect provided additional information, including a ground weather station to augment current weather data sources.

Crew communications were coordinated as described in the CONOPS, using laptops, cell phones, or other approved devices as the primary means. The TEAMS site for the Project served as a critical communication resource before and during the flight. Lines were maintained throughout the flight operation to ensure safe, well-coordinated communication. The line was set up by the UAS Operator and dispersed to all participants. All participants dialed into the line 30 minutes before scheduled flight operations to ensure communication was working correctly. When the UAS Operator notified the participants that all pre-checks were completed, they were ready to launch, and they confirmed readiness for flight operations. A verbal "Yes" from all participants was required. Once received, the UAS Operator notified the HUB Operator to launch the UAS and then stood back beyond the secured perimeter. The VO notified the line when the aircraft had taken off, reached altitude, and transitioned to forward flight mode. The UAS Operator notified the participants when the UAS had reached the halfway point of the flight path. The UAS Operator notified the VO at the landing location when the aircraft was five miles out. The VO notified the UAS Operator when the UAS came into view. The VO then notified the participants when it transitioned to hover flight mode and when the UAS was ready to land. The aircraft landed safely. Once the systems stopped, the UAS Operator notified the HUB Operator that it was safe to approach the plane and remove the payload and battery pod. These processes and procedures ensured flight safety.
Below is a list of VOs and their locations along the corridor, and is also provided as Attachment P.



Erin/Greg: New Town Road

VO1) Greta: 47.934498°, -102.450114°

VO2) Ian: 47.919953°, -102.446487°

VO3) Jeff: 47.876987°, -102.418888°

VO4) Sean: 47.802336°, -102.404893°

VO5) Steven: 47.737049°, -102.364850°

VO6) Shawn: 47.674424°, -102.333032°

VO7) Kyle: 47.610296°, -102.352012°

VO8) Hunter: 47.566961°, -102.293282°

Scott: Twin Buttes Road

In the proof-of-concept's communication plan, all members of flight operations, including ASL, had access to the same communication line and received crucial, up-to-date information. VOs were included in flight operations to enhance safety. A lesson learned is the importance of involving the VOs earlier in the planning process to ensure robust communications.

Specific metrics for use case, pre- and post-flight measurements, and adherence to expectations are listed as follows:

Preflight:

- Gathered local weather stations and airport METAR/TAF information during the entire flight (winds, temps, pressure, precipitation, etc.): This was achieved using the UAS on-board sensors and the interface software provided by ASL, as expected.
- Recorded the mission route and contingency points and evaluated the efficiency and effectiveness of the launch location: The original launch location was moved because of building construction delays caused by inclement weather. The launch location was moved to a hill near Elbowoods, which provided good visibility and allowed the required 100-foot quarantine circle around the aircraft. Approval of this change was secured from the requisite Tribal entities before relocation to minimize disruption. This included providing Wi-Fi and power access for the mobile radar at the VA Building in New Town.
- Verified the landing location was clear of personnel and foreign objects and debris for effectiveness: The landing location was clear as expected and allowed for more than sufficient buffer to personnel and debris. It also allowed easy access to the clinic in Twin Buttes.
- Collected site survey information (obstructions, areas of population, restricted airspace): The original planned route was verified as safe for operations, along with locations for emergency landings. Connectivity was found to be adequate along the path, and airspace activity was determined to be very low to non-existent at the flight altitudes.
- Tracked and documented all waivers, including all FAA requirements, for safety mitigation, and quality checked for efficiency and level of safety: A Safety and Security Operating Procedures (SSOP), produced by Valkyrie, was submitted to the FAA along with the Part 107 waiver on risk mitigation procedures. This supported approval for BVLOS flight (see Attachment T).
- Evaluated efficiency and functionality for the ground control station checklist: It was determined that The checklists, while thorough, produced by Swoop Aero were cumbersome because they required numerous trips around the aircraft to inspect parts and areas that could have been checked together. Changing the walk-around inspection order will greatly reduce the time spent on pre-flight checks

and improve their safety. Valkyrie provided these concerns to Swoop Aero for consideration of a revision.

- Reviewed all aircraft checks on the ground and documented aircraft functions (temps, weight, fuel load, voltages): There were no anomalies during either of the two flights.
- Determined aircraft payload/camera performance measures (within parameters, functionality, deviations, weight and balance, and center of gravity): The payload was not yet identified when determining these performance metrics. An EpiPen was ultimately identified as the desired payload, which allowed the flight crew to determine the proper weight and balance. The EpiPen was small enough and light enough not to affect the weight and balance during the flight. Also, no audio or visual sensors were flown on the aircraft.
- Reviewed VO procedures: VOs had brightly covered vests for PPE, along with snakebite kits due to the rattlesnake threats in the area. VOs were always in communication with the UAS Operator. VOs were responsible for issuing traffic calls when they saw a potential conflict. They notified the UAS Operator when an aircraft was sighted in the corridor, when they lost visual on the UAS, or if the aircraft left the corridor.
- Locked the payload in UAS: The payload was secured in a box that was locked into the UAS. The payload was not a controlled substance and was a simulated EpiPen that did not need any additional security measures.
- Captured communication network and verified communication plan for effectiveness and functionality: The UAS Operator and VOs used a cellular network for communication. The UAS used VHF/UHF/SATCOM for Command and Control.

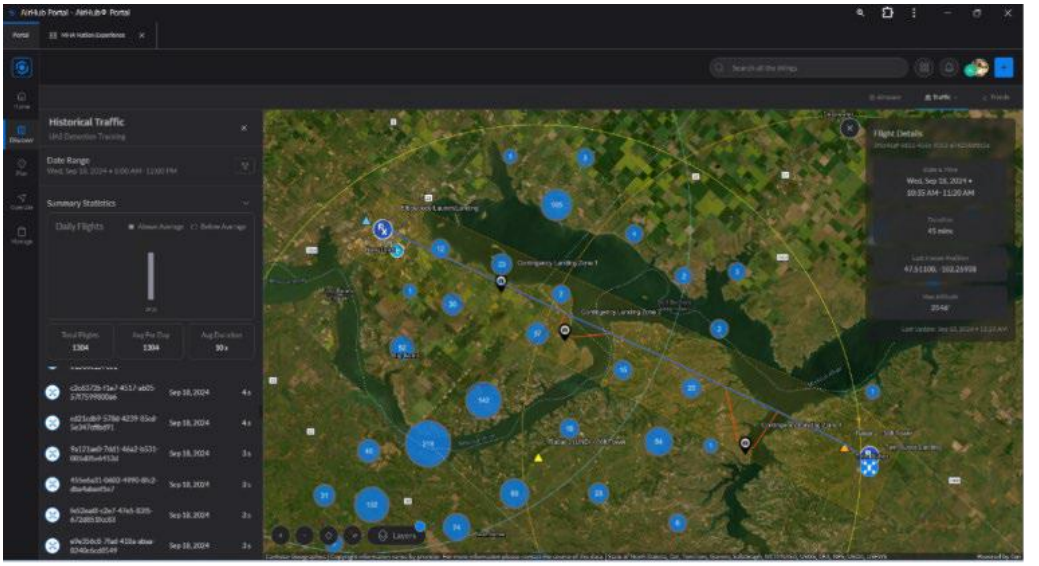
Mission:

The Team tracked time during ground operations from the start of flight preparation to when the UAS was ready for takeoff. The goal of the ground crew was to conduct operations safely and become more efficient with prepping the aircraft for flights. The extremely long delay on the first flight, the need for urgency in the second flight's takeoff, and the absence of any additional flights afterward prevented the collection of the anticipated data.

UND Graduate Student training on the safety of drones and the application of the payload.

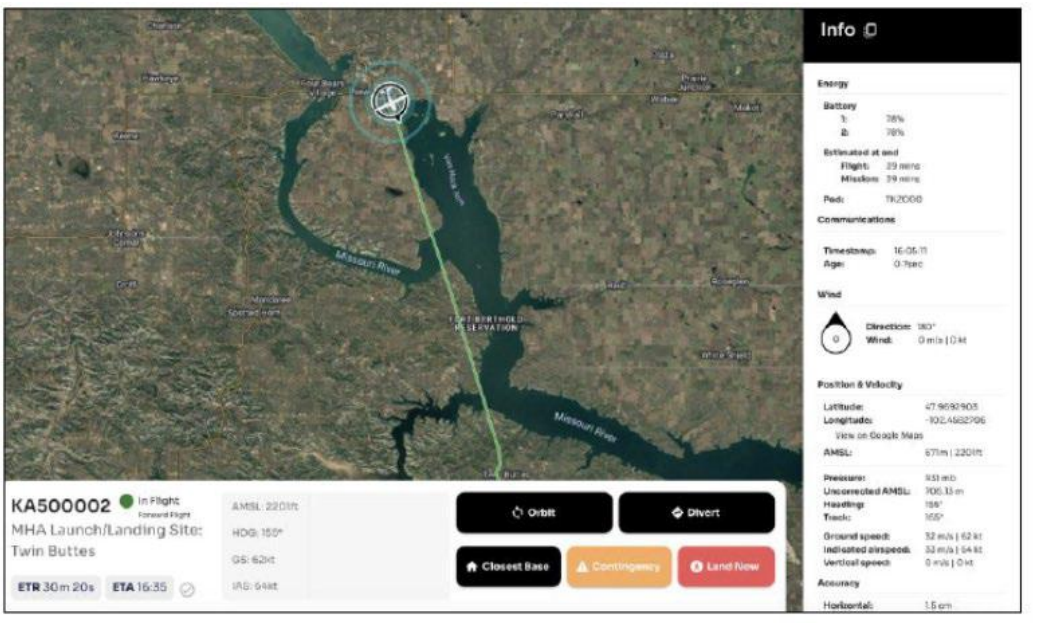
- Tracked data on the time it takes to upload the route to the UAS before Takeoff. Note that all points' latitude/longitude/altitude were confirmed: This was performed and tracked as expected through the UAS Operator interface software with the aircraft.

- Tracked data on the aircraft's emergency lost link altitude, route, and landing location and documented any deviation during flight: This was performed and tracked as expected through the UAS Operator interface software with the aircraft. No route deviations occurred during the flight.



Screen capture of AirHub software showing historical UAS Traffic in the area over time.

- Tracked aircraft in the area during the flight: ASL provided this service through its AirHub Portal platform. Additionally, beyond expectations, DeTect was present to demonstrate its mobile ground radar system and provided excellent situational awareness.
- Annotated all standard functions during flight, times, and any deviations: This was performed and tracked as expected through the UAS Operator interface software with the aircraft.



Screen capture of AirHub Software during flight

- Documented all handoff procedures for aircraft settings between VOs: Seven VOs were spaced out to support visual acquisition of other aircraft during the flight. The VOs and UAS Operator maintained communication from the start of ground operations through the aircraft's shutdown.
- Collected all aircraft data: This was performed and tracked as expected through the UAS

Operator interface software.

- Noted landing performance, target zone accuracy, and deviations in the landing sequence: This was performed and tracked as expected through the UAS Operator interface software with the aircraft. A landing deviation occurred with the first flight and has been described earlier in this section.
- Reviewed performance parameters on aircraft power-down sequence for efficiency or any deviations: This was performed and tracked as expected through the UAS Operator interface software with the aircraft. No deviations occurred.

Post-Flight:

- Annotated time of flight (ground operations, transit, post-flight procedures that go from power off to aircraft and ground operations center secured): This was performed and tracked as expected through the UAS Operator interface software with the aircraft.
- Analyzed the aircraft inspection process for effectiveness and annotated any damage: There was a post-flight inspection walk-around conducted on the UAS, and no damage was discovered.
- Analyzed the procedure for the release and delivery of cargo for effectiveness, safety, and the chain of command and any damage to cargo: Cargo was delivered intact with no damage. There were no chain of custody issues for this cargo as it was not a controlled substance. In at-scale operations, procedures will be needed to cover security, safety, and storage of all medications and medical supplies being delivered.
- Downloaded and documented aircraft logs: This was performed and tracked as expected through the UAS Operator interface software with the aircraft. Safeguarding and future storage of these documents are the responsibility of the NHS College.
- Downloaded and documented payload images: No images were collected.

The Implementation Plan outlined the proof-of-concept flights to gather data and verify the following additional metrics:

- Reduction of overall time for medical deliveries vs. traditional transportation: This was captured on both flights and met expectations. A round trip in a motor vehicle during normal weather conditions is approximately 3 hours. Having the medications flown directly to the clinic, avoiding a round-trip, saves nearly 2.5 hours of transportation time.
- Improvement of healthcare for traditionally underserved populations via additional prescription deliveries and time from discharge to delivery: Providing easier and more timely access to medication, as successfully demonstrated in the proof-of-concept flights, allows for future transportation improvements to healthcare in underserved communities.
- Reduction of risk/travel time impact associated with transporting medications via air instead of ground: It is a reasonable assumption that there would be less injury to life/limb/and property using UASs to deliver medication over a direct air route versus driving a ground vehicle long distance in sometimes inclement weather.
- Consideration of operational limitations, safety, and environmental impact: Time was spent looking at this during the NCE granted through June 30th, 2025. Environmental impact is

arguably lower due to reduced resource requirements for operations.

- Land, power, network capabilities, and GIS information: Launch and recovery locations will require a small area with dedicated power and network access. GIS information is needed for proper safety management and planning.
- Regulatory pathways for approval, environmental impacts, and economics for sustainability and safety: Existing regulatory pathways were utilized for the proof-of-concept flight. No significant environmental impacts were identified. Economics and sustainability are addressed in Section 4.
- Critical paths for implementation: The critical paths for implementation were identified and include:
    - Community engagement
        - Privacy management
        - Culturally appropriate use of technology
        - Identification of needs
    - Coordination with MHA leadership
    - Identification of use cases
    - Identification of required infrastructure
    - Leveraging of emerging operational capabilities for BVLOS operations (e.g., Vantis)
    - Economic viability and sustainability

Proof-of-Concept Flight Evaluation

The following will address the original goals proposed in the grant and how the proof-of-concept flight met those expectations. The original goal was to have 1-2 checkout flights followed by 3-5 proof-of-concept flights as outlined in the CONOPS. Logistical challenges with shipping the aircraft, associated systems, and supplies prevented achieving the desired number of flights. There was one checkout flight and two proof-of-concept flights. Due to limited resources, the flight team had to source supplies through various means, which increased the challenges of preparing for flight operations. These logistical challenges resulted in the spare aircraft and battery charger being damaged, reducing the availability of assets for the desired flights.

Another consideration, given this community's rural location and limited access to supplies, was the extensive time spent finding necessary materials for purchases that were not shipped. This lesson learned is to anticipate the lack of access to supplies, requiring providers to think ahead, and the limitations of rural delivery services, and to pack additional supplies and tooling above and beyond what they usually bring. This might also include providing additional technical support.

Due to the extensive time required to prepare the aircraft for flight, only one check-out flight was conducted before the scheduled proof-of-concept flights. With the spare aircraft being damaged and the primary aircraft having landing issues on the first landing, only one flight was performed on the first flight day. On the second flight day, the return flight was canceled due to the winds exceeding the 25 kt wind limitation of the aircraft. The Project Team’s most significant lesson learned is to understand better, in the future, the process by which the contracted flight team delivers aircraft to the testing location, as well as the level of maintenance support and expertise available to that team during the testing window.

The need to inform the whole MHA Nation Tribal community of the demonstration event was a focus, with live streaming on Facebook to educate the population. A newspaper article was released,

and Facebook page information was advertised along with livestreaming of the event. The community was invited to a free, catered dinner at the Earth Lodge on the eve of the first flight, for an up-close look at the aircraft and a brief overview of the week's activities. Additionally, invitations to watch both the Twin Buttes and New Town Clinics were extended to VIPs in the community and to the community at large. Data from the demonstration flights were transferred to the NHS College in accordance with the data management plan.

Community event held prior to the demonstration at the Earth Lodge Village in New Town.

Broader Project Evaluation

Community engagement was the focus of this Project and occurred through multiple means. Community outreach was a key effort engaged by the research team. One example is that the team had a designated member from the MHA Nation who presented media on Facebook and coordinated with media outlets to inform MHA Nation members about activities under the grant, such as UAS drone camps, Drones in School activities, and proof-of-concept flights.

Citizens of the MHA Nation were educated regarding the purpose and use of ground-based detection and avoidance systems using the UND radar truck and DeTect radars. The community was invited to four events where the DeTect ground radar trucks were present and available for tours and educational information. The first was at Drone Camp in July 2024, held at the Earth Lodge. The second was a community dinner held at the Earth Lodge before the UAS proof-of-concept flights. The following two were during the two proof-of-concept flights conducted from the VA Center in New Town.

Owing to these efforts, the project's outreach activities were well attended and received. Many Tribal Elders and citizens of MHA Nation attended events, watched live streams, and engaged in many conversations about the use of technology. This Project has enabled continued outreach, dialogue, and community engagement.

To provide USDOT guidance on how the team anticipates at-scale implementation of UASs for medical deliveries to improve the well-being of citizens of MHA Nation, the Project Team met expectations. It demonstrated the achievability of the following:

- Safety and Reliability: Improve pedestrian, bicyclist, and broader public safety. Improve emergency response.

  The Project demonstrated the ability of a UAS to fly a direct route, keeping roadways less congested and allowing drivers an alternative way to obtain critical medications or medical services during dangerous driving conditions. The Project goal of developing a plan to implement an aviation-grade infrastructure network to enable advanced UAS operations was

realized. Section 6 provides greater detail on the results of that study, along with the Thales Report, which is available to DOT if desired. The FAA-accepted, ground-based infrastructure system will provide airspace situational awareness, facilitate Command & Control (C2) needs for advanced UAS platforms, and improve overall safety for flight crews and the local communities they serve. The goal of safety outlined in the evaluation plan was to create an aviation grade infrastructure blueprint to support advanced BVLOS operations. This goal was achieved as described above.

- Resiliency: Increase the reliability and resilience of the transportation system, including improved cybersecurity and resilience.

  The goal of the Project, as stated in the Evaluation Plan, is to provide additional, lower-cost transportation layers to an underdeveloped transportation network. The proof-of-concept flight demonstrated that advanced UAS solutions can address many existing infrastructure, delivery, and transportation safety challenges by providing a multi-option approach across multiple transportation use cases, thereby increasing the resilience of the Tribal transportation network.

- Sustainability: Improve engagement.

  As noted in the original Project goals, community engagement with local organizations was the genesis of this Project and has remained a critical component throughout the planning, development, and deployment. Through the Stage 1 SMART efforts, the MHA Nation and its Project partners have interacted with many different stakeholders, including Tribal citizens, both Tribal leaders and Tribal Elders, and personnel from a myriad of Tribal offices, including law enforcement, transportation, Game and Fish, Legal Department, Emergency Operations, Fire Management, and the MHA Nation medical community. As a wrap-up to the Project, all partners came together on June 26, 2025, to debrief and discuss opportunities and future funding needs. The relationships built through a series of drone camps, in-person visits to Tribal communities by grant partners, engagement of Tribal leadership, and working with our Indigenous Project Team members, personnel with the Tribal Employment Rights Office (TERO), and Tribal Historic Preservation Office (THPO) have been a great success.

- Integration: Improve system integration and promote connectivity among infrastructure, connected vehicles, pedestrians, bicyclists, and the broader traveling public.

  In addition to demonstrating the ability to deliver medical care with advanced UAS, the team also collected and evaluated other use cases for high-level development of additional CONOPs to expand current and traditional transportation networks within the Fort Berthold Reservation. These cases, in addition to the work the state of North Dakota is pursuing in the UAS ecosphere, are laying the groundwork for an aviation-grade, performance-based, statewide transportation network.

- Workforce Development: Promote a skilled and inclusive workforce through training and education programs and activities.

  This metric is key to the MHA Nation as they continually aim to retain their youth and enable them to build the skills required to compete within highly technological industries such as the power, medical, and aviation sectors. To this end, MHA Nation, via the NHS College, worked with UND, specifically the JDOSAS, to establish and approve a curriculum that will allow students to obtain CFR 14 Part 107 pilot licensing, the first step toward flying for commercial purposes within the United States NAS.

  Additionally, more fertile avenues for workforce development should exist once an at-scale system is in place. Avenues for developing additional transportation use cases are

relatively straightforward, including the ability to deliver medications via UASs to multiple communities within the TAT of the Fort Berthold Reservation. Other possibilities include an "emergency response force" for public safety or an overall UAS office overseeing official UAS usage for the MHA Nation.

Drone Camp 1 in 2023 Staff, October 2023.

Previous Demonstration to Show Capacity

In preparation for the proof-of-concept flight and to engage the community, UND RIAS provided two live demonstrations during noon hour at the Second Drone Camp to 70 youth, the community leadership team, including a Tribal Business Council member, the Project team, and a DOT SMART Grant official who had traveled to New Town. Both demonstrations were live streamed via Facebook for community engagement and acceptance. A UAS from the UND was flown over the reservoir at the Earth Lodge Village, carrying a payload of a dog biscuit, which was delivered to a dog on site, to cheers from the youth at the Drone Camp. The second use case was a search-and-rescue operation involving a youth who had fallen from a boat. The team accessed a patient simulation from the UND School of Medicine and Health Sciences for this demonstration. The "patient" was unconscious, wearing a life jacket, and had drifted to shore. The drone promptly accessed the patient simulator and demonstrated the technology's life-saving capabilities to the community. As part of these demonstrations, the UND radar truck was available to demonstrate to partners the capacity to detect and avoid aircraft during missions. Following these efforts, a community featuring traditional foods was provided to Drone Camp youth, Drone Camp leaders, and community members. This effort was met with appreciation and enthusiasm.

Preparation for Next Steps

Based on the above evaluation and findings from the proof-of-concept flight, the following describes the realistic, achievable at-scale implementation for Stage 2. The MHA Nation has shown its desire and enthusiasm to utilize UAS technology to better the lives of its community. They have expressed a desire to expand on smart, sustainable use cases and flight routes that have a beneficial impact on their ecosystem's health and economy, including collaborations with MHA Nation Emergency Operations. At-scale implementation involves scaling this proof of concept, increasing frequency, and then expanding it to future locations and use cases.

The integration of advanced airspace management solutions into a ground-based detect and avoid The radar network will significantly enhance the Project's capabilities for at-scale implementation of

BVLOS UAS flights. By leveraging an intelligent sensor-based infrastructure, the MHA Nation will benefit from a comprehensive and adaptable framework that supports BVLOS operations in medical delivery and other transportation use cases, including commerce delivery and logistics, as well as bridge and road inspections. This will ensure safe, efficient, and scalable drone activities.

Summary

As referenced, the Project Team identified additional use cases, developed partnerships to address historical inequities, created a blueprint for a scalable system to enable BVLOS operations in rural areas, and addressed economic capacity and well-being. These goals were outlined in the Project evaluation report and have been achieved.

Section 4 of 7: Anticipated Costs and Benefits of At-Scale Implementation

At-Scale Implementation

The outcome of the benefit-cost analysis for Stage 2 will depend on the assumed structure of the at-scale drone delivery implementation at MHA. The UAS industry's relative immaturity means there are few standard models for such calculations on which the Project Team can rely. The vision for at-scale operations is a viable, competitive firm either as a stand-alone private entity or part of a public-private partnership. The end structure will depend on MHA leadership, North Dakota's infrastructure spending, and the Tribe's desired degree of integration within Vantis.

To provide a standardized model, the Project Team adopted a qualitative definition from its technical discussions, informed by conversations with third parties, such as the Choctaw Nation. The Choctaw Nation defined “at-scale” as one flight between medical establishments per day. The Project Team modified this into a “workweek” activity, equivalent to 260 flight days per year. For each flight day in Stage 2, the Project Team would expect an at-scale implementation to involve two flights. This is a morning and afternoon delivery model and represents a feasible alternative to individuals obtaining medicines on their own or through existing land-based delivery services.

Benefits identified include:

- Reduced number of vehicle miles traveled,
- Reduced road congestion,
- Improved safety for drivers, pedestrians, and others, and
- Reduced wear and tear on the road and related infrastructure.

The transportation network on the Fort Berthold Reservation qualifies many residents with limited access to medicines as underserved from this perspective. Therefore, the UAS implementation will improve access by significantly reducing transportation costs and possibly enhancing reliability.

If implemented, UAS use would facilitate the development of a new industry capable of enhancing economic growth, development, and workforce, as well as overall competitiveness in the economy. At the firm level, demonstrating the technical and financial viability of a new firm is a good way to incentivize private-sector investment, and the nature of any investment or partnership would require MHA Tribal Council review.

Potential Modes of Medicine Acquisition and Benefits Overview:

An accurate assessment of the relative costs of drone delivery requires consideration of the likely alternatives for MHA Nation residents to acquire medicines. The Project Team considered two alternative methods for residents to acquire medicines already in use at MHA Nation:

- Use delivery services to bring medicines closer to clinic locations.
- Patient driving to one location established for dispensing medication.

Numerous other variations could occur to ensure a patient receives medications using UAS. The Project Team thinks these are both likely and limiting cases. Surface routes are limited due to the Missouri River and Lake Sakakawea. Traveling from Twin Buttes, ND, to New Town, ND (the location of the primary IHS facility), is a 97.7-mile trip that is estimated to take about 1 hour and 46 minutes.

There is also an interest in considering other communities in the analysis, such as Mandaree, ND, and White Shield, ND, both of which are on the Fort Berthold Reservation. The distance from New Town to White Shield is 103.6 miles round trip, while the distance to Mandaree is 62.4 miles round trip.

At-scale implementation creates the alternative transportation infrastructure mentioned in Section 2. This alternative enhances access to medicines and, therefore, improves public health. Using UAS

It will take 30-35 minutes for one-way transport of medications, while driving one way between these two furthest segments is ~100 miles (nearly 2 hours). UAS can reduce travel time by approximately 75% per round trip. UAS operations are less affected by weather conditions such as snow, ice, or mud, which significantly affect ground transportation in these communities.

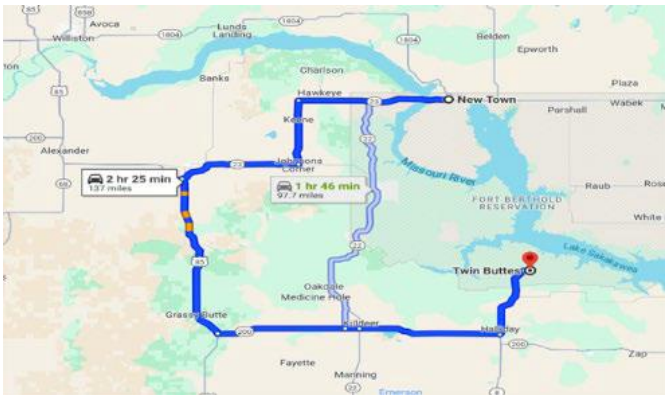
In addition to easier access to medicines, there is potential to boost economic development through the launch of new industries that require a newly skilled workforce and new capital investment. Even further benefits arise from potential reductions in driving fatalities among residents traveling to obtain medicine. To estimate these potential benefits, we performed multiple calculations of fatality reductions based on various fatality rates.

Safety and Reliability—Improve the safety of systems for pedestrians, bicyclists, and the broader traveling public and improve emergency response:

As detailed above, a round trip between New Town, ND, and Twin Buttes, ND, on the Fort Berthold Reservation would be 195.4 miles. We used the fatality rate per 1,000,000 miles traveled for the US as a whole (126) and for ND (107), both estimates from the 2023 North Dakota DOT Vision Zero Report (https://visionzero.nd.gov/Statistics). We then varied the number of trips saved per operating day from one to sixteen to estimate the reduction in fatalities.

A sample route for a rural resident driving to acquire Rx involves the following steps:

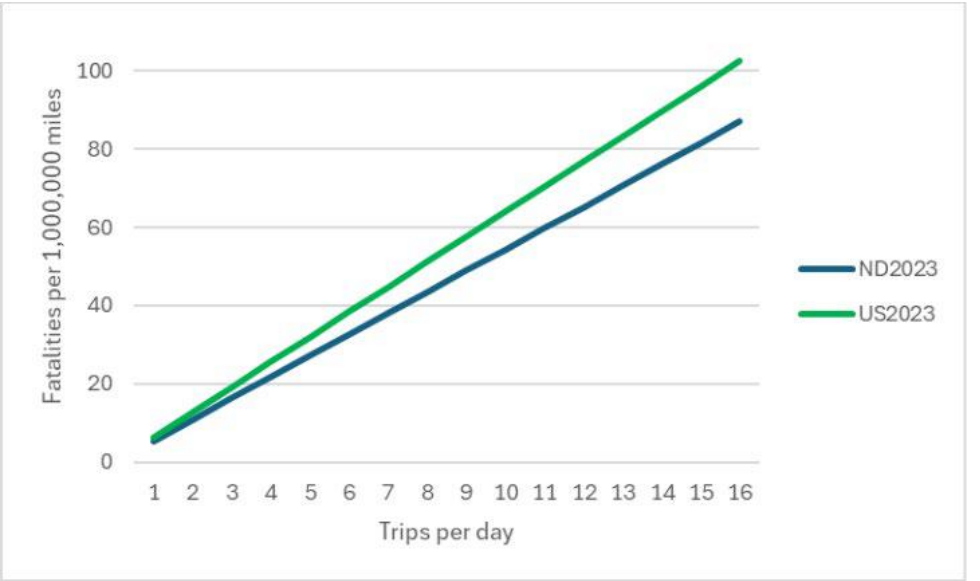
- Taking ND-8 from Twin Buttes, ND to Halliday, ND (14.5 mi)
- Pick up ND-200 and take it to ND-22 (20.1 mi)
- Take ND-22 to ND-23 (51.9 mi)
- Take ND-23 to New Town (11.1 mi)



Example ground transportation routes between Newtown and Twin Buttes, ND.

Considering the longest travel segment, from New Town to Twin Buttes, it is apparent that there are significant reductions in miles driven, even with just one round-trip per flight day (260 visits per year). Residents would drive 50,000 miles fewer, significantly reducing road congestion. The reduction in vehicle traffic could also improve safety for non-motorist traffic, such as pedestrians and the traveling public. This could reduce fatalities by between 5 and 6 per year. Eliminating one round trip from White Shield per day could reduce fatalities by about 3 per year. One fewer round trip per day from Mandaree saves an additional two lives. All told, eliminating one round trip per day could reduce fatalities by approximately 10 lives for these trips alone.

A round trip between New Town, ND and Twin Buttes, ND, on the Fort Berthold Reservation is 195.4 miles. We used the fatality rate per 1,000,000 miles traveled for the US as a whole (126) and for ND (107), both estimates from 2023 from the North Dakota DOT Vision Zero 2023 Report (https://visionzero.nd.gov/Statistics). We then varied the number of trips saved per operating day from one to sixteen to arrive at the estimated reduction in fatalities.



Visualization of potential fatalities averted.

Based on current estimates, UAS delivery could save ~1217 hours (approximately 29 days) of travel annually compared to traditional ground transport. These savings are based on the following: Traditional ground transportation takes 1 hour and 45 minutes under ideal conditions for a 97-mile round trip, totaling about 210 minutes (3.5 hours) per round trip. With two round-trip daily flights over 260 business days taking ~35 minutes each (1 hr round trip), the total savings is ~1217 hours [(3.5 hrs – 1.16 hrs) × 2 trips day-1 × 260 days].

The execution of the demonstration flights led to discussions about the locations for take-off and landing operations to minimize disruptions and risks to surface transportation routes. The use of drones for trips between facilities significantly reduces surface traffic miles (as demonstrated above), thereby reducing congestion and enhancing safety for pedestrians and other travelers on or near surface routes. For safety and reliability, this is expected to be a sizeable benefit with less risk for ground transportation.

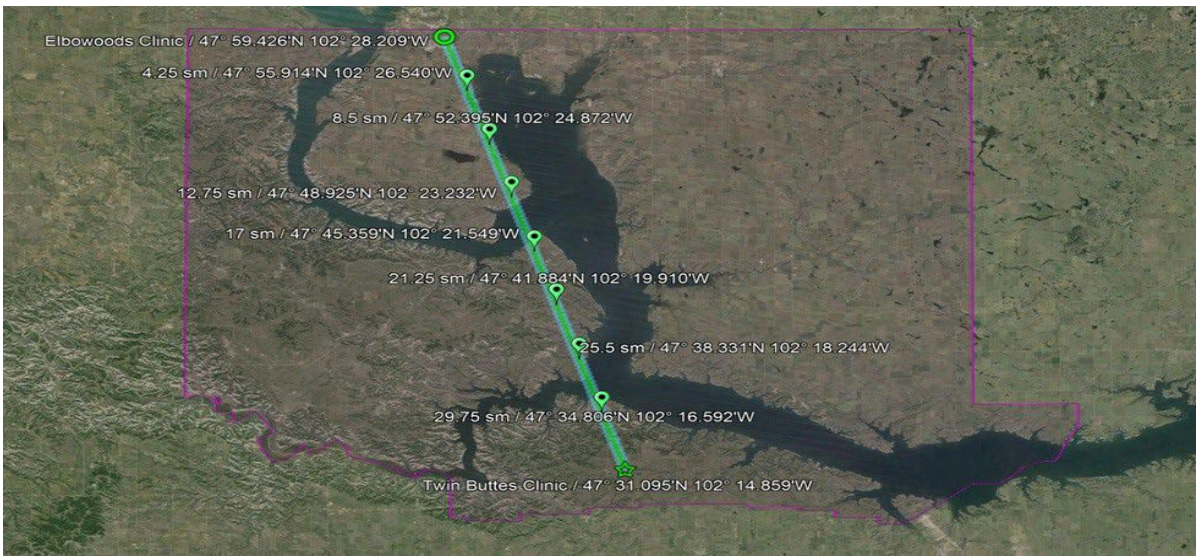


Image: The approved FAA Corridor from New Town to Twin Buttes

Resiliency: Increase the reliability and resiliency of the transportation system, including cybersecurity and resiliency.

At scale, operations improve the robustness and resilience of the transportation network for medical delivery, offering multiple delivery options depending on conditions. When surface routes are unavailable, such as after significant snowfall, medical deliveries can be completed by air. When air travel is unsuitable, surface routes can be used. In this way, the transition from the current situation to large-scale implementation enhances business and consumer options for travel and the receipt of medicines.

The Project Team believes this is a net gain in reliability for MHA Nation's transportation infrastructure, given the limited route options in the current system. The Project Team expects this to reduce costs by preventing delays caused by the currently limited number of surface routes, whether due to accidents or weather-related issues.

> UAS travel covers approximately 35 miles one way, with a round trip of 70 miles. Assuming a UAS cruises at 60 mph, it has a round-trip time of 70 minutes (1.16 hours). With two round trips daily over 260 business days, the total annual flight time is around 603 hours (~3.6 weeks). The annual savings from UAS usage are 1,820 hours (traditional) minus 603 hours (UAS), equating to around 1,217 hrs (about 1.7 months) saved annually (approximately 1 month and 21 days).

There will also be less depreciation on vehicles and reduced waste by-products from vehicle usage (oil changes, used tires), disposal, and storage. The Project Team anticipates dual delivery options that enable MHA residents and medical providers to choose the best way to receive medicines and respond to price signals, thereby improving the efficiency of the medical delivery service on the reservation.

Partnerships/Community Engagement: Contribute to economic competitiveness and incentivize private-sector investments or partnerships, including technical and financial commitments for the proposed solution. Demonstrate committed leadership and capacity from the applicant, partners, and community.

Stage 2 funding will need to be budgeted and sustained to continue these efforts, enabled in Stage 1. As other portions of the report detail specifically, there is tremendous community and leadership support from the MHA Nation for this Project.

Staff preparing for 2024 Drone Camp.

Integration: Improve system integration and promote infrastructure connectivity: connected vehicles, pedestrians, bicyclists, and the broader traveling public.

Through this Stage 1 effort and engagement with the MHA Drone Advisory Board, MHA Nation is already discussing proper ways to integrate and exploit enhanced travel infrastructure, such as UAS, into more aspects of operations, including eventual medical delivery and bridge inspection. The results of surveys administered at the MHA Nation are detailed in Attachments B, C, and D.

At scale, there will be significant opportunities to integrate with the TAT systems of the Fort Berthold Reservation and to partner with local and state governments to provide services. The Project Team believes that any such partnership and integration with existing systems, as deemed appropriate and beneficial by MHA Nation, would reduce costs.

Workforce Development: Promote a skilled workforce through training, education, and other programs and activities.

The workforce implications of an at-scale operation are profound. Drones in School and the Drone Camps demonstrated younger Tribal members' interest in drones. These individuals represent a potential workforce for UAS applications, as outlined in Stage 1 tasks, as well as in other industries. Competitive pay would be well above median pay levels across occupations at MHA Nation. Therefore, it would aid in other Tribal goals such as economic development, particularly youth retention, and population health. The NHS Tribal College has already partnered with the JDOSAS at UND on a licensing program curriculum, marking an initial step in a potentially broad-based workforce development program. This includes hands-on instruction from trained Part 107 pilots to complete the test successfully (see Attachment M). The Project Team expects that the workforce benefits at scale will be significant.

Proof-of-Concept/At-Scale Implementation Costs

Feasibility at scale is anticipated based on the current level of prescription drug usage. The Project Team anticipates increased demand, enabled by drone delivery, following discussions with the Choctaw Nation about their operational capacity at scale. The round-trip distance using a UAS is approximately 70 miles and would take about 70 minutes to complete. Including 30 minutes for loading, unloading, and other preparation, the total round-trip time is 130 minutes. Based on the purchase of aircraft with a capability similar to that flown during the proof-of-concept flight, the cost would be approximately $50,000 per aircraft. For Stage 2, two aircraft are anticipated at a cost of $100,000.

Vendors interviewed during the Project discussed the current industry adage of, “If you only have one drone then you have none”, which influenced the Project Team to include two drones for purchase. In addition, the Project Team factored in 15% for parts and labor for the year, totaling $15,000. The total of these, mostly fixed costs, equaled $115,000.

The other cost component, labor, is more volatile due to the potential for rapidly changing local market conditions and workforce availability. Estimates for annual costs for a drone pilot are around $138,520. Drone mechanic estimates range from around $52,000 to $75,000. If a combined pilot/mechanic model were adopted, earnings of $50 per hour with an estimated 1664 hours of operation are used. The per-worker cost is $83,200 per pilot/mechanic. The variable models available for a business of this type make precise estimation more difficult. For a firm with five employees, with two pilots, two mechanics, and one other employee assumed to perform planning/logistics and other functions, expected total labor costs, on the high end, are as much as $500,000.

To assist the calculation of efforts, drone delivery is assumed to be a new operation—that is, not a function assumed by an existing business or part of MHA operations. The total costs of an at- scale operation, including labor and equipment purchases, would total as much as $615,000. This should be considered a higher-end estimate for the initial at-scale implementation and does not account for

any learning-by-doing.

The Project Team recognized that smaller-scale operations would be feasible as well and would still be considered at-scale. Focusing on one segment of the possible delivery circuit, the longest one would lower the total operational costs by as much as $200,000.

Not included at this time are regulatory costs for permissions (including any legal fees), infrastructure costs such as radar, either owned by MHA Nation or purchased access to other networks (such as the Vantis network in North Dakota).

For radar, a range of estimates has been considered, from $250,000 to nearly $1 million. However, the various infrastructure needs are, as yet, undecided regarding location, radar type, and access fees for radar networks such as Vantis. Significant components of this cost will be fixed in nature rather than variable.

Cost-Benefit Analysis

The annual cost range of the at-scale program is estimated to fall between $400,000 and $615,000. Some of the potential benefits are more difficult to calculate because they are more diffuse in terms of the number of people impacted or the economic breadth, or because they are more difficult to quantify in dollar terms. Overall benefits to capture include:

- Improved population health from improved access to medicines and more prescriptions being filled,
- New jobs in the drone delivery industry,
- Time savings to individuals in traditional delivery roles and customers not needing to travel as frequently for medicines,
- Further economic/business development because of the introduction of UAS delivery.

The proof-of-concept developed in Stage 1 includes a baseline acquisition delivery/acquisition time that is roughly 105 minutes (about 1.75 hours) of driving time one way for more than 3 hours of driving time round trip. At 260 flight days per year with two round trips in a day, the total driving time would be over 1800 hours in a year. The actual travel times would likely be longer as there are other field clinic locations that would likely be serviced along the way.

Deployment and Benefits

The Project Team estimates the minimum employment for the at-scale model described above to be five (5) employees. This employment level will generate economic output of $1,065,255 for MHA Nation, with wages and proprietor income exceeding $500,000.

The Project Team anticipates learning by doing, potentially resulting in other uses for drones (such as test sample deliveries and engagements with other functions and areas) that would alter the cost structure soon after the implementation of the medicine delivery program.

After use cases have been normalized, drone purchases are expected to follow a cost-effective approach, with a 3–5-year lifespan for each drone. Anticipated additional uses, such as blood delivery for analysis, are also expected to come online only when the cost of purchasing (or leasing) additional fixed capital assets and labor resources is cost-effective. The general use of UAS in these environments at scale reduces annual costs by a significant percentage.

Other benefits are more difficult to quantify in dollar terms. Lower burdens to obtain medicines are likely to increase the percentage of residents taking medicines as directed, giving them more time for work or leisure and better health outcomes. This metric can be tracked through surveys and refill behavior, with longer-term tracking of population health taking place after this planning stage. Work

behavior and labor-leisure choices will be important to determine the additional economic benefits accruing to the region.

These conclusions are consistent with the results from Comtet et al. (2022) and Johannessen (2022). Essentially, the benefits for MHA Nation Tribal members exist but are circumstantial rather than general and require further development (use cases) to yield broader gains and more consistent cost estimates to allow for complete characterization within the benefit-cost framework. This includes collaborative, coordinated efforts with MHA Nation departments, such as the Water Resources/GIS Office, leveraging all available expertise and equipment. The lessons learned in Stage 1, if applied, will guide more efficient use and economic benefits.

MHA Nation GIS/Water director with a drone.

Further Projection of Costs – Break Even Points

As an additional evaluation, the Project Team calculated, as best as possible given incomplete cost information, the cost that would imply "breaking even" for a company based on a delivery scale roughly in line with current fill levels. This is more than the cost of the prescription itself. This gives some insight into the implied cost wedge between UAS and other acquisition methods such as trucks or customer pickup. This estimates what the implied cost per prescription would be at given the current level of pharmacy fills for Twin Buttes (prescription fill data provided by IHS and available below).

Ground acquisition is the presumed alternative to drone acquisition of prescriptions. This could potentially be via a courier or by people driving to pick up their medicines. One round trip per day for the total road distance of 260 days a year, to be equivalent to the drone operation days, would be 50,752 miles per day. If there were two round-trip flights, the total would be 101,504 miles. Conventional SUV fuel efficiency (29 mpg) would imply 1750.1 gallons per year. For a 15-year-old pick-up truck (16 mpg), fuel consumption would be 3172 gallons per year. With fuel prices between $3 and $4.42 per gallon, fuel expenses would be between $5,300 and $14,000, depending on vehicle type. The break-even price for the service at this level is $3.80 and $4.75 per item based on current levels of prescription fills.

When the costs for drone delivery and the implied price are considered, the price per fill is around $23 per item. If there was a 25% increase in prescription fills at Twin Buttes by Tribal members, the break-even price would drop to $18.50 per item. The gap between the delivery prices is currently around $20.

To give this some scale, the Project Team considered the following: An individual driving from Twin Buttes to New Town once a month for a round trip to fill a prescription. If the individual drove

an SUV, the per prescription fill costs were $20.33 and $29.75. If the individual drove a 15-year-old pickup truck, the price per fill was $36.84 and $53.92. The expense of drone delivery could be viewed as competitive and potentially beneficial for MHA Tribal residents, depending on their circumstances.

Prescription Fill Data

Preliminary data include prescription drug fill information from IHS at MHA Nation, though the transition from the current situation to large-scale development could conceivably increase the number of fills. Information from the Bureau of Labor Statistics, the Bureau of Economic Analysis, the Census Bureau, and reports from the MHA Nation were examined.

Location	New Fills	Refills	Annual Total
Mandaree	4,905	6,068	10,973
Twin Buttes	4,075	4,420	8,495
White Shield	5,533	5,536	11,069
Total	14,513	16,024	30,537

References

Comtet, Hans E., Martina Keitsch, and Karl-Arne Johanessen. "Realities of Using Drones to Transport Laboratory Samples: Insights from Attended Routes in a Mixed-Methods Study." *Journal of Multidisciplinary Healthcare* (2022) 15: 1871-85.

Johannessen, Karl Arne. "A Conceptual Approach to Time Savings and Cost Competitiveness Assessments for Drone Transport of Biologic Samples with Unmanned Aerial Systems (Drones)". *Drones (6) 62, (2022).* https://doi.org/10.3390/drones6030062

Section 5 of 7: Challenges and Lessons Learned

During the SMART grant period and upon completing the proof-of-concept flight, the Project Team reflected on each stage of implementation and analyzed areas of success and shortcomings. The grant provided an opportunity to demonstrate BVLOS capability on MHA Tribal land while also revealing challenges. Those challenges, along with lessons learned, were thoughtfully reviewed and discussed with Tribal leadership.

Partnership and Coordination:

Both partnership and coordination have been a challenge and an opportunity. The MHA Nation already utilizes UAS for many use cases (e.g., environmental monitoring) and has an underwater autonomous vehicle. The grant team was not fully aware of the breadth and depth of UAS use at the MHA Nation and, as a result, did not include a key MHA department (GIS/Water Resources Department) in the initial proposal. In addition, the MHA Nation has established processes (e.g., Tribal Resolutions) that provide opportunities for all partners to be educated. The Tribe was appreciative of the Project partners' responsiveness to the standards and practices of a Sovereign Nation. The Project underscored the importance of MHA Nation working with a host of state entities, which can provide complications in areas where there are large distances between stakeholders, inclement weather that is common in the region, and challenges in areas using collaborative tools such as GIS software or common streaming platforms (e.g., Teams). All of these are challenges that were overcome and will need to continue to be worked through in Stage 2 to ensure successful Project Team cohesion.

The MHA Drone Team had an operating structure comprising four sub-committees: assessment/use care, workforce, implementation, and economic viability. The sub-committees meet weekly or bi-weekly with subcontractors, with members assigned strategically to sub-committees based on level of effort and expertise. For example, the Assessment/Use Case Committee oversaw the work on the MHA Advisory Board and conducted assessment surveys. The Workforce Committee oversaw the work of the Drone Camps, Drones in School, and the first responder training. The Implementation Committee oversaw all aspects of the use case. The economic committee examined the fiscal costs at scale, accounting for a range of financial considerations. The PI at UND hosted all team meetings monthly via TEAMS to ensure coordination across subcommittees. All coordination and updates occurred via a Microsoft TEAMS page, including communication for the medical delivery. The Planning and Grants Office at MHA Nation, post-award personnel at UND, and the PI held frequent meetings on budget reconciliation and invoice submission.

Staff and community members are managing the demonstration in Twin Buttes.

The focus of public education efforts paid off. Both MHA and non-MHA performers now better understand how to work together, and the effort required to build this team has produced a strong, unified team that can rapidly overcome challenges. Moreover, efforts to strengthen the team have contributed to community engagement, resulting in strong support and enthusiasm for this overall effort.

The following are key lessons learned to enable effective partnership and coordination for this and follow-on efforts:

- Involving key stakeholders at early stages of development is critical. For any future work, the MHA GIS/Water Resources Department will be engaged, to the extent appropriate, at the earliest stage.
- All external stakeholders must commit to educating themselves about the history, geography, and culture of the Tribal Nations they are serving. For example, the Assessment Committee members all participated in and became certified in conducting research on Tribal lands through a culturally adapted research ethics training program to increase awareness of research among Indigenous members.
- An understanding must exist regarding how to secure Tribal Resolutions and determine the correct points of contact and decision-makers to secure approval.
- An understanding of the processes and procedures of all entities, including the funding agency, of any other relevant entity (e.g., the State of North Dakota), is crucial.
- A key enabler for the MHA Nation is proper engagement with industry to divide roles and attendance at meetings to gain information properly. All personnel are designed in an automation-enabled enhanced transportation network.

The MHA Nation is doing excellent work with drones. This could be enhanced by establishing a central UAS Office/Command Center to enable coordination, execute initiatives, further develop needed policies, and support community outreach (e.g., website), among other activities (See Attachment R).

Legal, Policy, and Regulatory:

One challenge encountered was educating stakeholders about the restrictions on UAS use. This can be a complicated topic, as safety requirements generally prevent BVLOS operations without the utilization of advanced systems (hardware, software, and personnel), and even then, BVLOS operations are not routine. BVLOS is on the verge of being routine, though, given advances such as the Vantis system developed and currently being deployed in North Dakota. Given that BVLOS operations are an operational standpoint, there are many nuances to understand. The team has collaborated with all stakeholders to leverage their expertise and inform and educate them on the latest technologies and applications.

The challenges encountered during the demonstration/proof-of-concept flights were associated with conducting BVLOS operations. Since Vantis is not yet in place within the MHA Nation (but is in place near the western borders of the MHA Nation), alternative means for conducting these flights were needed. Thus, a waiver with alternative means of compliance with the FAA Code of Federal Regulations (CFRs) was required (particularly to address the requirements of pilots to see and avoid other aircraft). To obtain the necessary waiver, Valkyrie was added to the team. The team, including Valkyrie, met regularly with the FAA to ensure that waiver acquisition was a smooth process. Engaging an experienced supplier of BVLOS operations and working directly with the FAA enabled the team to acquire a waiver and execute the proof-of-concept flights promptly.

The team leveraged its extensive experience with flight safety and regulations, BVLOS operations, and technical solutions (e.g., Vantis), to support capability building at MHA Nation. Key lessons in this area include:

- Building an advanced UAS capability (e.g., BVLOS) requires alignment of needs (use cases) and workforce capabilities with an understanding of legal and regulatory frameworks.
- Early education of stakeholders regarding opportunities, challenges, and enablers is beneficial.
- When obtaining a waiver to enable BVLOS flights (as with the demonstration), meeting regularly with the FAA can allow for a smooth and efficient process.
- Execution of advanced UAS operations is greatly enabled by engaging experienced operators.
- Ensuring a better understanding of the American Indian and Alaska Native Tribal Consultation Policy and Procedures is discussed below.

Consultation Policy and Procedures:

A framework for serving Tribal communities using UAS is located in Tribal FAA Regulations. This document, which the FAA partners identified as current, was shared by the MHA Nation with all partners. Issues relate to concerns non-tribal stakeholders have expressed regarding drone operations, with some proposing to limit drone operations over certain areas, and some states enacting laws restricting drone operations within their state. The subcontractors on the grant provided expertise on regulations, and the MHA Drone Advisory Board and the Planning and Grants Office at MHA Nation provided expertise and consultation on policies and procedures specific to Tribal operating procedures.

Public Acceptance:

A complement to enabling BVLOS operations is the deployment of systems and personnel that provide an appropriate level of safety (as defined by the FAA) and the establishment of policies that ensure public acceptance. One significant challenge in this area is privacy. As with all entities working to enable BVLOS operations, the MHA Nation is concerned about protecting the privacy not only of its citizens but also of sacred locations. The team was aware of all these concerns. During the assessment protocols, the team emphasized the importance of cultural and environmental restrictions and worked collaboratively with the THPO. The team led by the MHA Nation will continue to work to ensure that any operations will be both practical and respectful.

Another challenge in this area is trust. Due to a long history of actions that have eroded Tribal trust in outside entities, including flooding key tribal lands to create the Sakakawea Reservoir, skepticism regarding the motivations and possible cultural insensitivities of such entities persists. While these concerns cannot be entirely allayed, efforts by all partners to build collaboration and partnerships, and to ensure community engagement, have significantly helped in this area, resulting in a team and partnerships that are highly productive and valued.

Trust is essential to gaining public acceptance. These are enabled through communication, the development of genuine partnerships, and the creation of goals that focus on stakeholder benefits. The MHA Nation may enable these by establishing a central UAS Office/Command Center. One key to public acceptance is community engagement, which has been a strength in this effort. For example, over 115 MHA Nation citizens watched the live stream during the demonstration on September 18, 2024. The picture below is another example of a hosted dinner for the community to come out and see the UAS flying during the following proof-of-concept flight, hear about the events unfolding in the following days, and be treated to a traditional Tribal meal.

Tribal members watching the flight demonstration.

Data Governance:

Tribal Nations have historically faced colonization of data relevant to them, which is then misrepresented to the public. Thus, the proper handling of data in this Project is of utmost importance. Data sharing and storage efforts have been supported through the NHS College, which is working collaboratively with the Tribal Nation. Key technology experts at UND and NHS College were assigned to ensure access and support. Emphasis has been placed on protecting Tribal sovereign data and ensuring privacy. This effort, however, has required access to a large amount of Tribal GIS data for ground risk analysis and flight route planning, which required the team to secure a Tribal Resolution (24-155 FWF). The Tribe's sentiment when partners requested data was that there was potential for culturally sensitive, location-specific Tribal data to be shared inappropriately and analyzed incorrectly, as evidenced by prior experience, so caution was necessary among partners.This Project also required a community-based participatory action research approach to ensure that studies were more community-driven (e.g., listening sessions). UND's PI has extensive

experience with this approach and has worked with the MHA Nation on survey research. All collaborators on the assessment team and PI secured an ethics certificate through the Research Ethics Training for Health in Indigenous Communities: Comprehensive Training for Researchers and Community members during the Project's history. The Medical Director and CEO traveled to UND to secure this training and became certified, which will be critical in Stage 2 funding opportunities. The ethics curriculum serves as a guide for respectful research on Tribal lands.

A lesson learned is that, in addition to a data management plan to be defined at an early date within a project—perhaps as an initial milestone—is to incorporate some additional legal framework, such as a mutually agreed upon internal Memorandum of Agreement/ Understanding (MOA/MOU) to help further assuage Tribal concerns. The Tribe ultimately is the most authoritative source for data management within the reservation area. However, data sets should be available to the Project Team to support the analyses needed and to develop valuable insights that inform recommendations and findings in Stage 2. Without this access, reliance is on state and other publicly available data that may be out of date or incomplete, which can negatively impact analyses and findings and threaten the value the Tribe receives from partnering with industry experts. Proper data management is enabled through close coordination of key personnel (for both policy and process).
Herein, this occurred through a partnership between the NHS College and UND experts in radar data that could be expanded in Stage 2 to include the MHA Nation GIS Office or Science Department.

Adherence to IRB protocols was achieved. All files were de-identified and stored on a password-protected computer. The team assured adherence to the US Federal Governance DCAT US Metadata Schema. Key personnel attended the DOT SMART webinar on data-sharing expectations or listened to the recording if they were unable to log in to the session.

Cybersecurity:

The MHA Nation is addressing cybersecurity challenges related to data storage and network security. In a future Stage 2 grant, efforts will focus on establishing a strong security posture. The Science Department at MHA Nation has expressed a willingness to partner on future data storage and analysis as the central headquarters for this type of Tribal data. The following are areas requiring further collaboration in Stage 2:

- Future Data Protection: Implementing strong data protection policies and practices early in the granting process will make it easier to scale securely.
- Cloud Security: If cloud services are being utilized, understanding associated security measures and data handling is crucial. One should ensure that any cloud-based provider complies with relevant regulations and offers robust security features.
- Access to Controls: Establishing those who have access to sensitive information is crucial. Implementing role-based access control (RBAC) and privilege principles can help prevent unauthorized access.
- Endpoint Security: Ensure that all devices used by employees are secured, including the use of antivirus software, firewalls, and secure configurations. This helps prevent unauthorized access and malware infections.
- Network Security: Even without storing data, networks need to be secure. One should implement firewalls, intrusion detection systems (IDSs), and secure Wi-Fi proofs of concept to protect against potential breaches.
- Employee Training: Employees should be educated about cybersecurity best practices, such as recognizing phishing attempts, using strong passwords, and following proper data handling procedures.
- Vendor Security: Given that third-party vendors or subcontractors are part of the team, they must follow good security practices. Their security can impact your overall security posture.
- Incident Response Plan: Develop a plan for how to respond to a security incident. This plan should include steps to identify, contain, and mitigate potential threats or breaches.
- Legal and Compliance Issues: All partners should understand any legal or regulatory requirements

that may apply. Being aware of these requirements in the initial stages of the Project can help build a compliant and secure infrastructure.

- Data Privacy: Privacy implications should be considered when storing any data. Understanding data privacy laws and their impact will help with handling personal data. Additionally, adherence to data sovereignty for Tribal Nations is imperative.

By proactively addressing these items, the MHA Nation can continue to solidify a strong cybersecurity foundation that will support UAS operations as they grow. Stage 1 provided an opportunity in the planning and protocol development process to support strong data management and cybersecurity, acknowledging that Safety Risk Management (SRM) advances security. It requires identifying hazards (threats), establishing controls, training personnel, and maintaining a continuous process to ensure proper data protection.

Operations:

The proof-of-concept demonstration highlighted several challenges and opportunities for consideration that many were aware of but require future planning. These include:

- Inclement weather can create significant challenges for operations. Weather conditions, including winds, rain, and fog, posed challenges that required adjustments to timelines and additional safety precautions during the proof-of-concept flights. These factors underscore the importance of incorporating adaptable timelines and robust contingency plans into project planning to maintain continuity in variable conditions. Despite this, the advancement of UAS platform technologies has enabled both small footprints for takeoff and landing and operational viability in strong winds. Both of these were critical to the demonstration's success.
- When using radars to identify intruders (e.g., crewed aircraft), clutter (returns from non-aircraft such as cars, trees, hills, etc.) can cause significant challenges. During the demonstration, the team managed over 155,000 data points—48,471 from the UAS used for the demonstration and 106,675 from the surveillance radars. These data levels necessitate competent systems for required real-time processing.
- During the demonstration, issues with batteries not seating correctly within the aircraft limited the number of flights that could be carried out. In addition, a GPS issue caused the aircraft to miss its intended landing location by ~100 ft during one of the practice flights. Unfortunately, a technician was not available to resolve the battery seating issue. However, the geo-positioning issue was resolved overnight through a software revision. The need for backup batteries is critical and should be part of the procurement process's expectations. An on-site technician is also strongly recommended for future vendors.

Deployment:

One of the primary challenges of this effort is determining the economic viability associated with large-scale deployment. The team devoted significant effort towards determining this (e.g., Section 4). Many variables can affect economic costs and benefits. The MHA Nation supports the deployment of autonomy-enabled enhanced transportation systems. However, establishing the exact price point is challenging due to many variables. However, building BVLOS capabilities at the MHA Nation is needed to address associated safety and humanitarian (potentially lifesaving) benefits and to adapt to existing transportation barriers.

Contracting:

Issuing initial contracts was delayed due to adjustments in funding streams (UND as the lead contractor). This challenge was exacerbated by having needless layers of subcontractors. In the In the future, a different architecture will be utilized in which key subcontractors are at the same level (one level below either the prime or the lead subcontractor). Such a contractor structure will help accelerate progress, as will engagement by senior personnel within each partner and stakeholder organization. The MHA Nation partners were UND, which subcontracted with NHS College and the

Test Site. The Test Site, in turn, sub-contracted with Thales and ASL.

MHA Nation has expressed a commitment to continue working with UND as the lead partner. The Senior Science Advisor at MHA Nation has expressed a willingness to engage in proposal writing and Stage 2. Such a contractor architecture will help accelerate progress, as will engagement by senior personnel within each partner and stakeholder organization.

Another enabler is connecting those who take care of the "business" aspects of research projects. This Project has been greatly enabled by connecting personnel in the University of North Dakota Vice President for Research and Economic Development office with personnel from the Grants and Planning Office at the MHA Nation.

Leadership and Coordination:

Stage 1 of the SMART Grant Project illustrates the complexities of aligning diverse stakeholders and integrating advanced UAS technologies into a unified operational framework. The experience revealed opportunities to enhance leadership clarity and decision-making processes, particularly in selecting a unified technical platform and defining roles and responsibilities. Strengthening governance structures and fostering proactive collaboration will be key to guiding Stage 2 funding requests and achieving shared objectives. Monthly team meetings helped resolve these concerns, and the sub-committee process was generally effective. One barrier was the frustration external partners experienced when accessing the TEAMS page hosted by UND at the State entity.

Technical Integration:

The MHA Nation Stage 1 efforts provided valuable lessons learned on the challenges of executing a sophisticated UAS operation within tight deadlines and in rural regions. The integration of advanced technologies, such as radar systems and real-time situational awareness technology, showed significant potential but also highlighted areas for improvement in preparation and coordination for full-time deployment.

The technology-enhanced situational awareness during the use case was generally strong. However, it was noted that operational clarity can be difficult in an outside setting. Additionally, false positives from radar signals emphasized the need for more time to install and calibrate the sensors utilized. The team managed over 155,000 data points—48,471 from Swoop Aero and 106,675 from DeTect—requiring extensive real-time processing. This underscored the importance of advanced planning to handle large data volumes efficiently with appropriate access to storage. These lessons highlight the value of meticulous preparation and robust data management strategies to enhance future operations. Despite these concerns, that data management plan was effective in guiding operations.

Operational and Technical Preparedness:

A geo-positioning issue in the aircraft's guidance software caused a landing deviation of approximately 100 feet during the test flight. Despite time zone differences with the manufacturer in Australia, the issue was successfully resolved in time for a flight the following day, which the public witnessed. Valkyrie had a backup plan, bringing two aircraft to ensure redundancy in the event of failure. However, only one drone was operational from the start, limiting flexibility during mission execution.

Additionally, the UAV's battery was not sufficiently charged to complete the return flight, emphasizing the importance of rigorous pre-flight checks and contingency planning. These experiences reinforce the need for thorough technical readiness and robust backup strategies to ensure mission success. Tribal Elders, community members, healthcare executives, and Tribal public

relations officials, K-12 teachers and officials, a school board member, and a host of executives viewed the use case. They had good questions about community engagement and education that will guide Stage 2 efforts.

Tribal Elder, Advisory Board Member, and Language Keeper providing greetings at MHA Drone event prior to demonstration.

Stakeholder Alignment and Ownership:

The Project highlighted the importance of strong local champions to advocate for and drive the initiative forward. Engaged leadership presence on the MHA side facilitated smooth coordination and communication in Stage 2. Engaging dedicated stakeholders early in the Project lifecycle will help build momentum and streamline decision-making processes. Establishing a clear technical framework and decision-making process before Project initiation will help avoid unnecessary delays and enhance operational coherence.

Stage 1 provided valuable lessons learned that will inform future Project stages. Clear communication, comprehensive planning, and technical preparedness emerged as critical components for successful UAS operations. Specific takeaways include:

- Strengthening vendor management and coordination to streamline operations.
- Conducting rigorous pre-flight testing to address potential technical issues, particularly in rural and remote areas.
- Establishing clear communication protocols and local technical support to mitigate the challenges of collaboration and communication over various remote locations.
- Ensuring sufficient power supply, such as fully charged batteries and backup aircraft. Anticipating all necessary equipment needs is critical, given the limited purchasing options in a rural community.
- Community involvement, including local visual observers and partnerships with organizations like the Test Site and DeTect Inc, demonstrated the value of collaboration. Additionally, public engagement through the AirHub Portal highlighted the potential of UAV technology to enhance transparency and safety.

Moving forward, these insights will guide the refinement of UAV protocols, ensuring greater reliability and preparedness for future BVLOS operations while aligning with the SMART Grant's objectives.

Section 6 of 7: Deployment Readiness

The MHA Nation has explored aspects of deployment readiness for applications of BVLOS operations during this Project. This section outlines the key requirements, obstacles, and strategies necessary for scaling the Project, focusing on legal, policy, procurement, partnerships, and technological integration for Stage 2 implementation. This has included conversations with the Tribal Business Council, Tribal Elders, Key Stakeholders currently accessing or wishing to access UAS, and administrative staff at Elbowoods. As discussed earlier, an MHA Drone Advisory Board was established specifically to advise on the region's readiness and includes Legal Counsel from MHA Nation. A summary of the intent of the DOT SMART Grant was provided (see Attachment Q). Several topics related to readiness have been identified in earlier sections of this report.

Legal, Policy, and Regulatory Requirements

At scale success with BVLOS operations requires an ecosystem of commercial UAS operations on Tribal Lands, supported by clear legal and policy development through our Tribal Business Council and governance structures. MHA Nation has collaborated with its DOT Project partners to explore UAS policies for Tribal members, facilitating safe, repeatable UAS operations for all citizens and departments utilizing UAS technology. These policies include, but are not limited to, policies regarding citizen privacy, appropriate use of UAS's on Tribal lands for launch and recovery areas, and clear definitions of where UAS activities will not be permitted (i.e., in the vicinity of culturally sensitive areas) while complying with established FAA regulations. The Director of Water Resources/GIS has begun drafting a statement to prevent what they describe as "the wild west of use of drones". Some lessons learned to support deployment readiness are listed below:

- When weather can disrupt an operation, having someone on the team who can provide detailed forecasts whenever needed can significantly increase the operational efficacy.
- Contingency planning is very important—especially when adverse weather may impact operations.
- Testing using real-world scenarios enables identification of key issues that may impact scaled-up deployments.
- Redundancy, especially with key systems—can prevent failures from completely disrupting operations.
- When conducting operations, having a technician available who can resolve hardware and software issues (e.g., batteries not seating properly) is critically important.

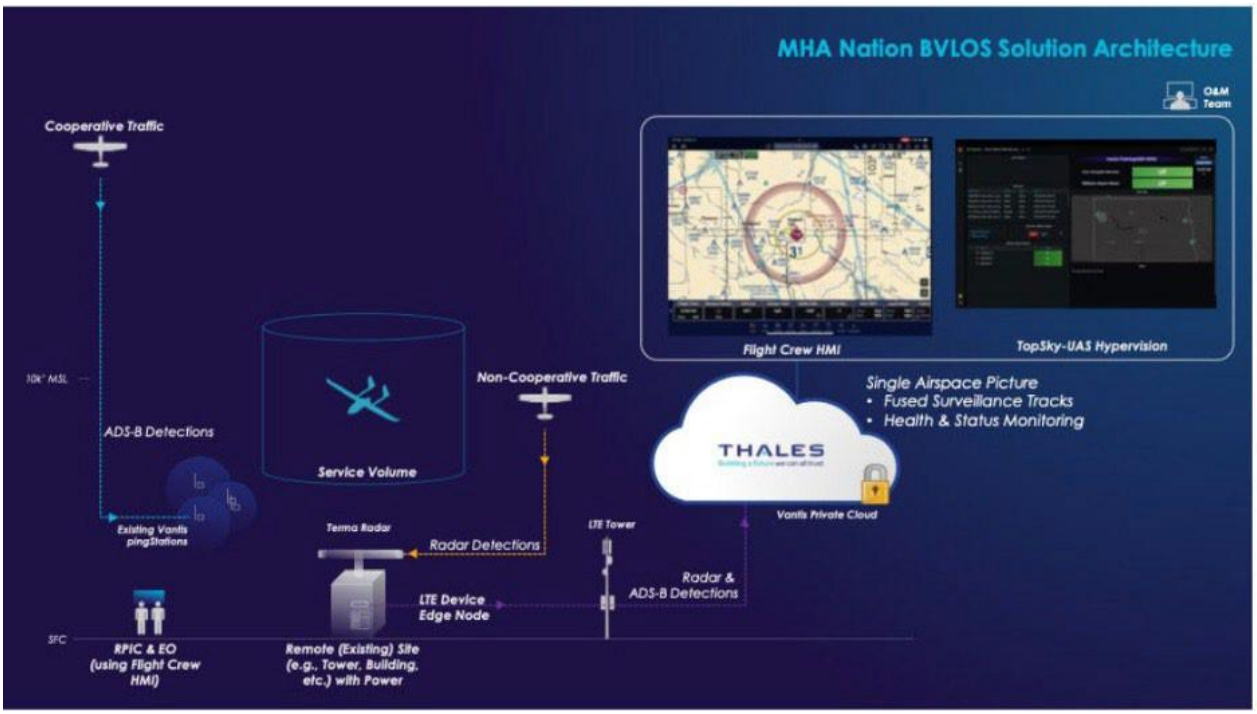
Codifying these and other policies into MHA's legal framework will ensure greater success in its pursuit of advanced BVLOS UAS operations for medical delivery, traffic management, bridge infrastructure inspections, and emergency response. Legal policy and regulatory agreements will facilitate success among a host of other CONOPS identified in this report that address innovative aircraft technologies, advanced commerce, and logistical missions. The legal and policy framework will ultimately need to be codified by the MHA Tribal Business Council and Tribal Chairman, with a commitment to adherence and a structure for monitoring compliance. During Stage 1, UND and its partners have been educated about Tribal decision-making processes, the realistic benefits of UAS technology for medical supply deliveries, and the challenges associated with such a mission. This has included the PI and Co-PI testifying before the Tribal Business Council, attending numerous meetings, and supporting efforts with Tribal committees. The Project Team at UND established a strong relationship with Tribal decision-makers.

The successful implementation of the regulatory pathway is more complex. Institutionally, the MHA

Nation is considering several options to obtain the regulatory permissions required for sustainable BVLOS delivery operations. The Tribe is exploring options to get the required certifications for medical delivery internally (14 CFR Parts 91 and 135, among others) or to partner with industry operators with experience in these types of delivery operations and the requisite certifications. For the sake of the prototype mission in Stage 1, the Project Team obtained a 107 waiver (107W-2024-02500) (see Attachment T). However, this waiver is limited in scope to the sole location of the corridor previously described and has a duration of less than a year.

The DOT grant partners provided the Project with access to FAA officials who assisted in guiding the project in bi-weekly meetings, which was extremely helpful. The FAA requirements were front and center of the problem-solving efforts, and clear guidance was provided.

During Stage 1, the Project Team has developed a vision for MHA on what "at scale" success of the Project could look like. After careful consideration, the Project Team proposed a viable pathway to at-scale success by leveraging North Dakota's Statewide UAS Network (Vantis), as shown below. Vantis is a performance-standard-based ground detection and avoidance (DAA) system developed in conjunction with the Test Site and Thales and funded by the North Dakota State Legislature. Vantis' mission is to provide hardware, software, network, and regulatory solutions for operators wanting to fly advanced BVLOS missions. The system provides real-time situational awareness of the airspace to a UAS Operator via several interconnected subsystems and supplemental data service providers (SDSP), allowing the pilot in control to adjust and adapt to changing conditions and ultimately to access tools and resources to complete any mission safely.



The Vantis System BVLOS Proposed Architecture with Ground Radar

The Vantis team has worked closely with the FAA as a charter member of its Near-Term Approval Process (NTAP) program for certification of third-party service providers (i.e., Vantis) to obtain expedited BVLOS certifications. Vantis has secured numerous expedited waivers, resulting in unprecedented turnaround times that streamline operations and enhance efficiency in rural areas. As noted above, the State of North Dakota has invested heavily in bringing the requisite technologies together and up to standards to establish the Vantis system, including efforts during the 2025 ND Legislative Session. The key sites for the existing Vantis system coverage are in Watford City, ND, Williston, ND, and Keene, ND, which is adjacent to the MHA Nation. The approximate coverage

area is 3,000 square miles, with the edge of existing coverage approximately 8 miles from the Fort Berthold Reservation's northwest boundary lines. The Vantis system uses an Edge Node, pictured below, that is collocated with the radar tower. It connects to Vantis cloud services and uses North Dakota's STAGENet fiber-optic cable system, which provides high-speed data transfer and robust cybersecurity for all users.

Terma Scanter 5202 Ground Radar Tower for BVLOS Sample

Given the efforts to develop and stand up the Vantis system, its benefits both in overall flight safety and security, and its proximity to MHA Nation, the Project Team believes expansion of this system in service of MHA's medical delivery mission will provide the fastest access to flight certification, the highest levels of flight safety, and the least amount of capital investment compared to pursuing an independent solution.

In summary, while local legal and policy efforts are essential for the Tribe to ensure the safety, security, and maximum value of UAS operations to the citizens of MHA Nation, the highest-risk area and critical path lie in navigating the regulatory processes required for flight operations. Although the FAA has expedited such requests in recent months, the process can take considerable time. The waiver the Project Team secured through Valkyrie was provided within 60 days, including time spent in early communications with the FAA to coordinate the submission. However, the FAA is actively advancing BVLOS rulemaking and regulations within the next few years that will enable large-scale drone deliveries. To address this challenge, the MHA Nation leadership will continue to engage with the Project Team to ensure stakeholders are informed about all solutions and opportunities associated with the chosen pathway, keeping critical stakeholders involved in planning and budgeting for the Stage 2 funding request.

Ground Radar Tower Base Displaying the Power Supply and Serer Location

Additional regulatory considerations for a BVLOS system that the Project Team explored include access to ground radar, which would require collaboration between the FAA and MHA Nation. The FAA Reauthorization Act of 2018, PL 115-254, Section 377, directed the FAA to develop a process to permit, authorize, or allow the use of UAS System Traffic Management Services. In response, the UAS Integration Office developed the NTAP for UTM services that ensures NAS safety and reduces UAS risk. NTAP is a process by which the FAA evaluates and approves a UTM safety mitigation for known hazards identified in FAA Order 8040.6 that is being provided to operators. The FAA's emerging approval criteria include:

- Clear concept of where and how the services will be used by operators, i.e. how does it help?
- Well defined architecture along with roles and responsibilities between both the service provider and the operator.
- Documented safety risk management plan
- Mature design, development, and testing of the system with associated artifacts
- Documented service level expectations between the provider and operator

A beneficial objective for our consideration is to position ourselves to benefit from NTAP and obtain broad approval for our services. An industry partner, Thales, recommends MHA Nation leverage a partnership with Vantis to inherit mature processes as a starting point to align with FAA expectations and monitor the progress of the NTAP program for future participation. This will have budgetary implications for the MHA Nation.

Among other local construction considerations, the last large regulatory hurdle would be the federal coordination process with frequency pre-screening using the FAA's Website for Frequency Coordination Request tool to identify potential conflicts with aviation navigation and surveillance systems. FAA Form 7460-1 is submitted to Radio Frequency Energy in aviation-sensitive bands. The FAA will then evaluate the Project against the Notification of Proposed Construction or Alteration, including tower height, airport proximity, and the potential for radio frequency interference with protected aviation bands. Receiving a determination of no hazard from the FAA is required before FCC registration and construction to initiate Tribal and environmental reviews through the FCC's Tower Construction Notification System. If the Project doesn't qualify for a category exclusion, an FCC Form 620 can be filed to address the National Environmental Policy Act and historic preservation compliance with the Tribal Historic Preservation Office (THPO) and the

State Historic Preservation Office.

Once FAA and environmental clearances are obtained, the tower is registered through the FCC's Antenna Structure Registration system. This process includes providing local and national notice of the Project's intentions to ensure transparency and compliance with community and regulatory stakeholders. To begin transmitting while the permanent license application is processed, a request would be made for a Special Temporary Authority from the FCC, citing operations pending full licensing. Upon grant of the permanent license via the FCC's Universal Licensing System, the radar system will operate under full regulatory compliance, completing the process from site selection through construction, registration, and authorized transmission.

Procurement and Budget

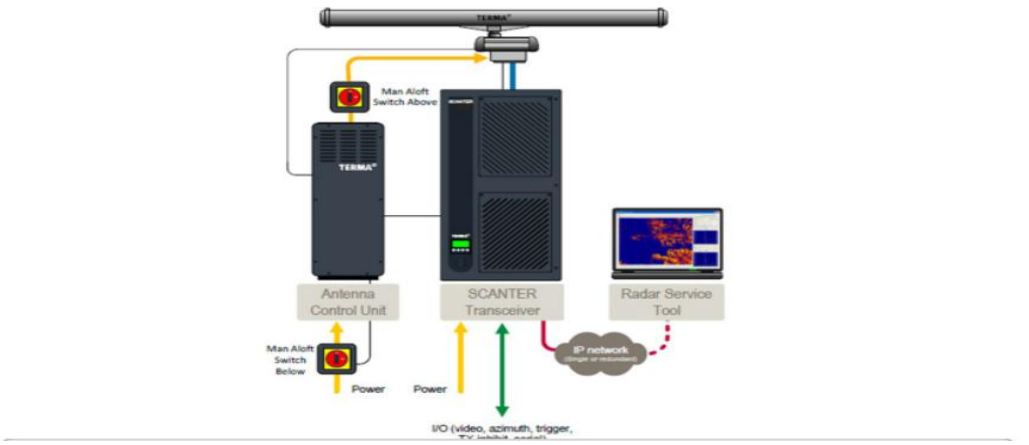
There were no cost overruns; however, a NCE was approved by DOT and MHA Nation Tribal Chair, with clear milestones addressed and progress to complete the Project by June 30, 2025.

If the Tribal Council ultimately selects the Vantis system, the first primary task for a future Project Team will be to develop the system's infrastructure. Risks in this area include the timely procurement of long lead-time items (usually high-value technological components such as radars), but building relationships to get the requisite approvals to begin construction.

The Terma Scanter 5202 radar provides medium-range surveillance in the region of interest. The Terma Scanter radars are proven commodities and are currently operating at hundreds of locations worldwide. The radar is a 2D sensor, presently approved by the FAA for the Vantis BVLOS service, and can provide accurate target range and other information to enable safe BVLOS missions.

The Vantis team has initiated several expansion projects across the state and has a strong understanding of the associated complexities. This effort would represent an extension of Vantis, following established and well-defined pathways. One opportunity for the Project Team will be the interface of North Dakota State agencies, including, but not limited to, North Dakota Information Technologies (NDIT) and the expansion of ND's StageNET fiber network, which serves as the primary network required by Vantis procurement. This will require government-to-government partnerships and interface with MHA Nation.

Category	Specification
Frequency:	9-9.2, 9.25-9.5GHz
Dimensions:	2D
Detection Range:	22.2km Pd ≥ 0.85 on 1 m^2 target
Range Accuracy:	6m
Azimuth Accuracy:	0.0176 degrees
Elevation Accuracy:	NA
Clutter Cancellation:	35dB
Effective Field of View (Az x El):	360 deg x 2km
Export Control:	ECCN 6A008k
FCC ID:	N9MSC5000
TRL:	Level 9



Visual Depiction of BVLOS Radar Architecture working to get information to User.

Thales provides the following Rough Order of Magnitude (ROM) for a Ground Based Surveillance System, broken into two phases, including implementation and service fees. The successful establishment of a GBSS requires a multitude of activities related to procurement, delivery, permits, site works, installation, integration, testing, safety case support, O&M, and program management that will be needed to meet the operational objectives successfully. This information will assist in the submission of the budget for Stage 2 funding, with the implementation cost of the GBSS, based on previous installations, being $4-$6M* USD. This includes:

- Project Management and oversight for the implementation period
- Site Survey to determine the final site location and necessary site work
- Tailoring of the system architecture to ensure all Project requirements are addressed
- Provisioning and shipment of the necessary material and infrastructure installation. The materials anticipated include: Two Radars, Radar tower, two Foundations, Electrical Disconnects, two Ice bridges, two Edge Node hardware, an H Frame, Radar software gateways, and one Flight Crew HMI (iPad),
- Permitting and Transmission licenses
- Integration and internal FAT of the infrastructure into Vantis Network
- Site Acceptance Test
- Customer support to obtain waiver of service fees

The annual delivery and operating expense for an on-premises deployment is $0.5-$1 million a year. This includes offering project management support throughout the term of the agreement, which includes scheduled network checks to verify system integrity. This includes a performance system for preventive and corrective maintenance, to include access to performance-critical systems and upgrades that include the following:

- Incident management and resolution to include managing unplanned events and outages to restore the service to an operational state safely and providing a system to log, track, and audit issues
- Performing corrective maintenance activities for line replaceable units (LRU) to include necessary configuration and verification.
- 3rd Party support to include facilitation, management, and oversight of third-party suppliers for Level 3 support and maintenance.
- Providing monthly licensing, hosting, and supporting access to all necessary software licenses and fees needed to support the accepted system
- A hypervisor for the health and status monitoring service that monitors the health and online or offline status of the components that make up the MDEC solution
- A Flight Crew HMI provided as a solution by Appareo, a company that designs aviation products. Of note, the sensor data fusion – multi-sensor tracker system (MSTS) combines surveillance information from multiple sources, including ADS-B data, and hosts fees for the centralized infrastructure.

With this arguably hefty price tag for a ground-based radar system, another option discussed was a mobile radar solution. The MHA Nation appreciated that DeTect was able to deploy rapidly and network two independent radars into a single, continuous corridor of surveilled airspace, integrating a live data feed into an unfamiliar management product for effective use. They were able to integrate with the UND mobile radar truck and collaborate with ASL on GIS. Most of the information was a duplication of radar imagery, with the same images appearing in different GIS platforms and dissemination products. The coverage area, or ‘viewshed’ footprint of the radars, could be better optimized in the future as it would be mobile to use in various corridors on a need basis. However, in the case of an emergency, the ability to deploy a mobile system that comes in at significant savings is a consideration MHA should explore if funding is available.

Partnerships

As noted throughout this report, the MHA Nation has established strong partnerships with several key organizations to ensure the success of this initiative. These partners include UND, the Test Site, NHS College, Thales, and Airspace Link. UND provides expertise in research, policy analysis, workforce development, and technology, and has served as the overall PI, Co-PI, and as a supporting program manager. The Test Site leverages the Vantis network to support BVLOS operations and includes expertise in flight test management and regulatory approvals.

Thales acts as the Systems Integrator, bringing extensive experience from the Vantis project to assist in planning, coordination, and technical implementation of BVLOS operations. ASL supported Tribal UAS operations through its GIS department and leveraged its AirHub Portal software to provide maps, airspace surveillance of participating aircraft, and LAANC approval for 107 operations.

The NHS College plays a critical role in education and training, helping to prepare the local workforce for new opportunities in UAS technology and operations. MHA will benefit from this relationship, along with other industry partners, including the university, to continue to drive its efforts toward advanced UAS operations. Each partner can bring support and additional guidance to the effort, and more partners may be needed to move forward. This is also true of MHA's relationships with State and Federal stakeholders. These relationships all need to be maintained to ensure MHA's success in this endeavor.

Data Governance

As noted earlier, effective data governance is essential for managing vast amounts of data generated by UAS operations. This includes data collection, storage, security, and usage policies. The MHA Nation's data management plan and Tribal Resolution outline the protocols for handling sensitive data, ensuring privacy and security. Moreover, consistent advisory board meetings enable oversight of data governance. These frameworks are integral to maintaining the integrity and confidentiality of data within the MHA Nation's jurisdiction. The data management plan was followed, submitted to DOT, and approved.

For at-scale implementation, it is recommended that MHA expand the data governance plan for this effort to include FAA or other reporting requirements and responsibilities, and to facilitate their personnel in handling the data. MHA Nation can utilize the Vantis MNOC in Grand Forks to maintain enhanced cybersecurity standards required for at-scale operations and to monitor the health and status of the Vantis infrastructure in real time. Given the sensitivity of some information needed for ground risk analyses and other planning activities, the Tribe should consider executing a non-disclosure agreement, a memorandum of agreement, or a similar agreement outlining which data will be shared and with whom. Ultimately, the data governance policies and procedures will require thoughtful input from MHA leaders to best protect their desired data to a level of comfort that everyone agrees on.

Workforce Capacity

The Project aimed to create well-paying jobs and enhance the local economy. Nine various training programs were offered in Stage 1 (Drones in School, Drone Camps, Part 107 Certification Training, Emergency Responder Training) that serve as templates for replication in Stage 2. The focus was on developing the future workforce through youth and emergency responder engagement. Training and capacity-building programs were put in place to prepare the local workforce for new opportunities in UAS technology and operations while supporting economic well-being. Ensuring the local community has the necessary skills and knowledge is essential. Partnering with educational institutions like UND to develop specialized training programs will help mitigate this challenge. The goal is to expand workforce capacity in aeronautics among MHA tribal members through continued partnerships among UND, the NHS College, the Test Site, and its partners, including Thales and

Airspace Link. This includes education, training, and funding to participate in planning for current and future students.

Internal Project Coordination

Some of the institutional challenges encountered during Stage 1 in issuing contracts to vendors will be mitigated in Stage 2, as relationships and collaborations have been established to enable successful at-scale implementation in the future. The MHA Nation will coordinate with the appropriate construction and engineering firms to implement the infrastructure, as well as with IT and Cybersecurity professionals, both internally and within the state and university. Expertise was identified among MHA Nation citizens and throughout ND in Stage 1 and will be expanded in Stage 2.

The capacity for Stage 2 will be enhanced by providing the opportunity for a full-time Tribal Liaison with established funding, using lessons learned from Stage 1. A full-time, dedicated member of MHA with the capacity and relationships to work with Tribal leadership and within Tribal governance policies and procedures is essential. This person will establish clear communication channels, clearly define roles and responsibilities, and ensure that all stakeholders are aligned with the Project's goals and timelines. In addition to establishing regular meetings and progress updates, and keeping accurate minutes and reports, they will also coordinate all Tribal Advisory Board meetings. These meetings are essential for keeping the Project on track and addressing any issues promptly. This person can build on the enthusiasm created in Stage 1.

Community Impact

Engaging with the community and ensuring public acceptance is a priority. Outreach programs inform and educate the community about the benefits and safety measures associated with these new technologies. Addressing public concerns and misconceptions about UAS operations requires public education and effective policy to eliminate the "wild west" phenomenon. The team proactively participated in public relations campaigns, offering transparent communication channels to address community concerns and build trust and understanding. A barrier was that people are busy, and meetings did not always take priority to discuss efforts. Although it was noted repeatedly that there was trust in UND. Once the Vantis system is implemented, it will help eliminate several entry barriers for both the public and private UAS sectors, fostering opportunities that benefit the Tribes on several levels.

Public Acceptance

Throughout this report, we describe efforts to engage the citizens of MHA Nation through public forums, establishment of an MHA Drone Advisory Board, listening sessions in all six segments, hosting a variety of public meetings, engagements by parents and educators of youth through the Drone Camps and Drones in School, the live streaming of use cases on FB, the survey work to secure both qualitative and quantitative data. Public acceptance grew throughout the Project, with continued reassurance that partners were committed to "doing this work with MHA Nation, not to them." Pride in the Project existed in the community with an understanding of the team's commitment to use technology for good. The KMHA radio station's live coverage on behalf of the Project was a benefit, as was the frequent coverage by the MHA Times (noted in Section 2), and the engagement of over 100 people on the Facebook page, with several positive comments posted about the work. The Project team hosted numerous meetings with key Tribal stakeholders using drones (Game and Fish, Law Enforcement, Drug Enforcement, Emergency Responders, Firefighters, Transportation, GIS) to secure feedback regarding collaborations. In Stage 2, the team will request funding to continue public engagement, educate the community about UAS, and better understand the privacy concerns noted in the data the assessment team secured.

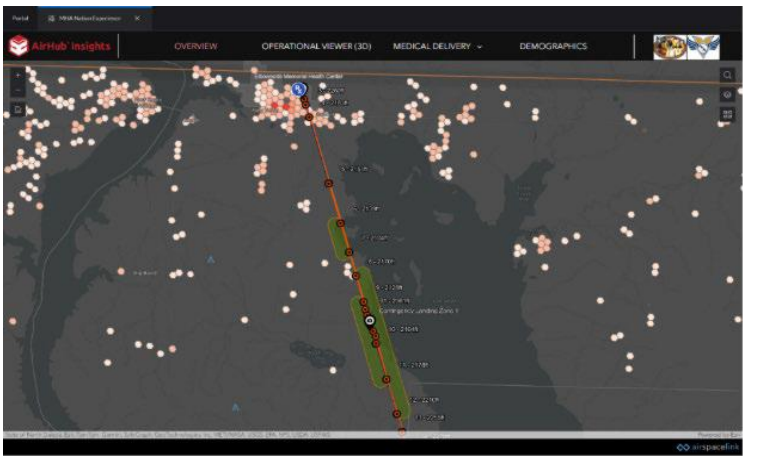
Technology Suitability

No BVLOS systems are currently being utilized on MHA lands, making challenges and risks

relatively minimal, as MHA lacks existing surveillance, C2, or other systems to support advanced UAS operations. The Vantis implementation would effectively establish the foundational technology layer, enabling MHA to pursue UAS opportunities as a platform for innovative aviation and transportation solutions. As noted previously, the Vantis system relies on North Dakota's StageNET fiber network. Over the years, the Vantis team has built strong relationships with North Dakota to integrate StageNET into system development effectively. The most significant challenge in integrating Vantis would be installing fiber, particularly given MHA's remote and rural location.

In preparation for the proof-of-concept flight, the Implementation Team conducted a comprehensive site survey and ground risk analysis. This process involved assessing potential hazards, evaluating terrain conditions, and identifying any obstacles that could impact flight safety. Based on these findings, the team adapted the flight path to mitigate risks and ensure smooth operation. A key component of the analysis was the use of population density data to determine areas best suited for flight. This information was critical in securing the BVLOS waiver, as it demonstrated that the flight would avoid densely populated areas and minimize risk to people on the ground.

Additionally, UAS experts conducted an on-site validation by walking through the key flight locations to confirm that the recommended landing sites met the required operational and safety standards. This hands-on assessment enabled real-time adjustments, ensuring each landing location was suitable for the surrounding environment. Factors such as terrain, obstacles, and accessibility were carefully considered to optimize flight performance. The results of these analyses were made available to the team through Airspace Link's AirHub Portal, providing a centralized platform for data access and decision-making throughout the flight planning process.



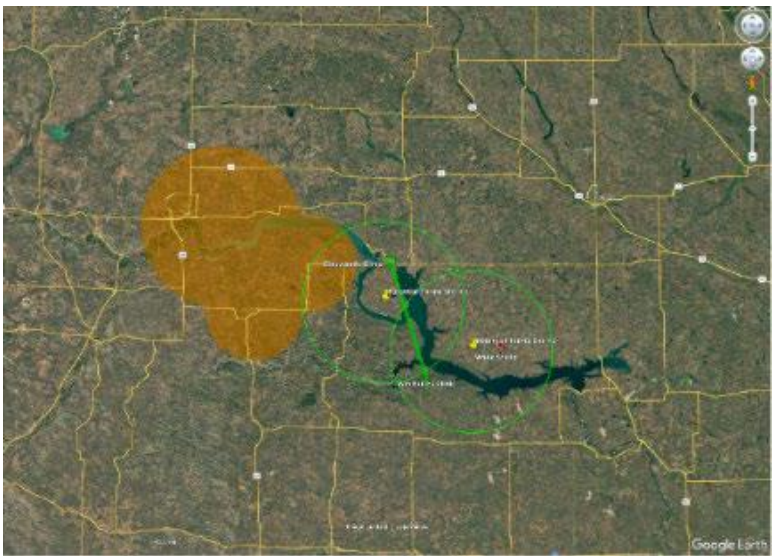
Air Hub Portal showing information gathered during multiple days performing a site survey of the area.

Site surveys for the proposed radar installation locations, including a corridor in White Shield, have begun, providing additional insights and actionable steps to address challenges related to network, power, and other utility requirements. The radar used in the analysis is the Terma Radar, which has an 18.6 NM radius of coverage with a 1 NM cone of silence that can be assumed for most altitudes at which drones are flown. To select specific radar spots, Lidar data were obtained from the U.S. Geological Survey and the State of North Dakota Geological Information System (GIS) to create a surface elevation map. From here, Google Earth was used to pick multiple potential sites based on initial factors such as established infrastructure (accessibility to power, ability to get to the location, etc.), relative elevation, as well as relative location to both cities in question and the line that connects the two places of interest, keeping in mind the cone of silence that would prevent the aircraft from being detected. Next, the sites were analyzed using the previously created lidar map by placing a virtual 90 ft tower and analyzing its coverage at a 150 ft plane relative to the tower. It is at this height that most UAS cannot fly, providing a conservative estimate while remaining within

FAA regulations. The 90 ft radar tower height was chosen because it provides the greatest coverage, overlooking many obstacles that would obscure potential areas with a shorter tower, while not requiring UAS to fly at higher altitudes to be detected. Among the sites analyzed, the two towers provide some of the best evidence of continuous coverage of the line referred to above. Additionally, these sites provide good coverage of other areas in the MHA Nation, allowing for the expansion of services and the area for UAS to travel if the flight path needs to be altered to deliver medical supplies along the initially proposed route. To date, no technological integration issues have been encountered, which bodes well for a smooth implementation process.

During the no-cost extension, this information was further evaluated under the Vantis network infrastructure, utilizing two Terma towers located at the coordinates provided in the table below. Service coverage along the UAS flight corridor flown during the proof-of-concept flight between White Shield and Twin Buttes medical clinic is viable.

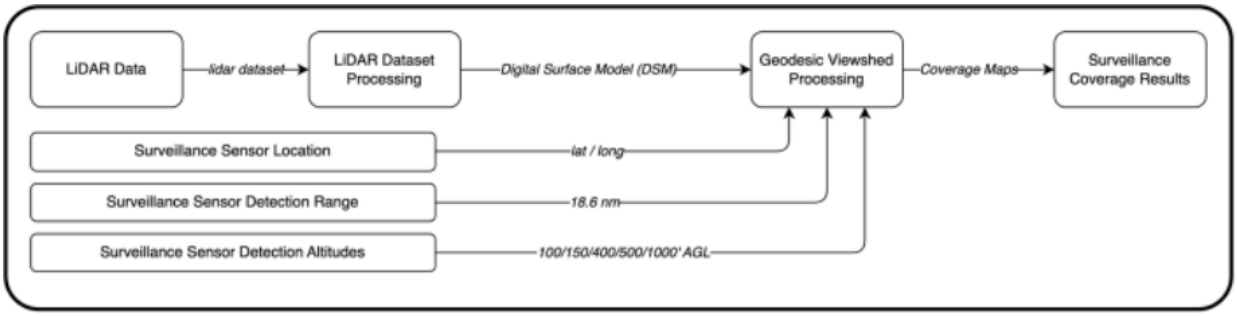
Proposed Location Name	Lat / Long Coordinates
Potential Terma Site #1	47°50'1.09"N, 102°30'32.16"W
Potential Terma Site #2	47°38'50.24"N, 102° 00'21.21"W



Proposed Terma Tower Placement

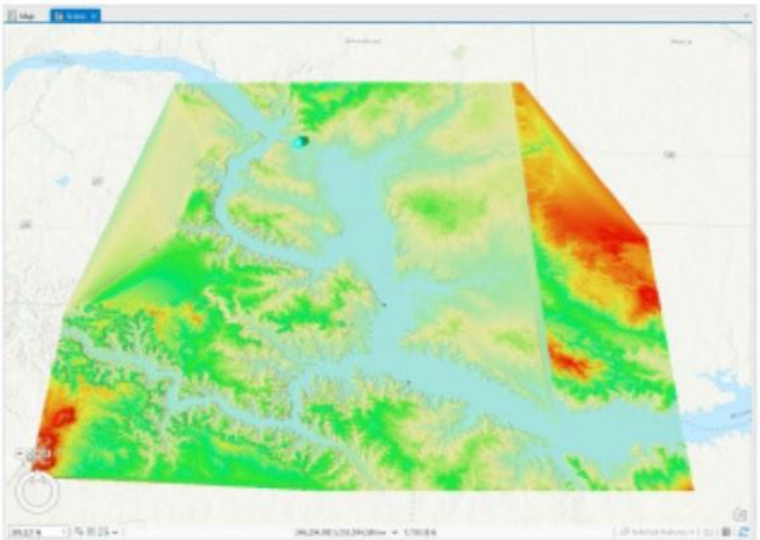
In this picture, you can see the yellow pins mark the locations of the Terma towers. The green circles represent the 18.6 nm coverage range provided by the Terma radar from the pin's locations. The radars provide overlapping coverage for detect-and-avoid surveillance along the flight corridor, depicted as the straight green line on the map below.

Additional consideration must be given to surveillance sensor coverage in this remote area. The process of conducting a surveillance sensor coverage analysis using LiDAR data that considers surface obstacles, not just elevation data. The goal of this analysis is to produce a viewshed of the Terma radars. More specifically, a geodesic viewshed is used to produce surveillance coverage results. The following image illustrates this process at a high level for the Surveillance Coverage Analysis Process using LiDAR Data.



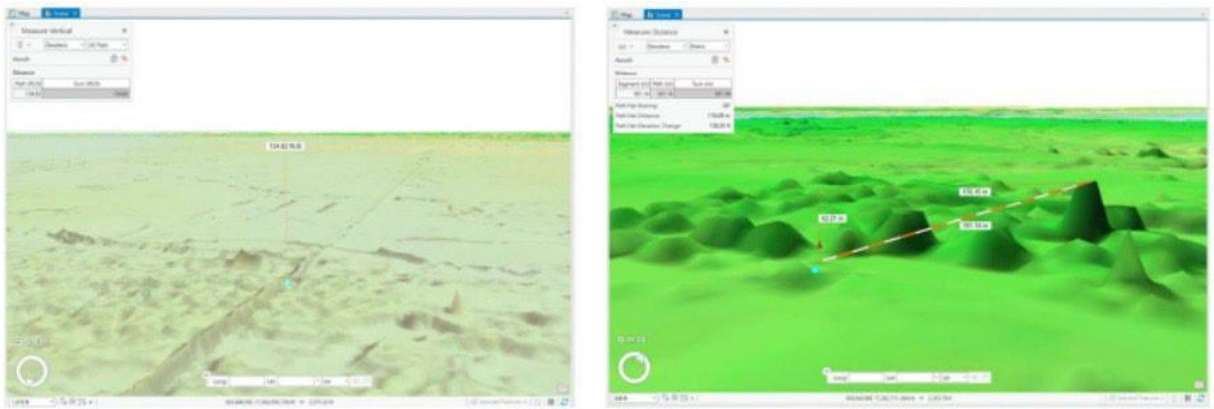
Surveillance Coverage Analysis Process

Beginning with the area of interest (AOI) – areas between New Town and Twin Buttes, ND – LiDAR data is collected/downloaded from an authoritative source and is uploaded to a GIS application for LiDAR Dataset Processing. Digital Surface Models (DSMs) are used as an input to the Geodesic Viewshed process, where other inputs are required, including the location and detection range of the Terma radars to produce the coverage maps that characterize the ability of the Terma radars to detect manned aircraft at various altitudes (i.e., the coverage results).



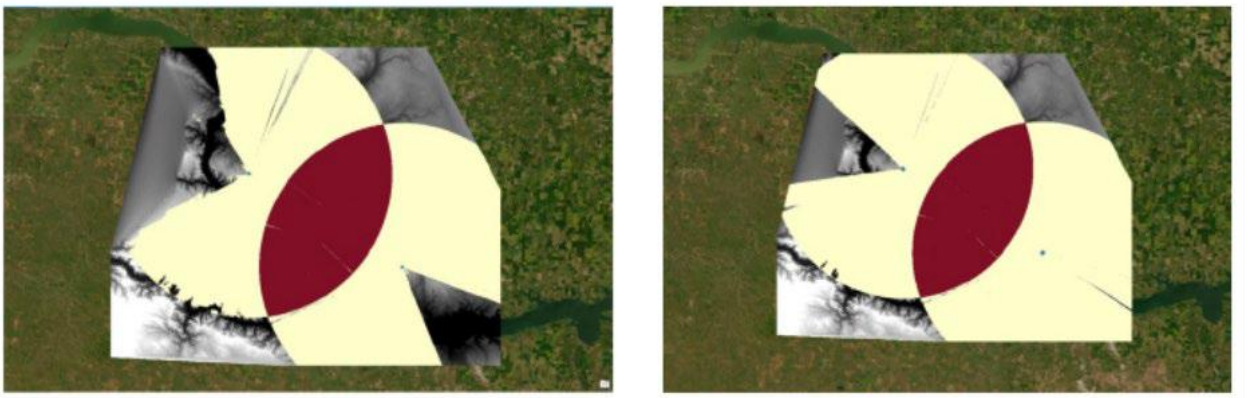
Lidar Data characterized in the area of interest, with the blue dot being New Town, ND.

With further Lidar analysis, it was determined that obstacles in the New Town area can extend up to 134 ft (40m) into the airspace, and in Twin Buttes, they can extend up to 137 ft (42m) into the airspace. Additionally, the terrain is not undulating but rather rises sharply, as depicted below.



LIDAR images of terrain to obtain terrain height.

The areas of each radar site chosen are colored tan. Overlapping detection areas of both radars are colored maroon. The first figure on the left is surveillance coverage from a 30-foot tower detecting targets at 1,000 feet AGL. The second figure on the right is from a 90-foot tower detecting targets at 1,000 feet AGL.



30-foot tower on the left and 90-foot tower on the right.

Additionally, it is important to note that in the above figure, there appear to be "wedges" (or gaps) in the coverage volume of each potential Terma site. However, this should not be perceived as a constraint. The wedges are present due to the placement of the "observation point" within the GIS application, which abuts the existing tower infrastructure at these locations (potential radar site #1 with an existing tower northwest of the observation point; potential radar site #2 with an existing tower southeast of the observation point). A way to mitigate against this could include the emplacement of the radar on the existing tower (though additional logistics, planning, and substantial costs would be required as these towers are erected well above 200' AGL). Even with these locations selected, the surveillance assets' coverage directly overlaps the intended corridor between New Town and Twin Buttes.

Though the coverage analyses show the notional coverages at various altitudes when emplaced on a 30' tower, MHA Nation appreciates the importance of conducting a formal site survey to assess optimal site locations that meet line-of-sight and other requirements, including local rules, regulations, and ordinances, as well as performing necessary test flights to validate the coverage of these assets at these locations.

Other steps that have been thoroughly considered and should be considered for at-scale implementation for MHA regarding technology suitability are testing and validation of the GBSS infrastructure, a crucial element in establishing a UAS operational center, with the end goal of obtaining a BVLOS waiver. The testing and validation approach is codified in the Test & Evaluation Master Plan (TEMP). Based on the FAA William J. Hughes Technical Center Test and Evaluation Handbook, the TEMP outlines an approach for functional and performance testing, beginning with hardware production testing, software testing, integration testing, and culminating in formal verification & validation acceptance testing. For this solution, services should be deployed to support the GBSS capability in the Traffic & Surveillance Service (TSS) and the Monitoring and Control Service (MCS).

MHA Nation has been informed by its partners that a partnership with Vantis represents not only an infrastructure optimization but also an opportunity to leverage test plans and procedures previously used in a safety case and a BVLOS waiver request.

As the new Documents and procedures of substantial value that could be leveraged include:

- Test & Evaluation Master Plan
- Surveillance Requirements
- Integration Testing practices
- Site Acceptance Testing procedures and requirement evaluation
- Operations & Maintenance best practices for at-scale implementation, MHA would explore using the following approach for validation of the GBSS.

Software Testing

The product development workflow includes multiple stages of software testing. The first stage is unit testing performed by an individual software developer. The second stage is functional verification, performed within the developed quality assurance environment. Following product testing, the software is tagged and released for deployment to Project Teams. Software releases are accompanied by release notes and test reports that highlight new enhancements, bug fixes, and any known limitations.

Integration Testing

As various assemblies and subsystems are installed, we perform informal integration testing to verify proper data flow and communication. The objective of this test is to ensure the system under test is integrated correctly and ready to enter formal acceptance testing.

Acceptance Testing

The acceptance testing approach leverages written, approved test procedures that verify and validate System/Sub-system (SSS) requirements. Requirement traceability, including verification results, is tracked and maintained in a Verification Requirements Traceability Matrix (VRTM). The test procedures are organized into a series of test cases designed to evaluate the various services. The TEMP provides flexibility by organizing the test and evaluation strategy in a modular fashion and by providing guidance on which test activities and test cases to execute based on the scope of a given project.

Once all system components are integrated and the Site Acceptance Test (SAT) entry criteria described in the TEMP are met, the system is ready for acceptance, testing, and validation. The objective of SAT is to demonstrate that the system meets requirements and is ready for operational evaluation. A test readiness review (TRR) will be conducted to brief the client and customers about the following topics:

- Demonstrate system readiness
- Walk-through maintenance tickets that were closed during pre-SAT activities
- Walk-through maintenance tickets that are still open but not affecting SAT results
- Presentation of final SAT schedule (SATs are usually multi-day events)
- Presentation of SAT flights, acceptance procedures, and criteria
- Final agreement on alternate schedule if testing cannot be conducted due to weather or other adverse environmental conditions

Flight operations, including crewed and/or uncrewed operations, as described by the system procedure book, will be planned and executed by a member or partner of the Project Team in the Stage 2 submission. Results, formal acceptance, and formal comments needing to be addressed at a later stage by a future team will be formally recorded in the SAT procedure book. If required, daily

SAT kickoff and recap meetings are held to prepare for the day, discuss potential observations, and record notes from the conduct of that day's SAT activities. The FAA has evaluated this robust testing and validation process and underscores the Team's high maturity level and pedigree in managing complex UAS operations.

Before future deployment to the fielded locations, hardware components undergo evaluation using an Asset Management Process. Smaller items, such as servers, ADS-B receivers, and similar components, are evaluated per internal Production Test Procedures. Larger items, such as radars, will be evaluated for functionality and performance in accordance with the manufacturer's specifications.

MHA Nation is aware that Vantis has been managing its existing infrastructure for several years and has reliable cost estimates for its operation and maintenance. The UAS industry is a young, dynamic, and fast-evolving sector with rapidly advancing technology. The Project Team is keenly aware of the challenges involved in planning for future technological developments. Despite this, Vantis ensures system safety and scalability by regularly delivering software and hardware updates across all field equipment, maintaining a robust, future-ready operational platform.

Maintenance and Operating Requirements for Continued Success

The Project Team currently possesses data on the number of prescriptions and trips required to serve the community (as provided in Section 4). However, it is anticipated that implementing advanced UAS operations for medical delivery could significantly increase the availability – and consequently, the demand – for prescriptions and other medical supplies and services.

The impact of this demand curve on UAS operations remains uncertain at this time. Since UAS operations are directly tied to maintenance, operating costs, and requirements, this is a key consideration. However, the GBSS capability includes the deployment and execution of the MCS and its core functions. The MCS is a monitored service and is supported by an integrated operations & maintenance team to guarantee that efficient and safe operations can be flown routinely.

The O&M team has developed extensive Standard Operating Procedures (SOPs) to ensure consistency in their approach. All O&M staff are trained to use these SOPs to monitor system health and respond to incidents as they arise. The MCS is a monitored service and is supported by an integrated operations & maintenance team to ensure efficient, safe operations can be flown routinely.

Thales can support the system using a three-tiered concept: Level 1, Level 2, and Level 3 are all required.

- Level 1 support is the initial support level responsible for fundamental customer issues reported to the Service Desk (web-based service). The Vantis resource can fulfill this function. Level 1 support gathers as much information as possible from end users and handles straightforward incidents.
- Level 2 support is more in-depth technical support provided by technicians with experience and knowledge of the system. Level 1 support solves basic incidents and investigates elevated issues. Level 2 support may order the replacement of hardware components from the onsite depot, perform diagnostic tests, and remotely access devices to troubleshoot and resolve incidents.
- Level 3 support handles the most difficult or advanced problems and is provided by experts at Thales or from our vendors/suppliers, if needed. Level 3 support is responsible for assisting Level 1 and Level 2 support and researching solutions to new or unknown incidents.

MHA Nation can leverage Vantis' well-defined lifecycle and change management process when subscribing to Thales' service model. This service-sharing approach involves all elements of the solution, including infrastructure, software, operations, maintenance support, and new-feature development and enhancement, resulting in significant cost savings for MHA Nation.

Beneficial Impact for At-Scale Implementation

The current Vantis operating system has demonstrated progress, including the successful procurement and installation of key technological components, the establishment of partnerships with leading institutions and organizations to leverage expertise and resources, and the creation of a fully operational MNOC serving as the hub for monitoring and controlling BVLOS operations, ensuring real-time data and situational awareness.

Vantis systems currently operate several miles to the northwest, near Watford City and Williston, ND, with surveillance radar coverage just outside the bounds of Tribal lands.

Upon completion of Stage 1 and the potential of the award of Stage 2 funds, the team will begin construction on the infrastructure sites in a matter of months, with initial procurement of technological systems starting much sooner. Vantis has established a clear framework for success, serving as a model for how UAS services at scale can positively impact communities. As Vantis potentially expands into MHA tribal lands, the growing demand for UAS services will drive a need for more skilled operators, thereby boosting economic activity within the MHA Nation.

Section 7 of 7: Wrap-Up

Throughout this report, challenges and lessons learned have been highlighted, along with the innovative solutions to overcome obstacles. This Project aims and deliverables are completed. The proposed solution met our expectations. The glue in the effort has been the high levels of community engagement and support from UND, NHS College, the Planning and Grants Office at MHA Nation, Elbowoods Memorial Health Center, and the MHA Nation Drone Advisory Board. Key stakeholders have engaged in numerous private, face-to-face meetings with community leaders and have hosted and attended several community public events. These efforts are described throughout the report.

Drone Camp 2 staff and UND radar truck.

Areas that Met or Exceeded At-Scale Implementation

Tribal engagement for the Project was exemplary, with descriptions in the bullets below.

- Adherence to government-to-government relationships by subcontractors with an understanding of the sovereign status of the MHA Nation. This included the grant team working collaboratively to secure appropriate Tribal resolutions. Positive responses were received from the Tribal Business Council and its subcommittees, including the Economic Committee and the Health and Human Resources subcommittees. Project staff and Advisory Board member Jared Eagle from Elbowoods Memorial Health Center prepared written testimony to secure the necessary approvals. Requests were secured for the flight and Stage 2 funding request. Engagement with Elbowoods' leadership was critical given the medical delivery use case.

Photo: MHA Nation Veterans Center's receiving area

- Support and engagement by an internal 14-member Advisory Board to guide culturally responsive implementation of the Project. The community collaboration included support from the MHA Nation Veterans Center, which allowed the launch site to be used from their location in New Town, ND.
- The engagement by critical stakeholders, including the Senior Environmental Scientist of MHA Nation on data storage and sovereignty, the Tribal Historic Preservation Office (THPO) to ensure respect for historic preservation, the GIS/Science Office to engage in a collaborative relationship of data exchange, Emergency Response Leaders on needs and takeoff and landing locations and sponsorship of the UAS/Drone and Data Management two-day training, MHA Law Enforcement, and MHA District Courts to assist with legal aspects of the Project, and others in personnel in face-to-face meetings by NHS College and UND staff. Due diligence included several face-to-face meetings with leaders to examine the Project's intentions and to secure feedback. Additional leadership, aside from the MHA Drone Advisory Board, included the Public Safety Administrator, Chief of Police, MHA Transportation Administrator, Administrator of the Natural Resources Range Rider Supervisor, Game and Fish Department Game Warden, and Four-Bears Segment Officials. Their expertise and guidance were critical in setting the stage for Stage 2 funding, as detailed in Section 2 of this report.
- Preparation of three reports to define needs and barriers surrounding the use of drones. The first report, Assessment of Drone Potential and Barriers for MHA Nation: Opinion Survey, summarized the results of a community opinion survey. The purpose of the opinion survey was to determine community perceptions and needs for the future use of drones by enrolled Tribal members of the MHA Nation. The second report, Summary of Listening Session: MHA Drone Project, summarized information gathered from the seven Listening Sessions held across our Tribal lands and shared and reviewed. This document underscores the needs relating to Stage 2 funding. This content guides community members' awareness and input regarding the capacity to forward a scalable Project. A third report, Tribal Needs for Stage 2 Funding Assessment, approved for distribution by the Tribes on June 26, 2025, regarding future use case needs, is provided in section 2. Enrolled members of the MHA Nation were given opportunities to participate in many events with UND and its staff, including public education at Tribal Elder events.
- UND and NHS College hosted several face-to-face community events to secure feedback and input from Tribal leaders, including (1) a workforce meeting with the New Town Schools Superintendent, Dean of Science at NHS College, and the Boys and Girls Club of TAT to develop a workforce plan, (2) an on-site MHA Drone Advisory Board meeting with a panel of critical stakeholders who described opportunities for use of UAS/drones to include formal invitations (3) a public invitation to attend a luncheon at the MHA Drone Camp in July 2024 serving traditional foods, including a personal invitation to the Tribal Chair and Tribal Council members by the PI at UND, (4) seven listening sessions in January at all segments and in Bismarck, ND where several Tribal members live, and (5) a final listening session and survey about needs that should be identified in Stage 2.

Paul Synder, Chair of UAS, UND, is being recognized for his work at a ceremony at MHA Nation

- Engagement with local media, including the MHA Nation Times newspaper and the KMHA Tribal radio station - 91.3 FM, kept the community updated.
- UND provided leadership in developing a nine-credit UAS certification program at NHS College with access to part 107 training and preparation for a successful score in the practice component of the requirements.
- Three Drone Camps were well-received and highlighted youth enthusiasm and engagement as the future workforce in this technology.
- Drones in the School Project for 153 middle-school youth at New Town Public Schools in November 2024. Additional Drones in the School efforts, which took place in April 2025 using no-cost extension funds, occurred in White Shield and Twin Buttes. These are schools located on the reservation with enrolled Tribal members. The Drones in School Project is highly sustainable and popular with both youth and Elders at MHA Nation.

UND Group presenting at AUVSI 2025 in Houston, Texas

DeTect provided two mobile radar trucks from Panama City, Florida, at no cost to the Project

because they were committed to the success of this effort. UND provided access to their mobile radar truck on two occasions (public education at the second Drone Camp). They were willing to support this because it was the "right thing to do".

Support Provided by the DOT SMART Grant Personnel

- The attendance by the Director of US DOT SMART Grants at the in-person MHA Drone Advisory Board meeting on July 17, 2024, and the second Drone Camp on July 18, 2024, in New Town, ND. His interviews with many media outlets were appreciated and valued. MHA Nation appreciates his assistance and interest in our work.
- Proactive feedback, communications, and guidance were provided by the SMART Grant Policy Advisors, who offered detailed information and feedback on the quarterly reports, annual report, content for the no-cost extension, and generally responded to inquiries.
- The SMART Grants Management Specialist assisted with reimbursement and postings to keep the Project running fiscally.
- The assistance provided by SMART Grant staff at the first meeting in DC and the second meeting in Boston, along with valuable content and guidance from DOT partners on the SMART Grant requirements and pitfalls, was invaluable. The opportunity to meet with other DOT SMART Grant recipients working to advance autonomous technology and support collaboration rather than competition was noteworthy.
- The thoughtful engagement by the vendor working with the Data Management Plans on the SMART grants in their willingness to gain a deeper understanding of data sovereignty opportunities.
- Support provided by DOT from the FAA through the assignment of a point person to support the Project with bi-monthly meetings to chat and engage in meeting all legal requirements of aeronautics. This resource was invaluable to the MHA Nation.
- Acknowledgment on the DOT SMART grant web page of the presentation at AUVSI in San Diego, the second Drone Camp, and the media from the proof-of-concept flight by KFYR TV was appreciated.

Presentation at AUVSI 2024 in San Diego, California

Established Valuable Partnerships

- The support provided to the MHA Nation in budgeting and finance by the UND in the pre-and post-award process was exemplary. The Vice-President of the Research and Economic Development Office supported all efforts. UND accommodated delays in securing resources. Support was secured from personnel in the Tribal Chair's office to ensure tasks were expedited. The capacity for frequent conversations with the PI at UND and the Director of Planning and Grants at MHA Nation was noteworthy in solving problems.
- The prompt follow-through on requests by UND and the MHA Nation Planning and Grants Office aim to engage the MHA Tribal Business Council with their commitment to incorporating the Project into their agendas (see Attachment S for the Tribal Resolution approving the submission of the request for Stage 2 Funding).
- Strong communication occurred across stakeholders at frequent meetings, including all team meetings, sub-committee workgroup meetings (implementation, workforce, assessment, and economic viability), advisory board meetings, planning meetings etc. Several meetings were held each week to move this effort forward. A TEAMS page located at UND was used to include and access written materials and to support a chat feature.
- Providing an opportunity, through access to a UND mobile radar truck, for Tribal members to see the capacity of radar to increase the capacity for flight safety.
- The Tribe acknowledges the frequent trips by UND faculty and staff on the Project to support initial and continued engagement.
- Many media outlets provided information about this Project across the state, all of which were positive and underscored hope for improved transportation access to secure medications in this rural Tribal area.
- The employment of UND students, who are enrolled tribal members at MHA Nation (Malnourie, Dahlen, and Headdress), provided a critical resource for the team, given their knowledge and expertise of MHA Nation. Dahlen secured employment as a result of this effort, and Malnourie was accepted into a graduate program in public health.

Notable Proposals for Solutions for At-Scale Implementation

- Engage industry partners with the most recent technology and their capacity to use it, and describe this effort to the community in an understandable manner. This will build trust.
- Engage earlier and effectively to advance BVLOS for commercial delivery, including prompt submission of a request to the FAA for a BVLOS waiver. Have clear communications about the waiver with all on the grant team.
- Ensure that all partners are fully engaged and remove people from the Project who do not participate in the early stages to support strong deliverables. The knowledge gained in Stage 1 and the coordinator will help the narrative in the Stage 2 funding request. For example, the Water Resource/GIA Office has access to an underwater drone that all must be aware of the work of the Project Team.

Planning and Grants Officer at Drone Camp 3

, Drone and staff from the NHS College and the Veterans Administration at MHA during the use case.

- Ensure effective use of technology to improve transportation barriers that can address inequities between indigenous and non-indigenous groups, including public education. This can be achieved through a greater understanding of the needs and fears surrounding the elimination of personal privacy. For example, several Tribal Elders expressed concerns about violations of their privacy at events such as powwows.
- The technical lessons learned are outlined throughout this report. Still, they are underscored by the need for a platform that can fly in high winds, ensuring that all equipment is available on-site, that launch and recovery sites have backup plans, and that extra batteries are available.
- Given the proximity of the MHA Nation to the Minot Air Force base, examine lessons learned in this partnership that have been effective in defense/Tribal engagement as replicable in the future.

Student receives recognition for work on Drone Project with mentors, May 2025.

Advice for Other Communities Using Autonomous Systems

- Begin efforts immediately upon securing the award to achieve your deliverables. Identify what at-scale is and begin that work immediately. Engage a host of stakeholders.
- Identify industry partners with the bandwidth and interest to support the effort throughout the Project's timeframe. The drone industry is immature, and companies can operate on a limited budget, which creates risks for deliverables.
- Address opportunities and barriers that arise from the nuances and expectations in procurement, including Federal, State, and Tribal requirements.
- Engage communities to define their needs and communicate any limitations. Ensure you have "boots on the ground" and a thoughtful temperament among all partners residing outside the community who are working on the Project. It is only successful if you have community buy-in and establish a relationship.
- There is a need for access to a UAS that can fly at high wind speeds with strong battery life and the capacity to fly in more inclement weather. Ensure a strong checklist, access to equipment before arrival, and an approved FAA corridor.
- Transparently address risk/ benefits/limitations in the use of UAS to the community and all leadership.
- Confirm that outside entities have the capacity to achieve grant deliverables with past efforts.
- Ensure that expanding workforce capacity is a long-term commitment, not merely grant-related activities.
- Establish a rhythm of team engagement with a weekly check-in to ensure remote partners are successful.
- Provide access to program management software that the entire team can access and is willing to use.
- Advance both internal and external collaborations that move the Project forward. Many moving parts require good communication and the ability to leave "egos at the door."

Conclusion

The Project has been effective in proof-of-concept flights, supporting workforce development, gaining community acceptance, and providing a strong economic basis for advancing the Project. The technology infrastructure to support BVLOS exists within the Tribal community of MHA Nation, if connected in the future to the Vantis network, and can be adapted and supported through meaningful engagement and follow-through, as well as Tribal data sovereignty. This can only be accomplished, however, through a commitment to a shared common good, addressing transportation barriers, and engaging in technology for good. Hopes have been raised about this capacity to address transportation barriers, so follow-through is critical with future partner communication and engagement with the MHA Nation. Emphasizing the level of community engagement is noted by the interest in continuing Drone Camps and Drones in the School. In June 2025, the Mountrail County Job Development Authority encouraged UND to apply for funds to continue efforts for both of these activities at the MHA Nation. A proposal has been submitted, and the Project Team will learn the outcome in November 2025, with extensive collaboration with key stakeholders and the securing of necessary letters of support from leaders who were aware of the work completed in Stage 1. The partnership between UND, NHS College, and MHA Nation is strong and will be accessed in the request for Stage 2 funding.

Acknowledgments

Lead Authors: Thomasine Heitkamp, UND PI, Amanda Brandt, Program Manager, Dr. David Flynn, Economic Viability Coordinator, Dr. Mark Askelson, UND-Co-PI, Chris Theisen, Director of RIAS, and Dr. Sheila Hanson, Assessment Coordinator under guidance from Sheila Many Ribes, with contributions from grant personnel at Nutea Hidatsa Sahnish College, Test Site, Air Space Link, Thales, and the Planning and Grants Office at MHA Nation.

Design: Emily Zent, UND, and Allie Tyree, UND

Photos: Thomasine Heitkamp, Prairie Rose Seminole, Jeremy Powers, and Emily Zent,

List of Attachments

Attachment A: Summary of the Proof-of-Concept Flights at MHA Nation

Attachment B: Findings from Drone Listening Sessions

Attachment C: MHA Drone Project Survey Summary

Attachment D: Tribal Needs for Stage 2 Funding Assessment

Attachment E: MHA Advisory Board Members

Attachment F: Emergency Response Training

Attachment G: MHA ND DOT SMART Grant ConOps

Attachment H: Safety and Security Standard Operating Procedure

Attachment I: MHA Drone Tribal Resolution – Access to GIS Data/Corridor Approved

Attachment J: MHA Drone Camp Agenda 2023

Attachment K: MHA Drone Camp Agenda 2024

Attachment L: MHA Drones in School 2024

Attachment M: Drone Certification Information Sheet

Attachment N: ASSUREd Safe FEMA Training Flyer 2024

Attachment O: MHA Reliance Agreement Institutional Review Board (IRB)

Attachment P: Visual Observer Locations

Attachment Q: Handout Introduction for Advisory Board

Attachment R NPUASTS Command Center Trailer - Deployment Training

Attachment S: MHA Drone Tribal Resolution - Stage 2 Funding Approval

Attachment T: FAA Waiver

Attachment A

Summary of the Proof-of-Concept Flights at MHA Nation on September 17 & 18, 2024

Summary of the Proof-of-Concept Flights at MHA Nation on September 17 and 18, 2024

Presented to the Health Committee of the MHA Nation Tribal Council, on behalf of the MHA Drone Project: Planning and Protocol Development

Thomasine Heitkamp and Amanda Brandt

Purpose: The project goal was to develop an MHA Nation driven use case with a proof-of-concept flight to explore the use of an uncrewed aircraft system (UAS), or drones, for a direct flight between New Town, ND, and Twin Buttes, ND. The long-range goal is to eliminate extensive ground transportation time and risk between the two locales.

Summary: Two beyond visual line of sight (BVLOS) flights were conducted between the Veterans Administration Building in New Town and the Pavilion/powwow grounds in Twin Buttes, ND on September 17 and September 18. **The flight time on September 17 was 30 minutes and the flight time on Sept 18, 2024 was 39 minutes.** Both days had extensive winds which would have resulted in additional time. Without wind, the flight time would be 23 minutes. **The use case was proven successful and scalable for future operations.**

Figure 7. Display of Swoop Aero Kite at Community Event at Earth Lodge Village

Approvals: The corridor used for the flight was approved by the MHA Nation Tribal Council on May 7, 2024 (Tribal Resolution 24-155). The flight was conducted with the approval of the Department of Transportation/Federal Aviation Administration (FAA) for Matador UAS Logistics, LLC (aka Valkyrie UAS Solutions) under waiver number 107W-2024-02500. The pilot was Catherine Self with Valkyrie UAS Solutions flying a Swoop Aero Kite. All safety measures were deployed.

This project is supported by the United States Department of Transportation SMART Grant Number: SMARTFY22N1P1G38

Figure 2. Pre-Flight Training of MHA Citizen

The University of North Dakota (UND), as the prime subcontractor to MHA Nation, provided a host of support for the flights. The UND Research Institute for Autonomous Systems (RIAS), provided two visual observers at take-off and landing and served as HUB operators for Valkyrie. The two staff were trained in aircraft operations. Additionally, they supported geo-synchronization procedures. The Director of RIAS and Project Co-PI, Dr. Mark Askelson, is a meteorologist and provides frequent weather updates critical to safety. The PI on the Project from UND Research and Economic Development, Thomasine Heitkamp, served in the role of operational manager for the flights. She provided information about the flight to the Chair and Tribal Council, MHA Drone Advisory Board, local stakeholders, and residents. She hosted a community event at the Earth Lodge Village on September 16, coordinated logistics, and local arrangements, worked collaboratively with Elbowoods Memorial Health Center, and assisted MHA Nation in local media.

Safety Measures and Public Participation: To provide additional flight safety, two partners on the project (Thales and the Test Site) provided eight visual observers (VOs) on the corridor. However, it is essential to note that these BVLOS flights did not require a visual observer to execute this use case. Additionally, DeTect Inc. donated access to two mobile radars, which were transported from Panama City, Florida, and installed at the Twin Buttes Pavilion and the Veterans Building in New Town. In coordination with DeTect, UND Aerospace provided access to their mobile radar truck to a remote rural area of Mandaree, ND, to assist in monitoring the aircraft. The three radar trucks provided 360-degree coverage of the entire flight corridor.

Figure 3. Pre-Dawn Readiness Checks of Radar

The Test Site provided Mobile Command Centers at both the New Town Veterans Administration Building and Twin Buttes Powwow grounds to track aircraft during flight, providing real-time movement of the drone to the public who attended the launch and landing. Airspace Link integrated their Air Hub surveillance software with DeTect-Inc to enhance the live display of the aircraft as it moved through the approved corridor. This allowed for additional situational awareness updates for communication and coordination to the visual observers placed along the flight path.

Figure 4. The community is watching the flight from the Mobile Radar truck

Figure 5. Celebration of Landing in Twin Buttes

Prairie Rose Seminole, staff of Nueta Hidatsa Sahnish (NHS) College on the MHA Drone Project, provided a live stream of the flights on Facebook on the MHA DOT Drone Project page. Local enthusiasm was noted in public comments during the livestream. In coordination with Lovell Overlie, Public Relations Coordinator/Executive Liaison for the Three Affiliated Tribes, the MHA Drone Team on the ground contributed several interviews to the media during and after flight operations. Prairie Rose Seminole provided streaming of the flights to local media at their request. The links to the media will be shared in a larger report to MHA Nation regarding the proof-of-concept flights. That report will be completed by mid-November 2024 to be provided to MHA Nation.

Thanks to MHA Nation: We wish to thank all the MHA Nation Citizens who helped ensure the success of the proof-of-concept flight event. They all provided many key elements and contributions including (1) MHA Nation Chair Mark Fox, for his support, (2) Robert Hunter Sr. and C. Preston Danks at the Veterans Administration Building in New Town who contributed critical access to their grounds and internet and provided free lunches to the Veterans who traveled as part of the project, (3) Jared Eagle, Shelby Stein, Justice Rabbit Head, Dr. Kathy Eagle, and Dr. Anita Martin with Elbowoods Memorial Health Center who supported these efforts and committed to current and future efforts, (4) Gary Snow with MHA Tourism who provided access and support at the Earth Lodge Villages, (5) Charlie Moran, MHA Drone Advisory Board Member, who offered prayer and critical historical information at the community event, (6) Better B Café for catering the dinner on September 16, 2024, (7) Sheila Many Ribs, fiscal Project management for MNA Nation, (8) Melissa Starr, Staff with Councilman Corey Spotted-Bear's office, (9) Alyssa Starr, Twin Buttes School Board President (10) Marle Baker, offered to store the radar trucks, (11) Dr. Kerry Hartman, PI for NHS College, provided space at the College for the MHA Drone Team and hosted a workforce development meeting, (12) the MHA Nation GIS/Water Resource Staff, and (13) Chad Wright, Marketing Specialists NHS College.

We are humbled and honored to be acknowledged by Jared Eagle following the flight in New Town, ND on September 18, 2024.

Figure 6. MHA Nation Honors MHA Drone Team

Summary: The project is funded by the United States Department of Transportation (SMARTFY22N1P1G38). All expectations and deliverables outlined in the project work plan were achieved in this proof-of-concept flight allowing MHA Nation to report strong outcomes to DOT. MHA Nation is eligible to apply for additional funding from DOT for a Stage 2 effort for $15 million over 36 months. UND staff and faculty on the project anticipate that information gathered during this proof-of-concept flight, which will be reflected in the grant's extensive final report to DOT, will assist in your preparation of a proposal to DOT for additional funding that assures sustainability and scalability for the future. UND, and additional partners, are here to assist in any manner desired by the MHA Nation.

Authors Thomasine Heitkamp, and Amanda Brandt thank all who contributed to this report including Catherine Self and Tyson Harmon (Valkyrie), Prairie Rose Seminole (NHS College), Ryan Walsh (DeTect, Inc.), Greta Silewski (Thales), Kelley Lindish (Airspace Link), and Sheila Hanson (UND-Nistler).

Attachment B

Findings from Drone Listening Sessions

MHA Drone Project

MHA Drone Project: Planning and Protocol Development Report

Summary of Listening Sessions on January 22, 23, and 24, 2024

Submitted Final Report by Thomasine Heitkamp (UND-PI) and Sheila Hanson (UND Needs Assessment Coordinator) in coordination with Prairie Rose Seminole (NHS College), Rylee Dahlen (UND Student), and Landon Johnson (Northern Plains UAS Test Site).

Background:

The MHA Drone Project: Planning and Protocol Development (Project) Department of Transportation funded project in collaboration with the Nueta Hidatsa Sahnish (NHS) College, the University of North Dakota (UND), Three Affiliated Tribes (TAT) GIS Water Resources Department, and the Northern Plains UAS Test Site hosted seven World Cafes (listening) Sessions. A session was offered in each segment of MHA Nation to determine the need for drone use on these Tribal Lands. The goal was to gain a greater understanding of the use of drones to inform the Project's efforts and plans. The sessions were offered from January 22-24, 2024. The sessions were designed to support broad community participation and engagement in determining opportunities, barriers, and needs relative to the use of drones (UAS) at MHA Nation with publicity shared broadly through a flyer designed by the Project team. Below are the dates and locations of listening sessions:

- January 22, 2024 | 9:00 AM - 10:30 AM | Good Road Recovery Conference Room | 1308 Elbowoods Lane | Bismarck, ND
- January 22, 2024 | 2:00 PM - 3:30 PM | Twin Buttes Wellness Center | Twin Buttes, ND
- January 23, 2024 | 9:00 AM - 10:30 AM | Diabetes Wellness Center | 1058 College Drive | New Town, ND
- January 23, 2024 | 11:00 AM - 12:00 PM | Nueta Hidatsa Sahnish (NHS) College | 220 8th Ave E | New Town, ND
- January 23, 2024 | 12:00 PM - 1:30 PM | Parshall, ND & Four Bears, ND | Zoom only
- January 24, 2024 | 9:30 AM - 11:00 AM | New Ralph Wells Memorial Community Center | White Shield, ND
- January 24, 2024 | 2:00 PM - 3:30 PM | Water Chief Hall | Mandaree, ND

Implementation:

Five of the sessions were offered in a hybrid format with project team members in-person and online except for Parshall and Four Bears (online only) and Mandaree (in-person only). Due to the various technology capabilities at the locations, some challenges occurred for participants attending online to hear content. However, dedicated facilitators were on site who kept notes that contributed to the content provided in this report including four DOT project members, with two being citizens of MHA Nation, who facilitated the session and provided content. Nineteen people attended the sessions with only two online. The written notes gathered were analyzed and summarized into three categories 1) strengths and opportunities, 2) challenges and considerations, and 3) summary of outcome. Email addresses of all who participated were gathered, and this report was shared with participants before distribution. With participants before distribution.

The background surrounding the current use of drones at TAT was provided by the GIS/Water Resources staff who had representatives at each session in their role as a sponsor of the listening sessions. The access to $1,966,345.00 in funds from the Department of Transportation (DOT) to support this effort in a timeline of August 2023 to February 2025 was also underscored. The role of MHA Nation as prime in securing this funding from the Department of Transportation (DOT) was described. Conversations were organic with numerous topics raised in the groups involving opportunities, challenges, potential next steps, and ideas for consideration, etc. Primary themes emerging from the sessions are categorized from written notes and described in the next section.

This project is supported by the United States Department of Transportation Grant Number: SMARTFY22N1P1G38

NHS NUETA HIDATSA SAHNISH COLLEGE

NORTHERN PLAINS UAS TEST SITE

UND LEADERS IN ACTION

MHA Drone Project: Planning and Protocol Development Report

Overarching Theme:

The use of drones on these Tribal lands must ensure the protection of the Seven Generations of the future. This includes protecting their energy, water, and natural resources. Acknowledgment of relationships of citizens of MHA was emphasized with one participant stating, "We are all related culturally, socially, or by blood." In terms of the focus of the use case of the Project, it was noted that the use case in the proposal to DOT is the delivery of medications between Twin Buttes and New Town. A statement underscored that when "medication is going to a relative" there will be gratitude and appreciation.

Identified Strengths and Opportunities: 10 Items for Possible Development:

1. Ensuring the use of drones for positive environmental outcomes. For example, drone use for **monitoring pipelines for oil spills** is an opportunity to assist and respond to environmental crises. This will save the time of the people on four-wheel vehicles monitoring the lines. Related to environmental reclamation, drones may be used to **monitor environmental safety**. Further, drones could **monitor road damage, flooding, and continued construction of site progress**. The opportunity to **create three-dimensional topographic maps is easier, safer, and more efficient, as drones can fly over more difficult or dangerous terrains** to ensure environmental safety.

2. Drones as a resource to create a more successful and safe community. Along with the GIS/Water Resources Department, the TAT Fish & Wildlife Division and the Energy Sector use drones. Still, opportunities exist to **expand drone use to emergency services and law enforcement**. Use for **search and rescue** was a theme. Recognition of various locations on tribal lands that may benefit from the use of drones for **surveillance among law enforcement** and others exists. For example, drones could be used to **identify encampments on Tribal lands**.

3. Expand the use of drones to support animal husbandry/agricultural use. UAS/drone use for livestock management was a recurring theme. It costs $2.5K+ to replace a lost animal, which has a huge economic impact on ranchers' livelihoods. Searching for cattle, in general, and finding calves during the calving season, especially during/following a blizzard, were raised as expanded opportunities for the use of drones. Further, GIS applications in agriculture are a continued need (soil coverage and aerial view of grasslands). Other agricultural uses include the elimination of noxious weeds.

4. Expanding the workforce at MHA to improve access to pilots - 107 Certified. Currently GIS/Water Resources at TAT contracts with Frontier Precision[1] in Bismarck for training pilots. Discussions are underway about establishing a certification program at NHS College in partnership with the University of North Dakota - John D. Odegard School of Aerospace Sciences. Interest was expressed in providing support to begin the process of training pilots and creating an interest in aeronautics at the Twin Buttes High School, which is under construction and will have space. Further, opportunities exist for dual training of drone pilots working in search and rescue as emergency responders or working in collaboration with pilots. Beyond pilots, there is interest in the potential demand for UAS-connected workers at MHA particularly to ensure sovereignty of the data gathered to be analyzed and summarized by Tribal members.

[1] https://frontierprecision.com/events/event/1-day-part-107-uas-training-bismarck-nd-25/

This project is supported by the United States Department of Transportation Grant Number: SMARTFY22N1P1G38

MHA Drone Project: Planning and Protocol Development Report

Identified Strengths and Opportunities: 10 Items for Possible Development:

5. Opportunities exist to expand business-to-business and government-to-government partnerships by establishing a process focused on sovereignty. This includes ensuring data sovereignty as the data drives the effort and guides future decision-making for the Tribe. Given that six counties border MHA Nation, several opportunities exist to partner however, this also creates challenges. The project creates opportunities for industry and higher education to work collaboratively with MHA Nation. **A need for a Tribal Resolution on the ethics and safety of drone use on Tribal lands** and consideration of a corridor for flight paths was discussed.

6. Building on the current and potential capacity of the GIS/Water Resources Office was a theme. A strength is their existing capacity, including expertise in GIS and drone pilots and GIS data specific to these Tribal lands. Collecting GIS data potentially serves multiple purposes in developing efficiencies in the GIS office as they continue to gain momentum in their work. Their drones are equipped with infrared or thermal imaging to analyze heat patterns from the air. The office also secures external grant dollars as well as their work with the MHA Drones Project: Planning and Protocol Development team. For example, the elimination of the noxious weed program was funded by the US Department of Interior through Indian Health Services with approval from the Tribal Council through resolution number 23-017-FWF to secure and access this funding with efforts beginning in the spring and summer of 2024.

7. Respecting Cultural and Sacred Spaces and Tribal Events (e.g., Pow Wows). Protecting cultural spaces and Native Site Information locations and monitoring unidentified drone activity in the area was underscored by many participating in the sessions. Using drones while setting exclusionary areas and boundaries to protect sacred spaces was identified as necessary and possible. Of note, drones flying recreationally during powwows were expressed as a concern.

8. Addressing food scarcity. Both quantity and quality of food are concerns for MHA Nation. For example, people living in Twin Buttes travel to Beulah (38 miles) to shop for food that is not in a convenience store. On the day of the meeting in Twin Buttes, that road was covered in snow and ice with an hour's drive one-way. An impactful statement made was that "There should not be a hungry household on tribal lands." MHA Greenhouse[2] and Buffalo[3] Projects, and potential future use cases tied to both of those endeavors, are opportunities. Availability of fresh fruits and vegetables and other healthy food options is a concern with discussions on the role of drones in enabling the delivery of healthy foods. Though pharmacy deliveries were also raised as a possibility, food delivery was a strong theme.

9. Youth Involvement and Future Workforce. There was a strong theme across groups involving children and grandchildren in drone efforts with implications for a future workforce. Of note was an appreciation for the collaboration of the DOT Project staff and GIS/Water Resources in offering a Drone Camp in New Town at the Earth Lodge Village in October 2023. Many ideas emerged for youth. Outreach to the High Schools located at the various segments was underscored, particularly to support their role in workforce development. It was noted that drone racing is fun and a great way to include kids. Visiting the high schools to conduct educational outreach was suggested. Perhaps accessing the Drone Cage that UND purchased for MHA as a resource to engage students in the proper use of drones and establish a drone team for High Schools. Though UAS is the topic right now, developing autonomous systems in general, both air and ground-based is possible.

[2] https://www.mhanation.com/news/2021/4/19/mha-nation-breaks-ground-on-greenhouse-project
[3] https://echo-maker.com/the-mha-buffalo-project/

This project is supported by the United States Department of Transportation Grant Number: SMARTFY22N1P1G38

MHA Drone Project: Planning and Protocol Development Report

Identified Strengths and Opportunities: 10 Items for Possible Development:

10. Adopting emerging technologies for drone use was also discussed. This will include the capacity to remain innovative in developing the use of drone-in-a-box technology, enhancement of 3D printing capabilities, increasing payload and battery capacity of drones, and improvements in remote identification. The goal could be the development of a QR code that all could have access to that will ensure safety and support for travel. The future holds promise for increased capacity to use drones.

Identifying Challenges and Considerations:

1. Expanding public education to ensure the public is engaged and has input on this effort. Overall, there is both interest and hesitation about drones that generate conversation and questions which call for the need for more public education. Expanding community education would facilitate the six segments working together to expand the use of drones. **Building a drone program, setting up a satellite office for flight recording, and offering a Drone 101 course for the public** were discussed for consideration. The adults we spoke with had never flown a drone. Interest exists in finding a way to engage more hands-on opportunities, so Tribal Members can experience flying a drone in a safe environment that ensures addressing privacy concerns.

2. Expanding use to enhance public safety is necessary. The potential use of drones to add to public safety was a theme as discussed above. However, the importance of **privacy in the use of drones was underscored in the public safety comments.** Privacy appeared as a subtheme within other general themes like public safety. There were stories of instances of attempts to "shoot down" drones already happening. Tribal members may be inclined to protect themselves from unknown drones on their property. The question was raised regarding the use of drones to prevent crime. At present, droning related to public safety is described as "a reactive tool, not a proactive tool."

3. Serving remote and rural Tribal areas can be difficult. There are many needs emanating from the rural challenges of the six segments, and the six counties create challenges. For example, some rural roads are not all named; they are isolated, and **sometimes there are no 911 addresses.** At times, individuals and families are stormed due to a blizzard for multiple days which is most problematic for running out of medication and oxygen. Also, access to dialysis during power outages is a concern. The needs of rural tribal members, due to their isolation, need to be made known to inform policymakers. A road map for rural delivery could help.

4. Adaptations are necessary for inclement weather: Cold temperatures and high winds were often topics of conversation. The extremes of -50 degrees Fahrenheit and 75 mph winds were raised. MHA land does fall in a geographical area with "good" and "excellent" wind as a resource[4]. However, that is challenging for drones, so for implementation, drone specifications need to consider local weather conditions.

5. Ensuring privacy and security is paramount. Security challenges and identifying which units or departments will protect cultural resources in people's homes and on their lands were discussed. Education regarding the laws around flying over air space and people's homes or being a nuisance and potential concerns from individual landowners (e.g., water intake on private lands) about the use of drones by the tribe as well as by industry. There is a need to be compliant with airspace laws and be respectful of landowners.

[4] https://windexchange.energy.gov/maps-data/78

This project is supported by the United States Department of Transportation Grant Number: SMARTFY22N1P1G38

MHA Drone Project: Planning and Protocol Development Report

Identifying Challenges and Considerations:

6. Tribal/Industry relationships and privacy issues vs environmental issues were raised. Using UAS to monitor companies' wells/construction/pipeline/industrial sites raises both privacy issues and environmental issues. Conflicts like oil companies opposing rules and regulations, the tribe not having enforcement or capacity to enforce, see or detect aircraft in Tribal air space etc. The importance of keeping a business-friendly culture but also adhering to rules and resolutions from the Tribe was emphasized. Participants want to protect Tribal lands and keep companies honest while still facilitating a healthy business environment.
Discussion occurred regarding balancing business interests with accountability and adherence to laws. Continued discussion about environmental surveillance when dealing with companies with a common theme of environmental protection. A suggestion was provided regarding promoting Mandaree as the "drone hub" due to its ample land and the presence of oil companies. This would expand capacity to ensure that oil companies comply with regulations on dumping and use of waste sites.

7. Airspace, sovereignty, and policy development need to be understood broadly to ensure safety. Formulating drone usage laws on these Tribal lands was mentioned as an opportunity. Noting the limited staffing in the GIS team despite heavy drone use. Concerns about this being "the wild west" in the use of drones were expressed. Questions were raised about airspace use and policies.

8. Involving Tribal leadership in the future of drone use. A need exists for Tribal Council involvement and buy-in. There was a suggestion to meet with segment leaders directly. Tribal members want more information regarding the use of drones and this project. There was also a suggestion that project members get involved in more regular community gatherings.

9. Drone knowledge, technology capabilities, and challenges exist. Participants were curious about the types of drones, sizes, and how they are currently used. Access to large payloads on the drone is a challenge. Wind and weather limitations as previously stated were a potential limitation raised. Noise from drones is both an environmental concern and a potential nuisance. Flight safety is a concern and curiosity around seeing and detecting aircraft in the airspace.

10. Medication delivery is a need but not paramount. Of note, medication delivery is a priority to pursue in the aims of the DOT fundings from the listening sessions, it was not often raised by community participants as a priority. This theme primarily emerged, however, related to winter weather. Citizens have mentioned the delivery of medications from veterinarians for animals as a possible use case as well.

This project is supported by the United States Department of Transportation Grant Number: SMARTFY22N1P1G38

MHA Drone Project

MHA Drone Project: Planning and Protocol Development Report

Summary of Outcome:

The use cases for drones that were identified in the listening sessions include:

- **identifying Tribal artifacts,**
- **protecting Native Site Information,**
- **conducting environmental surveillance/environmental protection (ex. monitoring drill pads) and pipelines,**
- **continuation of efforts to monitor construction sites,**
- **expanding use of emergency services and use among law enforcement,**
- **continuing all efforts to ensure safe water access,**
- **delivering bison from the Bison Farm to citizens,**
- **delivering fruits and vegetables from the Native Green Grow project**[5]
- **checking fences,**
- **general animal husbandry (counting cattle),**
- **measuring soil coverage and grasslands,**
- **expanding industry and government-to-government relationships.**

Building internal capacity and understanding was critical to the DOT-funded project. The listening sessions were not only an opportunity for the project team to listen and learn, but they were also an opportunity for GIS staff to do outreach and share their current capabilities with the community. Further, it was an opportunity for the project team, GIS Office, and community members to interact about building capacity. An opportunity exists to have a radar system that will allow for the Tribe capacity to monitor launch and landing sites within the reservation borders. It is anticipated that the Project will assist in this endeavor. Sophisticated GIS mapping of the reservation is another opportunity that remains. Finally, there is an opportunity for future funding to build infrastructure as the DOT funding has a Stage 2 opportunity for funds. This document can guide future efforts and be organic as future needs arise and the technology of drone use grows.

The team wishes to thank all who participated in these sessions and provided such valuable feedback.

The DOT has provided liaisons from the Federal Aviation Administration to offer guidance on safety and guidance in the use case identified in the project. Monthly meetings are occurring with partners on the project.

[5] https://www.nativegreengrow.com/

This project is supported by the United States Department of Transportation Grant Number: SMARTFY22N1P1G38

Attachment C

MHA Drone Project Survey Summary

Assessment of Drone Potential and Barriers for MHA Nation: Opinion Survey
January 2025
MHA Drone Project: Planning and Protocol Development
DOT SMART Grant FY22N1P1G3

The MHA Drone Assessment/Use Case Team conducted a formal opinion survey at MHA Nation in December 2024 and January 2025. The purpose of the opinion survey was to determine community perceptions and needs for the future use of drones by enrolled Tribal members of MHA Nation. The MHA Drone Advisory Board provided guidance and support in a review of survey questions and the recruitment of participants to complete the survey.

Survey questions were informed by perceptions gleaned in the Listening Session conducted in January 2024 and a scoping literature review of the feasibility and acceptability of UAS, particularly for medical delivery use cases. The Assessment/Use Case team survey was placed in Qualtrics for ease of online completion. UND's IRB# IRB0006181 approved the study with a supporting reliance agreement from NHS College. This eSort was also approved by the MHA Nation Tribal Council Sub-Committee of Health & Human Resources on May 2, 2024. Survey participants were provided with a consent form in Qualtrics at the beginning of the survey to review before voluntarily proceeding with participation.

As of January 16, 2025, 60 individuals have responded to the survey[1]. To date, geographic representation was distributed across the segments including North (New Town; 46.7%), South (Twin Buttes; 26.7%), East; (White Shield; 21.7%), West (Mandaree; 21.7%), Northeast (Parshall; 28.3%), Four Bears (21.7%), Bismarck (15%), and Fargo (1.7%). Age ranges of participants were distributed as follows: 18-25 (13.2%), 30-39 (17.0%), 40-49 (22.6%), 50-59 (26.4%), 60-69 (15.1%), and 70+ (5.7%). The percentages in this survey summary are based on the responses of participants who completed the question.

The survey included both closed-ended and open-ended questions to gather opinions about enrolled Tribal members related to drone usage at MHA Nation particularly considering medical uses. Below is a review of the survey findings:

Responses to closed-ended questions:

The survey began by asking participants about their level of familiarity with the MHA Nation Drone Project. Participants responded about their familiarity as follows: "very familiar" (6.7%), "somewhat familiar" (36.7%), "Not very familiar" (23.3%), and "never heard of it

[1] If a no-cost extension is granted, data collection will continue into Spring 2025 to provide more enrolled Tribal members with an opportunity to participate, particularly Elders.

before now" (13.3%). **36% of the respondents have little to no familiarity with drones, underscoring the need for more public education**.

Next, participants were asked about their knowledge of drones. More than half (55.0%) of respondents indicated that they were "somewhat knowledgeable", while the remaining half said that they were very knowledgeable (8.3%), gathering knowledge (18.3%), and not very knowledgeable (13.3%) These **findings indicate a range of knowledge about drones with a need to provide training about drone capacity and functioning to a specific audience.**

Participants were asked about their current position on the use of drones for various use cases at MHA Nation and they responded as follows: strongly support (61%), somewhat support (25.9%), unsure (11.1%), other (1.9)%. The latter "other" added a comment that, "*I'm in support of drones doing tasks that'd be infeasible for the normal man to operate. I have my own questions about security outside of medical use*."

Focusing on potential use cases, participants were then asked about their level of support for the following:
Rescue work (e.g, searching for persons in distress): very positive (68.5%), positive (24.1%), and neutral (7.4%).
Construction work (e.g. for surveying plots and construction): very positive (59.3%), positive (29.6%), and neutral (11.1%).
Agriculture (e.g., for monitoring animals and crops in fields): very positive (57.4%), positive (29.6%), and neutral (13.0%).
Delivery of healthy food: very positive (55.6%), positive (33.3%), neutral (9.3%), negative (1.9%).
Identifying and protecting Tribal artifacts, sacred sites: very positive (55.6%), positive (31.5%), neutral (9.3%), negative (1.9%), and very negative (1.9%).
Measuring soil coverage in grasslands: very positive (55.6%), positive (33.3%), and neutral (13.0%).
Police work (e.g., for traffic monitoring and monitoring and management of accident sites): very positive (50.0%), positive (29.6%), neutral (14.8%), negative (3.7%), very negative (1.9%).

Of note, is the commitment to the use of drones for lifesaving measures.

Next, participants were asked about their level of support for the use of drones for the following use cases in the health field:
Medicine delivery: very positive (61.1%), positive (31.5%), neutral (5.6%), and negative (1.9%).
Blood sample delivery: very positive (55.6%), positive (27.8%), neutral (14.8%), and very negative (1.9%).
Delivery of defibrillator equipment to restart heart: very positive (63.0%), positive (29.6%), and neutral (3.7%), and negative (3.7%).

Medication delivery to reverse drug overdose: very positive (61.1%), positive (25.9%), neutral (9.3%), negative (1.9%), very negative (1.9%).
Vaccine delivery: very positive (59.3%), positive (24.1%), neutral (13.0%), and very negative (%).

Then, participants were asked about various delivery scenarios. This question is important given that only one bridge connects six segments at MHA Nation. Participants with their level of support as follows:
Delivery between segments at MHA Nation: very positive (61.1%), positive (27.8%), neutral (9.3%), and negative (1.9%).
Delivery between MHA Nation and nearby locations (e.g., Minot and Bismarck): very positive (50.0%), positive (31.5%), neutral (13.0%), negative (3.7%), and very negative (1.9%).
Delivery to patient homes: very positive (50.0%), positive (27.8%), neutral (16.7%), and negative (5.6%).

This underscores the general commitment to the use of drones to serve needs in this remote and rural area.

Responses to Open-Ended Questions:

Participants were asked to share any comments they had about the need for drones at MHA Nation. This open-ended section of the survey is summarized in the following section using a thematic analysis.

Summary Statements:

"Drone technology and operations can greatly increase the efficiency of the MHA Nation emergency services and programs offered to the Fort Berthold Indian Reservation and the surrounding area".

"This could be life-saving. Valuable services. I hope our Tribe moves forward with the project. Thank you"

"*This could be "just another form of controlling the masses…. ON SOVEREIGN lands*"

In their comment about the need for drones at MHA Nation. A summary is provided below by theme in categories.

The participants noted a host of uses of drones to serve the citizens of MHA Nation including the **primary use case of delivery of medicine and medical supplies**.

- Several respondents mentioned the use of drones for **emergency services**. A participant stated, "*Emergency Services across the reservation support this*

initiative!" A focus on **lifesaving measures** was noted in a participant stating "*I am pleased that the MHA nation is choosing to utilize drones for lifesaving emergency services. Drone technology and operations can greatly increase the* ***efficiency of the MHA Nation emergency services*** *and programs offered to the Fort Berthold Indian Reservation and surrounding area."*

- Another participant suggested using drones for surveillance to **ensure oil company "*wastewater is not being dumped*** *on tribal land or in tribal shore waters.*"
- Other participants underscored the use of drones for **medical delivery** with a participant stating "*Drones can deliver* ***critical supplies like defibrillators, blood products, and emergency medications*** *to the site of an incident. This would be very beneficial for our communities."* Another participant stated that drones would expand safer access to healthcare resources.
- **Package delivery** was mentioned via battery-powered drones with the benefit of improving efficiency. "*I've read and researched Drones' size and design make them agile, allowing them to reach remote areas which couldn't or wouldn't be accessible with standard delivery vehicles.*"

However, there was caution expressed for the MHA Drone team relative to the additional eSort required to support community engagement. This includes the need for more information about the use of drones with several participants stating they needed more **information like the findings in the closed-ended questions.** Underscored was the need for **more public education**, **additional collaboration with current entities on Tribal lands using drones**, **transparency around costs, and understanding and adherence to regulation and ensuring safety.** Below are sample quotes in categories:

- More **public education and training**: "*We need more public education about drones. Drone usage and information should be more explained to the people/community for all 6 segments. In-person presentations or video promotion would help the people be more informed and possibly feel more comfortable.*"
- Additional **collaborations and engagement with those using drones**: "*The project needs to make sure they are working with Tribal Departments/programs already utilizing drones daily.*"
- More **training and education on the use of drones**: "*The need to have training for individuals, communities, workers-law enforcement, animal control, fire management, and all the other programs and organizations that need to be trained.*"
- Need for **transparency in cost**: "*The need" for drones will only cost more in the tech and services provided for said drones. This will only dig into what budget the tribe has and if it were to take precedence over immediate actions available in each segment, in times of distress and such setbacks by drones, would only prove a waste of money."*
- **Safety and adherence to regulations**: "*Need guidelines for use, safety, rules, etc. will be needed for Fort Berthold and some MOA with state of ND/counties.*"

- **Safety and protection**: "*My only concerns are aimed at the safety and protection of any medical delivery services that the drones are anticipated to use. Also, drones are intended to oversee any location that has been chosen.*"

The need for more **engagement of Tribal elders** was underscored in this statement. "*Most elders wouldn't be up in arms for a solution that'll only prove a problem past their time. Build from the ground up before putting so much money at a time*." This has been a request of the MHA Drone Advisory Board noting the need for the MHA Drone Team to attend Tribal Elder events and provide presentations.

Comments about **ensuring privacy and data management** in the use of drones were significant. **A warning about privacy concerns**: "*There are individuals and families on the reservation that may not be comfortable with their land/area being recorded or monitored*." Another salient quote on **safety and transparency** "*There needs to be accountability, transparency, and protocols that ensure our tribal members' privacy and safety*." Trust **personnel to use this technology for good** and trust in our law enforcement not to use this technology for nefarious reasons.

Stakeholder Feedback:

Additional **community feedback was secured from key stakeholders currently using drones or who anticipate future use. Information was secured from MHA Emergency Operations/Fire Management, Elbowoods Memorial Health Center, MHA Law Enforcement, MHA Drug Enforcement, and MHA Water Resources/GIS, in a panel discussion on July 18, 2024**. All partners and the MHA Drone Advisory Board were present for this discussion at NHS College.

Use case suggestions:

Regarding medical needs, there is a **need for a more rapid process to transport laboratory work to secure more timely analysi**s. For delivery of **medication**, Twin Buttes has a pharmacist, and the other segments have pharmacy technicians, many medications need to go through New Town.

Other uses of drones suggested including ensuring **soil health, vegetation health, elimination of noxious weeds, and identifying grave sites after the flooding of the reservoir**. The importance of identifying culturally significant sites was underscored. Additionally **monitoring the energy industry was a need that drones could address**. An additional need for **construction management was mentioned. Game and Fish** (who use drones) could advance work on stocking and range unit herd count. A thermal drone could help.

The need to use drones for **fire management, with wildfires, grassfires, and forest fires was underscored**. Relative to context, about 30 coal seam fires are burning, which creates a greater risk for fires with several burning since 2012. Of note, there is more vegetation this year, when it dries up, there's a fire risk.

Also, accessing drones to assist people who are homebound following a blizzard was a need including being able to **deliver medications** to the homebound.

The need to **use drones for search & rescue, crime, and accident scenes**. There is interest in various technologies using drones such as loudspeaker attachments, which fly at night without lights. Emergency Operations uses a small drone and works with Law Enforcement, GIS, and Game & Fish for search and rescue. They are interested in new technology and capabilities of drones **like underwater body recovery, surveillance, and radio communication, mobile cell site** with Verizon, dropping snipers "Squishy Robots"

Drones are being used to **locate subjects in a home and apprehend them**. They are already used for surveillance.

A caution in this discussion was the need to **plan around the rough terrain on MHA lands in installing infrastructure**. For example, emergency responders can't get equipment in some places because the terrain is so steep. There are also mapping issues to address. The area of Hwy 23 in the Badlands area has very rough terrain. Having accurate maps will help with planning. Finally, and this issue has come up on many occasions in the work of the MHA Drone Team, is the need for regulations that are specific to the Tribe in the use of drones.

Attachment D

Tribal Needs for Stage 2 Funding Assessment

Tribal Needs for Stage 2 Funding Assessment

NHS College

- Current Use of Drones: NHS College uses drones as an academic recruiting tool to raise interest among TAT youths. They also use them for lessons in drone usage at special area management plans including the Drone Camps. They would like to use a drone for air quality sampling around flares.
- Equipment Needs: A larger drone with air sampling capabilities. Samplers and processors.
- Additional Comments: Awaiting directions from the TAT Business Council.

Health Administration

- Expanding Use of Drones: Medical Delivery to outlying communities outside of Elbowoods.
- Equipment Needs: Not applicable for facility.
- Workforce Needs: Focus on sustainability, security, and maintenance.
- Processes to Consider: Yes — approvals for transport, address HIPAA regulations, and ensure patient confidentiality.

Four Bears Segment Offices

- Current Use of Drones: Tourism, Activities, Fourth of July, Employee Days, Promotions of New Economic Development, Nature and Landscapes.
- Expanding Use of Drones: Traffic and Congestion Areas within the Four Bears Casino & Lodge, Tribal Headquarters, Interpretive Center, all on North Dakota Highways 23 and North Dakota 22 in con- junction with Bureau of Indian Affairs Route 2 and 27; Clarks Creek Route, Thunder Butte Route, and the Waste Water Entrance on North Dakota 23.
- Equipment Needs: Necessary support equipment and transportation of such equipment.
- Workforce Needs: One or two employees per segment of the Fort Berthold Reservation or a combination of staff working across segments (Four Bears, Mandaree, Twin Buttes, White Shield, Par- shall, and New Town).
- Additional Comments: Emphasized the importance of public safety in areas such as:
    - Traffic within the Williston Basin Bakken Oil & Gas Development
    - Tourism and workforce transit
    - Lake Sakakawea safety (boating and fishing tourism industry)

In follow-up the PI at UND reached out to the MHA Director of Tourism who indicated drone/UAS need at large events where drones could be used to manage traffic might include the New Town/Little Shell, Mandaree, Parshall, Four Bear, Twin Buttes, and White Shield/Arikara Celebrations (powwow and rodeo events) during the summer months each year. For example, the Little Schell Celebration draws up to 1,000 people with vendors, drummers, contestants, and guests. Other events include up to 18,000 people at the concerts at the 4 Bears Casino, and the large North Dakota Governor's Walley Cup https://www.ndgovernorscup.com/. The annual New Town Chamber Car and Motorcycle show also attracts a large audience. These are events that could use drones.

Attachment E

MHA Advisory Board Members

MHA Drone Camp Advisory Board Members

Marie Baker
Fire Management Officer, TAT

Dr. Twyla Baker
President, Nueta Hidatsa Sahnish College

Morgan Berquist
Science Advisor, MHA Nation

Jared Eagle
Director, Health Administration, MHA Nation

Dewey Hosie
Deputy Director, MHA Nation

Blanche Hunts Along
Events Coordinator, MHA Nation

Dr. Lisa Lone Fight
Senior Science Advisor, MHA Nation

Sheila Many Ribs
Director, Planning and Grants, MHA Nation

Marcus Levings
Director, Public Works, MHA Nation

Charlie Moran
American Indian Language and Cultural Instructor, NHS College

Tanya Sand-Driver
GIS/Water Resources Director, MHA Nation

Emily Sitting Bear
Director, Emergency Operations, MHA Nation

Sheldon Standish, J.D.
Legal Advocate, MHA Nation

Elizabeth Yellow Bird
Court Administrator, MHA Nation

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NHS NUETA HIDATSA SAHNISH COLLEGE

NORTHERN PLAINS UAS TEST SITE

UND LEADERS IN ACTION

Attachment F

Emergency Response Training

The University of North Dakota in collaboration with Mississippi State University

Extension and their Alliance for System Safety of UAS through Research Excellence (ASSURE)

Is offering **FREE** FEMA Training on Uncrewed Aircraft Systems (UAS)/drones and data management to First and Emergency Responders serving MHA Nation

Training is Available at **NO COST** and includes a **$300.00 stipend** for any cost related to attendance.

When:

Tuesday, April 22, 2025
UAS Flight Operations

Wednesday, April 23, 2025
UAS Data Analytics

Where:

Computer Lab
at Nueta Hidatsa Sahnish College
301 College Drive
New Town, ND, 78763

Training Content:

April 22, 2025: UAS Flight Operations for Emergency Response (AWR-422) is a 1-day, in-person course that will prepare first responders with technical resources, knowledge, and experience to deploy UAS for a variety of emergency response scenarios. Content will cover rules and regulations, mission planning, airspace coordination, platform and sensor selection, risk assessment and mitigation, flight operations, data collection, and metadata retention. Register to UAS Flight Operations

April 23, 2025: UAS Data Analytics is a 1-day, in-person, instructor-led course on how to effectively organize, generate, analyze, and rapidly disseminate geospatial data from UAS imagery. This course will train participants on how to transform UAS imagery, video, and other data into products that can be used to support decision-making, damage assessment, and other mission-critical tasks for emergency response. Register to UAS Data Analytics

The session can host only 12 participants so register early. We hope to have all of the MHA Nation Segments represented. This training is being offered in collaboration with The MHA Drone Project.

Attachment G

MHA ND DOT SMART Grant ConOps

MHA ND DOT SMART GRANT CONOPS

Matador UAS Logistics*, LLC*
dba Valkyrie UAS Solutions

cscelf@valkyrie-uas.co

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Definitions

ADS-B	Automatic Dependent Surveillance-Broadcast
ASL	Airspace Link
ASOS	Automated Surface Observing System
ASTM	American Society for Testing and Materials
ATC	Air Traffic Control
AWOS	Automated Weather Observing System
BVLOS	Beyond Visual Line of Sight
COA	Certification of Operation
CONOPS	Concept of Operations
DAA	Detect and Avoid
DoT	Department of Transportation
DBA	Doing Business As
Electronic Conspicuity	Refers to the ability of aircraft to electronically communicate their position, velocity, and other relevant information to nearby objects and traffic control systems. This is typically done via various types of transponders or broadcasting devices that send out signals that can be picked up by other vehicles or monitoring systems. The main aim of electronic conspicuity is to increase situational awareness among operators and air traffic controllers, thereby reducing the risk of collisions and other incidents.
EO	Electro-Optical
ETR	Estimated Time to Return
FAA	Federal Aviation Administration
FC	Virtual link between devices using Fiber Channel
GCS	Ground Control Station
GNSS	Global Navigation Satellite System
HAZMAT	Hazardous Materials
IMEI	International Mobile Equipment Identity
IR	Infra-Red
LLC	Limited Liability Company
LMS	Learning Management System
MAC	Mid Air Collision
MFA	Multifactor Authentication
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
MTBF	Mean Time Before Failure
NMAC	Near Mid Air Collision
NOTAM	Notice to Air Missions

OMS	Operations Management System
PPD	Primary Piloting Device
RPA(S)	Remotely Piloted Aircraft (System)
RPS	Remote Pilot Station
UAS OPERATOR	Remote Pilot in Command
RTH	Return to Home
SAR	Synthetic Aperture Radar
SatCom	Satellite Communications
SBD	Short Burst Data
SGI	Special Governmental Interest
SMART	Strengthening Mobility and Revolutionizing Transportation
SORA	Specific Operations Risk Assessment
SPD	Secondary Piloting Device
TFR	Temporary Flight Restriction
TTUHSC	Texas Tech University Health Sciences Center
UAS	Uncrewed Aerial System
UND	University of North Dakota
USC	United States Code
UTM	Uncrewed Traffic Management
VO	Visual Observer
VMC	Visual Meteorological Condi6ons
VTOL	Vertical Takeoff and Landing
WC	Well clear
WiFi	Wireless Fidelity
WX	Weather

Overview

The MHA Nation, consisting of the Mandan, Hidatsa, and Arikara Nation located on the Fort Berthold Indian Reservation, has been awarded a SMART DoT Grant Phase 1 to develop a plan for and visually demonstrate under CFR Part 107 the use of small Uncrewed Aerial Systems (UASs) aka "drones" to serve historically underserved populations with better access to medical care and equipment such as diagnostics. The Reservation consists of 17,418 enrolled members on 988,000 acres located on the Missouri River in extremely rural North Dakota. The MHA Nation is currently working with Federal Aviation Administration (FAA), the University of North Dakota (UND), the Tribal Counsel, and UAS Industry leaders in establishing Beyond Visual Line of Sight (BVLOS) capabilities to plan, develop, and deploy small UASs to provide better, more timely access to critical medical supplies across areas with surface transportation deficiencies.

Figure 1 - MHA Na/on in North Dakota

Matador UAS Logistics, LLC (aka Valkyrie UAS Solutions – also referred to as Valkyrie) supports "Life from Above" through Uncrewed Aircraft Systems (UAS) operations and services. The Mission centers on strengthening communities, improving patient outcomes, and creating opportunities to help overcome inequities across rural America through advanced UAS and autonomous transportation solutions. A key use case for the MHA Nation is moving medical related items such as lab samples, blood products, lightweight medical supplies, diagnostics, and eventually vaccinations to support medical needs. Valkyrie is powered by a strategic partnership with Swoop Aero. Valkyrie is part of the Matador UAS Consortium which is a group of 45+ industry, academia, and government agencies with similar mindsets working together to further critical use cases in rural communities.

Valkyrie is the awarded UAS Operator for such use cases.

The Swoop Aero Kite B UAS pallor authorized by a previous international agreement to operate within the National Airspace System (NAS) will be utilized for these medical missions. Swoop Aero is currently operating Kite B aircraft across six (6) continents supporting the same type of missions. Their drone networks continue to directly improve the quality of life of millions of people in Albania, Malawi, Singapore, Ethiopia, the Democratic Republic of Congo, Mozambique, Eswatini, and Australia. Swoop Aero is an Australian company and is where the aircraft are manufactured by Kookaburra Aerospace Pty Ltd. Carbon fiber parts come from Tucson, AZ, and the Lithium-Ion batteries come from China.

Request

Valkyrie is requesting Part 107 relief from the following:

- 107.31 Visual Line of Sight Opera6ons
- 107.33 Visual Observers

The intended daylight visual flight route from New Town, ND to Twin Budes, ND is 34 miles over the Fort Berthold Reservation. The entire route is in Class G airspace, within the boundaries of the Reservation, and within the state of North Dakota. There are oil and gas helicopters and crop dusters that operate in this airspace. Pre-coordination has begun and will continue with these groups to deconflict airspace. These entities are also on the notification list for flight operations. No additional regulatory relief or authorization is requested to include TFR, COA, SGI, waiver, or ADSB-Out, however, Valkyrie intends to perform night operations and is adequately equipped with proper aeronautical lighting to satisfy requirements. This route has been approved by the MHA Tribal Nation.

Figure 2 – MHA Nation Approved Flight Route

Valkyrie does not intend to operate directly over people and will do everything possible to avoid operations over people. Eleven (11) roads must be crossed throughout the route, therefore, communications will be provided to the communities, and they will be notified of each flight operation so they are clear of the operations. There will be a Visual Observer (VO) at the launch and landing locations which will communicate with the Remote Pilot in Command (UAS Operator) to avoid operations over people.

Operations will be conducted within the certified aircraft operating limitations within Visual Meteorological Conditions (VMC). No night flight operations are being requested at this time.

This waiver is in direct support of the MHA Nation's Phase I SMART Grant award. This is the "crawl" phase of the flight operations that are planned to commence in September 2024. Phase I will include a series of 1-3 checkout flights followed by the official "protocol" flight over the course of 2 weeks utilizing 2 UASs. Data collected from these flight operations will directly support the MHA Nation's Phase II application. We are requesting the waiver be valid for 6-9 months to accommodate contingency flights should weather limit our planned flights. Initial flights are planned for September

2024 consisting of 1-2 checkout flights followed by 3-5 protocol flights.

There will be (an) additional waiver(s) requested for Phase II which will be the “walk” phase. These are currently planned for 2025-2026 upon Grant Award.

Valkyrie is planning on obtaining a P135 certification for long-term operations. This will be our “run” phase. These flights are in preparation for the P135 submission.

Missions

There is one (1) initial use case that will be conducted to provide the most impact on the MHA Nation’s rural communities:

- Aeromedical Logistics - Rural Healthcare (no materials classified as HAZMAT per 49 USC part 178 will be carried onboard)
  - Non-cold chain vaccinations
  - Incidental medical goods and diagnostic tools
  - Lab samples
  - Blood products

Aeromedical Logistics – Rural Healthcare

Matador UAS Logistics, LLC dba Valkyrie UAS Solutions will provide non-HAZMAT vaccinations, diagnostic tools, and lightweight medical supplies between the following rural clinics: Elbowoods Clinic and Twin Budes Clinic.

Swoop Aero's core business is aeromedical logistics. With an exemplary medical commodity delivery track and safety record, Swoop Aero operates an air logistics service across six (6) continents and have transported more than 50,000 vaccines across Africa.

Matador UAS Logistics, LLC (Valkyrie) will leverage this and other existing, successful Concepts of Operations (CONOPS) to improve rural healthcare for the underserved communities of the MHA Nation. This operation will remain within the US, operated by Matador UAS Logistics, LLC, and no materials classified as HAZMAT per 49 USC part 178 will be carried onboard.

The Fort Berthold Reservation lies within a rural and rugged landscape, covered by heavy oil production, rough roads, and unforgiving weather conditions. The MHA Nation has a longstanding relationship with the University of North Dakota (UND), including working together to explore use of UASs to improve health outcomes, especially with the transport of medical samples and medicines between Twin Budes and New Town, North Dakota. While the most pressing need is for rapid blood delivery, other use cases such as vaccines and other pharmaceutical transportation remain a priority.

Flight Operations

The Concept of Operation (CONOPS) is intended to provide aeromedical logistics and lifesaving operations with the same aircraft on the same network as existing Swoop Aero supported

operations. All operations will be conducted with one (1) US Part 107 trained and licensed citizen to one (1) Swoop Aero Kite B aircraft/platform. There will be a second Swoop Aero aircraft to be used as a spare should the need arise. Flight plans will not be filed with Air Traffic Control (ATC), however, a permanent Notice to Air Missions (NOTAM) will be published for the length of the waiver authorization. There should be no ATC liaisons required.

The three key components of this Concept of Operations that support the delivery of this integrated service:

- The Remotely Piloted Aircraft
- The Command, Control, and Communications
- The Platform

The Remote Pilot Station (RPS, also known as Ground Control Station or GCS) is a cloud application that will be accessed via a device that is connected to WiFi by the Remote Pilot in Command (UAS Operator) from the Ground Operations Center which will likely be located at the Elbowoods Clinic; specific location to be confirmed during the site survey in July 2024. The RPS/GCS is the primary interface for the Remotely Piloted Aircraft (RPA) monitoring and command. The RPA features fully encrypted hardware. The encryption is added at the point of manufacture in Australia developed by Swoop Aero. Only persons within Swoop and trusted 3rd parties have access to the encryption code(s). The RPS/GCS is accessible from any approved/authorized device connected to the Internet and is protected via multilayered security protocols to prevent unauthorized access. The Remote Pilot Station (RPS) cannot be operated unless connected to the Swoop Aero Platform (the Platform) via an encrypted link.

Access to the Platform and associated portals is secured to authorized staff via multifactor authentication (MFA) login. This allows the aircraft to be flown remotely from anywhere in the world, however, these operations will be executed from New Town, ND.

Per Section 1.2.2 in the *Swoop Aero Kite-B - Remotely Piloted Aircraft: Flight Manual*, the RPA may only be released for a flight on authorized flight routes by designated personnel via the operations portal on the Platform. Swoop Aero retains full, centralized control of this platform, preventing unauthorized release for flight or flight on unapproved flight routes. Flight route construction is governed by aviation regulatory processes and managed centrally by designated staff. Executing an unapproved flight route on the RPA is impossible, and internal company procedures govern the approval of flight routes.

Once released for flight, approved staff use the RPS to execute flights. The RPS is accessible only by approved persons, and the RPA avionics will not accept a command from any source other than the RPS. The RPA will not send messages without an encrypted TLS handshake. The RPA and RPS each have an X.509 certificate and a public and private key used to encrypt and decrypt communications.

The combination of the RPA's avionics architecture and software controls means that in an event where an RPA is actively misappropriated (for example, stolen), it is impossible to execute any flight without centralized release for flight and execution of an approved flight route.

Additionally, the onboard flight system architecture does not allow the RPA to operate without Swoop Aero's proprietary encrypted avionics suite. In a situation where an RPA is misappropriated and a commercial off-the-shelf avionics suite is installed to bypass any software locks, the RPA would remain unable to function due to the complexity of onboard systems. Removal of these systems aner manufacture would destroy the RPA.

Maintenance of the platform to include hardware and software is conducted at regular intervals per Swoop Aero's Aircraft Maintenance Manual and software policy. Additional information requested by an authorized source will be provided upon request.

The Operations Management System (OMS) allows managing the oversight of operations, including securing operational release for flights and flight authorization. This ensures that all regulatory reporting requirements, including maintenance management, defect reporting, and rectification are met. The integrated operations platform is premised on a set of predetermined outcomes to ensure strategic decisions are made and programmed before the RPA ever takes off. These decisions include but are not limited to mission, weather and payload considerations station, etc. There is the capability to manually perform a different maneuver than what has been pre-programmed should the need arise.

The Swoop Aero cloud-based flight route planner allows automated checks preventing any breach of aircraft, airspace, or ground risk limits to ensure the airspace and aviation ecosystem remains secure, agile, robust, and resilient. All routes are passed through an automated software validation tool which ensures routes are planned within set limitations, comply with flight planning risk mitigations, and clear of terrain within the flight geography.

The Airspace Link AirHub Portal will also be leveraged to assist in flight planning. This will be used as a UAS Traffic Management (UTM) application in addition to Swoop Aero's UTM for flight operations as the capability becomes available.

The Hub Operators and Visual Observers will be trained in each location to assist with the battery swaps, pre, and post flight checks, change out payloads as required, and monitor the air and ground. There will be a one hundred security perimeter at each launch/landing location marked with cones. Only trained personnel are within the perimeter to ensure all others are at a safe distance including domestic animals and wildlife.

The aircraft will operate visually in daylight between 130'-275' AGL within Class G airspace and will maintain a 3-mile buffer from the flight path as a risk mitigation method.

Alternate launch and landing sites will be identified during the site survey in July 2024. Sites will be added to the flight plan as alternative landing locations and will be displayed through the RPS to the UAS Operator. These will be pre-planned in case of an emergency.

Platform

Swoop Aero Kite B is the aircraft that will be utilized for the flight operations. This is an Australian-made aircraft. The aircraft is 6.89' long with an 8.85' wingspan. It stands 1.476' high with a maximum takeoff weight is 54.5 pounds including payload.

Figure 3 - Swoop Aero - Kite B - Front View

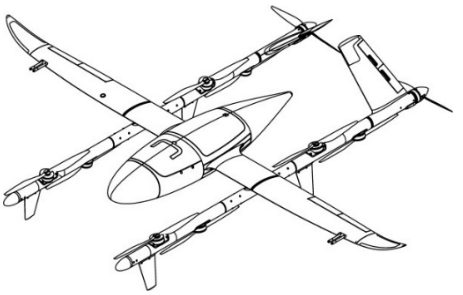


Figure 4 - Swoop Aero - Kite B Top View

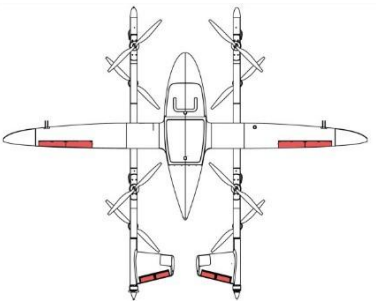


Figure 5 - Swoop Aero - Kite B

The Remotely Piloted Aircraft System (RPAS) is directly comprised of:

- The Kite Remote Pilot Sta6on (RPS)
- Battery Pod
- The Platform

The Kite B is a powered Remotely Piloted Aircraft (RPA). The Kite B adopts a modular design that enables rapid deployment of RPA configuration changes, repairs/maintenance, and payload integration. The Vertical Take-off and LiN (VTOL) capability allows for operations to and from almost anywhere, minimizing the need for additional launch infrastructure. An advanced sensor suite combined with redundant global communication capability enables mission execution and flight monitoring from anywhere in the world.

The Kite B is designed to operate on pre-programmed flight routes between predetermined take-off and landing locations, with dynamic routing on more complex mission profiles such as SAR or other responsive mission profiles.

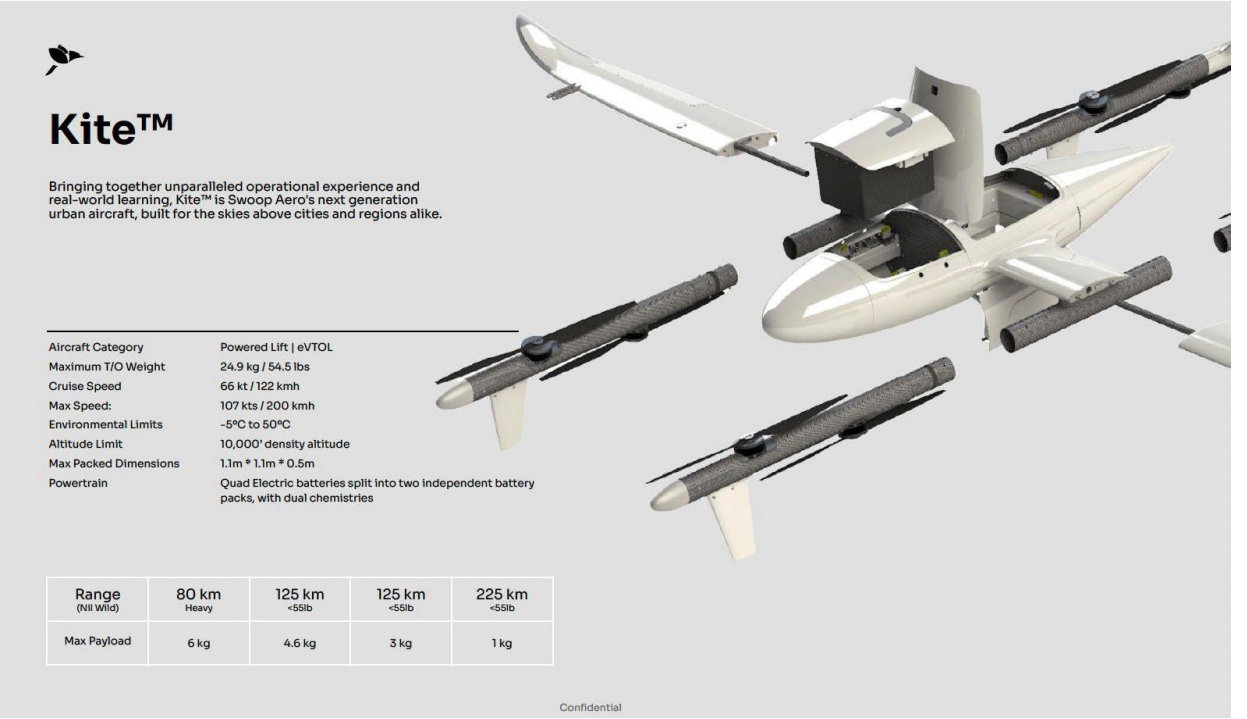


Figure 6 - Swoop Aero Platform Specs

The Kite B features common power and data, allowing for a number of pod types to be utilized. Due to the high level of automation in the Remotely Piloted Aircraft System (RPAS), there is minimal need for direct communication between the crew (UAS Operator, Hub Operators, etc.). Aural and visual notifications support this via the RPS for the RP and via the RPA for the Ground Operator. The responsibilities of each crew member are clearly defined in the vendor training manuals, the vendor checklists, and in the P107 regulations. Specific communication is only required if something outside of normal operations has occurred between the UAS Operator and Hub operators and/or VOs. In this instance, direct communication will be made to address the situation via a shared communications line that is set up at the beginning of the operation and will continue through the completion. The payload bay is an enclosed area on the body of the aircraft. Its dimensions are: 9.842x7.874x5.118”. The payload bay is opened from the top to retrieve medical supplies.

Remote ID

The two (2) aircraft have received the Remote ID Statement of Compliance approval. They have been registered to the Remote Pilot in Command (UAS Operator) in DroneZone and were marked per FAA requirements. Should the aircraft supporting these flight operations change, they too will be registered and marked accordingly. This will be completed before any flight operations.

Lighting

The aircraft anti-collision lighting has been designed to comply as closely as practical for an RPA with AS 8017D - Minimum Performance Standard for Anti-collision Light Systems.

The left-hand tail features flashing white anti-collision lighting. In the figure below, Area 1 (darker grey)

features all lighting, and Area 2 (lighter grey) features reduced lighting when viewed directly side-on from the right-hand side of the aircraft due to the opposite tail.

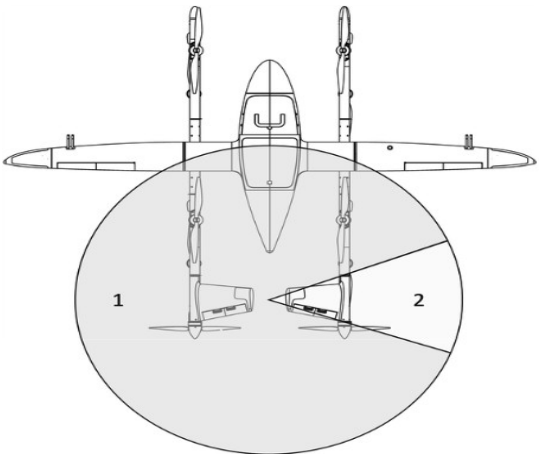


Figure 7 - AircraM Taillight Areas

Alerts

The Remote Pilot Station (RPS) generates the visual and aural alert messages (flags) in the table below to indicate the health of the RPA so that the Remote Pilot can an6cipate required actions.

Visual Alert	Aural Alert	Level	Description
	Whoop Whoop	Warning	A serious condition exists that the requires the situation to be addressed as soon as possible to ensure ongoing safety (during any phase of flight).
	Beep Beep	Caution	A condition exists that will heighten the level of risk associated with continuing the flight.
	Nil	Advice	A condition exists that may prevent the completion of the mission as planned. A return to the closest base should be completed.
	Nil	Note	A relatively low priority condition exists that is for remote pilot awareness. The remote pilot should monitor the RPA to ensure the condition does not escalate to a higher level flag.

Figure 8 - System Alerts

Additional information regarding procedures for degraded function or failure and associated alerts can be found in Section 4 of *20231005 - Swoop Aero Pty Ltd - Kite-B - Remotely Piloted Aircraft Flight Manual - Version 1.5.0*.

Engine Specifications

Engine specifications can be found in the *Kite-B - Remotely Piloted Aircraft: Flight Manual,* sections 1.2.6 Forward Motor, 1.2.7 Hover Motor, 1.4 Powerplant.

The Kite B has independent brushless electric motors to provide propulsion for hover and forward flight, which are attached to the RPA structure.

Each motor (both forward and hover types) has the following features:

- Forced air cooling.
- Electrical noise highly tolerant signal and telemetry connection
- High-frequency telemetry repor6ng to the Flight Controller (to trigger automated corrective ac6on) including the following:
    - Temperature (monitoring, motor driver transistors)
    - Speed
    - Throttle Demand
    - Command link health
    - Vibration levels
    - Voltage and Current

Hover Motor:

The hover motor module is comprised of a customized motor and a motor controller. The motor base of the hover motor includes a portion of the external boom profile. This feature allows the module to be bolted directly to a Forward Boom or Tail Boom LH/RH module and maintain a fully integrated appearance. Having the motor base as a portion of the weeded aircraft area additionally increased the cooling surface area. The motor controller bolts directly to the underside of the motor base, using the motor base as a heat sink to provide Metal Oxide Semiconductor Field Effect Transistor (MOSFET) cooling. The motor stem has a magnet that rotates above an encoder integrated into the motor controller to provide precise radial position data. The motor controller contains an accelerometer that can detect the vibration of the hover motor. There is a silicone seal bonded to the motor base to provide a waterproof and secure interface to the Forward Boom or Tail Boom LH/RH module. The hover motor module is easily replaceable with the removal and reinstallation of four (4) fasteners and two (2) electrical connectors.

AREA		SPECIFICATION
MOTOR	MANUFACTURER	T-Motor
	MODEL	V605
	KV RATING	KV210
	IDLE CURRENT	1.6A
	PEAK CURRENT	70A/Continuous 180s
	MAX POWER	3200W/Continuous 180s
	MAGNET MAX TEMP	150 C
	ENAMELLED WIRES MAX TEMP	220 C
ESC	MANUFACTURER	Swoop Aero
	MODEL	Custom
	OPERATING TEMPERATURE	-40°C to +105°C (-40°F to 221°F)
PROPELLER	MANUFACTURER	T-Motor
	MODEL	V22*7.4

Figure 9 - Hover Motor Specification

Forward Motor

The Forward Motor module is identical on both the left and right sides of the aircraft. The Forward Motor bolts to the Tail Boom module in six (6) locations. The Forward Motor contains a machined aluminum structure to which other components bolt. The structure accepts the six (6) Tail Boom module interface fasteners. Additionally, the motor and the motor controller bolt directly to the structure. The forward motor has the same specification as the hover motor but has different additional customizations from the base model that cause the motor to be distinct from the hover motor instances. The motor controller is common across both hover and forward motor modules. The motor controller contains an accelerometer that can detect motor vibration. An additional encoder board is present in the Forward Motor module to measure the radial position of the forward motor, as the motor controller is packaged differently than in the hover motor module.

AREA		SPECIFICATION
MOTOR	Manufacturer	T-Motor
	MODEL	V605
	KV RATING	KV210
	IDLE CURRENT	1.6A
	PEAK CURRENT	70A/Continuous 180s
	MAX POWER	3200W/Continuous 180s
	MAGNET MAX TEMP	150°C
	ENAMELLED WIRES MAX TEMP	220°C
ESC	MANUFACTURER	Swoop Aero
	MODEL	Custom
	OPERATING TEMPERATURE	-40°C to +105°C (-40°F to 221°F)
PROPELLER	MANUFACTURER	Falcon Prop
	MODEL	20 x 14

Figure 10 - Forward Motor Specification

Battery System

Pod Retention

The Pod Retention Module is part of the larger battery module. It automa6cally seats the battery pod in the aircraft. It also lifts the battery pod off the aircraft when it needs to be removed for charging and lowers it onto the aircraft ensuring correct sea6ng of interface connectors. This feature removes the possibility of a 'mis-seated' battery pod which could impact the safety of flight. It also reduces aircraft and structural loads resulting from inserting and removing the battery pod.

Battery Pod

The battery pod contains two (2) independent Li-ion 22000mAH batteries. The pod itself is comprised of both print and carbon fiber composites. Through the pod reten6on module, the battery pod has automatic seating/installation and removal. Range and Endurance is shown in Figure 12 below.

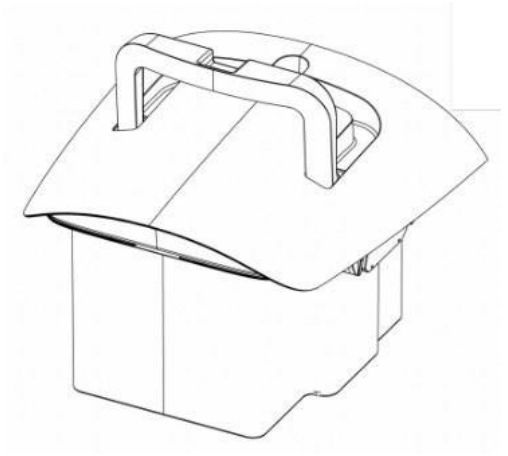


Figure 11 - Battery Pod

SPECIFICATION	VALUE	
MAXIMUM RANGE		
MAXIMUM RANGE (ONE-WAY, NIL PAYLOAD, NIL)	167 km	90 nm
MAXIMUM RANGE (ONE-WAY, 2.5 KG PAYLOAD, NIL)	149 km	80 nm
MAXIMUM RANGE (ONE-WAY, 4.0 KG PAYLOAD, NIL)	141 km	76 nm
MAXIMUM RANGE (RETURN, 2.5 KG PAYLOAD, NIL)	139 km	75 nm
MAXIMUM RANGE (RETURN, 4.0 KG PAYLOAD, NIL)	132 km	71 nm
MAXIMUM RANGE (RETURN, 2.5 KG PAYLOAD, 25 KTS)	119 km	64 nm
MAXIMUM RANGE (RETURN 4.0 KG PAYLOAD, 25 KTS)	113 km	61 nm
MAXIMUM ENDURANCE		
MAXIMUM ENDURANCE (ONE-WAY, NIL PAYLOAD)	84 min	
MAXIMUM ENDURANCE (ONE-WAY, 2.5 KG PAYLOAD)	75 min	
MAXIMUM ENDURANCE (ONE-WAY, 4.0 KG PAYLOAD)	70 min	
TOTAL BATTERY CAPACITY	1.95 kWh	
TOTAL USABLE BATTERY	1.56 kWh	

Figure 12 - Range and Endurance

Flight Termina-on System

The Digital Parachute is a unique system that ensures that the aircraft can safely complete the mission or perform a controlled landing after any single failure and after the most probable failure combinations. This is achieved through full-stack power train redundancy of both the hover and forward flight power systems, combined with a distributed-responsibility flight control architecture.

This negates the significant issues associated with deployment and altitude limitations of a conventional parachute whilst ensuring that the likelihood of any uncontrolled descent is drastically reduced.

Hovering is the primary flight mode of the Kite B. All parts required for the Kite B to hover are considered flight essential. Forward flight is then considered the secondary flight mode. If a failure occurs during the secondary flight mode, the aircraft can always return to the primary flight mode and safely land.

The Digital Parachute system will show compliance with relevant aspects of ASTM F3322 (Standard Specifica6on for Small Unmanned Aircraft System (sUAS) Parachutes) as well as specific testing throughout the Type Certification process.

Digital Parachute Redundancy Strategy

The Kite B utilizes a holistic approach to redundancy to ensure that the vehicle's safe operation is robust to simple failures and handles complex multiple failure scenarios deterministically to ensure the safest possible outcome in all operating scenarios.

There are several additional controls that are in place and should also be viewed in relation to the other possible courses of action when addressing the activation of the digital parachute (an actual parachute or uncontrolled flight).

This strategy utilizes the following axioms:

- For a function, sensor, or actuator to be considered redundant, all common points of failure

must be considered. If possible, elimination of the common point of failure is preferable, and where this cannot be achieved, the risk of failure of the common point must be mitigated to a standard that ensures the risk of a common failure is less than the random failure of both redundant functions in a single flight.

- For a function, sensor, or actuator to be considered redundant, the system must be able to detect the failure with a reliability that matches the failure rate of the function and ensure that the system continues to operate for the practical minimum time appropriate for the risk associated with complete failure of the function. As if it is possible that the failure of a function is not detected, and the system continues operation, the system is effectively operating at the same risk level as if the redundant system were not present.
- For a function, sensor, or actuator to be considered redundant, the remaining system functionality after the failure of the function must be exactly equivalent to the system functionality prior to the failure. If the system functionality is reduced, or the operating risk is otherwise increased after the failure, this risk must be mitigated to a standard that this increased opera6ng risk level is no higher than the random failure of the redundant function.
- If a function, sense, or actuator is redundant to the above standard, then it is accurate to assess the mean time between dangerous failures (in number of flights) of the combined redundant system as the multiple of the MTBF of the individual functions, as a dangerous failure will only occur if random failure of both redundant functions occurs in the same flight.

The Kite B system design ensures that all flight critical functions are redundant to the standard defined above, enabling a very high standard for mean time between dangerous failures, while requiring an achievable burden of proof for the mean time between failure (MTBF) of the individual components.

For example, a MTDF of 1:1,000,000 flights can be achieved by demonstrating only that:
The MTBF of the individual func6ons is >1:1000 flights. The redundancy of the function meets the standard for redundancy defined above.

The digital parachute system includes:

1. Continual Alarm as RPA descends
2. Bright Flashing lights as RPA descends
3. Reduction of the aircrafts descent velocity to 0.5 m/s, with possible simultaneous failures resulting in a 2 m/s descent rate. Resul6ng in a maximum pre-impact kinetic energy of 36.9-foot pounds
4. The 12-inch rotors are housed within the frame further reducing access to them and limiting the exposure
5. There is no minimum altitude for activation. This can be activated automatically due to the identification of failures or by the pilot at any time. Automatic activation is notified to the pilot. This approach reduces the likelihood of any uncontrolled descent to extremely improbable. (The probability of multiple failures causing a catastrophic failure of the hover system is 10^-8, which is classified as Extremely Improbable)
6. This approach is superior to a parachute system as there is no minimal activation height, there are aural and visual warnings and the descent rate is far less than the 4-6m/s target rate of a Specific Operations Risks Assessment (SORA) physical parachute system. It also

allows for the likelihood of a catastrophic failure of the hover system to be extremely improbable.

To meet this standard of redundancy, in particular, to address the increased risk of operating after some worst-case combinations of single components, the system is required to take automated actions when it detects these failure combinations, up to and including aborting the mission by completing a hovering emergency landing, as soon as possible. *This is the source of the name for the strategy "Digital Parachute" as this strategy results in a system where even in the worst-case failure scenarios, the system is always able to reduce risk by hovering to the ground, dramatically reducing impact energy, and dramatically improving the overall safety of operations.*

Remote Pilot Station

The Remote Pilot Sta6on (RPS) is the primary interface for Remotely Piloted Aircraft (RPA) monitoring and command. The RPS is accessible from any approved/authorized device connected to the Internet and is protected via multi-layered security protocols to prevent unauthorized access.

The Kite B has redundant systems for position, heading, and altitude estimation.

Please see *20230828 - Swoop Aero Pty Ltd - Platform - Remote Pilot Sta/on (RPS) - Version 1.3.0*. This contains example images of the interface and a detailed outline of the information presented to the Remote Pilot.

In addition to the specific equipment requirements set out in *Kite B - Remotely Piloted Aircraft: Flight Manual*, the following ground control set-up is recommended:

- Redundant Remote Pilo Stations:
- Primary Piloting Device (PPD)
- Secondary Piloting Device (SPD)
- Redundant Internet
- Redundant Power
- Appropriate consideration is given to the following environmental factors:
  - Space
  - Seating
  - Noise
  - Temperature
  - Environmental Protection
  - Security

Command and Control

Communication between RPA and RPS is achieved via any one of the following:

- Satellite, using Iridium L-Band (Short Burst Data, SBD)
- Terrestrial wireless internet, using 2G, 3G, and 4G
- Wi-Fi, using 2.4GHz

The use of up to three independent links ensures in-flight telemetry and communication capability is

maintained at all times. Maintaining these links is the responsibility of the RPA's onboard compute core, which monitors both the satellite and terrestrial hardware.

The terrestrial communication link connecting the RPA to the Swoop Aero Platform is encrypted with TLS AES256-SHA encryption.

The RPA's satellite communica6on link is encoded with the Satellite Communication (Satcom) module's physical identification key (IMEI). This key is required to facilitate a direct link to Swoop Aero's Platform, and packets sent over this link are additionally encoded with a proprietary communications protocol.

An onboard automated network manager ensures appropriate and timely handover between communications methods to ensure that the most appropriate service is always used.

Flight operations will occur over the Fort Berthold Reservation. The route has been coordinated with and approved by the MHA Nation. Communications have begun and will continue through the flight operations to ensure the route is free of people, boats, or vehicles, and obstructions on the ground under the aircraft. This is a very rough terrain and rural part of the country, however, given the tertiary communications system there should always be communications with the aircraft. A site survey will be completed on July 19, 2024 to verify connectivity throughout the planned flight path.

The aircraft operates safely on proven through all three communications methods to include significant SatCom-only operations in areas of poor cellular coverage, such as the Democratic Republic of Congo.

The latency tends to increase when using Satcom (from milliseconds with cellular to seconds with Satcom).

The command-and-control link configurations operate within the existing FCC approvals.

Bluetooth Module / FCC ID X8WBT840X
Terrestrial Module / FCC ID 2AJYU-8PYA007
Satcom Module / FCC ID Q639603

SPECIFICATION	VALUE	
BANDS	L-Band	
FREQUENCY RANGE	1616 to 1626.5 MHz	
OPERATING TEMPERATURE	• 40C to +85C	-40 to 185 F
LATENCY	0-20 seconds (depending on coverage).	
ANTENNA	Maxtenna M1621HCT	

Figure 13 - Satellite Module

SPECIFICATION	VALUE	
BANDS	LTE-FDD B1, B2, B3, B4, B5, B7, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66 LTE-TDD B34, B38, B39, B40, B41 WCDMA B1, B2, B4, B5, B6, B8, B19 GSM 850, 900, 1800, 1900MHz GNSS GPS, Beidou, GLONASS, GALILEO, QZSS	
OPERATING TEMPERATURE	• 40C to +85C	-40 to 185 F
LATENCY	Milliseconds IAW with standard internet communications	
ANTENNA	PA.711.A & PA.710.A antennas	

Figure 14 - Terrestrial Module

An onboard automated network manager ensures appropriate and timely handover between communications methods to ensure that the most appropriate service is always used.

Lost Link

Lost Link procedures are listed below**.**

Responsible - Remote Pilot in Command
This procedure should be executed if there is a degraded or loss of communica6ons link with the RPA. The following RPS alert messages indicate a degraded or loss of command and control or an inability for the Remote Pilot to execute aircraft commands:

- Ground Station Connection Lost
- Note: Latency > Over 30 Seconds*
- Note: FC Link > Poor Connection
- Advice: FC Link > Lost Connection (See explanatory note)

Following a loss of the communications link, the RPA will continue its planned route and execute automated actions based on system logic. The displayed estimated time to return (ETR) will remain accurate based on the wind at the point of the loss of the communications link. Remote Pilot commands sent to the RPA may be delayed.

An ‘Advice: FC Link > Lost Connection’ alert message is not a loss of the communications link between the aircraft and the ground station. This alert indicates a loss of connection between the aircraft’s onboard Compute Core and Flight Controller. When this alert is present, the aircraft will not respond to RPS commands and therefore this procedure applies.

Remote Pilot actions:

1	Check that the ground station connection is still valid: Refresh the RPS; Check that the RPS device internet connec6on is still valid; Connect the RPS device to an alternate internet source and refresh the RPS; If using a SATLINK connection: Check that the connection is still valid; Reposition the SATLINK device as required. Attempt to re-establish the connection on an alternate RPS device.	
2	Monitor for link re-establishment	
3	If the link is not re-established after 30 seconds*: Determine if the loss of communica6on generates any additional ground or air risk and inform relevant stakeholders of the following: Description of the RPA; Last known position of the RPA; Planned route and destination of the RPA; Possible contingency landing locations. Stakeholders to consider notifying (depending on the situation): • ATC. • Ground operations personnel. Destination personnel. • Possible contingency landing locations. Supervisor. • Local Law Enforcement.	
4	Monitor the RPS and other sources (phone, radio) until the RPA's position is confirmed	
5	Upon completion of the mission, if communication was not re-established, do not conduct further flight until the cause of the loss of communication has been determined and rectified.	**Overdue RPA Procedure** If the RPA does not complete the mission within 15 minutes of the expected arrival time, and its position is unknown: Take all reasonable efforts to find the RPA. Execute the Occurrence Checklist.
6	Notify supervisor and CRP (or delegate)	
7	Complete all Swoop Aero, Operator and Regulatory Reporting requirements (if any)	

*30 second dura6on will be validated once on-site

Detect and Avoid

Current Swoop Aero operations occur in regions with low encounter rates and airspace density. The risk of MAC or NMAC is strategically and tactically reduced using mitigations such as NOTAMs, stakeholder engagement, UTM/system feeds, and electronic conspicuity to form part of the holistic DAA solution.

The DAA system is air-based; however, a ground risk assessment has been completed for pre- flight

planning. The flight path was planned based on details from 60+ datasets (hyper- localized/local authoritative data included) within the Airspace Link portal as well as through coordination with the MHA Nation and their partners. The datasets look at airspace, telecommunication towers, land obstacles, etc. A full list of the datasets is provided in the attachment: *CONFIDENTIAL_AirHub Portal_available datasets*. The 3D data will be used to consider the best flight altitudes as well as consideration for population density movement prediction patterns.

Systems like ADS-B are commonly used for this purpose. When equipped with ADS-B, an aircraft automatically broadcasts its identification, current position, and other telemetry data. This data can then be received by air traffic control centers as well as other aircraft, providing a real-time picture of the air traffic environment. The aircraft is equipped with both ADS-B In and Out, however, only ADSB-In will be utilized for these flight missions.

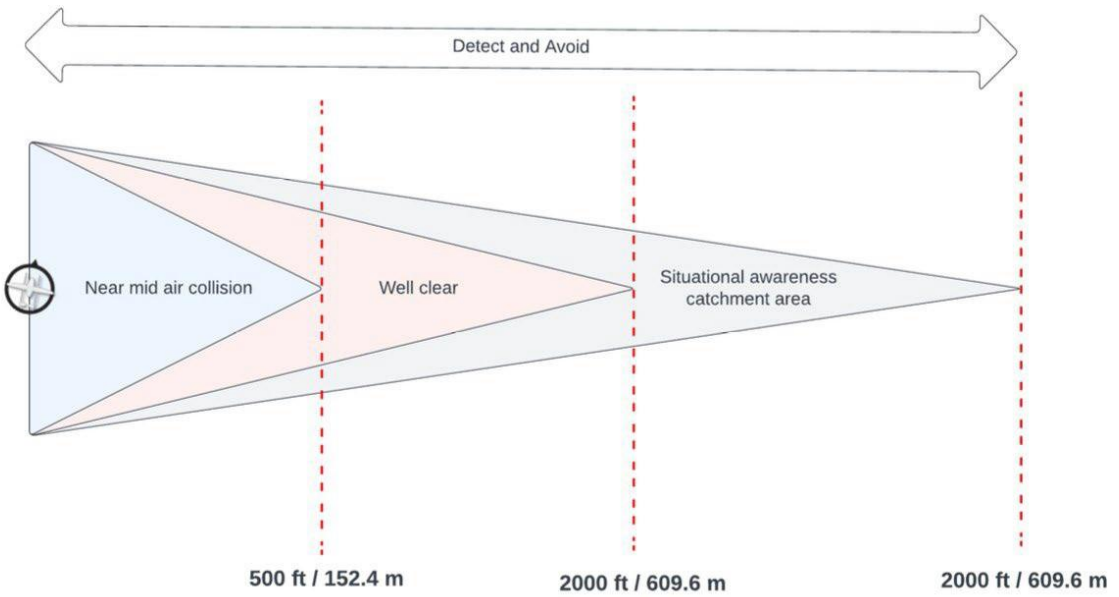


Table 2-2: Protection Volume Diagram

Protection Volume	Lateral Distance (Radius)	Vertical Distance	
		Above	Below
Near Mid Air Collision (NMAC) Boundary	500 ft / 152.4 m	100 ft / 30.5 m	100 ft / 30.5 m
Well Clear (WC) Boundary	2000 ft / 609.6 m	250 ft / 76.2 m	250 ft / 76.2 m
Situational Awareness Catchment Area	10 km	3000 ft / 914.4 m	400 ft / 120m

Figure 15 - Detect and Avoid Distances

If a cooperative aircraft enters the operational area, the following warnings will be issued:

- Anticipated breach of NMAC Boundary: Warning level visual and audible alert
- Anticipated breach of the Well Clear Boundary: Caution level visual alert and audible alert
- Aircraft detected in the situational catchment Area: Note level visual alert

Automatic Dependent Surveillance - Broadcast (ADS-B) In is the primary mitigation for cooperative

traffic. The ADS-B In on the Kite-B is the uAvionix PingRX, and ADS-B In is the Ping1090i. The ADS-B PingRX receiver has a horizontal range of 160 km (100 miles) and can simultaneously track about 100 aircraft. The ADS-B 1090i transceiver has a horizontal range of 278 km (172.7 miles) and a vertical range of – 304.8 m – 24,384m (-1000 N – 80,000 N) and can also simultaneously track about 100 aircraft. The Remote ID system has a standard configuration. The estimated range of Bluetooth 4 is 1 km (0.62 miles) and that of Bluetooth 5 is > 2.3 km (1.43 miles). However, the system is filtered to only show aircraft within 10 km, 3000 feet above, and 400 feet below.

Some actions are automated (i.e. preventing launch if the Kite identifies an aircraft before launch that may breach its Well Clear Boundary). Additionally, for a breach of the Near Mid Air Collision Boundary, there are automated options to 'land now' to ensure the aircraft does not end up in an airspace conflict with a conventional airspace user. These actions are outlined in Section 3.1 of the *Kite B supplement – Detect and Avoid* included in the attachments section.

Any of the actions that are automatically triggered are also available to be used by the UAS Operator at their discretion and/or to override the automatic functionality*. Emergency landing locations will be identified as part of the flight planning process. In the event the UAS OPERATOR needs to 'land now' the only infrastructure below the aircraft: along the flight route are inactive rail lines. The UAS Operator will be able to land directly on the tracks in the event of an emergency landing that overrides the automatic procedures of the aircraft.*

Additionally, Airspace Link will provide 60+ data feeds in addition to the Swoop Aero UTM system. See *AirHub Portal available datasets* included in the attachment. The two systems are complimentary as both were written to the ASTM Standards and can be integrated.

NOTAMs, stakeholder engagement, UTM/system feeds as noted above will be utilized, and electronic conspicuity to form part of the holistic DAA solution. This includes a layering of DAA strategies and risk mitigations that include procedural, very remote operational areas, and pre-coordination to account for uncooperative activity in the area. A permanent NOTAM will be filed noting UAS Operations.

The on-board camera is not able to be used for visual identification of non-cooperative intruders, however, public outreach will be conducted and coordinated in advance of flight operations with the community, airports, parks, border patrol, Marines, etc. will be completed before flight operations commence. Initial feedback from the various groups is that the known flight route is a significant risk reduction.

There is visible and audible alerting for DAA system failures and/or degradation.

While the DAA system has not operated in the exact operating environment, it has been operated in similar operating environments effectively.

Finally, the flight path is completely over the Reservation further reducing the risk. The flight path will define a control volume in 3D space around the planned path. If, while in flight, the RPA is forced onto a trajectory that could exceed those boundaries, automated actions are triggered to

ensure the aircraft does not exceed that volume. (i.e. Emergency Land). The RPA cannot exceed its planned control volume.

Avoidance Strategy

Recognize Function

Aircraft detection in the vicinity of a Swoop Aero Remotely Piloted Aircraft (RPA) is done through onboard sensors. Depending on the configuration of the RPA, this may consist of ADS-B In/Out and/or RemoteID. The Kite B is equipped with Broadcast RemoteID (Bluetooth) (send and receive) and Network RemoteID.

The sensor package provides a feed of relevant aircraft for the decision func6on. Relevant aircraft are those within the Situational Awareness Catchment Area. Aircraft within the catchment area are displayed in the RPS to aid situational awareness.

Resolve and React Func6ons

The system constantly reviews the speed and heading of other aircraft in the situational awareness catchment area. If the system anticipates that another aircraft will breach the RPA Well Clear (WC) Boundary (defined as 2,000N lateral/250N vertical minimum), the system will respond sufficiently early to avoid any actual breach, assuming the other aircraft remains maintains its current speed and heading.

Any of the actions that are automatically triggered are also available to be used by the Remote Pilot at their discretion.

Aircraft within 10 km display on the RPS map interface. Aircraft within the Well Clear Boundary and NMAC Boundary are alerted to the UAS Operator.

Flight Path

The route of flight will occur in Class G airspace along the flight route over the Fort Berthold Reservation. Launch and recovery locations are notated below. These will not be shielded operations.

Figure 16 – MHA Nation Flight Route

Elbowoods Clinic Launch/Land loca6on: 47° 59.426’N/ 102°28.209"W
This location is off by itself with no immediate buildings in the vicinity outside of the clinic. There is clear terrain to the east. The exact launch/landing site will be identified during the site survey conducted by Valkyrie to ensure the safest spot is selected. There will be a VO to ensure the take-off/landing area is clear of any obstructions, vehicles, and/or people. There will be bi-directional communications between the VO and the UAS Operator.

There is the New Town Muni airport 1.5 miles to the south of the launch/landing site at Elbowoods Clinic which will be communicated and coordinated with before any flight operations via NOTAMs. This is an uncontrolled airport that does not provide ATC services. Initial communications will occur in person with the airport personnel to ensure awareness of drone operations as well as to gain an understanding of specific requests from the airport. The UAS Operator will communicate with the airport personnel as agreed upon via email 1 week prior to operations and again prior to each day’s missions. The UAS Operator will require acknowledgment of the email that will be archived as part of the post-op write-up. During flight operations, an aviation radio will be used to listen to surrounding traffic. The aircraft is also equipped with ADSB-In and is able to “see” potential breaches of airspace and initiate an abort of launch. UAS Operator will monitor the Airport CTAF on 122.9 and the APCH/DEP SVC PRVDD BY MINNEAPOLIS ARTCC ON FREQS 127.6/279.6 (MINOT RCAG). Additionally, the UAS Operator will request the airport issue a permanent NOTAM in the AFD that states "infrequent controlled UAS/drone operations within 1.5 nautical miles of the airport".

Figure 17 – Elbowoods Clinic Launch/Land Loca/on

Twin Buttes Clinic Launch/Land location: 47°30'42.1"N 102°15'37.0"W

This location is to the south of the new Twin Buttes Clinic. It has a direct route over the Reservation with limited roads, homes, or other populous areas. This does cross highways 8 and 22. Highway 22 is considered a Minor Arterial Rural road for North Dakota.

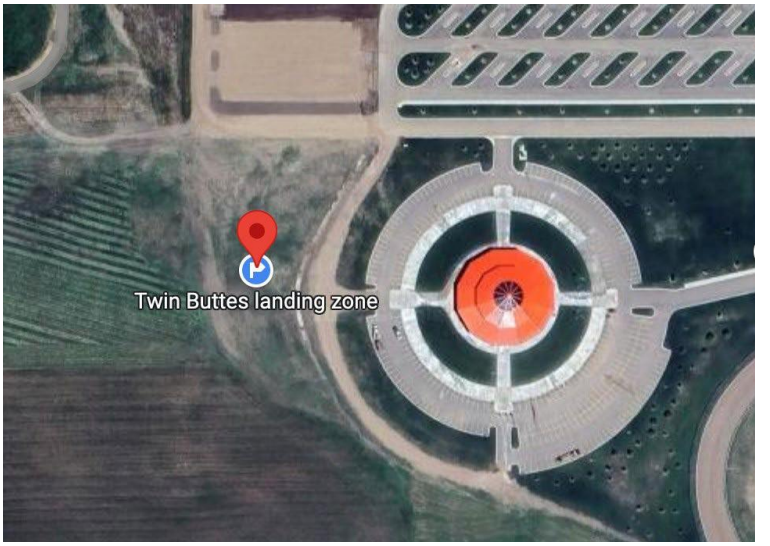


Figure 18 – Twin Buttes Clinic Launch/Landing Loca/on

There will be sufficient VOs to ensure the launch/landing location is clear of any obstructions, vehicles, and/or people. There will be bi-directional communication between the VO(s) and the UAS Operator.

The Swoop Aero cloud-based flight route planner allows automated checks preventing any breach of aircraft, airspace, or ground risk limits to ensure the airspace and aviation ecosystem remains agile, robust, and resilient. All routes are passed through an automated software validation ensuring routes are planned within set limitations, comply with flight planning risk mitigations, and are clear

of terrain within the flight geography. Mission planning is completed in Swoop Aero's internal software system, a Swoop-trained Planner, under strict software validation and procedure. It is then approved by a different Swoop-trained Route Approver. Additional flight planning will be done utilizing Airspace Link's software application as a cross- reference to ensure the best possible route is planned and risks are mitigated sufficiently.

The flight computer continuously calculates the theoretical emergency landing trajectory from the current position and ground-referenced velocity. When the flight computer determines that the current velocity vector and position would result in exiting the contingency volume, an emergency landing is executed automatically. This calculation ensures that the RPA cannot leave the specified contingency volume boundary even with a worst-case direct tailwind.

The contingency volume is calculated from a parameter stored in the autopilot, which defines the distance the RPA may travel during a worst-case emergency landing. This worst-case emergency landing distance is calculated from the deceleration profiles. The contingency volume distance (and thus the operational volume) varies for turning and straight segments and for constrained and unconstrained segments.

This emergency landing calculation assumes the worst-case scenario of a direct tailwind at the maximum allowable flight magnitude. This is very improbable because it combines the worst- case wind, which represents a very small fraction of overall flight hours, with a direct tailwind, which represents a small percentage of overall flight time, so the vast majority of emergency landings will not travel as far as the edge of the contingency volume.

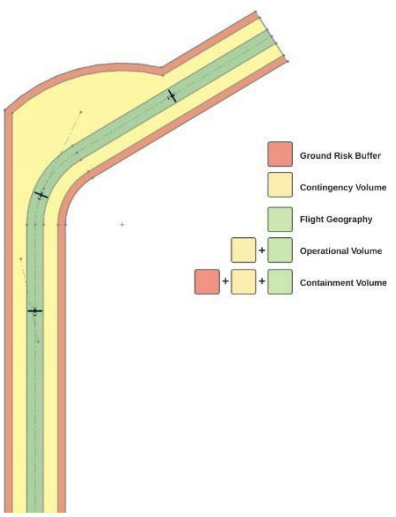


Figure 19 - Average Cross Track Error

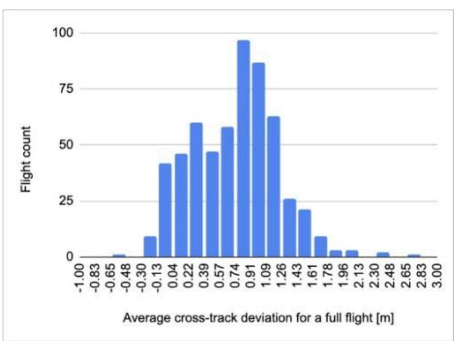


Figure 20 - Flight Route Buffer

The average deviation over the full flight is the following:

Mean = 0.73m

Standard deviation = 0.48m

The UA does have a Return to Home (RTH) feature called ‘Closest Base'. When commanded, the aircraft will return to the closest location designated as a 'Base' or 'Pod Swap' via a designated and pre-planned route. The aircraft will not fly 'direct to', it will only follow a pre-determined route that has been planned with consideration for ground and air risk.

The Operations Management System allows managing the oversight of operations, including securing operational release for flights and flight authorization. This ensures that all regulatory reporting requirements, including maintenance management, defect reporting, and rectification, are met. The integrated operations platform is premised on a set of predetermined outcomes to ensure strategic decisions are made and programmed before the RPA ever takes off.

The UAS Operator will be operating directly over the Reservation with minimal people or vehicles below the UA. The flight route has been strategically planned to avoid roads and populated areas where possible and will have the VO’s at the launch and landing locations to provide proper safety and situational awareness to the UAS Operator.

NOTAMs will be filed through Flight Services 24-48 hours prior to flight operations.

Landing Equipment Requirements

A landing target is required for the visual landing system onboard the RPA. This allows the RPA to accurately identify the assigned landing location and conduct a safe and contained landing. A security perimeter will be cordoned off around the launch/landing site of 100’ visibly with cones.

⚠ Metal/hard landing targets are slippery when wet or icy. Use caution when walking on targets and remove any standing water or ice before use.

Figure 21- Launch/Landing Location Target

If a landing target is not used, the aircraft will land using GNSS information.

⚠ Given the ground clearance of the hover propellers on the underside of the boom it is strongly advised that a target is used. In cases where a target cannot be used, flat ground with no obstructions (long grass, rocks etc) must be used.

Figure 23 - Notice to Flight Operations Team

Visual Observers

There will be a minimum of 1 VO at each launch/landing location during the flight operation to ensure the airspace and ground are clear. VOs will not be used while in transit.

Specific locations are identified in the Flight Path section.

Weather

The UA is limited to the following:

Temp: -10°C to 50°C (14°F to 122°F)
Maximum wind speed: 13 m/s or 25 kts (including gusts) Precipitation: Nil precipitation or visible moisture.

The UAS Operator will note ambient temperature, winds, precipitation, etc. before flight operations commence and throughout the flight to ensure operations are within aircraft and regulatory limitations. Density altitude is not calculated. Air speed sensors provide a temperature readout during flight. Four (4) airspeed sensors are providing a high level of redundancy for measuring temperature throughout the flight. The entirety of the flight path with a 3-mile buffer to either side of the 34-mile route will be verified to ensure enough area for the aircraft to turn around if warranted and get to an alternate landing location. The 3-mile buffer will be measured from the edge or center echoes along the entirety of the flight path including launch and landing locations. This area is sufficient as there will be enough time for the pilot to decide how the weather will impact the mission and determine the best course of action. If a storm begins approaching operations, the UAS Operator will assess the proximity to the flight path and determine if the flight should be aborted or if it is safe to continue on the current flight path. No flight operations will be conducted in known icing conditions. If there is visible moisture in the air and the temperature is +5°C (+41°F), which could cause icing, flight operations will be held until the moisture dissipates or the temperature rises.

The UAS Operator will also use the below-mentioned AWOS/ASOS informa6on which is not augmented. The UAS Operator will augment that information with the following weather sources to provide a holistic look at the entire flight path plus a 3-mile buffer around the 34-mile flight route to ensure the aircraft is operating within limits throughout the operation including accommodating a turn should the need arise: windy.com, WxBrief, Apple weather, and tomorrow.io. The UAS Operator will log the following weather-related data – temperature, wind, wind direction, minimum visibility, and precipitation.

The following AWOS is available in the vicinity of the route:

Figure 22 - AWOS/ASOS Contact Information Along Flight Path

The RPA uses the Airspeed Sensor in conjunction with the GNSS to estimate wind speed. Wind Speed is the difference between the true airspeed and the ground speed. The Airspeed Sensor measures true air speed and the GNSS measures ground speed. A "steady state" wind value is sent up to the pilot and visible on RPS.

The UAS Operator will also have access to Airspace Link's AirHub Portal. This provides access to real-time weather alerts, advisory alerts within the operational area, and data feeds to include:

- Advisories
- FAA provided data
- Operations in the area

Although Valkyrie does not have a mobile ground weather station to aid with weather checks, the RPS allows for the pilot to configure limitations to ensure the flight operations comply with 107.51 (a) and (b). The UAS OPERATOR will utilize WXBrief to ensure minimum flight visibility requirements are met to remain in compliance with 107.51 (c) and (d). In the future, Valkyrie will procure a mobile ground weather station to augment the current weather data sources. This will help aid in decision making as they pertain to flight operations.

The RPA aborts the mission if the limits are exceeded, this automatically executes a "closest base diversion" if exceeded. The aircraft has been tested above these limits to give the ability to still get to the ground safely, automated actions will scale up according to conditions in the following order:

- Closest base
- Contingency landing (pre-planned closest landing)
- Emergency landing (hover down on the spot)

NOTE: Proximity of convective weather/lightning strikes:

CONDITION	LIMITATION
LIGHTNING	The aircraft is not designed nor built with conducting paths through the aircraft to take the lightning strike and conduct the currents. If Lightning is less than 5km away, the pilot should return the aircraft back to base.

Figure 23 - Lightning Conditions

The pilot can easily identify the proximity of lighting and weather to the RPA to effectively adhere to the Environmental Limitations listed above. In RPS, there is an overlay of radar and lightning (in regions where the data is available from the "The Weather Company" provided stream). The Figure below shows a screenshot of RPS. The black arrow points to a lightning symbol on the map, indicating that there is lightning in the area. Additionally, the radar data is shown on the RPS screen, in this case, in green and yellow.

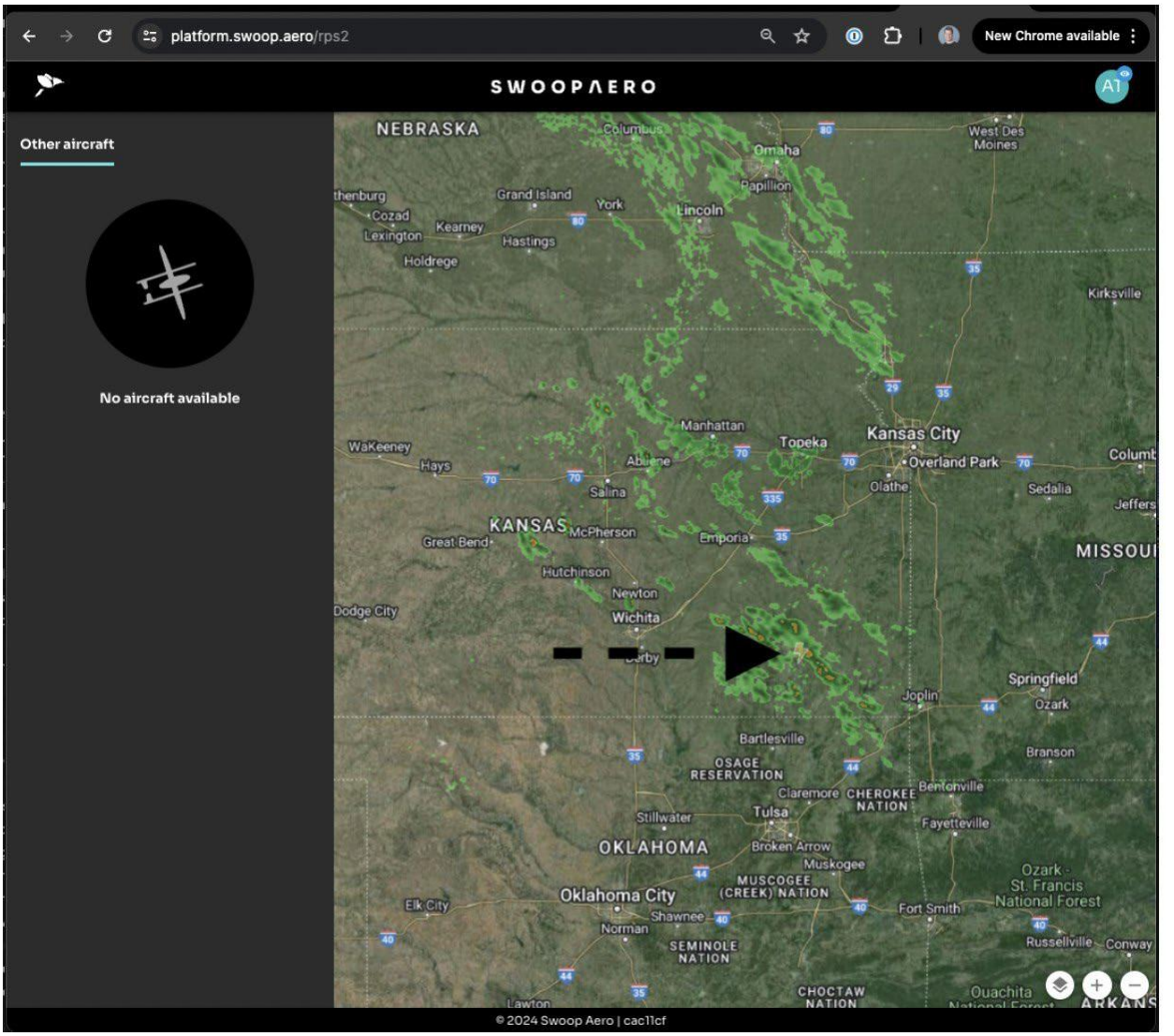


Figure 24 – RPS with Radar and Lightning Overlay Example

If weather requires a deviation from the mission, the weather conditions will be recorded as part of the post-flight write-up and will be reported to the Valkyrie UAS Safety Officer. The Safety Officer will determine if further reporting is required.

Valkyrie UAS Solutions is very interested in micro-weather technologies. Valkyrie will continue to monitor the development of new instrumentations and tools and will test and or leverage new technology to improve situational awareness for the UAS Operator.

Night Operations

The UAS is equipped with anti-collision lighting that will enable night flight operations. The flashing, anti-collision lighting is visible for three (3) statute miles and will be functioning nominally during night operations. If the anti-collision lighting is not functioning, night operations will not be conducted.

Pre-Flight and Post-Flight Checks

The UAS OPERATOR and crew will perform all checks according to *20231005 - Swoop Aero Pty Ltd - Kite-B - Checklist - Remote Pilot - Version 1.5.0.* In addition, the UAS OPERATOR will look for any evidence of precipitation and icing. There are no additional weather instruments that will be used beyond weather reports throughout the flight path and visual inspec6on at the launch/landing locations.

Crew Requirements

Flight operations will be supported by the UAS OPERATOR, a Hub Operator, and a VO at each launch/landing loca6on. The Hub Operator is also able to fulfill the VO requirements. The minimum crew is 3 people

- 1 UAS OPERATOR
- 1 VO at the launch location
- 1 VO/Hub Operator at the landing location

Roles

Remote Pilot in Command

The UAS OPERATOR will be designated before the flight operation. The remote pilot in command is directly responsible for and is the final authority as to the operation of the RPA. They are required to follow *20231005 - Swoop Aero Pty Ltd - Kite-B - Checklist - Remote Pilot - Version 1.5.0*.

Hub Operator

The Hub Operator is responsible for the ground operations at launch/landing locations. They are required to follow the *20231005 - Swoop Aero Pty Ltd - Kite-B - Checklist - Hub Operator - Version 1.4.1*.

The Hub Operator may also act as a VO.

Visual Observer

The VO is responsible for ensuring the airspace and ground in and around the launch/landing locations are clear. The VO will be provided training before supporting their first flight operation and subsequently as needed.

See Flight Path and Training sections in this CONOPS for additional information.

Crew Communication

The flight operations crew will establish a shared line utilizing laptops, cellphones, or other approved devices as the primary means of communication and will maintain the line throughout the

flight operation to ensure safe, well-coordinated communications. The line will be set up by the UAS OPERATOR and will be dispersed to all participants. All participants will dial into the line 30 minutes prior to scheduled flight opera6ons to ensure communications are working appropriately. When the UAS OPERATOR notifies the participants that all pre-checks have been completed and they are ready to launch they will confirm all are ready for flight operations. A verbal "Yes" from all participants will be required. Once received, the UAS OPERATOR will notify the Hub Operator to launch the UAS and then stand back beyond the secured perimeter. The VO will notify the line when the aircraft has taken off and when it reaches altitude and transitions to forward flight mode. The UAS OPERATOR will notify the participants when the UAS has reached the halfway point of the flight path. The UAS OPERATOR will notify the VO at the landing location when the aircraft is 5 miles out. The VO will notify the UAS OPERATOR when the UAS comes into view. The VO will then notify the participants when it transitions to hover flight mode and when the UAS has made the complete landing. Once the aircraft is safely on the ground and the systems have stopped, the UAS OPERATOR will notify the Hub Operator that it is safe to approach the aircraft and remove the payload and battery pod.

Crew Safety Plan

The flight operations crew will follow the *Safety and Security Standard Operating Procedure OP- 01.*

Training

All operators participate in a training program that was defined and developed by the manufacturer to ensure they are fully qualified. Swoop Aero also has a simulator program to assist with training, compliance, and currency.

Swoop Aero's proprietary Learning Management System (LMS) offers a comprehensive knowledge base that comprises of all documentation, training packages, and education materials to run all operations safely and seamlessly. The LMS allows the delivery of online training and tracking of learning outcomes across all applications, including operations, pilot training, and service applications such as logistics management and mapping/surveying.

The Swoop Aero Catalog is a comprehensive set of aviation documentation and operational procedures required for safe and reliable operations across managed and platform networks. Publication management allows the rapid dissemination of safety-critical material while blocking if required, access to operational systems until newly released documentation has been read and understood.

The UAS OPERATOR will be fully trained on all phases of Part 107 and Swoop Aero Kite B flight operations, emergency procedures, and routine maintenance per the manufacturer's training requirements and procedures.

Line maintenance operators will be trained per the manufacturer's training requirements and procedures. All VOs will be trained to fulfill their required duties.

All online training will be documented and maintained via the Swoop Aero Operations Management System. This ensures that all regulatory reporting requirements, including

maintenance management, defect reporting, and rectification, are met. The integrated operations platform is premised on a set of predetermined outcomes to ensure strategic decisions are made and programmed before the RPA ever takes off.

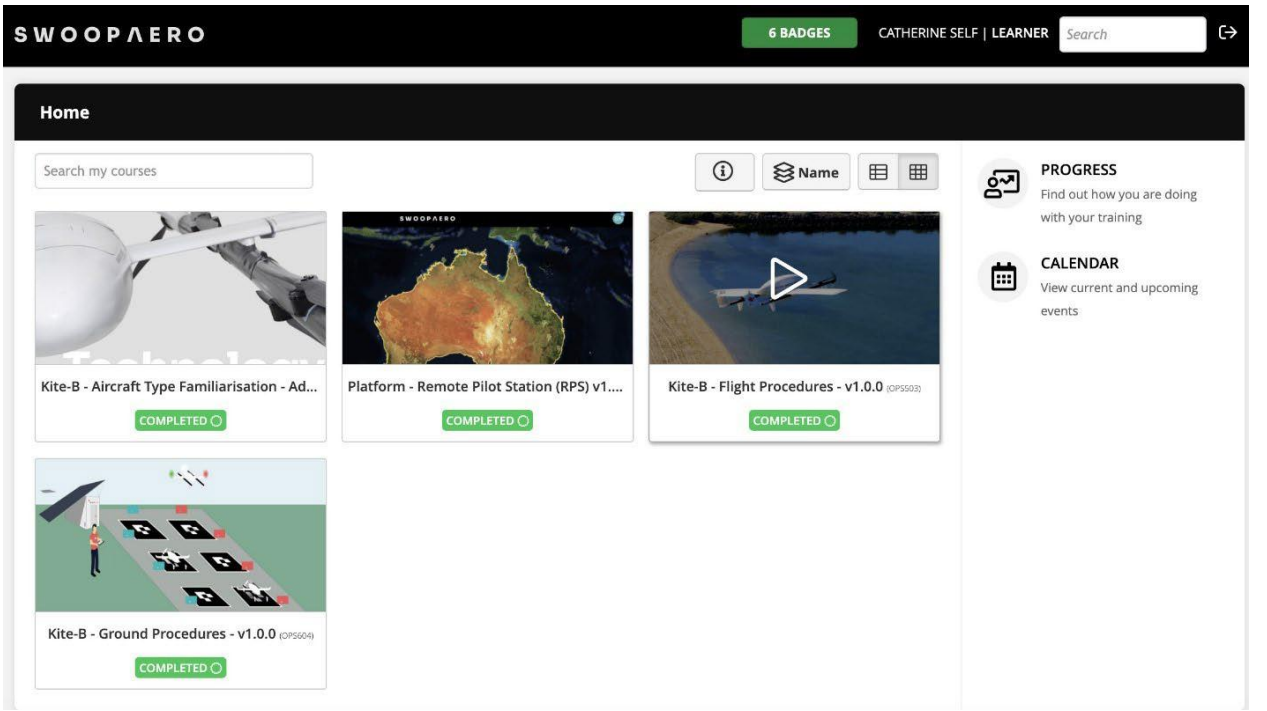


Figure 25 - Example Swoop Aero Learning Management System

A Valkyrie UAS Solutions resource will receive Train the Trainer training in July 2024 who will then be able to provide required training to the Hub Operators and the VOs for flight operations. There is an online portion of the Hub Operator training that is required and will be tracked in the Swoop Aero LMS tool. The hands-on portion of the training will be conducted once the online portion has been successfully completed. The Hub Operator will have an annual recurrent training session with the Trainer.

VO training will be conducted before the initial flight operations commence and will be revisited as needed but minimally on a semi-annual basis.

Valkyrie UAS Solutions will maintain a complete record of all online, hands-on and recurrent training.

Mishap Reporting

See *Safety and Security Standard Operating Procedure – OP-01, Sec/on 4 – Mishap Reporting* for the procedure on reporting Mishaps internally and externally to the FAA/NTSB. The UAS OPERATOR is responsible for notifying the on-site Safety Officer of any mishap. The Safety Officer will determine reporting requirements and is responsible for submitting the report should one be required.

Attachment H

Safety and Security Standard Operating Procedure

Safety and Security Standard Operating Procedure

Overview

To ensure all persons performing work, supporting and/or visiting Valkyrie UAS Solutions are able to do so in a safe and secure environment.

Definitions

SOP *Standard Operating Procedure*

POC *Point of Contact*

AED *Automated External Defibrillator*

OIC *Officer In Charge*

UAS OPERATOR *Remote Pilot In Command*

OEM *Original Equipment Manufacturer*

PPE *Personal Protection Equipment*

RPS *Remote Pilot Station*

Assumptions & Prerequisite Skills

- This SOP assumes that the end user knows how to follow instructions.

Supplies Needed

- Daily safety briefing location identified
- Tool to document points of contact and other life-saving information
- First Aid kit
- AED (?)
- Aircraft and associated equipment for the job (e.g. RPS)
- Proper PPE for the job
    - Hard hat
    - Safety Vest

Overview of Steps

Section 1 – Daily Safety Briefing
Life-saving information

Section 2 – Safe Operations
Safe operations throughout the day

Section 3 – Unsafe Operations
How to address unsafe operations

Section 4 – Incident Reporting
How to report an incident, accident, and/or injury

Section 5 - Security
Secure environment

Section 6 – Biohazardous Material Transportation
How to handle biohazardous material

Section 1 – Daily Safety Briefing

BEFORE YOU START: OIC for the day is identified

1. OIC assigns roles for the operations for the day
   1.1. Headcount - assign who will conduct a headcount throughout the day – will be responsible for ensuring all persons are accounted for in the event of an emergency
   1.2. CPR/1st Aid/AED (if available) – determine if anyone is CPR/1st Aid/AED certified and assign primary and secondary
   1.3. Nearest Hospital/Emergency Service – identify and document the nearest facility that can provide health-related services
   1.4. 911 – assign responsible party to call emergency services
   1.5. Medical Conditions – determine if anyone has any medical conditions that others should be aware of – if not comfortable sharing in a group, instruct where to put the information in case of an emergency (i.e. in the left sock/shoe)
   1.6. Exposures – review known exposures
      1.6.1. Walking path of travel
      1.6.2. Line of fire/release of energy
      1.6.3. Ascending/descending
      1.6.4. Pinch points
      1.6.5. Others
2. Discuss any learnings from previous day/operations and determine if adjustments need to be made to accommodate those findings
   2.1. Assign party responsible for taking next action
   2.2. Define next action to be taken
3. Ensure all assignees are familiar with their responsibilities and are able to perform the tasks as needed
   3.1. Assign flight operations roles:
      3.1.1. UAS OPERATOR

3.1.2. Hub Operator/VO
3.1.3. Other roles as applicable
4. Discuss the work to be done for the day
5. Answer any questions

BEFORE YOU MOVE ON:
OIC to ensure everyone fully understands the job for the day, who is assigned to what role and that everyone is comfortable with the briefing and expectations.

Section 2 – Safe Operations

BEFORE YOU START: OIC has a clear understanding of the operations for the day.

1. Review assignment of roles
   1.1. UAS OPERATOR
   1.2. Hub operator(s)
   1.3. Route approvers
   1.4. Route planners
2. Discuss the plan of action
   2.1. Review flight operations
   2.2. Discuss possible risks that could be encountered and how they will be addressed should they arise
3. Perform daily operational checks as defined by OEM
4. Perform pre-flight checks as defined by OEM
5. Perform operations
6. Perform post-flight checks as defined by the OEM
7. Review any anomalies that occurred and follow appropriate SOP

BEFORE YOU MOVE ON:
Ensure the day's activities have been accomplished, if not, determine next action.

Document any anomalies that were identified and share in the next Safety Briefing.

Section 3 – Unsafe Operations

BEFORE YOU START: OIC should have been assigned for the day.

1. If an unsafe act has been identified, it is everyone's responsibility to bring it to the attention of those involved
   1.1. The unsafe act should be stopped as quickly and safely as possible
   1.2. Parties involved and/or in the vicinity should discuss the unsafe activity – call in the OIC if needed
   1.3. Parties should determine what course of action should be taken
   1.4. Conduct a new Safety Briefing with the course of action included
   1.5. OIC should be briefed based on the urgency of the act
      1.5.1. Brought into the discussion immediately if personal or operational safety was in jeopardy
      1.5.2. Notified and invited to the new Safety Brief
      1.5.3. At the end of the day
2. If a person does not feel comfortable addressing the unsafe act directly, they should bring it to the attention of the OIC and/or Safety Director
   2.1. Follow the same steps as 1.1-1.5

3. Notify the Safety Director if they were not involved in the process

BEFORE YOU MOVE ON:
Ensure all parties have been properly briefed on the situation and an alternate course of action has been identified. Ensure all parties understand the new course of action and what their role is in the execution.

Section 4 – Incident Reporting

BEFORE YOU START: Familiarization with the mishap details.

1. Regroup and assess the situation. Do not compound the problem.
   - 1.1. Stop, re-brief and make a safe plan.
   - 1.2. Take pictures which may include
     - 1.2.1. Launch site and surroundings
     - 1.2.2. Incident/accident site including the aircraft prior to retrieving
     - 1.2.3. Any other pertinent information such as structures, vegetation, etc.
     - 1.2.4. Pictures of documentation
       - 1.2.4.1. Safety Briefing
       - 1.2.4.2. Flight Assessment Forms
       - 1.2.4.3. Re-brief documents
       - 1.2.4.4. Any other documentation related to the mission
   - 1.3. Document the occurrence. Be sure to include:
     - 1.3.1. Date
     - 1.3.2. Time
     - 1.3.3. Location
     - 1.3.4. Crew/Team Members
     - 1.3.5. Weather Conditions
     - 1.3.6. Written Statements – each crew/team member is writing up what occurred as they witnessed
     - 1.3.7. All Pertinent Information
     - 1.3.8. Example of Formal Notification
       - 1.3.8.1. This is a (Team Name) Team alert of an incident that occurred today (or date) at (location). This incident (did or did not) result in injury but (did or did not) result in the (damage or loss), to (equipment, vehicle, etc.) Crew/team members at the scene were (list names). Details are as follows:
       - 1.3.8.2. Include pictures as noted in section 1.2
2. Internal Reporting - Notify OIC and/or Director of Safety by the fastest available means of communication. They will determine further notification as needed.
3. External reporting
   - 3.1. If the occurrence resulted in an aircraft incident or accident, follow FAA/NTSB instructions
     - 3.1.1. FAA:
       - 3.1.1.1. When to report an incident/accident - https://www.faa.gov/faq/when-do-i-need-report-accident
       - 3.1.1.2. How to report an incident/accident - https://www.faa.gov/faq/how-do-i-submit-accident-report-under-small-uas-rule-part-107-faa
     - 3.1.2. NTSB: https://www.ntsb.gov/investigations/process/Documents/NTSB-Advisory-Drones.pdf
4. General information
   - 4.1. You are painting a picture. Provide a detailed narrative of the occurrence. Provide facts. Include mission objective, weather conditions, position of team members, team member roles, and description of surroundings at a minimum. Be very professional in your writing style.
   - 4.2. Answer any anticipated questions before they are asked. The goal is to provide a detailed enough report that there are no other questions.
   - 4.3. Identify the root cause.
     - 4.3.1. Call it like it is. I.e. if it is a complacency issue – name it as such.
     - 4.3.2. Own it if it is yours. Take responsibility.

4.4. Identify a Corrective Action Plan to ensure this type of occurrence does not happen again.

BEFORE YOU MOVE ON:
Ensure all parties have been properly notified of the situation and corrective action plan.

Section 5 – Physical Security

BEFORE YOU START: An assessment of the environment should be conducted.

1. Ensure proper markings of launch/landing locations are clear
2. Ensure proper markings are clear where it is safe for personnel, participants and/or observers to be located
3. Ensure the UAS OPERATOR has an area where they are:
   3.1. Able to conduct operations without distraction
   3.2. Free from severe elements
   3.3. Have all the tools necessary for them to complete their job effectively
4. Ensure there is a location where the equipment is stored that is tamper-free and secure

BEFORE YOU MOVE ON:
Ensure the environment meets the requirements of operations.

Section 6 – Biohazardous Material Transportation

BEFORE YOU START: Section to be developed.

1. To be developed

BEFORE YOU MOVE ON:
Ensure the environment meets the requirements of operations.

Conclusion

Please direct questions, comments and recommendations for this SOP to:

- cself@valkyrie-uas.co

Revision History

Date	Version	Description	Approved
5/1/2024	1.0.0	Initial document created	

Attachment I

MHA Drone Tribal Resolution – Access to GIS Data/Corridor Approval

RESOLUTION OF THE GOVERNING BODY
OFTHE
THREE AFFILIATED TRIBES
OFTHE
FORT BERTHOLD INDIAN RESERVATION

A Resolution Entitled: ***"MHA Drone: Planning and*** *Protocol Development Use Case."*

WHEREAS, This Nation having accepted the Indian Reorganization Act of June 18, 1934, and the authority under said Act and having adopted a Constitution and By-Laws pursuant to said Act; and

WHEREAS, The Constitution of the Three Affiliated Tribes, also Known as the Mandan Hidatsa Arikara Nation ("Tribes" or "MHA Nation"), generally authorizes and empowers the Tribal Business Council to engage in activities on behalf of and in the interest of the welfare and benefit of the Tribes and of the enrolled members thereof; and

WHEREAS, Article III of the Constitution of the Three Affiliated Tribes provides that the Tribal Business Council is the governing body of the Tribes; and

WHEREAS, Article VI, Section 5(1) of the Constitution of the Three Affiliated Tribes provides the Tribal Business Council authority to adopt resolutions regulating the procedure of the Tribal Council and other Tribal Agencies and Tribal Officials of the Reservation; and

WHEREAS, The Three Affiliated Tribes of the Fort Berthold Reservation has been awarded a Strengthening Mobility and Revolutionizing Transportation ("SMART") grant FY22NIP1G3, for the Project entitled "MHA Drone Project: Planning and Protocol Development," from the United States Department of Transportation ("US DOT'), to explore Unmanned Aerial System ("UAS") technology in furtherance of delivering lifesaving medical supplies and other beneficial health materials to members of this Nation between New Town and Twin Buttes on the Fort Berthold Reservation; and

WHEREAS, The MHA Project Team supporting this use case includes Nueta, Hidatsa, Sahnish (NHS) College, the University of North Dakota, the Northern Plains UAS Test Site, Airspace Link, and Thales; and

WHEREAS, A MHA advisory board to guide activities and engage Tribal stakeholders and Tribal elders in planning and protocol development has been assembled for the Project; and

WHEREAS, The MHA Project Team respectfully requests Geographic Information System ("GIS") data from the Tribes for the successful implementation of the SMART grant to solely plan prospective flight paths, launch and landing zones, ground- based risks and routing analysis; and

WHEREAS, The request for this GIS data is also to protect and eliminate operations in certain areas, including but not limited to, areas of cultural significance, sacred sites, etc.

NOW, THEREFORE, BE IT RESOLVED, that the Tribal Business Council of the Three Affiliated Tribes approves the provision of Three Affiliated Tribes GIS data to the MHA Project Team as necessary to the successful operation of the aforementioned SMART grant and for use in planning flight operations, conducting flight operations, and authoring the final grant report for the above referenced purposes; and

BE IT FURTHER RESOLVED, that the GlS data provided to the MHA Project Team be given with set back limits as required by the Three Affiliated Tribes around sensitive cultural areas to obscure the exact location of sites of significant importance to the Tribes; and

BE IT FURTHER RESOLVED, that no personally identifying information (PII) of any members of the Tribes will be shared via this data request; and

BE IT FINALLY RESOLVED, that all GJS data provided to the MHA Project Team and all partners for use in the Project remain the sole property of the Tribes and will remain confidential and not available for use for any other purpose than that specified above. Specifics on data management may be found in the data management plan for the Project which has been approved by the Tribes and US DOT for the grant.

<SIGNATURE PAGE TO FOLLOW>

CERTIFICATION

I, **the** undersigned, as Secretary of the Tribal Business Council of the Three Affiliated Tribes of the Fort Berthold Indian Reservation hereby certify that the tribal Business Council is composed of seven (7) members of whom five (5) constitute a quorum, 7 were present at a Regular Meeting thereof duly called, noticed, convened and held on the 7th day of May, 2024, that the foregoing Resolution was duly adopted at such meeting by the affirmative vote of 5 members, 0 members opposed, 0 members abstained, 2 members not voting, and that said Resolution has not been rescinded or amended in any way.

Chairman [ ] Voting. [**X]** Not Voting.

Dated this this day of May, 2024.

ATTEST:

Executive Secretary Fred Fox
Tribal Business Council
Three Affiliated Tribes

Tribal Chairman, Mark N. Fox
Tribal Business Council
Three Affiliated Tribes

Attachment J

MHA Drone Camp Agenda 2023

October 20, 2023 – 9:00 AM to 3:30 PM
Earth Lodge Village in New Town North Dakota

UAV/Drone Camp

Sponsors

MHA Nation, Boys and Girls Club of TAT, Nueta Hidatsa Sahnish College, University of North Dakota, Northern Plains UAS Test Site, Airspace Link.

9:00 to 9:30

Registration and Greetings: Rylee Dahlen, UND, Mike Haman, UND, Kacey Murdock, NHS College, Matt Murdock, NHS College, Shadlynn Severance, NHS College, Jordan Conklin, NHS College, and Brian Dover, NHS College.

9:30 to 10:15

Let's Get Started, Drone Safety, Why Drones: Future Employment Opportunities Names: Tanya Sand-Driver GIS TAT, Kerry Hartman, NHS College, and Jordan Krueger, RIAS-Research Institute on Autonomous Systems.

Participants will rotate through the following five stations:

10:15 to 11:00 — Station Rotation

11:00 to 11:45 — Station Rotation

12:00 to 12:50 — Lunch

1:00 to 1:45 — Station Rotation

1:45 to 2:30 — Station Rotation

2:30 to 3:15 — Station Rotation

3:00 to 3:30 — Wrap up -Kerry Hartman

Station Information:

Station 1 Public Safety Exercise: Names: Dan Myles (UND), Donald Rescignio (UND), Rylee Dahlen (UND), and Jordan Conklin (NHS College).

Station 2 Flying an Obstacle Course: Improving Skills: Names: Jordan Kruger (RIAS-Research Institute on Autonomous Systems), Scott Keane (UND), Jeremy Amundson (Northern Plains UAS Test Site), and Brian Dover (NHS College).

Station 3: Drones at Fort Berthold: Supporting Natural Resources and Use of Data: Names: Tanya Sand-Driver (TAT-GIS), Lee Voight (GIS-TAT), Shadlynn Severance (NHS College) Caley Fox (GIS-TAT), Naomi Fox, (GIS-TAT) and Delia Blake (GIS-TAT).

Station 4 Using Tech to Fly Safely: Charting a Course: Sonny Beach (Airspace Link), Mivsam Yekutiel (Airspace Link), Sam Johnson (Northern Plains UAS Test-Site), and Kacey Murdock (NHS College).

Station 5 UAS Ping Pong Challenge: Names: Isack Yetzech (UND), Landon Johnson (Northern Plains UAS Test Site), Zack Reeder (RIAS-Research Institute on Autonomous Systems), and Matt Murdock (NHS College).

This project is supported by the United States Department of Transportation (the USDOT)
Grant Number: SMARTFY22N1P1G38

Attachment K

MHA Drone Camp Agenda 2024

MHA Nation Drone Camp

Schedule of Events | Boys and Girls Club of TAT

Thursday, July 18, 2024 | Earth Lodge Village | New Town, ND

9:45 - 10:00 AM | Registration @ Earth Lodge Village

10:05 - 10:10 AM | Introductions of Drone Camp Staff @ Earth Lodge Village

10:10 - 10:25 AM | Safety Discussion | *Amanda Brandt, Senior Research Scientist*

10:30 -11:55 AM | Rotate Through Three Stations

- Station 1: Airworthiness Flight Training

Air Traffic Control demands drone pilots to fly at assigned altitudes and on charted flight routes to maintain safety separation from other traffic and ground obstacles. Aviator candidates will practice flying through an obstacle course to hone their pilot skills essential to become the next great mavericks of the sky!

Lead Instructor: Tanner Yackley, University of North Dakota Aerospace

- **Station 2: Livestock Herding**

Drones are providing new and exciting opportunities through innovation across many diverse career fields. Aviator candidates will simulate herding livestock (ping-pong balls) using a drone's downwash to direct them into desired locations.

Lead Instructor: Leslie Martin, University of North Dakota Aerospace

- **Station 3: Precision Delivery**

Aviator candidates will practice "On Time-On Target" operations crucial for the distribution of critical supplies in humanitarian and military operations. During this station, essential team building and communication skills will be practiced as mission controllers talk pilots onto a target and granting them clearance to land to hit targeted times.

Lead Instructor: Amanda Brandt, University of North Dakota Research Institute for Autonomous Systems (RIAS)

12:00 PM | Complimentary Lunch at the MHA Interpretive Center

12:25 PM | Flight Demonstration

12:50 PM | Graduation

1:00 PM | Return to Earth Lodge Village to Board Bus

This project is supported by the United States Department of Transportation SMART Grant Number: SMARTFY22N1P1G38

NHS NUETA HIDATSA SAHNISH COLLEGE

NORTHERN PLAINS UAS TEST SITE

UND NORTH DAKOTA

Attachment L

MHA Drones in School 2024

Drones in School at MHA Nation

Sponsor: MHA Drone Project staff with the Research Institute on Autonomous Systems (RIAS) at the University of North Dakota (UND) and Nueta Hidatsa Sahnish (NHS) College.

Fund Number: SMARTFU22N1P1G38

Dates: November 18, 2024 | New Town Public School
November 19, 2024 | Twin Buttes Public School

The project will be offering curriculum to STEM classes for Middle School and High School students at New Town and Twin Buttes. This will provide students with an opportunity to apply real-world search pattern techniques using drone technology to simulate early detection of wildfires. By identifying and plotting wildfire coordinates with GIS software, students gain hands-on experience with critical tools used in the field, enhancing their understanding of the vital role Autonomous Systems and STEM. This exciting exercise provides multiple opportunities for practical drone flying, fostering teamwork and technical skills in a dynamic, educational environment.

UND UNIVERSITY OF NORTH DAKOTA
LEADERS IN ACTION

Attachment M

Drone Certification Information Sheet

Proposed Nine Credit Drone Certificate Program [1]

Agreement Proposal between the University of North Dakota (UNO) and

Nueta Hidatsa Sahnish College (NHS College)
Timeline and Start Date

Students can enroll in Aviation 126 in the Fall 2024 or Spring 2025 semester.

Fall 2025 is the formal start date for the program to ensure all approvals are in place.

Online Course Offerings with Onsite Flight Training/Credit Value/Content/

Avit 126- **Introduction to UAS- Online - 2 credits**

- This course of instruction introduces the students to the history of Remotely Piloted Aircraft and their current and future development for use in a burgeoning civil industry. Specific blocks deal with aircraft, ground, communications, launch and recovery systems while emphasizing human integration into the overall system.

Avit 238 - **UAS Operator Certification - Online- 3 credits** (course number will change but the content will not)

- This course will develop the student's knowledge and skill needed to manage and operate small remotely piloted aircraft. Course content includes Federal Aviation Regulations, airspace authorization criteria, and operational approval requirements. Mission employment skills will be acquired through both classroom and hands-on flight activities. Flight activities will include launch and recovery operations, emergency procedures, plus mission planning and execution. Students must complete the appropriate UAS flight lessons to satisfactorily complete the course. (Avit 126 is pre-req) - By the time this is offered we may have a new Course number for an Online version of Avit 238.

  NOTE: UNO will need to establish a cost for UNO instructors to travel to New Town to conduct the Flight Training at NHS College. This would be individual UAS flight instruction using various platforms and payloads(cameras). [2]

Aviation 333 - **Remote Sensing- Online -4 Credit** (Aviation 238 is pre-requisite)-

- This course presents the theory and operations of common sensors used by the operators of remotely piloted and autonomous aircraft systems. The theory is combined with operational scenarios to provide the student with the ability to match specific sensors with anticipated missions. **Lab portion is included with special emphasis on**
  - Certificate program will require approval by the North Dakota Board of Higher Education
  - If you complete this flight training at UNO it is $1,609-this provides 9 hours of one-on-one instruction and 6.5 hours of UAS flight training. So, if NHS College had 10 students enrolled, UNO faculty could do paired training. UNO will need to travel a few instructors for the week. Eventually, faculty at NHS College will be able to offer this training independently.

Attachment N

ASSUREd Safe FEMA Training Flyer 2024

ASSURED SAFE

ASSURED Safe is a non-profit, self-sustaining, fee-for-service federated ecosystem that provides standards, education, training, testing, certification, and credentialing of first responders' use of UAS for public safety and disaster operations.

CURRENT TRAININGS

UAS Flight Operations for Emergency Response (AWR-422)* is a 1-day, in-person course that will prepare first responders with technical resources, knowledge, and experience to deploy UAS for a variety of emergency response scenarios. Content will cover rules and regulations, mission planning, airspace coordination, platform and sensor selection, risk assessment and mitigation, flight operations, data collection, and metadata retention.

UAS Data Analytics for Emergency Response (PER-407)* is a 1-day, in-person, instructor-led course on how to effectively organize, generate, analyze, and rapidly disseminate geospatial data from UAS data. Course content will cover how to transform UAS imagery, video, and other data into products that can be used to support decision-making, damage assessment, and other mission-critical tasks for emergency response.

UAS Flight Operations for Emergency Response Level II (PER-421)* is a 1-day, in-person, instructor-led course. This course will expand first responders' abilities to prepare, plan, and execute Unoccupied Aircraft Systems (UAS) mission for infrastructure inspection & area mapping. The course will cover UAS within the ICS structure, airspace coordination mission planning for infrastructure inspection, mission planning for area mapping, executing an infrastructure inspection mission, & executing an infrastructure area mapping mission. There are no pre-recs for this course.

UAS Data Analytics for Emergency Response Level II (PER-434)* is a one-day, in-person, instructor-led course that covers how to effectively organize, generate, analyze, and rapidly disseminate geospatial data from imagery collected using Uncrewed Aircraft Systems (UAS) imagery. In this course, participants work through a real-world disaster response scenario in which they execute an end-to-end workflow to transform UAS imagery into data products, integrate UAS data with other sources of information, assess damage, and share the data with external organizations. There are no pre-recs for this course.

*These courses are delivered by ASSURED Safe instructors at various regions around the US. Course delivery, materials, and travel and lodging funding is provided by The U.S. Department of Homeland Security (DHS). Please visit https://www.firstrespondertraining.gov/frts/trainingproviders to learn more.

training@assuredsafe.org
ASSURED Safe
ASSURED Safe
@assured_safe
@assuredsafe

Use the QR code to register for a training course or visit us at assuredsafe.org

Attachment O

MHA Reliance Agreement Institutional Review Board (IRB)

Nueta Hidatsa Sahnish College

Dr. Kerry Hartman
Academic Dean Chair Sciences
220 8th Ave., N
P. O. Box 490
New Town, ND 58763
Phone No. (701) 627-8053
Fax No. (701) 627-4099

June 26, 2024

Michelle Bowles, Director of Research Assurance & Ethics
Institutional Review Board
Tech Accelerator, Suite 2050
4201 James Ray Dr Stop 7134
Grand Forks, ND 58202

Dear Ms. Bowles:

I am pleased to confirm that Nueta Hidatsa Sahnish (NHS) College has established an Institutional Review Board (IRB) reliance agreement with the University of North Dakota for the DOT SMART Grant MHA Nation Drone Project: Planning and Protocol supported by a United States Department of Transportation (DOT) Grant (SMARTFY22N1P1G38). I serve as a Principle Investigator on the grant.

MHA Nation Drone Project staff presented the research plan for an assessment of Tribal needs to the Health and Human Resource Committee meeting on May 2, 2024. At that meeting the research was approved by that Tribal Committee. Meeting minutes were also provided in the IRB submission to UND. As part of the grant, there is an approved data management plan in place with DOT covering data sovereignty and privacy. Presently neither NHS College nor the MHA Nation has an IRB. However, NHS College is relying upon the expertise of University of North Dakota's IRB for the ethical review, approval, and management of research involving human subjects.

For any questions regarding this IRB reliance agreement, please contact me by phone at (701) 627-8053 or email.

Sincerely,

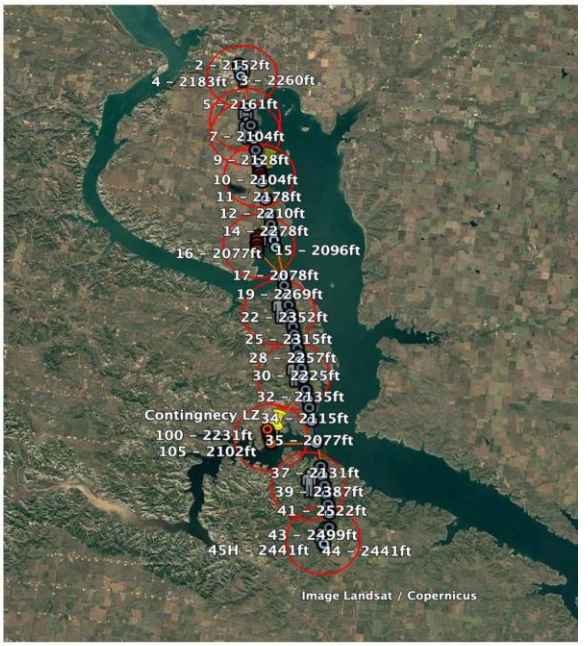
Dr. Kerry Hartman
khartm@nhsc.edu

Attachment P

Visual Observer Locations

Flight Operations

Visual Observer Locations



Erin/Greg: New Town Road

V01) Greta: 47.934498 °, -102.450114 °

V02) Ian: 47.919953°, -102.446487°

V03) Jeff: 47.876987 °, -102.418888 °

V04) Sean: 47.802336 °, -102.404893 °

V05) Steven: 47.737049°, -102.364850°

V06) Shawn: 47.674424 °, -102.333032°

V07) Kyle: 47.610296 °, -102.352012 °

V08) Hunter: 47.566961°, -102.293282°

Scott: Twin Buttes Road

Attachment Q

Handout Introduction for Advisory Board

World Café

DRONE CAMP STAFF

Summary of MHA Drone Project prepared for:
World Café Sessions

January 22-24, 2024.

Location: All segments and online.

Hosted by: Dr. Kerry Hartman and Prairie Rose Seminole with
Nueta Hidatsa and Sahnish College, and their grant partners at the University of North Dakota, in collaboration with Tanya Sand-Driver, Director, TAT GIS/Water Resources.

NHS NUETA HIDATSA SAHNISH COLLEGE

NORTHERN PLAINS UAS TEST SITE

UND LEADERS IN ACTION

World Café

Project Overview: The goal of the MHA Nation Drone Project: Planning and Protocol Development is to develop infrastructure to support government-to-government relationships to improve access to basic needs using autonomous systems (drones) on the tribal lands of the Three Affiliated Tribes (TAT) of the Mandan Hidatsa and Arikara (MHA) Nation. This effort will include building a sustainable foundation to integrate the use of UAS, which is repeatable and scalable. Specifically, the project will demonstrate the use of UASs/drones to ensure better access to medical care and equipment and potentially other use cases. The priority use case is the application of drones to deliver medical supplies between Twin Buttes, ND, and New Town, ND across the Missouri River in northwestern North Dakota.

Project Timeline: August 15, 2023, to February 15, 2025.

Funding: Stage One SMART grant funding is provided to Three Affiliated Tribes by the United States Department of Transportation (DOT) in the amount of $1,966,345.00 for the 18-month period. A total of 392 proposals were submitted with 59 funded (15% acceptance rate). Three Affiliated Tribes is the only Tribal Nation to secure an award and the only recipient in a broad geographic area of the mid-west. Stage One funders are the only group eligible for Stage 2 funding in the amount of $15 million dollars for 36 months of activity on their project.

Partners: The entities supporting this project include the Nueta Hidatsa Sahnish College, GIS Water Resources at Three Affiliated Tribes, the University of North Dakota, the Northern Plains UAS Test Site, Thales, and Airspace Link. The primary mission is to develop a safe, efficient, and scalable network within MHA Nation to deliver products and services using drones on tribal lands.

Specific Project Aims: The Three Affiliated Tribes of MHA Nation will work with their university and industry partners to (1) finalize a community assessment of needs to support decisions regarding future use cases, (2) determine the economic viability of using drones to improve the quality of life on these tribal lands, (3) expand workforce capacity and development in collaboration with the NHS College and Boys and Girls Club of the Three Affiliated Tribes, (4) expand government to government relationships, (5) plan for integration of Beyond Visual Line of Sight (BVLOS) operations and implementation of drone use on tribal lands through application of the Vantis Network, and (6) evaluate the effectiveness of planning and protocol development activities with anticipation of a request for Stage 2 funding.

Team Structure: The MHA Drone Project has sub-groups who have assigned and are working collaboratively with Three Affiliated Tribes to achieve the aims of the project, including an assessment/use case group working in tandem with an economic viability group at the University of North Dakota. The workforce development committee that is guided by NHS College in collaboration with the University of North Dakota College of Aero-Space Sciences, and a Beyond Visual Line of Sight Group/Implementation group in partnerships with the Northern Plains UAS Test-Site, Thales, and Airspace Link.

NHS NUETA HIDATSA SAHNISH COLLEGE

NORTHERN PLAINS UAS TEST SITE

UND LEADERS IN ACTION

Attachment R

NPUASTS Command Center Trailer - Deployment Training

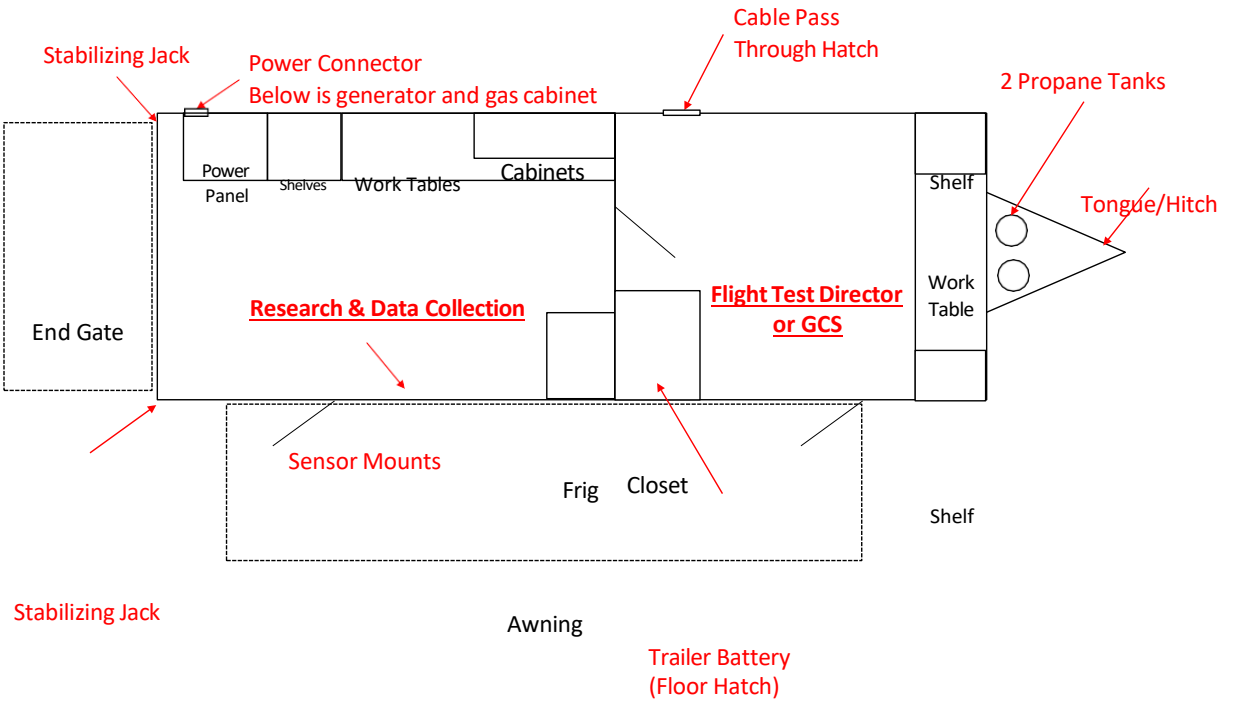
NPUASTS Command Center Trailer

Deployment Training

Specs

- 24’ box
- 4’ tongue
- ~8’ rear door/ramp
- Highly configurable
- 2 divided interior areas
  - Front – GCS, Flight Director, or other
  - Rear – Research and data collection
- Roof platform w/ ladder access
  - Sensors or VO platform
- Climate (AC and Heat)
- 2 side doors
- 2 cable pass through
- 7500W Honda Inverter Generator

Trailer Sections



Sensors and Specialized Software

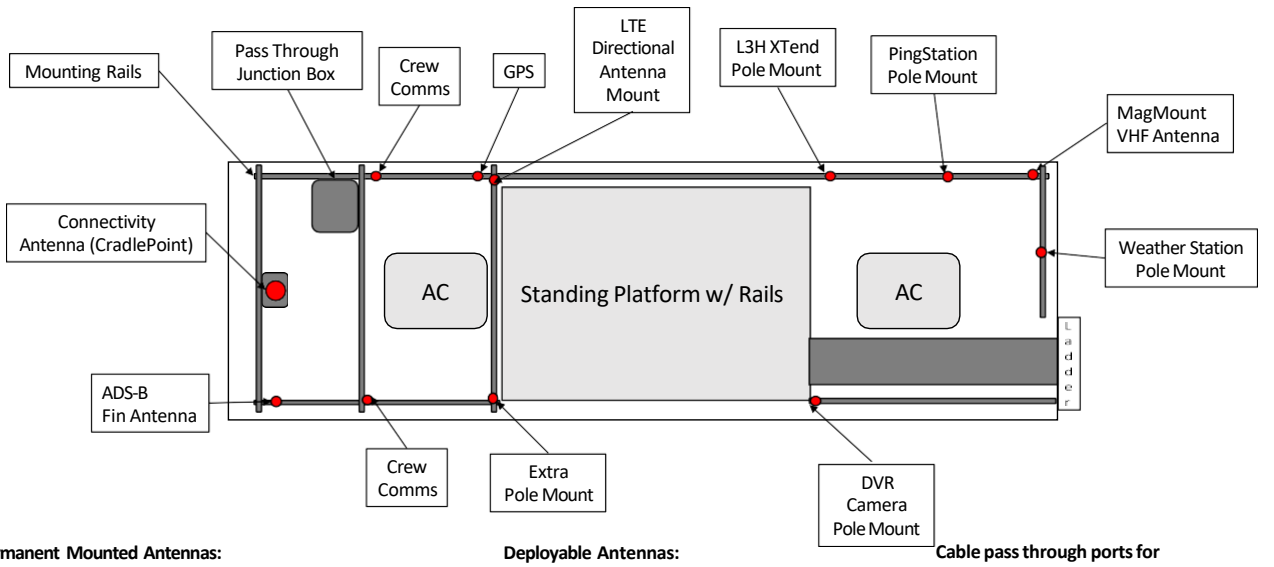
- The following is a list of sensors and specialized software currently deployable with the trailer. These sensors are only deployed if projects require them.

- ADS-B Receivers
  - SkyRadar DX
  - Appareo Stratus2
  - uAvionix PingStation
  - L3Harris Xtends
- Davis VantagePro2 Weather Station
- A-Zone DVR Security System w/ 4 Cameras
- Echodyne Echogaurd Radars
- Simulyze Mission Insight
- L3Harris RangeVue
- L3Harris DCAPS w/ screen tag

Communications

- The following is a list of communications equipment currently deployable with the trailer. These sensors are only deployed if projects require them.

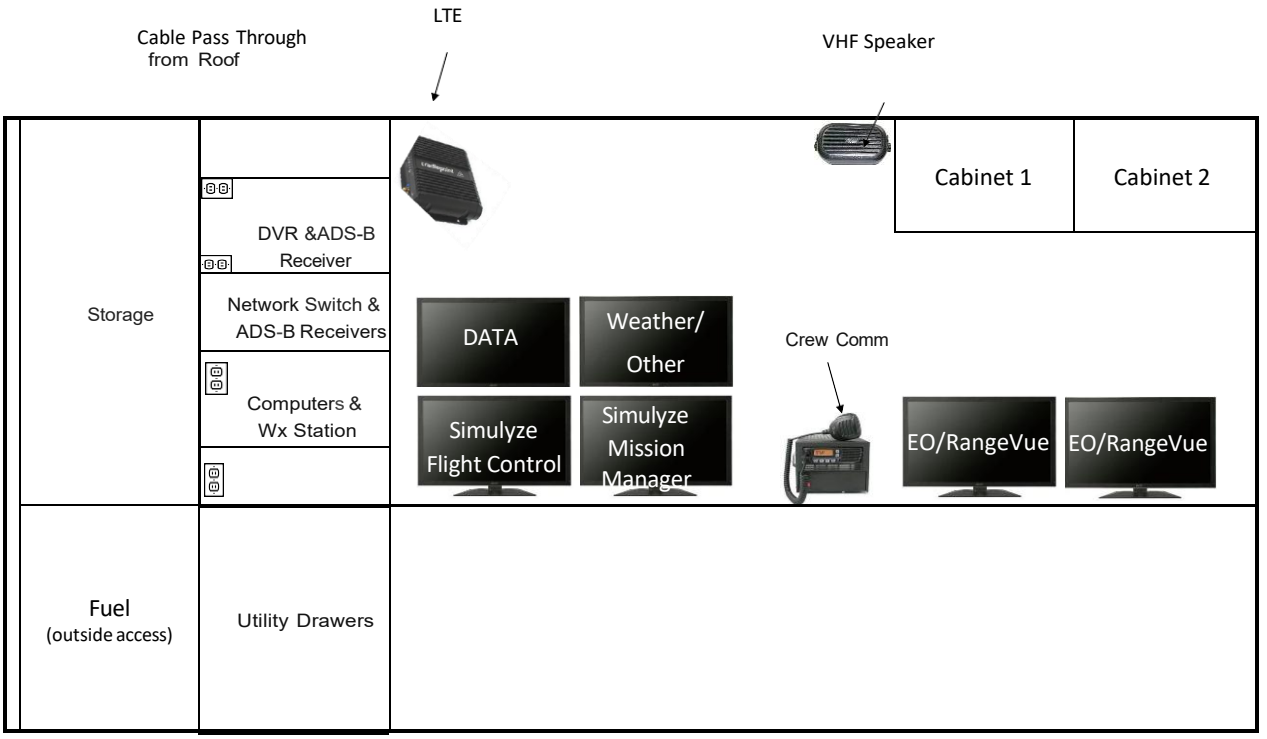
- VHF Radio with Options for Different Antennas
  - Mag-Mount (permanent)
  - White Whip (deployable)
  - Mag-Mount on Telescoping Pole (deployable)
- Cradlepoint IBR1100 w/ 5-in-1 Antenna (permanent black dome)
- LTE Directional Antenna (deployable)
- StoneCast Crew Communications Radios and Antennas (permanent)

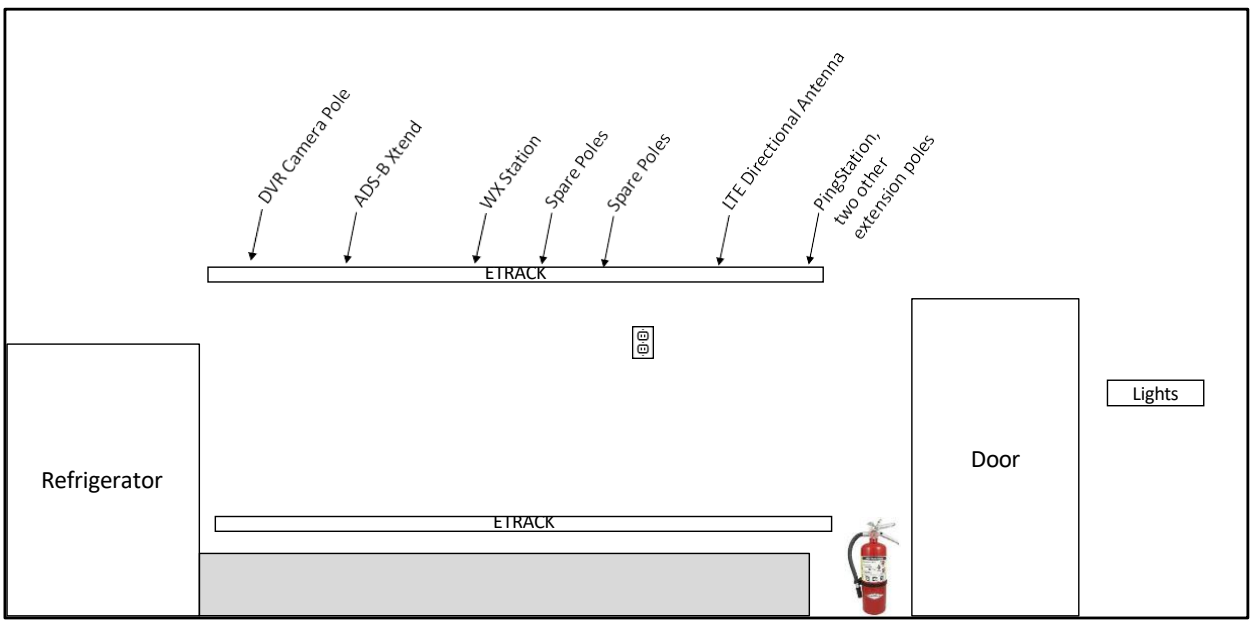


Permanent Mounted Antennas:
1) ADS-B
2) GPS
3) Mag Mount VHF Antenna
4) Crew Comms (Stones Mobile)
5) Connectivity (CradlePoint)

Deployable Antennas:
1) Weather Station
2) LTE Directional Antenna
3) PingStation ADS-B Receiver
4) DVR Cameras
5) Xtend ADS-B Receiver
6) White Wipe VHF antenna
7) Echodyne Radars

Cable pass through ports for Deployable Antennas:
1) Driver's side of trailer towards front
2) Trailer roof in back

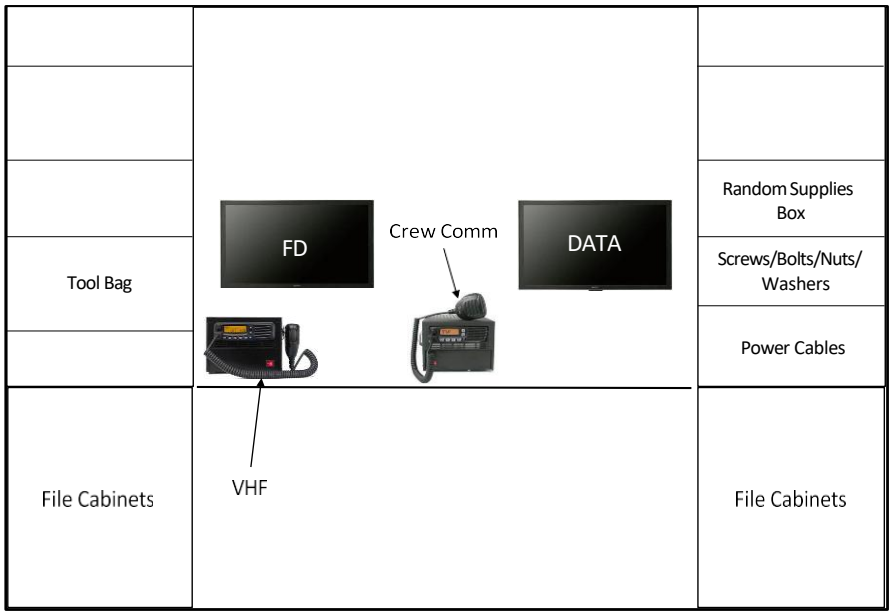

Cable Pass Through from Roof
LTE
VHF Speaker
Cabinet 1
Cabinet 2
Storage
DVR &ADS-B Receiver
Network Switch & ADS-B Receivers
Computers & Wx Station
DATA
Weather/ Other
Simulyze Flight Control
Simulyze Mission Manager
Crew Comm
EO/RangeVue
EO/RangeVue
Fuel
(outside access)
Utility Drawers

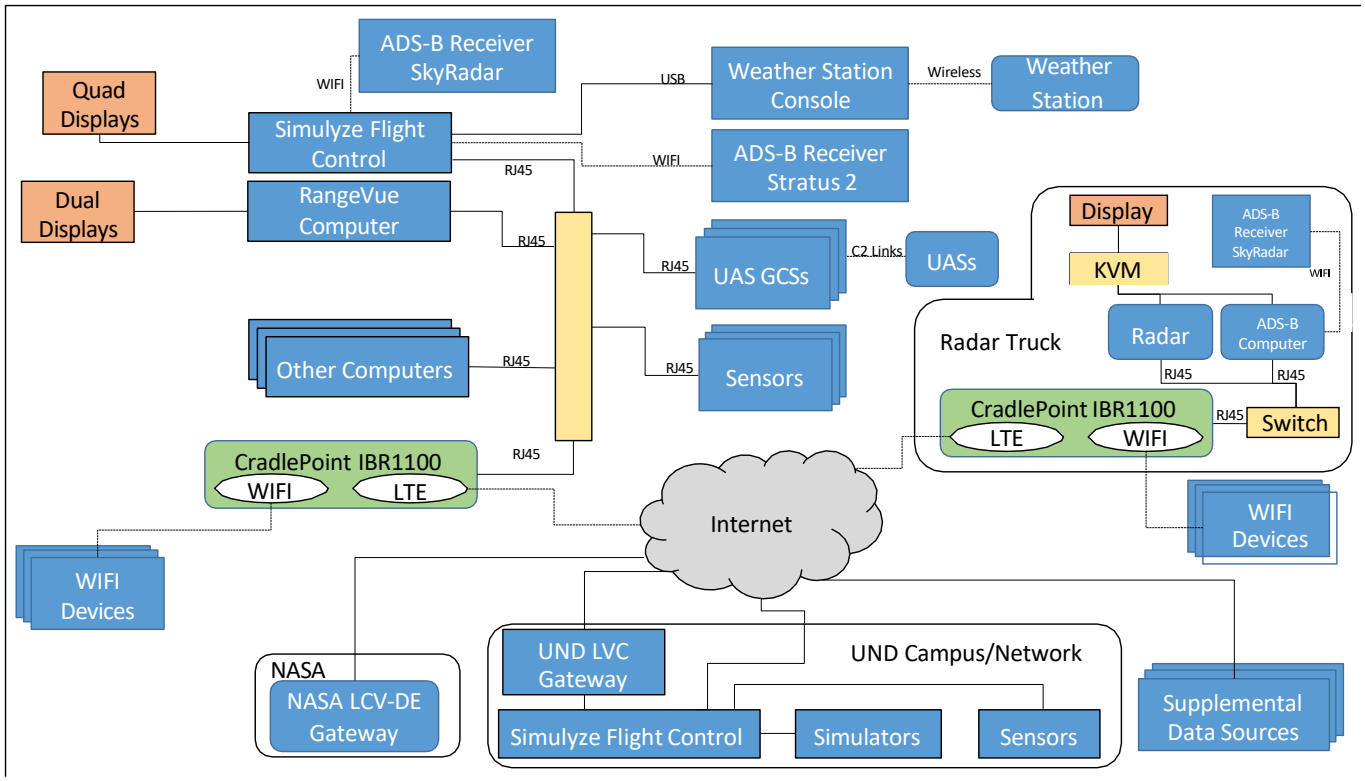

DVR Camera Pole
ADS-B Xtend
WX Station
Spare Poles
Spare Poles
LTE Directional Antenna
PingStation, two other extension poles
ETRACK
Refrigerator
ETRACK
Door
Lights

No computers are setup in the front of the trailer.

Monitors can be plugged into a laptop with HDMI

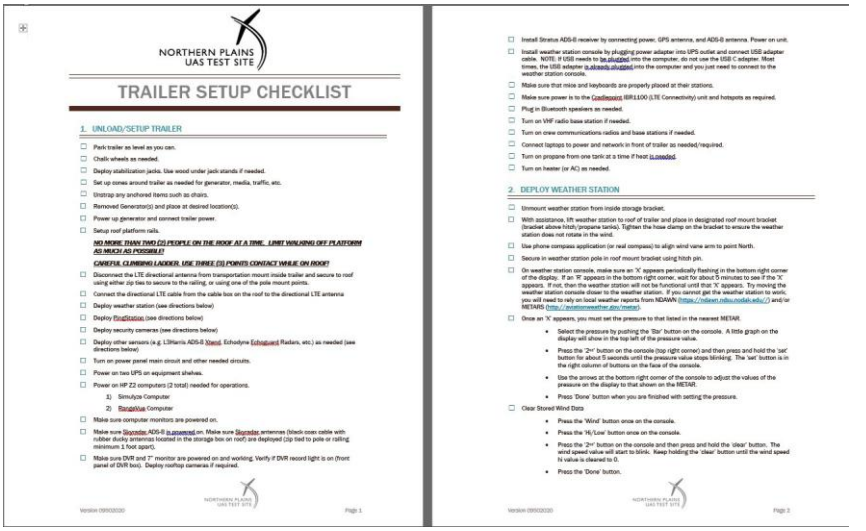
Two general stations are for Flight Director and or GCS laptops





Follow the Checklist

- Checklist is on SharePoint and on the local computers



NORTHERN PLAINS UAS TEST SITE

TRAILER SETUP CHECKLIST

1. UNLOAD/SETUP TRAILER

- ☐ Park trailer as level as you can.
- ☐ Chalk wheels as needed.
- ☐ Deploy stabilization jacks. Use wood under jack stands if needed.
- ☐ Set up cones around trailer as needed for generator, media, traffic, etc.
- ☐ Unstrap any anchored items such as chairs.
- ☐ Removed Generator(s) and place at desired location(s).
- ☐ Power up generator and connect trailer power.
- ☐ Setup roof platform rails.

NO MORE THAN TWO (2) PEOPLE ON THE ROOF AT A TIME. LIMIT WALKING OFF PLATFORM AS MUCH AS POSSIBLE!

CAREFUL CLIMBING LADDER. USE THREE (3) POINTS CONTACT WHILE ON ROOF!

- ☐ Disconnect the LTE directional antenna from transportation mount inside trailer and secure to roof using either zip ties to secure to the railing, or using one of the pole mount points.
- ☐ Connect the directional LTE cable from the cable box on the roof to the directional LTE antenna
- ☐ Deploy weather station (see directions below)
- ☐ Deploy Pingstation (see directions below)
- ☐ Deploy security cameras (see directions below)
- ☐ Deploy other sensors (e.g. L3Harris ADS-B Xtend, Echodyne EchoGuard Radars, etc.) as needed (see directions below).
- ☐ Turn on power panel main circuit and other needed circuits.
- ☐ Power on two UPS on equipment shelves.
- ☐ Power on HP Z2 computers (2 total) needed for operations.
  1) Simulyze Computer
  2) RangeVue Computer
- ☐ Make sure computer monitors are powered on.
- ☐ Make sure Skyradar ADS-B is powered on. Make sure Skyradar antennas (black coax cable with rubber ducky antennas located in the storage box on roof) are deployed (zip tied to pole or railing minimum 3 foot apart).
- ☐ Make sure DVR and 7" monitor are powered on and working. Verify if DVR record light is on (front panel of DVR box). Deploy rooftop cameras if required.

- ☐ Install Stratus ADS-B receiver by connecting power, GPS antenna, and ADS-B antenna. Power on unit.
- ☐ Install weather station console by plugging power adapter into UPS outlet and connect USB adapter cable. NOTE: If USB needs to be plugged into the computer, do not use the USB C adapter. Most times, the USB adapter is already plugged into the computer and you just need to connect to the weather station console.
- ☐ Make sure that mice and keyboards are properly placed at their stations.
- ☐ Make sure power is to the Cradlepoint IBR1100 (LTE Connectivity) unit and hotspots as required.
- ☐ Plug in Bluetooth speakers as needed.
- ☐ Turn on VHF radio base station if needed.
- ☐ Turn on crew communications radios and base stations if needed.
- ☐ Connect laptops to power and network in front of trailer as needed/required.
- ☐ Turn on propane from one tank at a time if heat is needed.
- ☐ Turn on heater (or AC) as needed.

2. DEPLOY WEATHER STATION

- ☐ Unmount weather station from inside storage bracket.
- ☐ With assistance, lift weather station to roof of trailer and place in designated roof mount bracket (bracket above hitch/propane tanks). Tighten the hose clamp on the bracket to ensure the weather station does not rotate in the wind.
- ☐ Use phone compass application (or real compass) to align wind vane arm to point North.
- ☐ Secure in weather station pole in roof mount bracket using hitch pin.
- ☐ On weather station console, make sure an 'X' appears periodically flashing in the bottom right corner of the display. If an 'X' appears in the bottom right corner, wait for about 5 minutes to see if the 'X' appears. If not, then the weather station will not be functional until that 'X' appears. Try moving the weather station console closer to the weather station. If you cannot get the weather station to work, you will need to rely on local weather reports from NDAWN (https://ndawn.ndsu.nodak.edu/) and/or METARS (http://aviationweather.gov/metar).
- ☐ Once an 'X' appears, you must set the pressure to that listed in the nearest METAR.
  - Select the pressure by pushing the 'Bar' button on the console. A little graph on the display will show in the top left of the pressure value.
  - Press the '2nd' button on the console (top right corner) and then press and hold the 'set' button for about 5 seconds until the pressure value stops blinking. The 'set' button is in the right column of buttons on the face of the console.
  - Use the arrows at the bottom right corner of the console to adjust the values of the pressure on the display to that shown on the METAR.
  - Press 'Done' button when you are finished with setting the pressure.
- ☐ Clear Stored Wind Data
  - Press the 'Wind' button once on the console.
  - Press the 'Hi/Low' button once on the console.
  - Press the '2nd' button on the console and then press and hold the 'clear' button. The wind speed value will start to blink. Keep holding the 'clear' button until the wind speed hi value is cleared to 0.
  - Press the 'Done' button.

Attachment S

MHA Drone Tribal Resolution - Stage 2 Funding Approval

RESOLUTION OF THE GOVERNING BODY
OF THE
THREE AFFILIATED TRIBES
OF THE
FORT BERTHOLD INDIAN RESERVATION

A Resolution Entitled: ***"Approved to apply for Strethgthening Mobility & Revolutionizing Transportation (or "SMART") Stage 2 Implementation Grant."***

WHEREAS, This Nation having accepted the Indian Reorganization Act of June 18, 1934, and the authority under said Act and having adopted a Constitution and By-Laws pursuant to said Act; and

WHEREAS, The Constitution of the Three Affiliated Tribes (or "Tribes") generally authorizes and empowers the Tribal Business Council to engage in activities on behalf of and in the interest of the welfare and benefit of the Tribes and of the enrolled members thereof; and

WHEREAS, Article III of the Constitution of the Three Affiliated Tribes provides that the Tribal Business Council is the governing body of the Tribes; and

WHEREAS, Article Vl, Section 5(1) of the Constitution of the Three Affiliated Tribes provides the Tribal Business Council authority to adopt resolutions regulating the procedure of the Tribal Council and other Tribal Agencies and Tribal Officials of the Reservation.

WHEREAS, The Three Affiliated Tribes of the Fort Berthold Reservation was awarded the Strengthening Mobility and Revolutionizing Transportation ("SMART") grant FY22N 1 P 1 03, for the Project entitled "MHA Drone Project: Planning and Protocol Development," from the United States Department of Transportation ("US DOT"), to explore Unmanned Aerial System ("UAS") technology in furtherance of delivering lifesaving medical supplies and other beneficial health materials to members of Tribes between New Town, ND and Twin Buttes, ND on the Fo1i Berthold Reservation; and

WHEREAS There is a notice to solicit applications for Stage Two SMART Implementation Grant Funds for the Fiscal Year ("FY") 2024 SMART Grants Program. The SMART Grant will be awarded on a competitive basis to Stage Two awardees in order to implement the plans and prototypes previously developed in Stage One that will advance smart city or community technologies and systems to improve transportation efficiency and safety.

NOW, THEREFORE, BE IT RESOLVED, that the Tribal Business Council of the Three Affiliated Tribes hereby supports and authorizes the submission of an application on behalf of the Tribes for the aforementioned Stage Two SMART Implementation Grant Funds for FY 2024; and

BE IT FURTHER RESOLVED, that the Tribal Business Council hereby authorizes the Tribes' Planning and Grants Department to execute all applications, forms and other documents necessary to apply for said grant.

BE IT FINALLY RESOLVED, that the Tribal Business Council hereby authorizes the Tribes' Planning and Grants Department to administer, along with the Tribes' Federal Contracts Officer, such grant funds in accordance with the terms of the grant, should this funding be awarded to the Tribes.

CERTIFICATION

I, the undersigned, as Secretary of the Tribal Business Council of the Three Affiliated Tribes of the Fort Berthold Indian Reservation hereby ce11ify that the Tribal Business Council is composed of seven (7) members of whom five (5) constitute a quorum, 6 were present at a Regular Meeting thereof duly called, noticed, convened and held on the 21si day of October, 2024, that the foregoing Resolution was duly adopted at such meeting by the affirmative vote of 6 members, 0 members opposed, 0 members abstained, 0 members not voting, and that said Resolution has not been rescinded or amended in any way.

Chairman [X] Voting. [ ] Not Voting.

Dated this 21st day of October, 2024.

ATTEST:

Chairman, Mark N. Fox
Tribal Business Council Three
Affiliated Tribes

Attachment T

FAA Waiver

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE **OF WAIVER**

ISSUEDTO

Matador UAS Logistics, LLC (dba **Valkyrie UAS** Solutions}
Responsible P,erso:n: Catherine Self
Wa|rver Number: 107W :2024□025·00

ADDRESS-

11300 **Twisting Meadows Dr**
Has.let, TX 76052

This certificate is issued for the operations specificaJiy described hereinafter. No person shall cond11ct any operation purs11ant to the authority of this certificate except in accordance with the provisions contained in this certificate.

OPERATIONS AUTHORIZED

mall unmanned.aircraft system (sUA) operations beyond the isual line of sighl of the remote pilot ia command (PIC)· mall unmanned aircraft system (sUAS) operations in which a participating i ual Ob erver (VO) is not able to see the umn.anned aircraft.

LIST OF WAIVED REGULATIOIIIS BY SECTIO AIIIOTITLE

14 CF1R §§ 107.31-Visual rne of sight aircraft operatiion1, and
107.33(b) & (c)(2)-Vis.ual observer

STANDARD PR.OVISIONS

1. A copy of the application made for this certificate shal|.l be attached to and be.come a part hereof.
2. This certificate shall be presented for inspection upon the request of any authorized representativ,e of the Administrator of the Federal Aviation Administration, or of any rate or municipal official charged , ith the duty of enJ:orcing local laws or regulations.
3. The holder of th.is certificate shall be responsible for tllie strict observa□oe of the terms ancl provisions contained herein.
4. This certificate is nontransferable.

NOT This certificate constitutes a waiver of those Federal rules or regulalions specificaUy ret7erred to above. It does not constitute a waiver of any State law or local ordinance.

.SPECIAL PROVISIONS

Special Pmvisions Nos. I to 32, inch1sive, are set forth on the attached pages.

This Certificate ofWaiver is effective from August 5 2024, to ugus,t 31, 2025, and is subject to cancellation at any time upon notice by the Administrator or an authorized representat!i e.

B DIRECTIO OF TUE ADMINI TRATOR
CHRISTOPHER M DOHIERTY
Digitalysignedby CHRISTOPHER M DOHERTY
Dare: 2024_08.06 14:38:31 **-05'00'**
Emerging Tecb111ologies Divi ion, AF 700

ESTABLISHED BY FORT LARAMIE TREATY 1851 1951
MANDAN · HIDATSA · ARIKARA · NATION

NHS NUETA HIDATSA SAHNISH COLLEGE

UNIVERSITY OF NORTH DAKOTA.
LEADERS IN ACTION.

THALES

NORTHERN PLAINS UAS TEST SITE

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