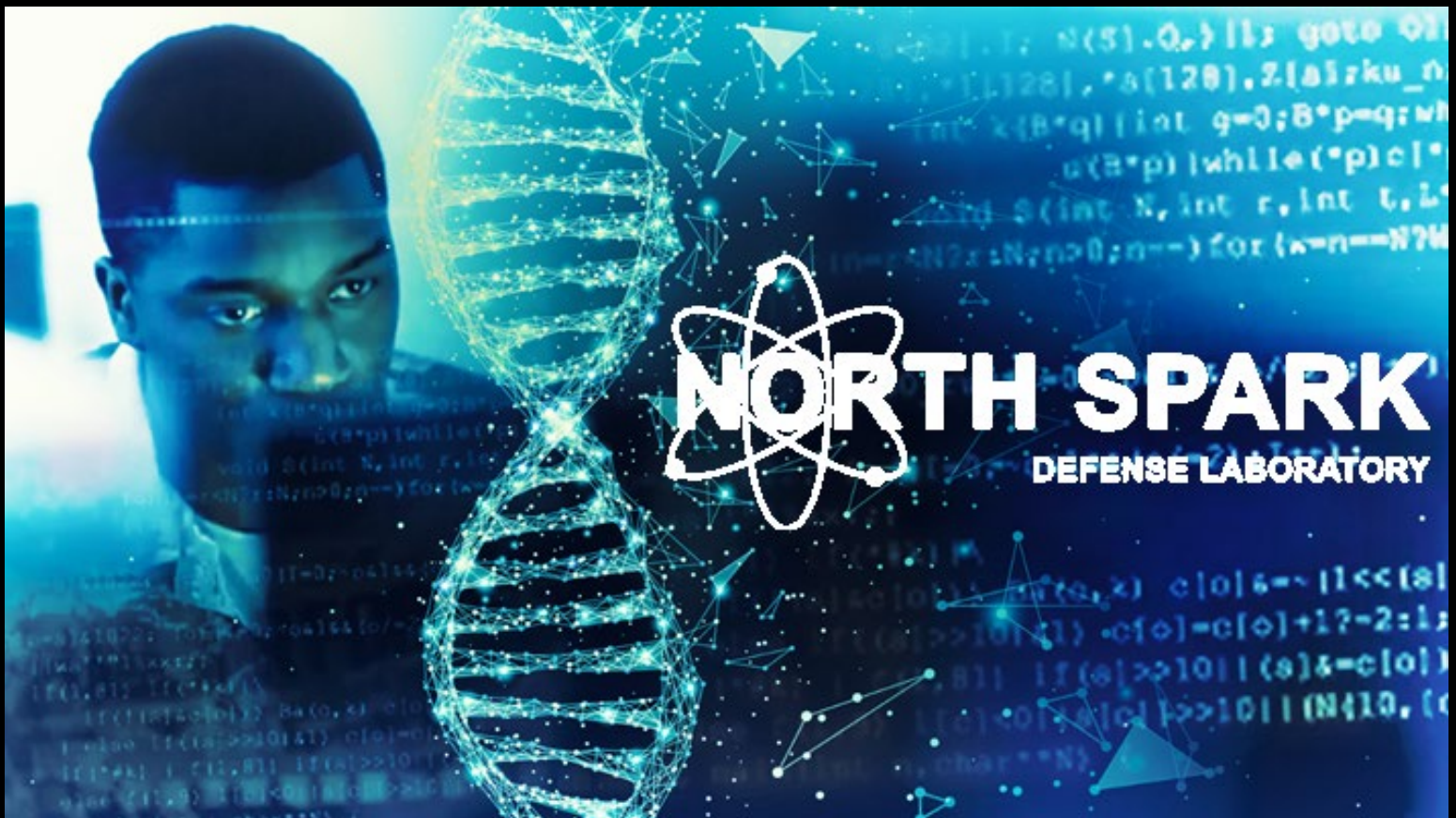


North Spark Defense Laboratory

319th Reconnaissance Wing

Acceleration Report 2021

January 2022



Accept and promote smart risk

CONTENTS

North Spark Defense Laboratory Ethos	3
Project Outcomes	4
Innovation Culture Cultivation	6
Collaborative Partnerships	7
Projects in Development	9
A Look Ahead to 2022	10
Resources	11



"When somebody has a breakthrough innovation, it is rarely one little thing. Very rarely, is it one little thing. It's usually a whole bunch of things that collectively amount to a huge innovation."

Elon Musk

North Spark Defense Laboratory Ethos

The Goal

Build a culture of innovation that promotes responsible risk taking, learning from the experience of failure, and creating outside the box resolutions. Through the North Spark Defense Laboratory (NSDL), Airmen are provided the tools to experiment, prototype, and design solutions for the challenges we face in the new era of competition. North Spark Defense Laboratory promotes the concepts of revolutionary ideation in order to meet the AF 2030 strategic goal to "dominate time, space, and complexity".

Mission

To establish a culture of innovation that produces time-sensitive, cost-effective solutions for today's problems and game-changing ideas for the future.

Vision

To increase and foster innovation and collaboration across the Wing and local communities to elevate Airmen's lives, mission effectiveness, and operational capabilities.

"To succeed, we must properly identify problems, empower decentralized solutions by individuals and teams, and infuse an ethos of innovation at all levels. Innovation depends both on creative individuals and supportive organizations to turn concepts into reality"

General Charles Q. Brown Jr, CSAF

Project Outcomes

Building high-performing exceptional Airmen ready for tomorrow's fight



Zero Ground eSports Center

Connecting Airmen and creating dynamic teams is central to our mission. With less than 10 eSports centers in the USAF, Grand Forks AFB has joined the ranks of the elite Air Force bases who aim to create their own professional gaming teams to compete in leagues and tournaments worldwide. A new eSports center was added to the Grand Forks AFB Fitness Facility, and includes several next-gen systems such as the Nintendo Switch, XBOX Series-X, Playstation 5, top-of-the-line gaming PCs, and Virtual Reality (VR). This facility was deliberately designed to attract and retain talented Airmen and civilians, and increase connectedness and resiliency.

Idea to Realization:
21 months
Execution: \$180K SIF



“The goal was to improve Airmen’s quality of life by modernizing our facilities and bringing the improvements they asked for. In partnership with Airmen across the base, local community partners, and eSports businesses, we successfully developed and launched a state-of-the-art eSports center” - Daniel Leonhart

Modern Health and Fitness Tracking

We are building today's combat ready Airmen with modern fitness tracking equipment. Airmen now have access to advanced technology that can quantify their overall physical fitness and body composition with extreme accuracy. One tool, known as the Bod Pod, is a sophisticated tool that can be utilized by anyone to measure their overall health by measuring weight and volume to determine body fat percentage. In addition, we used the Pandemic Case Management Suite (PCMS) to provide Airmen with free wearable devices which allowed them to gain valuable insight on health metrics like sleep and physical activity. The wearables devices also provide commanders with the ability to track data on the health of their unit, to include contact tracing, ultimately improving overall unit readiness.



Idea to Realization:
6 months
Execution: \$48K SIF

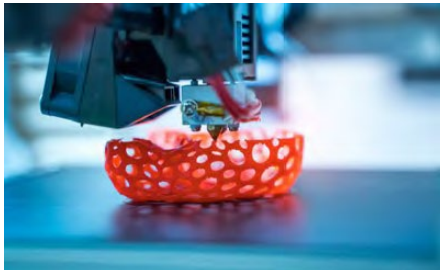
“Mental Health has received an increase in calls from patients... after receiving sleep tracking feedback from their device, this allows us to identify gaps in sleep knowledge and provide briefings to target this.”

- Anna Ojczyk

Project Outcomes

Enhancing competitive capabilities with innovative technologies

Maker's Space Additive Manufacturing



This is a new and exciting opportunity for Airmen to express their ideas and construct prototypes. It is a well-equipped, collaborative space, complete with audio, visual, design, virtual reality, 3D scanning and additive manufacturing capabilities. Formerly the golf course club house, this uniquely developed and constructed space is designed to appeal to the creative side of Airmen to promote a culture of innovation within Grand Forks AFB. The North Spark

Defense lab was planned, assembled, and opened within 6 months using \$81K secured from AFWERX.

Idea to Realization:
18 months
Execution: \$81K

Training in Virtual Reality

Grand Forks AFB Airmen are utilizing virtual reality (VR) training for tasks such as welding and painting. The use of VR solutions improves performance, increases accuracy and versatility, saves money, and increases hand-on training time.

Idea to Realization:
4 months
Execution: \$84K SIF



"I never thought that it would be able to properly train Airmen, given all the technical aspects of our job; however, the booth is producing some of the best painters I've seen. I absolutely love it." - David Brown

Streamlining and Automating Processes



North Spark hosted the Robotic Process Automation (RPA) Center of Excellence Roadshow, which trained 32 Airmen to utilize advanced, programmable electronic assistants. The goal was to reduce personnel hours required for simple tasks. These Airman designed programs can be customized in specific ways for tasks like inventory, file management, routine equipment checks, material transport and much more. Additionally, these programs are shareable worldwide across the Air Force. The three day design sprint developed the initial cadre who then created 14 RPAs, which are projected to save two-thousand hours annually.

Cultivating Innovation Culture

Partnering with Academia to develop robust collaborative networks

Winter is Coming

AFCYBERWORX, in partnership with the National Security Innovation Network (NSIN), and the University of North Dakota (UND) Center for Innovation (CFI) led a design sprint of 14 Airmen to improve quality of life for their peers who live in the dormitories. This project highlighted the need for additional amenities and opened the door for future improvements for Grand Forks AFB Airmen. Airmen were guided to conduct interviews with those who reside in the dorms, and collaborate with each other to discover root causes of dissatisfaction and come up with tangible, viable solutions to address the needs. Mentors were provided to assist in getting projects in front of leadership and secure funding sources.



UC Berkeley Innovation Boot Camp



Through NSIN, the University of California, Berkeley guided 28 members through a virtual design sprint, with a goal of developing new solutions for the on/off boarding processes for members arriving and departing the Mission Support Group. The course trained students on the innovation process, challenging them to think differently and be bold with their ideas and designs. Students had the opportunity to present their final projects to Wing leaders and prominent corporate directors in the civilian sector.

"These educational opportunities showed me that failure isn't always a bad thing. I thought some of the ideas I came up with would be laughed at or deemed too crazy, but it turned out, they were the exact projects we need for today's fast paced environments." - Nicole Pope

Project Mercury

Our Airmen have participated in 2 cohorts of Project Mercury lead by the University of Michigan through a partnership with Air University. This rigorous 12 week course created 11 Certified Professional Innovators on Grand Forks AFB. The rigorous course introduced students to innovation vernacular and academics while deconstructing different tactics and strategies to approaching new projects.



"Project Mercury gets a lot of attention. It's typically not a place where innovation dies. It actually thrives because it gets the attention and we can get it up to the Vice Chief of Staff."

-Lieutenant General James B. Hecker

Collaborative Partnerships

Forging connections with academia to empower decentralized solutions

Hacking For Defense (H4D)

This program leverages academia to tackle national defense issues with the goal of utilizing student perspectives to develop novel solutions. In partnership with NSIN, the USAF Academy and University of North Dakota accepted all of Grand Forks AFB's problem statements sent up through the Hacking for Defense Program last fall and collaborated with Grand Forks AFB personnel to generate new perspectives and ideas.



“Being part of H4D as a sponsor was unique and rewarding. It was exciting teaching college students, with no military exposure, about the military as an organization. It was also great to see the unique practical and theoretical solutions they came up with.” – Scott Weiss

H4D Problem Statement #1: Retention of Personnel

A 2019 analysis of personnel retention rates concluded that Grand Forks AFB loses 21 percent more Airmen than the Air Combat Command (ACC) average. This equates to an estimated loss of \$1.3M in training costs each year. The USAF Academy students drilled down the root causes and identified three major pain-points: lack of activities for single Airmen, low Basic Allowance for Housing (BAH) rates, and lack of consistent staffing for the Military Personnel Flight (MPF).

H4D Problem Statement #2: Improving Inventory Tracking and Readiness

This initiative, presented to the USAF Academy, was an effort to modernize the organization of Air Force warehouse storage practices, while also tackling maintenance down time due to supply shortage. This project ended without a proposed solution. This is a perfect example of how problems and solutions can be proposed, but may not have a viable resolution right away. Innovation often does not operate on a linear timeline.



H4D Problem Statement #3: From Lab Coats to the Front Line

This project was intended to allow Grand Forks AFB access to before-market technologies with the caveat that Airmen would field test the gear provided. UND students provided a solution to create a web-based application which would allow Grand Forks AFB Airmen to match their operational needs with a company that would provide the technology to fill the requirements.

H4D Problem Statement #4: Too Cold To Function

This initiative was intended to mitigate the effects of extreme cold and high wind conditions to improve Airmen's efficiency and effectiveness during winter months. A cold weather information card was developed, alongside a partnership with a local business that has already provided Airmen with winter gear at a lowered cost

H4D Problem Statement #5: Mental Health Improvements

A study conducted in 2016 found that Grand Forks AFB Airmen have a 96% higher rate of mental health issues compared to other northern tier bases of similar size. UND students identified the main issue was a lack of activities on the installation. They presented the idea of an activities pass which would increase awareness of upcoming activities and events throughout the region.

Collaborative Open Innovation Networks

The purpose of this project was to create an idea sharing, and social network between Grand Forks AFB and local academic institutions. This initiative allows Grand Forks AFB personnel to expand diversity of thought, and leverage domain specialists at local institutions. The students presented the solution to employ a mobile escape room that could be a shared resource between UND and Grand Forks AFB.

X-Force Fellowship

The 319th Reconnaissance Wing has applied for the X-Force Fellowship program. An NSIN initiative, the fellowship is open to U.S. citizens at the undergraduate and graduate level. Fellows possess a diverse set of skills ranging from mobile and web app development, data analysis and visualization, hardware prototyping, social media strategy, and technology scouting. Their technological skills and perspectives can be leveraged to advance projects from the inception phase to a viable prototype.



Ohio State University Cooperative Agreement

North Spark has entered into a Cooperative Research and Development Agreement (CRADA) with Ohio State University to harness data analytics to maximize the value and outcomes of Air Force innovation efforts. This analysis will provide insight on the how, where, and why of innovation investments. The goals for this project include providing Airmen with the ability to make data-informed decisions, develop risk assessments, and identify gaps in funded versus desired areas. Ultimately, this will allow Air Force leaders to drive the innovation efforts that will ensure success against near-peer adversaries.



Projects in Development

A look to the horizon

1Huddle

Grand Forks AFB has been awarded a Small Business Innovation Research (SBIR) of \$750K to gamify training efforts to make them more engaging and fun. Backed by science, learning through failure and gameplay improves long-term retention of information and helps to prevent knowledge decay. Early offerings include SAPR, off-duty educational opportunities, innovation, and Grand Forks local area immersion with many more in the works.



319th Reconnaissance Wing Mascot Design Sprint

Hosted by the UND Center for Innovation, a diverse team of Airmen and university students embarked on a 12-week design sprint to select a new mascot for the 319th Reconnaissance Wing. Spanning the globe with three different geographically separated locations, the new, more inclusive face of the Wing will better represent the Airmen and Guardians of the 319th.

Duality Systems Scheduling

Capturing the emerging power and advantages of Artificial Intelligence (AI), the 348th Reconnaissance Squadron entered into a SBIR contract with Duality Systems. In development is an aircrew scheduling program to autonomously de-conflict pilot and aircraft availability, and is expected to return 7K personnel hours to the unit.



Energy Development Design Workshop

In line with North Dakota's carbon neutral initiative, Grand Forks AFB is teaming with the UND Center for Innovation, local businesses, and power suppliers to increase energy resiliency through the use of renewable energy resources. On the horizon is an Educational Partnership Agreement (EPA) between the North Spark Defense Lab and UND to share resources and data on renewable energy research.

Warrior Edge/Parent Edge/Teen Edge

Made up of a team of Olympians, veterans, and human performance experts, the Warrior's Edge Program aims to relieve the stresses of military life. The program introduces methods and techniques to help improve the performance and resiliency of our Airmen and their families. All three courses were launched and available to the base populous in Feb 22.

Project Mercury Workshop

With more Project Mercury course graduates than any other base in the Air Force, Grand Forks AFB was selected for the first-ever in-person Project Mercury Workshop. Driven by the mission to "Accelerate Change or Lose," Project Mercury generates a vibrant innovation ecosystem within the Air Force, and fosters Airmen's innovation readiness.

Grand Forks AFB warfighters will generate and deliver an array of radical, creative, and disruptive ideas to help transform us into the base of the future and will be guided through the process by ten of our own graduate coaches.



A Look Ahead to 2022

The North Spark Defense Lab (NSDL) is excited about what 2022 holds. We are seeking partnerships in the fields of artificial intelligence, machine learning, robotics, automation, advanced manufacturing, renewable energy solutions, and human performance. As we look to establish ourselves in the ecosystem of National Defense Innovation, we will be opening our doors to the Airmen Accelerators of Grand Forks AFB. Our facility will host meetings, design sprints, classes and workshops with the intent of preparing warfighters for future combat operations and dominating strategic competition. Individuals are encouraged to prototype their designs and experiment with new ways of accomplishing the mission. NSDL's facility is a place where failures can be celebrated as steps towards success, and risk tolerance is normalized.

"Failure is success in progress."

Albert Einstein

Resources

North Spark Defense Laboratory

<https://www.grandforks.af.mil/About-Us/North-Spark-Defense-Laboratory/>

VISION:

<https://vision.apps.dso.mil/>

GAIN:

<https://gain.apps.dso.mil>

Robotic Process Automation

<https://www.uipah.com>

AFWERX:

<https://www.afwerx.af.mil>

AFCYBERWORX:

<https://afcyberworx.org>

Hacking For Defense

<https://www.h4d.us/submit-a-problem>

National Innovation Service Network

<https://www.nsin.mil/>