



**NATIONAL SECURITY  
INNOVATION NETWORK**

U.S. DEPARTMENT OF DEFENSE



# NSIN YEAR IN REVIEW FY21

*Approved for public release: distribution unlimited.*



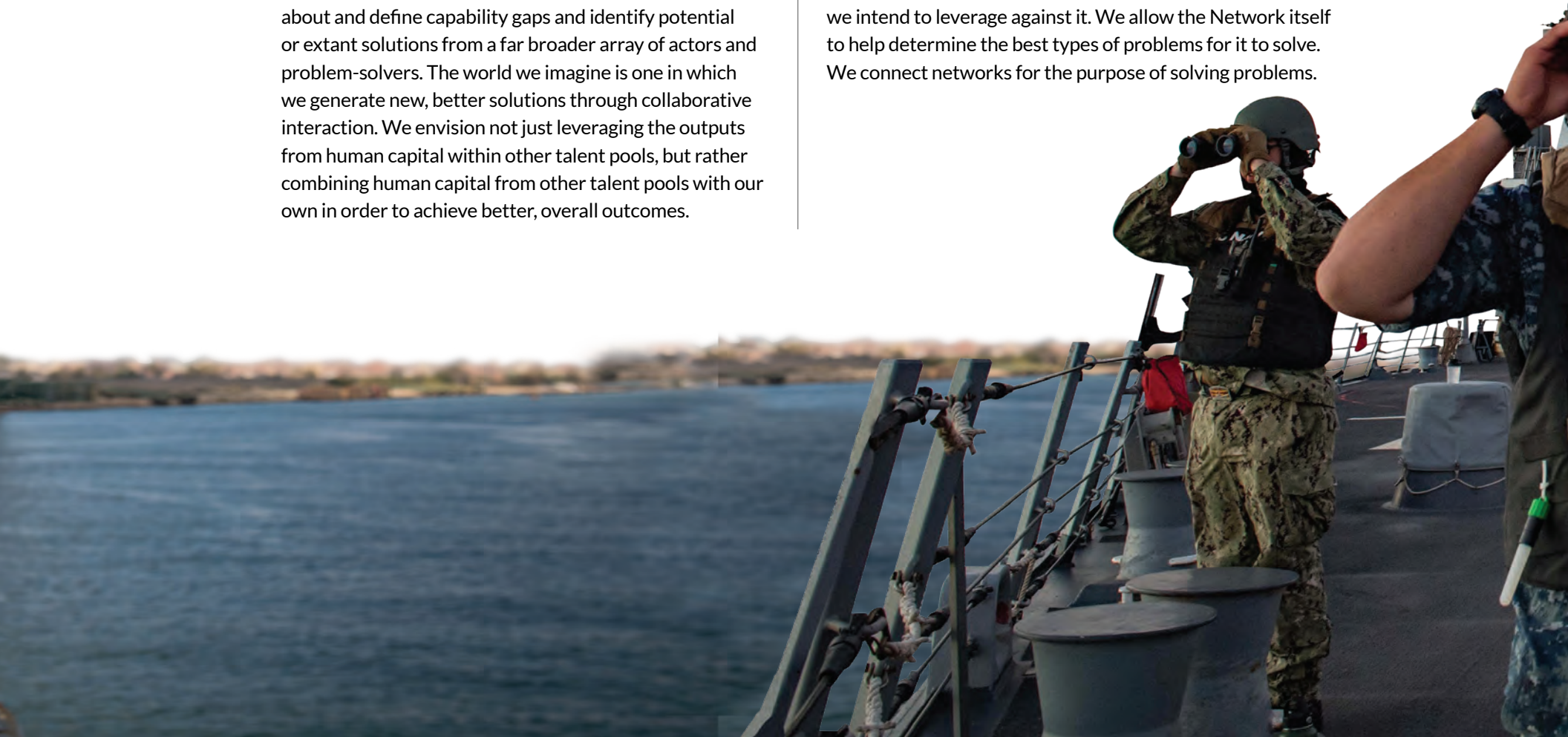
# A Vision for Better Problem Solving. A Mission to Solve Problems by Building Networks.

**NSIN'S VISION:** We want to change the way the Department of Defense solves problems.

NSIN envisions a world that radically opens the aperture through which the Department of Defense (DoD) can think about and define capability gaps and identify potential or extant solutions from a far broader array of actors and problem-solvers. The world we imagine is one in which we generate new, better solutions through collaborative interaction. We envision not just leveraging the outputs from human capital within other talent pools, but rather combining human capital from other talent pools with our own in order to achieve better, overall outcomes.

**NSIN'S MISSION:** We build networks of innovators to generate new solutions to national security problems.

NSIN fulfills our mission by considering the types of problems that are appropriate for the human capital that we intend to leverage against it. We allow the Network itself to help determine the best types of problems for it to solve. We connect networks for the purpose of solving problems.





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# NSIN BY THE NUMBERS

FY 2019-2021

NSIN Funding

**\$95**  
million dollars

NSIN helped

**909**

DoD organizations solve

**963**

problems  
by generating

**1,366**  
unique solutions.

Engaged

**6,925**

new people in the  
National Security  
Innovation Base.

Supported

**370**

new companies to enter  
the National Security  
Innovation Base and spun  
out **33 of DoD-funded  
technologies.**

Since 2016, companies in  
NSIN programs **raised**

**\$64**

million in private  
funding and

**\$295**

million in DoD funding.





# Letter from the Director

The National Security Innovation Network (NSIN) was built on the premise that the Department of Defense needs to incorporate new problem solvers into DoD processes and fundamentally change the way it solves problems. Since 2016, we have relentlessly pursued our mission to leverage new skills sets and new perspectives to strengthen the DoD's problem-solving capacity by engaging people to work with the Department of Defense who would not normally do so.

I'm pleased to report that NSIN has continued to achieve outsized impact. We have paired over 6,900 non-traditional problem solvers with over 900 DoD organizations and supported the growth of 370 new companies into the DoD market with significant private and public financial support.

In recognition of our fifth year of solving problems to make the world a better, safer place, I'm pleased to share this Year in Review from our FY21 work, a compilation of stories from a pivotal year of maturation and growth. I invite you to engage with the content from each region to see for yourself, how effective NSIN's network model can be. On behalf of TeamNSIN, thank you for your partnership. None of this would have been possible without your collaboration and dedication to challenging the status quo and driving towards excellence in defense innovation.

Like many organizations last year, NSIN faced new challenges. The one that had the most dramatic effect on our operating model was the need to immediately pivot our in-person program delivery model to 100% online and virtual. Despite the disruption to our modus operandi, and through the creativity, dedication, and perseverance of NSIN staff and partners, our

programs rallied and we posted our best year yet in terms of the number of problems sourced, program iterations conducted, diverse problem-solver participants engaged, and solutions adopted by DoD partners. Not only did we achieve a 154% increase in participants in NSIN programming, but also the NSIN team itself has grown by 35%. NSIN sought new solutions and methods, our teams innovated and persevered to fulfill the mission under different and difficult conditions. The warfighters we serve deserve nothing less.

We even ran a [Super Bowl ad](#) on Armed Forces Network to engage service members to share their ideas for improving the ways things are done, and to engage NSIN's free resources to ultimately "prove there's a better way."

We are the same unrivaled problem-solving organization for the Department you know, but with a renewed sense of purpose powered by our talented and diverse team.

We believe that people (human capital) are the key to innovation, and I couldn't be more proud of the work this team does every day in that pursuit of our mission. I have no doubt that there are many more great things to come!



Yours in service,

A handwritten signature in black ink, appearing to read "Gregory M. Bernard". The signature is fluid and cursive, written over a light blue background.

Gregory M. Bernard, D.Sc.  
Acting Director  
National Security Innovation Network

# Our Mission and Approach

“Innovation” has been a buzzword within the DoD since the inception of the 2014 Defense Innovation Initiative (DII) when at least a dozen new defense innovation organizations were created within the Department. One of these organizations, the MD5 National Security Technology Accelerator, was renamed the National Security Innovation Network in 2019.

The DII was developed because of the growing realization within the national security community that the so-called “peace dividend” that was expected at the conclusion of the Cold War was supplanted by a multi-polar, complex environment that was making it more difficult for the United States to maintain technical dominance and overmatch. The rise of non-state actors, hybrid threats, revanchist states, and political turmoil within the U.S. all pointed to a future wherein the U.S. could no longer guarantee its way of life if the DoD continued doing “business as usual.”

## NSIN THEORY OF THE CASE

Although many theories emerged to address these observed trends, the NSIN theory of defense innovation pre-supposes that all other theories are necessary, but ultimately insufficient, to assure future victory because they largely ignore the most precious commodity that is most underutilized by the DoD: human capital.

Central to our theory of innovation are two tenets: 1) if the DoD wants to solve problems differently, then *we need to incorporate new problem-solvers into our Departmental processes*; and 2) none of these theories of innovation will materialize the competitive advantage they seek unless the DoD *fundamentally changes the way the Department solves its problems*.

Our theory favors iterative interactions amongst and between the DoD and new problem-solvers that will establish resilience and persistence that the DoD can rely upon either in conjunction with all other current theories of defense innovation, and perhaps most importantly, if all others fail.

Our network theory of defense innovation is not just additive, it serves as a hedge against the strategic uncertainty innate to all the others.

## SEEKING OUT NEW TALENT WHERE IT LIVES

We are seeking to leverage pools of talent that possess two, key characteristics: a penchant for iterative experimentation and organic incentive structures for finding difficult answers to key questions. In both cases, the early-stage venture community and the academic communities present untapped pools of innovators. The collision of these two pools of talent, either individually or in combination with one another, along with DoD end users and the belief that better, faster, and cheaper solutions will emerge as a result of those collisions is a core component of our theory for defense innovation.

As NSIN seeks to identify new pools of talent within the early-stage venture and academic communities, the method(s) by which we join those talent pools with DoD end users matters. NSIN has deliberately chosen to take a network approach to national security problem-solving, based on the following hypotheses:

- **Networks Achieve Outsized Effects**
- **Networks Are Resilient**
- **Networks Scale**





“The Department will innovate at a speed and scale that matches a dynamic threat landscape. This will require advances in our joint warfighting concepts and a commitment to rapid experimentation and fielding of capabilities.”

— **Lloyd Austin**, United States Secretary of Defense  
(January 2021 - present)



“You got to get the right people who can think outside the box and challenge the status quo. We need to give them the authority and resources to get it done and take the necessary risk.”

— **Mark Esper**, United States Secretary of Defense  
(July 2019 - November 2020)



“Any competitive organization must nurture its maverick thinkers. You can’t wash them out of your outfit if you want to avoid being surprised by your competition. Without mavericks, we are more likely to find ourselves at the same time dominant and irrelevant, as the enemy steals a march on us.”

— **James Mattis**, United States Secretary of Defense  
(January 2017 - December 2018)



“Come in, work with us ... no strings attached. You don’t have to become part of the government. Come in, try it out, work on an important problem for a year or two, see how you like it.”

— **Ash Carter**, United States Secretary of Defense  
(February 2015 - January 2017)



“We must take the initiative to ensure that we do not lose the military-technological superiority that we have long taken for granted.”

— **Chuck Hagel**, United States Secretary of Defense  
(February 2013 - February 2015)

# A YEAR OF EXPANSION, DIVERSIFICATION, AND INNOVATION

As we close the books on fiscal year 2021, NSIN is marking five years of developing new ways of solving problems for the DoD. From Seattle to Syracuse, Tallahassee to Tempe, and everywhere in between, the past year welcomed an expansion on our regional footprint and our capacity to engage diverse problem solvers. Along the way we have adapted and learned as conditions changed, and innovated to meet the needs of our DoD partners. This year will be remembered for three lines of effort: expansion, diversification, and innovation. A few highlights from this work follow.

## Expanded Nationwide Footprint

We believe that a better, safer, and stronger future is possible when academics, innovators, and service members collaborate. This ethos is at the center of our mission to build a network to “change how the DoD solves its problems.”

Over the past 18 months, NSIN greatly expanded its Regional Network Team (RNT), including adding 11 new university program directors at designated Tier-1 and Tier-2 research institutions, and five regional directors. The collective RNT is now composed of 27 professionals whose focus is building relationships with entrepreneurial and academic problem-solving communities for the purpose of engaging their specialized knowledge and innovative thinking to solve DoD partner problems.

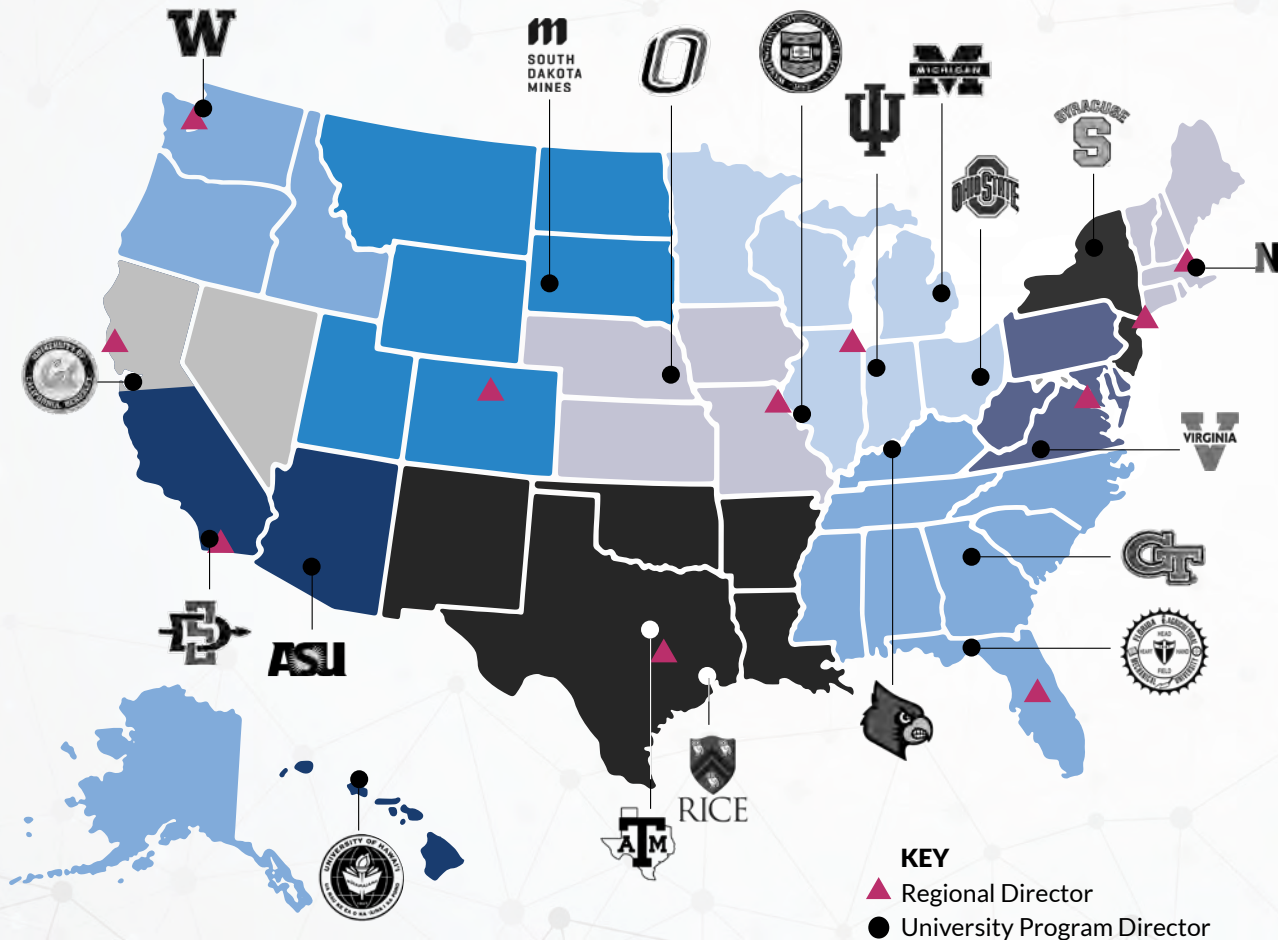
The regional approach is integral to our network building mission, and the team successfully navigated new local requirements concerning in-person meetings and networking events, a cornerstone activity for building relationships with potential

new participants in the National Security Innovation Base (NSIB). Events moved online, and then later in the fiscal year more hybrid options became available. Team NSIN was resilient and innovated its approach throughout, and momentum for our mission continued to build. A few noteworthy regional events include:

- NSIN’s Southwest Regional Director briefed Deputy Secretary of Defense Kathleen Hicks during her May 11, 2021 visit to Capital Factory in Austin, Texas. Hicks’ trip to the area focused on the DoD’s innovation and modernization efforts and use of best practices to put new technology in the hands of the warfighter. During her visit, she emphasized that public-private partnerships are critical to modernizing the force, “[They’re] even more critical today because so much of the investment in ecosystems around innovation is happening outside of the government sector, so it increases the need for DoD to make sure it’s [the Defense Department] part of that broader innovation ecosystem,” Hicks said.



## NSIN REGIONAL NETWORK AND UNIVERSITY PARTNERS



### NORTHEAST

**Matt Merighi**  
Regional Director/  
Acting DO

**John Griffin**

University Program Director,  
Northeastern University

### MID-ATLANTIC

**Grant Fox**  
Regional Director

**Roger Misso**

University Program Director,  
Syracuse University

### NATIONAL CAPITAL

**Trish Martinelli**  
At-Large Regional Director

**John Robinson**

University Program Director,  
University of Virginia

### SOUTHEAST

**Beverly Seay**  
Acting Regional Director

**Will Fortune**

University Program Director,  
University of Louisville

**Patrick Reynolds**

University Program Director,  
Georgia Institute of Technology

**Marcy Muldrow Sanders**

University Program Director,  
Florida A&M University

### GREAT LAKES

**Tony Arendt**  
Regional Director

**Ian Haynes**

University Program Director,  
The Ohio State University

### MIDWEST

**Jake Laktas**  
Regional Director

**Mike Seper**

University Program Director,  
Washington University  
in St. Louis

### Wade Watts

University Program Director,  
University of Nebraska  
at Omaha

### SOUTHWEST

**Jim Rabuck**  
Regional Director

**Charles 'Fritz' Kuebler**

University Program Director,  
Rice University

**Andy Riise**

University Program Director,  
Texas A&M University

### ROCKY MOUNTAIN

**Brandon Greene**  
Regional Director

**Jason Combs**

University Program Director,  
South Dakota Mines

### NORTHWEST

**Trish Martinelli**  
At-Large Regional Director

**Justin Dunicliff**

University Program Director,  
University of Washington

### PACIFIC-NORTH

**Trish Martinelli**  
At-Large Regional Director

**Kaitie Penny**

University Program Director,  
University of California, Berkeley

### PACIFIC-SOUTH

**Jesse Gipe**  
Regional Director

**Gloria Choo**

University Program Director,  
University of Hawaii at Manoa

**Samantha Hiller**

University Program Director,  
Arizona State University



### On why public-private partnerships are critical to modernizing the force

“[They’re] even more critical today because so much of the investment in ecosystems around innovation is happening outside of the government sector, so it increases the need for DoD to make sure it’s [the Defense Department] part of that broader innovation ecosystem.”



— **Deputy Secretary of Defense  
Kathleen Hicks**



*Jim Rabuck briefed Deputy Secretary of Defense Kathleen Hicks about NSIN's work in the Southwest region on May 11, 2021.*

- More than 800 people virtually attended our one-day New York Defense Innovation Summit. This successful regional event featured remarks on DoD missions from U.S. Sen. Kirsten Gillibrand (D-N.Y.) and focused on increasing the impact of New York startups, universities, and industries. The event identified strategic initiatives and partnerships to enhance collaboration across the Defense community.
- NSIN also held the Defense Entrepreneurial Symposium (DES) in partnership with the Nebraska Business Development Center. U.S. Rep. Don Bacon (R-Neb.) opened the event with remarks discussing the role of innovation in Nebraska in addressing critical national security challenges. The DES event built on the decades-long close relationship between Offutt Air Force Base (including the United States Strategic Command and the 55th Wing), University of Nebraska at Omaha (UNO), and Nebraska's business community. A particular focus of DES was to engage organizations and individuals who might not otherwise collaborate with the DoD.



# Diversified the Network of Problem Solvers

Diversity of thought, experience, and background drives innovation. Building a diverse network of problem-solvers sourced from under-represented and non-traditional DoD participant communities is a key characteristic of our approach. The work NSIN does in seeking out talent where it lives is central to our contribution to the important work of expanding and diversifying the National Security Innovation Base.

## FIRST HBCU PARTNERSHIP

During the past year NSIN established its first strategic partnership with a historically Black college or university (HBCU) with the appointment of Dr. Marcy Muldrow Sanders at Florida A&M University (FAMU) and the State University System of Florida.

NSIN is eager to fully engage the talent in our HBCU communities and this partnership will build an enduring connection between FAMU and the Department of Defense that will open opportunities for service to students and faculty and allow the DoD to tap into their incredible talent pool.



FAMU President Larry Robinson, Ph.D. said the partnership builds a critical bridge between creating lasting innovation infrastructure and HBCUs.

"FAMU welcomes alumna Dr. Marcy Muldrow Sanders back to our campus community. This is an important step in our partnership with the National Security Innovation Network and the Department of Defense," said Robinson. "Sanders' leadership

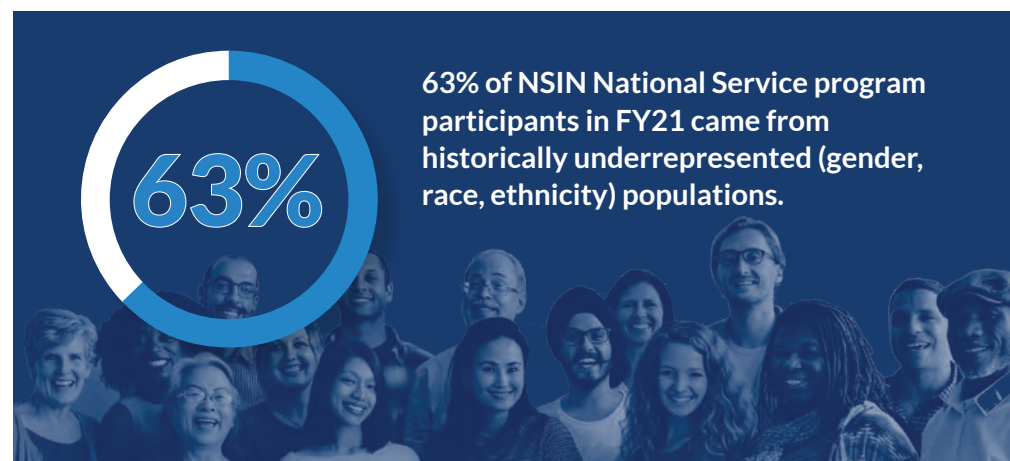
in this initiative will greatly benefit students and faculty at FAMU and across the Florida State University System as they seek solutions to issues that impact Florida and the nation as a whole."

## UNIVERSITY ENGAGEMENT GROWTH

Universities are an important source of new talent for DoD problem solving. Overall, NSIN's engagement with universities increased 84% between 2020 and 2021.

## PARTICIPANT GROWTH & FROM DIVERSE POPULATIONS

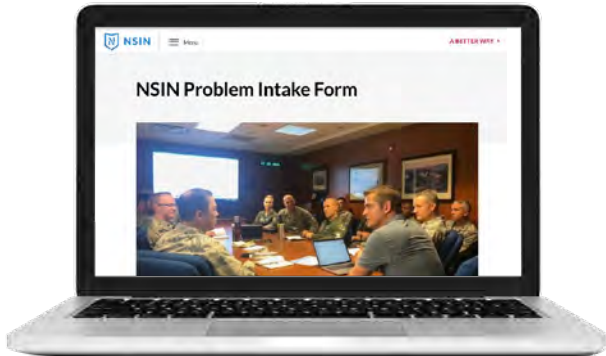
From all sources, NSIN saw a significant increase in year-over-year growth for new participants in national security innovation. In addition, 63% of National Service program participants came from historically underrepresented (gender, race, ethnicity) populations. The number of new entrants tracked by NSIN increased from 1,795 in FY 2020 to 4,014 in FY 2021 — a record of 124% in year-over-year growth.



# Innovative Problem Solving Capabilities

NSIN builds networks of innovators to generate new solutions to national security problems is more than just our mission statement, this is the work we do each day. We help solve a variety of problem types ranging from public policy-oriented, to technology and human capital focused. This important work begins with a DoD partner bringing a problem to us, and in FY 2021 the number of problems submitted to NSIN for solution increased by 62%. Our message to DoD organizations: Keep

sending your problems. We have an online form (<https://www.nsin.mil/problem-intake-form>) or you can work with the regional director in your area to determine opportunities for working with us (see the Resources section for a directory of contacts).



## ADAPTIVE THREAT FORCE: SOLVING WARFIGHTER PROBLEMS WITH HUMAN CAPITAL

Innovation comes in many forms. For some the word means technology. While NSIN does its fair share of sourcing tech solutions to warfighter problems, we also work with a unique combination of experts to solve challenging issues in the field while embedded with the warfighter.

Two years ago NSIN launched the Adaptive Threat Force (ATF), an exclusive live field red team providing prototype testing, evaluation, and innovative technologies for the battlefield, to meet ground warfighters' needs to have real-time problem-solving capabilities in the field.

ATF is the only DoD innovation program of its kind, and since its initial launch it has made a significant impact to safety and operational capabilities.





ATF lives outreach everyday, with ground warfighters, testing and experimenting with combined arms maneuver at the edge of current conflict challenges and near-peer threats. Since its inception, ATF has engaged over 10,000 soldiers and Marines, and they participated in four experiment exercises in FY 2021.

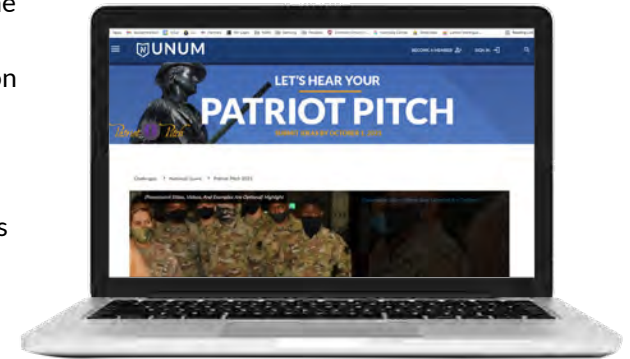
In FY 2020, NSIN launched the second iteration of ATF — after a successful iteration with the U.S. Marine Corps and program transition to the Marine Corps Warfighting Laboratory (MCWL) — with the Mississippi Army National Guard at Camp Shelby, Mississippi.

In FY 2021, ATF focused on exercise/simulation design, surrogate technology integration, data collection analysis, and interactive student-led discussions on technology. By bringing together commercial entities, academia, and other subject matter experts that otherwise would not collaborate with the DoD, NSIN and programs like ATF bring people of diverse backgrounds together with a shared mission to support national security interests.

NSIN will continue to incubate this current iteration of the ATF and look to transition the capability to partners in the future. This model of seeding and incubating specific variations of the ATF for various military partners, while also transitioning to those partners, demonstrates the long-term impact of NSIN's human capital centric approach that yields outsized impact.

## COLLABORATION PLATFORM

In addition to its regional efforts, in 2021 NSIN re-launched its online collaboration and networking platform, the Defense Innovation Network (DIN), as UNUM. The new platform features an enhanced user experience, new website, and name. What began as a single community called Marine Maker, where Marines shared designs for mission-oriented 3D-printable projects, has evolved to include dozens of communities for disparate commands. Air Force, Army, Navy, Marine Corps, and DoD offices tackle topics on UNUM ranging from additive manufacturing to artificial intelligence. From Marines repairing gear using additive manufacturing to military units crowd-sourcing logistical and administrative problems, the UNUM platform exists to provide a rapid collaboration platform for the DoD Community. Along the way, the platform helps capture and communicate successes and challenges along the way. It's free to join, and you can learn more at [unum.nsin.us](https://unum.nsin.us).









A blue-tinted photograph of a landscape featuring rolling hills and a statue in the foreground. The text 'PROGRAM HIGHLIGHTS & SUCCESS STORIES' is overlaid in white. A blue geometric pattern is visible on the right side.

# **PROGRAM HIGHLIGHTS & SUCCESS STORIES**



# NSIN PROGRAM HIGHLIGHTS

The work of innovating national security and solving tough problems for the DoD is hard and proof of progress is typically measured over years as new entrants and companies mature as they advance through the myriad of stages of working with or for the Department. NSIN is continually measuring, iterating, and improving how it quantifies the impact of our programs, and the results and contributions to the National Security Innovation Base made by our alumni. We are pleased to highlight a few program success stories from the last year.

**NATIONAL SERVICE PORTFOLIO** | Creating new opportunities for national security service.

## **NSIN Opens Doors for NSWC Crane and NGA to Advance Machine Learning and Hypersonics**

### **PROGRAM: EXPERTS**

In spring 2021, Naval Surface Warfare Center Crane (NSWC) and the National Geospatial-Intelligence Agency (NGA) developed a relationship through NSIN Experts with universities to advance machine learning and hypersonics research. Professors at the University of Missouri, St. Louis University, and Washington University at St. Louis engaged students participating in the X-Force Fellowship, students working on their master's degrees, and students completing their doctorates to research new machine learning capabilities that brought fresh ideas, approaches, and hypotheses to NGA.

At NSWC, the Advanced Concepts Group's Hypersonic Vehicle Modeling and Simulation team partnered with professors from Notre Dame, Purdue, Texas A&M, Florida A&M, and the University of Virginia to bring new problem solvers to national security issues and research. As a result of these new partnerships through the NSIN Experts program, the universities delivered new research and white papers about advanced modern hypersonic flight systems in support of national defense for NSWC to develop.

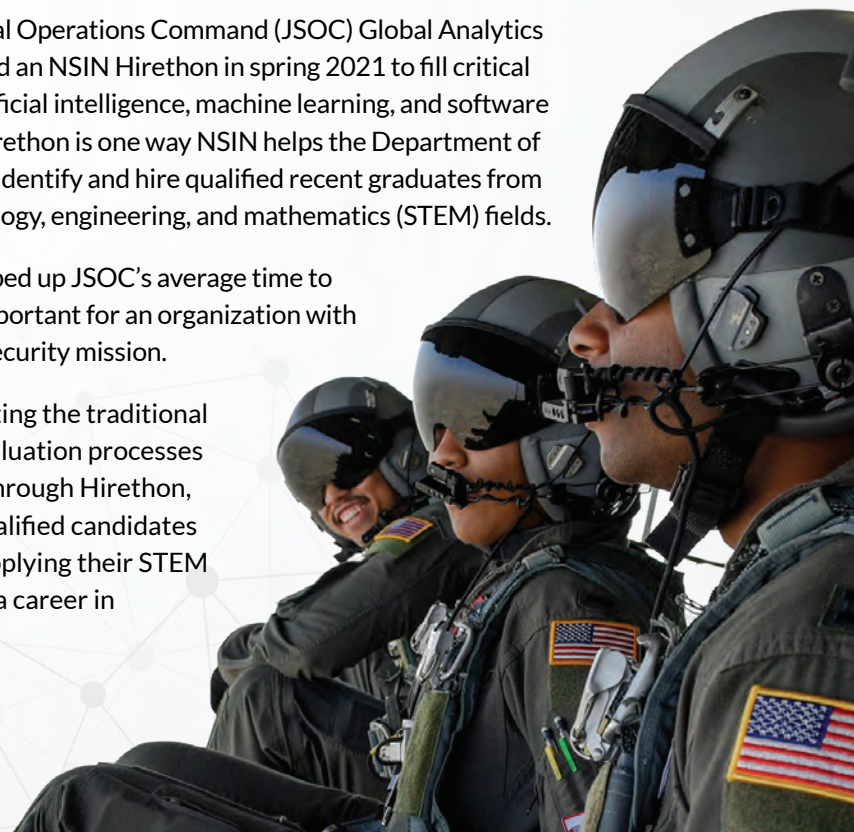
## **JSOC Quickly Hires the Right Talent through Hirethon**

### **PROGRAM: HIRETHON**

The Joint Special Operations Command (JSOC) Global Analytics Platform utilized an NSIN Hirethon in spring 2021 to fill critical positions in artificial intelligence, machine learning, and software engineering. Hirethon is one way NSIN helps the Department of Defense (DoD) identify and hire qualified recent graduates from science, technology, engineering, and mathematics (STEM) fields.

The Hirethon sped up JSOC's average time to hire which is important for an organization with their national security mission.

By short-circuiting the traditional application, evaluation processes and timelines through Hirethon, JSOC found qualified candidates interested in applying their STEM background to a career in civil service.





# All-Female Team Tests Prototypes to Improve Army Ranger Health

PROGRAM: X-FORCE

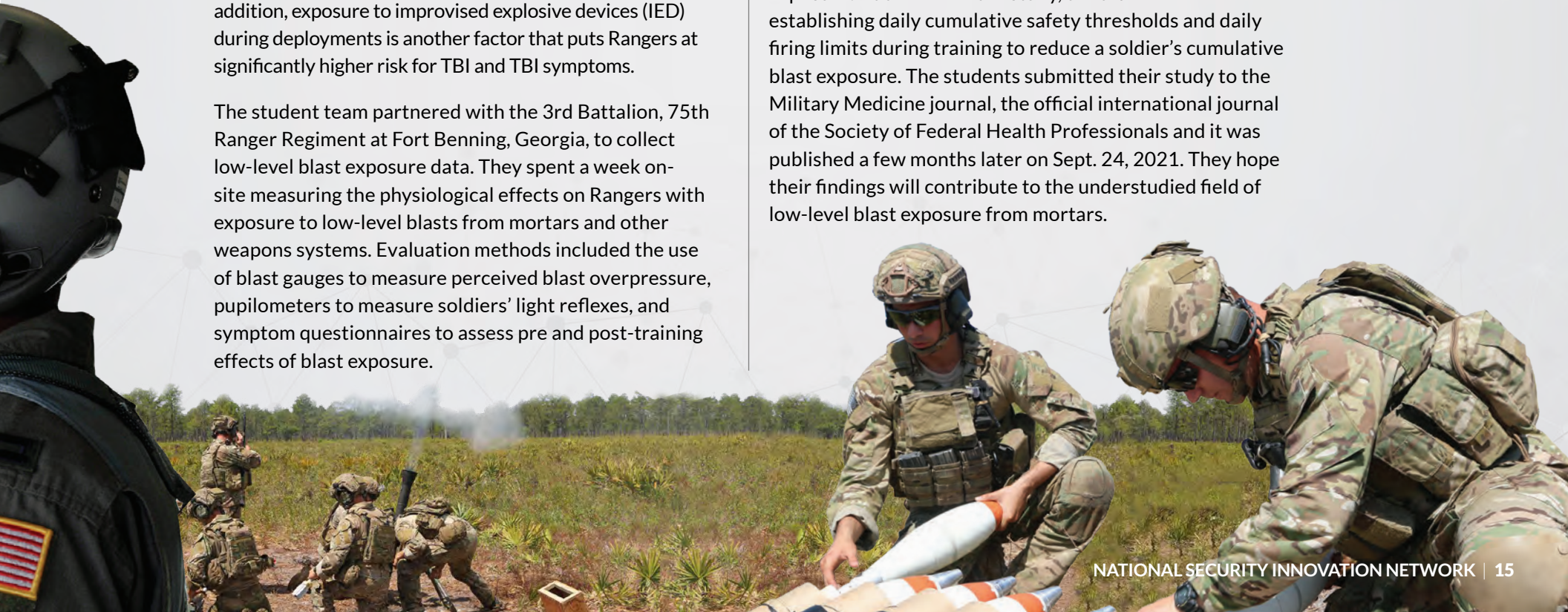
PILOT PROGRAM: CAPSTONE

**An all-female team of students in the NSIN Capstone and X-Force Fellowship programs from Georgia Tech and Emory University discovered methods of testing the effects of blast exposure on service members and its correlation to traumatic brain injury (TBI).**

TBI is a significant issue for the Ranger community because of their increased exposure to blasts during training and deployments. Consider that Ranger mortarmen routinely fire 100 to 200 mortar rounds daily during training, and at least 200 rounds every day for four months during deployments. Many Rangers repeat this schedule for 10 years. In addition, exposure to improvised explosive devices (IED) during deployments is another factor that puts Rangers at significantly higher risk for TBI and TBI symptoms.

The student team partnered with the 3rd Battalion, 75th Ranger Regiment at Fort Benning, Georgia, to collect low-level blast exposure data. They spent a week on-site measuring the physiological effects on Rangers with exposure to low-level blasts from mortars and other weapons systems. Evaluation methods included the use of blast gauges to measure perceived blast overpressure, pupilometers to measure soldiers' light reflexes, and symptom questionnaires to assess pre and post-training effects of blast exposure.

The students applied the knowledge they gained from their weekly meetings with their military sponsors in the NSIN Capstone course to measure data and to apply relevant figures to solve computational fluid dynamics (CFD) problems. The team tested different hypotheses and discovered that using a blast attenuator, which fits over the muzzle of a mortar, mitigated the blast overpressure for the gunner and the assistant gunner. With an understanding of measures that will improve lives, the students then applied their learnings to test various prototypes and assess the best methods to alleviate blast exposure. At the end of the study, the team recommended establishing daily cumulative safety thresholds and daily firing limits during training to reduce a soldier's cumulative blast exposure. The students submitted their study to the Military Medicine journal, the official international journal of the Society of Federal Health Professionals and it was published a few months later on Sept. 24, 2021. They hope their findings will contribute to the understudied field of low-level blast exposure from mortars.





### Recent STEM Grads Gain Experience While Serving Their Nation

#### PROGRAM: TECH SQUAD

In 2021, NSIN launched a new opportunity for talented, early-career technologists with a desire to serve their nation. The NSIN Tech Squad matches qualified individuals with flexible, part-time, volunteer service opportunities with DoD organizations.

The inaugural Tech Squad applied their science, technology, engineering, and mathematics (STEM) skills to tech-oriented, real-world government projects. For example, volunteers created solutions applying functional user interfaces (UI), developing predictable maintenance platforms, and leveraging machine learning (ML) for automating tedious and repetitive tasks.

“I chose to serve in Tech Squad because I love solving problems that can impact many people,” explained Sam Obe, a Tech Squad volunteer with the U.S. Army’s 244th Expeditionary Combat Aviation Brigade. “With Tech Squad, I believe I will [be] able to accomplish my goal while helping the DoD develop modern tech solutions. In addition, I hope to get some more development experience which will help further my career in the tech industry.”

### New Program Places Fellows at the Pentagon and on Capitol Hill

#### PILOT PROGRAM: TECHNOLOGY & NATIONAL SECURITY FELLOWSHIP (TNSF)

In its inaugural year, the Technology and National Security Fellowship (TNSF) placed six early and mid-career technologists in paid fellowships at the Pentagon and on Capitol Hill where they helped advise on critical issues at the intersection of national security and technology.

In the past year, TNSF Fellows worked in the Joint Artificial Intelligence Center (JAIC) where they advised on artificial intelligence (AI) strategy for the DoD; the office of Congressman Tim Ryan (D-Ohio) who serves on the House Appropriations Subcommittee on Defense; and the office of the Assistant Secretary of the Army, Acquisitions, Technology, & Logistics (ASA/ALT), where fellows contributed to the technology and capability acquisition process of the U.S. Army. Because of the value TNSF added to these offices, there is demand for more Fellows, and NSIN hopes to increase the number next year.





## Fellows' Innovation Saves Air Force 500k per Aircraft

### PROGRAM: X-FORCE

An X-Force Fellow at South Dakota School of Mines & Technology is working with Ellsworth Air Force Base to innovate a new cold spray technology. Cold spray increases the lifespan of aircraft and weapon systems while decreasing repair costs for the U.S. Air Force. On average, cold spray technology is helping save the DoD \$500,000 in repair costs for each aircraft. The X-Force program exposes students to real-world problems and solutions, such as how to reduce annual maintenance and repair costs for the Air Force, while the program gives students hands-on experience and exposure to DoD careers during school.

## Fellows Develop Emergency Database Solution for Luke AFB

### PROGRAM: X-FORCE

In the spring of 2021, two X-Force Fellows worked with Luke Air Force Base (AFB) to develop an integrated database for sharing emergency information. Their work would help solve a critical problem because data for base emergencies was previously stored in various locations with no unified tool to gather information. For instance, if there was a fire or another crisis where security was needed in a timely manner, fast-response information about who was on base was unavailable.

The impact of the X-Force Fellows was immediate when after their solution's first trial, its code passed the base's test phase, which meant the solution worked and could be developed for future application. Today, the students hope to continue developing their solution for Luke AFB by creating a company through the NSIN Vector program.



## Hanscom Delivers First Virtual Bootcamp

### PROGRAM: BOOTCAMP

The COVID-19 pandemic compelled organizations to pivot how training is delivered to personnel, and even reassess if a particular training is still relevant and important to the mission.

When the in-person NSIN Bootcamp for new contractor hires at Hanscom Air Force Base (AFB) was shuttered, leaders there initially decided not to attempt to replicate the program virtually. Their concerns were the same as other organizations — such as whether they had the proper resources and technology to support virtual education and how valuable virtual engagement would be for peer-to-peer collaboration.

As time went by with no virtual replacement for Bootcamp, gaps in new contractor hire knowledge started appearing — learnings that were previously gained from the in-person program. Hanscom leaders needed to close the training gap, and they decided to work with NSIN on the first virtual delivery of Bootcamp to improve new hire onboarding outcomes.

While some of the initial virtual delivery was not optimal, the Hanscom team continued to iterate and adapt the approach. For example, the in-person Bootcamp spanned three full days, but they learned the virtual version was more effective as a four-week program. The longer duration had the benefit of closer relationships forming between participants since the pace of the material was spread out to allow for more interpersonal collaboration. A [podcast](#) also was developed that contractors could listen to anytime. The virtual Bootcamp was so enjoyable, Hanscom had to create a waiting list for their next virtual Bootcamp.

## Mechanical Engineering Design Students Create Better Navy Bomb Hoist

### PROGRAM: CAPSTONE

Mechanical engineering design students participating in an NSIN Capstone program at San Diego State University (SDSU) created a new bomb hoist for the U.S. Navy that can load lighter ordnance up to three-times faster than the current hoist. The HLU-288/E Bomb Hoist had been used for decades by both the Navy and Marine Corps for loading and unloading, but it was outdated and inefficient for use with lighter loads. Using much of the existing hoist's current casing and internal gearing, the Capstone team's final design reduced labor and maintenance required for the new hoist. Their solution is estimated to reduce the loading time for the F/A-18 E/F by up to 106 seconds and the loading time for the F-35-B/C Lightning by up to 150 seconds.





## NSIN Supports Innovation Within the XVIII Airborne Corps

**The XVIII Airborne Corps fosters a culture of innovation across its ranks by including its people in its decision-making processes.** NSIN is supporting the Corp's mission through our Source and Bootcamp programs and also through UNUM, our collaboration platform that provides soldiers with a forum to elevate new ideas and engage with others. The two NSIN program engagements and platform are recognized by leaders and rank and file as helping the unit modernize resources and improve operations.

"We must innovate to support our people and optimize our readiness," said XVIII Airborne Corps Brig. Gen. Robert T. Ritchie, who is also their director of innovation. Our soldiers and civilians are fully empowered to innovate by introducing new thoughts, technologies, processes, and equipment."

"There are Soldiers all across XVIII Airborne Corps with ideas to improve how we do things," said XVIII Airborne Corps 1st Lt. Nate Schnittger. "I see the NSIN Portal as a way for those Soldiers to speak up and be heard. Anyone of any rank can submit an idea; any idea can be heard."

In particular, the Bootcamp program opened up access for the Corp to over 230,000 experts, professors, and students with access to 3D printing, artificial intelligence, and robotics through partnership agreements with 18 universities and the Army Research Laboratory (ARL). Bootcamp makes available resources that soldiers would otherwise not have. Eliminating these obstacles means soldiers have the opportunity to test ideas and develop solutions to real-world challenges. What was previously only a hypothetical, can now be tested, proven, and even adopted by the military.

For example, the U.S. Army is implementing Maj. Evan Adams' idea for better management of range time. Adams pitched his idea to the first XVIII Airborne Corps NSIN Bootcamp Innovation Challenge, a 'Shark Tank'-style competition that asked soldiers to submit ideas on improving range and training area management. There were many great pitches and Adams' idea won, opening doors to present his solution to senior Army leaders.

In addition, in 2021 the XVIII Airborne collected service member solutions through the NSIN Source Sexual Assault Prevention Challenge, or SHARP Challenge. The purpose of the Challenge was to collect ideas for eliminating sexual harassment and assault in the Army.

The Challenge was highly successful in sourcing ideas. In fact, from the seven ideas presented, parts from all seven have been implemented across the XVIII Airborne. Some of those changes are to the military justice policy, the way reports are handled, and grade-determination boards following sexual assault cases.

Another idea that was implemented uses a virtual-reality program to create a more immersive training experience to prevent sexual assault and harassment. It allows soldiers to participate in simulated real-life scenarios instead of relying on videos or print materials.



### H4D Project Becomes Air Force Pilot Program

PROGRAM: HACKING FOR DEFENSE (H4D)

The University of Virginia (UVA) has been involved in a long-term project for the U.S. Air Force Operational Energy Office (SAF/IEN) to incentivize greater fuel efficiency for airmen and squadrons. The engagement began in fall 2020 with four H4D students and continued in spring 2021 with the graduate H4D course that refined the plan and proposed five concrete policy goals for the program. The work of these two UVA H4D cohorts was so successful and valuable that it became a pilot program called the Mission Execution Incentivization Program (MEIP), which the Air Force is currently implementing. In addition to the important policy development work, one H4D student received an internship, and two NSIN X-Force Fellows managed the pilot program's launch in summer 2021.

### Seeing Through Walls Made Possible from H4D Startup

PROGRAM: HACKING FOR DEFENSE (H4D)

Lumineye, a startup created in a H4D course at Boise State University (BSU), developed a 3D-printed radar device that sees through walls using signal analysis software to differentiate humans from other objects. In addition to its value for soldiers on the battlefield, Lumineye identified an opportunity to use its solution to address climate change. Because of H4D, the team learned to solve real-world problems and create solutions that make lives better and safer. Today, Lumineye is working with firefighters to develop its product to see inside buildings and through thick brush to rescue people. In addition, Lumineye has participated in cohorts with leading corporations such as Verizon and continued to develop its technology for scalable solutions.





## From H4D to Orbit in Five Years

PROGRAM: HACKING FOR DEFENSE (H4D)

San Francisco-based Capella Space was born in a 2016 Hacking for Defense (H4D) course at Stanford. Five years later, it has four satellites in orbit that provide detailed landscape photographs for the DoD. In addition, the team is using its tech to help communicate during wildfires, which are destroying the homes where Capella was created. Day or night, through clouds or smoke, Capella's technology rapidly provides information that assists the U.S. Forest Service and local firefighters with clear communication while running into blazing wildfires.

Moreover, Capella took the skills it learned from NSIN and is giving back to other startups following in its footsteps. In July, Capella hosted its second hackathon to spur innovation and bring its employees together for a few days of team bonding and fun.

Today, Capella has contracts worldwide and works closely with the U.S. Air Force and the National Reconnaissance Office.

## Strangers Unite to Win Arctic Hacks Event; Prototype in Progress

PROGRAM: HACKS

Polaris Communications, a startup created by two Arizona State University (ASU) students at the Aug. 5 NSIN Hacks event, earned \$45,000 from their first-place finish for technology for geospatial intelligence in the Arctic. Jim Crowell, an ASU alum and founder of another Phoenix-based defense innovation startup, and Daniel Newsom, an ASU senior, didn't know each other until they met at NSIN's Polar Vortex hackathon. The two decided to use their complementary skills to form a startup and develop a laser-based, mid-infrared, free-space optical communication for national intelligence work in the Arctic. Today, NSIN is guiding Crowell and Newsom towards a DoD follow-on contract to build a prototype that can be tested by DoD end-users in the Arctic later this year or early 2022.



### Early-Stage Venture Develops Solution for Special Forces

#### PROGRAM: MAKER

Two years ago, a sole competitor won the NSIN San Diego Hackathon, held in partnership with the 1st Special Forces Command and the Defense Intelligence Innovation Office, to solve technological constraints when conducting missions and training in austere environments. The winning solution used novel materials to greatly improve Special Operations Forces (SOF) equipment by reducing its weight by 30%, increasing its ruggedness, and improving heat transfer characteristics using carbon fiber and kevlar. The benefit of this solution is that DoD operators now have stronger and lighter equipment, thus reducing the overall weight of their backpacks when operating and training in austere environments.

With the Hackathon win, this innovator decided to pursue opportunities for turning this novel solution into a practical and real prototype and joined the 2020 NSIN Maker cohort.

Through support and mentoring provided through the Maker program, they formed a company called Next Generation Electronic Encasements (NGEE) to continue to serve the special forces community and are in the process of bringing their product that was developed at the Hackathon to market.

### III MEF Big Ideas Challenge Gives Marines Opportunity to Pitch the CO

#### PROGRAM: SOURCE

The U.S. Marine Corps III Marine Expeditionary Force (MEF), headquartered in Okinawa, Japan, created the Big Ideas Challenge in partnership with the NSIN Source program, to take place virtually on UNUM, NSIN's community and collaboration platform. The III MEF Big Ideas Challenge offers opportunities to pitch individual Marines' ideas directly to their commanding officer. Because of the direct approach, Marines can see their ideas implemented across the base, which improves morale through a rewarding and tangible process. For their second Big Ideas Challenge, III MEF hosted an awards ceremony for the 10 finalists on Sept. 15. The two winning teams received a U.S. Navy and Marine Corps achievement medal and a commander's coin for their solutions.





## Starts Winner Connects Defense Solutions and Advances Dual-Use Tech

**In October 2020, Omnispace, a global communications company in the Washington, DC area, won the \$50,000 grand prize at the inaugural NSIN Starts Presents: Navy & Marine Corps 5G program.** Omnispace edged out 49 other companies in the dual-use competition with their 5G technology solution to integrate terrestrial and satellite networks into a single connectivity solution.

Omnispace's technology is the first to harness the power of 5G technology in this way which has both Department of Defense (DoD) and commercial applications. For example, soldiers, equipment, and machines all use different satellite networks to operate. A soldier's radio operates at a different frequency and bandwidth than a gas pipeline, operates differently from an unmanned aerial vehicle (UAV) and so on. To make timely decisions and ensure operational security and success across all networks, Omnispace combines the different networks into one so soldiers have access to complete information when it matters most.

Driven by real-world service member needs, the NSIN Starts program connects senior DoD officers, entrepreneurs and the national security community, to accelerate the adoption of solutions offered by dual-use ventures.

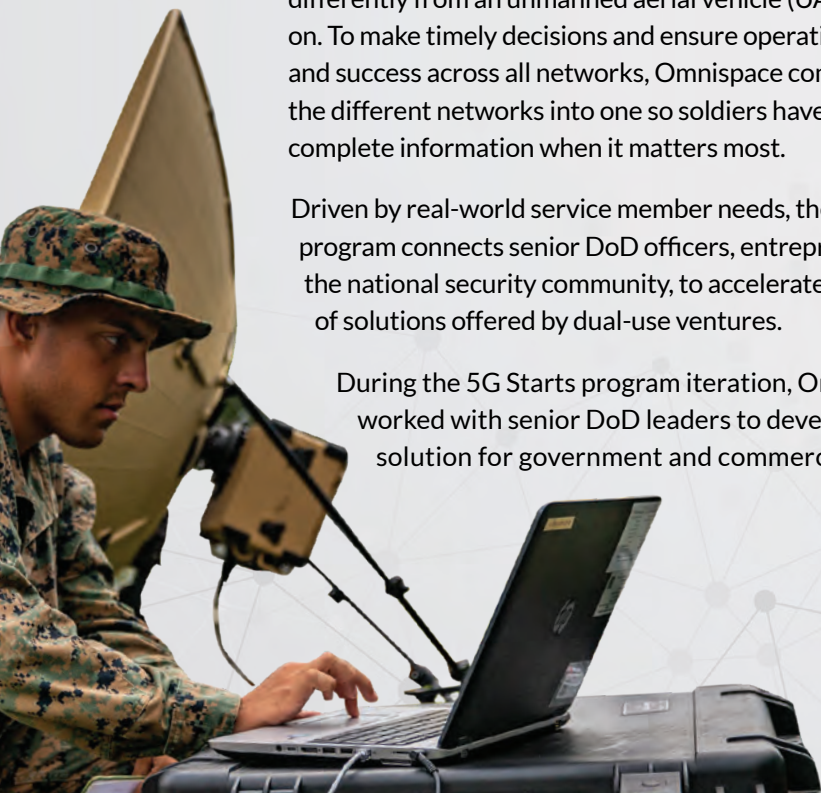
During the 5G Starts program iteration, Omnispace worked with senior DoD leaders to develop their solution for government and commercial 5G

communication problems. As a part of the Starts programming, Omnispace gained a better understanding of DoD 5G problems and the pathways their company could take to quickly contract with DoD organizations. Omnispace leveraged the partnerships they built during the program to expand their defense innovation network.

"Omnispace is honored to have been selected to work with the U.S. Navy and Marines to demonstrate 5G capability from space... giving our warfighters ubiquitous global connectivity and true comms-on-the-move," said Campbell Marshall, vice president of government and international markets at Omnispace.

In March 2021, Lockheed Martin announced that it was establishing an agreement with Omnispace to build a space-based 5G network. The partnership developed because Omnispace successfully demonstrated its on-orbit satellite capabilities to NSIN, the Navy, and the Marines. Access to this 5G network means commercial users will have a cellular connection virtually anywhere and "dead spots" will become a thing of the past.

Last year, Omnispace closed \$60 million in equity financing to develop its satellite-based service for 5G, the Internet of Things (IoT), and smart technology. In 2021, Washingtonian Magazine named Omnispace CEO Ram Viswanathan one of their "**2021 Tech Titans**," and the company won Mobile Satellite Users Association (MUSA)'s 2021 "**Top 5G Wireless Mobile Innovation**" award.





## Early-Stage Venture Attracts National Attention and New Funding

### PROGRAM: PROPEL

Propel delivers custom accelerator programs with leading partners like Techstars and MassChallenge to enable the DoD to test, pilot and identify contracting opportunities with early-stage ventures developing dual-use technologies. Pison Technologies, one such early-stage venture, was founded in 2016 to assist people with amyotrophic lateral sclerosis, or ALS, through the use of a neuromuscular sensing system which enables hands-free gesture control of digital interfaces. Pison participated in Propel's 2019 Safety & Security track with MassChallenge enabling the company to engage with DoD stakeholders to explore dual-use applications of its technology. Since then, the company has secured nearly \$3 million in DoD awards and contracts with applications including touchless gesture control of robots, drone pilot training and drone flight simulation. Pison has raised over \$11 million in private capital including a \$7 million Series A round in March 2021 from leading investors like Lavrock Ventures and In-Q-Tel, and [its new technology was featured on PBS NewsHour on Sept. 1](#). Since 2019, Propel has run 10 programs accelerating the growth of nearly 90 early-stage ventures who have secured over \$50 million in DoD contracts and raised nearly \$70 million in private capital.

## Record-Breaking Year for DIA

### PROGRAM: DEFENSE INNOVATION ACCELERATOR

In the last year, two Defense Innovation Accelerator (DIA) cohorts have created a total of 22 companies, nine of which are actively in licensing or cooperative agreements with DoD labs.

Candelytics, the December 2020 DIA cohort winner, is now in the final stages of pre-seed funding and converting its Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) contracts into Phase II. In addition, Candelytics has successfully secured two contracts with the U.S. Air Force and a memorandum of understanding (MOU) with AFWERX.

The September 2021 winner, ELVEE, is a biomechanics lab in a shoe that incorporates measurement technologies, which exist only in state-of-the-art laboratories, into a small, portable insert and ankle electronics package. ELVEE can determine weight, movement and joint patterns like ankle position, forces on the ankle, weight distribution, and ankle power in real-time conditions.





# Arizona State University Exemplifies the Future of Defense

**For the sixth year-in-a-row, U.S. News and World Report ranked Arizona State University (ASU) first in innovation programs for students.** The university is located near several active-duty military bases and large defense industry companies, and ASU is leveraging these local assets to lead national security innovation through a diverse set of NSIN programs such as Hacking for Defense (H4D), National Security Academic Accelerator (NSA2), Hacks, and X-Force.

In 2019 NSIN established its first university program director at ASU and since that time, the successes of students and startups through NSIN programming on campus have accelerated economic development and dual-use technology for commercial and military purposes across the world.

“For us to be strategic in the way that we’re deploying our programs and connecting dots, it’s most helpful to have somebody on the ground,” said Samantha Hiller, NSIN’s ASU university program director. “My goal here is to turn Arizona’s defense footprint into an ecosystem, with ASU at the center.”

While many states have great research universities, startup accelerators, or military partnerships, the challenge is to connect them all and create a community where ideas flourish. Hiller has built a network for defense innovation at ASU to thrive in NSIN programs. A few highlights from the past year:

## NSA2

The NSA2 program at ASU creates opportunities for faculty, researchers, and students to solve national security problems. During the program’s inaugural year in 2020-21, 27 ASU teams advanced 16 technologies. In addition, the researchers are

expanding their Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs.

## Hacks

Two ASU students teamed up to develop the winning solution at the summer NSIN Hacks event “Polar Vortex: Hacking the Arctic” with their geospatial technology for national intelligence work in the austere Arctic environment.

Before they met at Hacks, one student had his own defense tech startup in Phoenix, and the other was a finalist at another Hacks event. Through the Hacks process, the

duo created a new company, Polaris Communications. Today, NSIN is guiding them toward a DoD follow-on contract to build a prototype.



## X-Force

Through the NSIN X-Force Fellowship, two ASU students worked with Luke Air Force Base (AFB) to develop a database for sharing emergency information. Today, the students plan to continue work on their solution for Luke AFB through the NSIN Vector program which works with NSIN alumni to develop their solutions into dual-use businesses.

## H4D

Two ASU students in an H4D class worked with the Air Force Research Laboratory (AFRL) to develop a new process for measuring core body temperatures. The students formed a company, Isocore Technologies, and now work with AFRL to bring the product to the pararescue and firefighter communities, who rely on core body temperature monitoring to keep their teammates safe and healthy.

### Slingshot Gains Series A Funding and DoD Contract

#### PROGRAM: STARTS

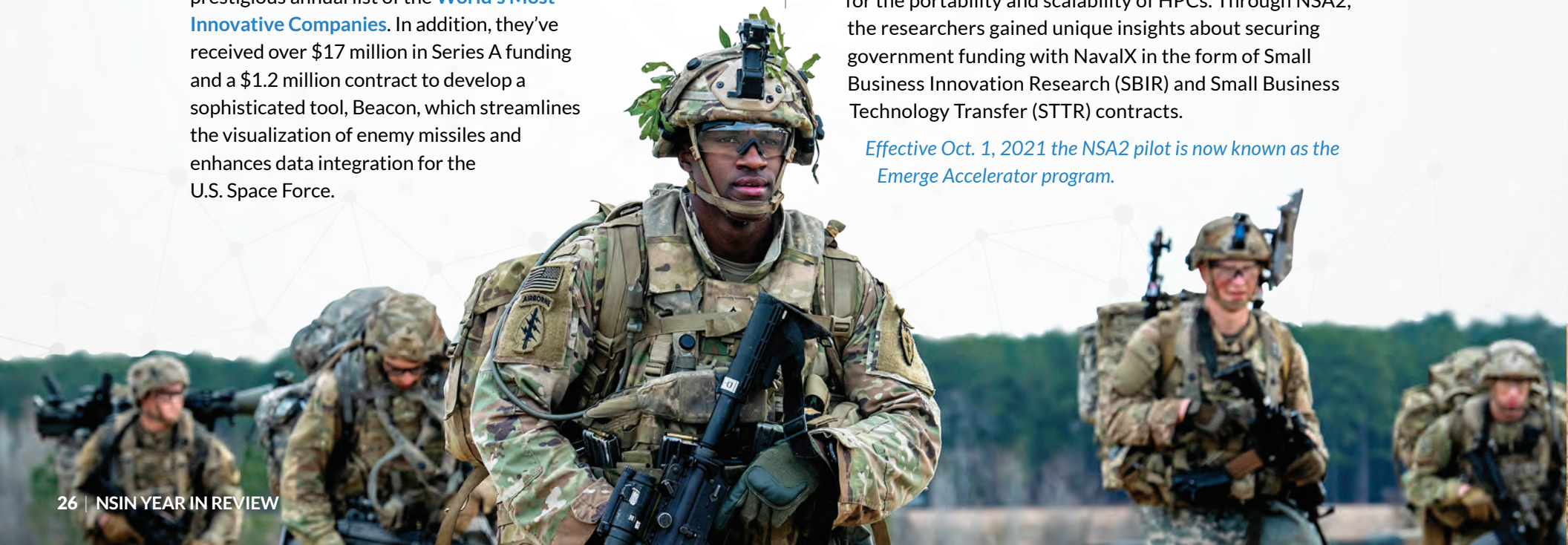
Slingshot Aerospace, a company that grew from an NSIN Hacking for Defense (H4D) course and an NSIN Starts program, helps companies in space and defense rapidly make sense of data collected by radar and other observation technology aboard satellites, airplanes, and drones. Slingshot expanded its knowledge of DoD problems and its network of potential DoD partners in NSIN Starts. Because of the relationships Slingshot formed in the Starts program, the team has become a national leader for partnerships in situational awareness technology. In 2021, Slingshot was named to Fast Company's prestigious annual list of the **World's Most Innovative Companies**. In addition, they've received over \$17 million in Series A funding and a \$1.2 million contract to develop a sophisticated tool, Beacon, which streamlines the visualization of enemy missiles and enhances data integration for the U.S. Space Force.

### High-Performing ASU Teams Advanced 16 Technologies

#### PILOT PROGRAM: NATIONAL SECURITY INNOVATION ACCELERATOR

The National Security Academic Accelerator (NSA2) program at Arizona State University (ASU) created a unique opportunity for ASU faculty, researchers, and students to solve national security problems. During the program's inaugural year, 27 ASU teams advanced 16 technologies. One solution developed was a framework accelerator that enables extreme-scale, heterogeneous high-performance computing (HPC). The accelerator allows for programming against a unified application programming interface (API), which is the performance key for the portability and scalability of HPCs. Through NSA2, the researchers gained unique insights about securing government funding with NavalX in the form of Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) contracts.

*Effective Oct. 1, 2021 the NSA2 pilot is now known as the **Emerge Accelerator** program.*





## **NSIN Company Becomes National Leader; Two-Time NSIN Program Winner Pays It Forward**

### **PILOT PROGRAM: VECTOR**

Distributed Spectrum won the \$25,000 grand prize at the February 2021 NSIN Mad Hacks: Fury Code pitch event with its radio frequency (RF) Threat Detection System. RF Threat Detection System identifies enemy transmissions designed to disrupt vehicle operations, while also determining if the threat could disrupt a vehicle's safety.

After its Hacks victory, Distributed Spectrum participated in the May 2021 inaugural NSIN Vector cohort to continue developing detection systems to help human-controlled and autonomous vehicles operate on the battlefield during cyber attacks or other instances of electronic warfare. In the Vector cohort, the team learned business formation skills, market analysis, sales, fundraising, government contracting 101, and pitch prep. At the final Vector pitch event, Distributed Spectrum won an additional \$25,000 to continue developing its technology.

Today, Distributed Spectrum is coaching other defense innovators along with NSIN and senior DoD officials at events such as Fed Supernova.











# IMPACT BY REGION

# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

**13**

Universities engaged

**61**

Sponsored programs

**490**

Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

**23**

Hirethon

**196**

X-Force

**40**

National Service

## GENERATING NEW SOLUTIONS

**12**

Programs & pilots

**28**

DoD problems worked on

**32**

Ideas adopted

National Security Innovation Base programs & regional events:

**18**

New Entrants

**5**

Service members

Active UNUM users:

**160**

## NEW VENTURE CREATION

**25**

Dual-use ventures created from NSIN programs



**HUB CITY:**  
Boston, MA





# NORTHEAST REGION

**The Northeast Region has the world's leading university network in terms of both student population and quality of institutions.** It is also one of the strongest venture ecosystems in the country in amount of venture dollars invested and the number of companies created, and it is home to both large technology companies and emerging local startups. The region is a leading source of maritime technologies (bluetech) because of its maritime culture, naval presence, oceanographic science credentials, and grassroots undersea vehicles work. The region has a strong record in biological and medical technologies (biotech/medtech) owing to the state of Massachusetts' supportive policies and concentration of large biotech corporations. Materials sciences and advanced fabrics are well represented due to the region's previous role in the national garment industry. Robotics, software, and artificial intelligence (AI)/machine learning (ML) startups spin out from renowned computer science programs at local universities.

"We met some really incredible people through the hackathon and as we worked on this project. They were really excited to talk and to help in any way they could," Armistead said. "To create something that could help save lives and protect communities was very rewarding."

—**Katrina Armistead**, Participant in NSIN's Beat the Blaze Hackathon



# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

<b>7</b>	<b>14</b>	<b>48</b>
Universities engaged	Sponsored programs	Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

<b>12</b>	<b>51</b>	<b>63</b>
Hirethon	X-Force	National Service

## GENERATING NEW SOLUTIONS

<b>14</b>	<b>24</b>	<b>19</b>
Programs & pilots	DoD problems worked on	Ideas adopted

National Security Innovation Base programs & regional events:

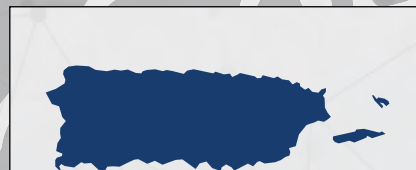
**34**  
New Entrants

Active UNUM users:

**243**

## NEW VENTURE CREATION

**12**  
Dual-use ventures created from NSIN programs



United States Virgin Islands



Puerto Rico

**HUB CITY:**  
New York City, NY



# MID-ATLANTIC REGION

**Defense installations in the Mid-Atlantic Region tend to focus on tech development (e.g., C5ISR, lethality), strategic mobility, dense urban environments (DUE), and domestic operations.** The region is one of the strongest venture ecosystems in the country and is well-poised to address those mission sets. New York City is generally rated second to San Francisco/Silicon Valley and is comparable to Boston in terms of venture formation and deal value. The presence of significant sources of financial and human capital, top tier universities, strategic partners, and actively supportive state and local governments strengthen the Mid-Atlantic venture ecosystem. Combined with the region's 280 universities and colleges, including the largest public university system in the country with well over 400,000 students, Mid-Atlantic innovators are especially well positioned to address tech challenges relating to artificial intelligence (AI) machine learning (ML), media (e.g., virtual reality (VR)/augmented (AR), disinformation), cyber, biomedical, and urban environments.

“NSIN Propel will enable the U.S. government to benefit from dual-use technologies critical to defense while providing the companies the guidance they need to scale their solutions for both the government and commercial sectors.”

—Shaun Stewart, CEO of Newlab



# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

<b>3</b>	<b>15</b>	<b>152</b>
Universities engaged	Sponsored programs	Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

<b>99</b>	<b>36</b>	<b>143</b>
Hirethon	X-Force	National Service

## GENERATING NEW SOLUTIONS

<b>21</b>	<b>76</b>	<b>208</b>
Programs & pilots	DoD problems worked on	Ideas adopted

National Security Innovation Base programs & regional events:

<b>28</b>	<b>3</b>	<b>2,579</b>
New Entrants	Service members	

## NEW VENTURE CREATION

# 28


Dual-use ventures created from NSIN programs

**HUB CITY:**  
Washington, DC





# NATIONAL CAPITAL REGION



**The primary advantages of the National Capital Region are the density of the population and the diversity of Department of Defense (DoD) customers.** The region hosts customers at the tactical, operational and strategic levels and is home to organizations that focus on every major tech vertical. Universities in the region have several niche competencies that make them useful partners to the Department, including top tier policy and law schools with faculty and students already inclined toward national service, as well as expertise in artificial intelligence (AI), robotics, naval engineering and maritime programing, computer science, engineering, medicine, and applied physics. While the National Capital Region is not traditionally a hotbed for technology innovation, regional startups and investors are primed to support the defense sector. The National Capital Region also includes think tanks, interest groups, executive branch innovation organizations, and the legislative branch, all of which are focused on solving similar technological challenges to NSIN's.

“My career and functional understanding of the Department of Defense was shaped by the National Security Innovation Network through the Hacking for Defense program at the University of Virginia, as well as the X-Force Fellowship. These invaluable experiences allowed me to make real contributions to issues of National Security... I am currently in my last phase of training at Officer Candidate School in Newport, Rhode Island. I truly believe I am where I am because of the extensive network and opportunities that came from H4D and X-Force.”

—Brandon Hylton, Class of 2020 at UVA



# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

**16**

Universities engaged

**40**

Sponsored programs

**415**

Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

**20**

Hirethon

**42**

X-Force

**69**

National Service

## GENERATING NEW SOLUTIONS

**27**

Programs & pilots

**74**

DoD problems worked on

**75**

Ideas adopted

National Security Innovation Base programs & regional events:

**42**

New Entrants

**11**

Service members

Active UNUM users:

**449**

## NEW VENTURE CREATION

**19**

Dual-use ventures created from NSIN programs



**HUB CITY:**  
Orlando, FL



# SOUTHEAST REGION

Major commands headquartered in the Southeast Region include extensive networks: Special Operations Command (SOCOM), Central Command (CENTCOM), Southern Command (SOUTHCOM), Joint Special Operations Command (JSOC), XVIII Airborne Corps, II Marine Expeditionary Force (MEF), United States Army Special Operations Command (USASOC), United States Marine Forces Special Operations Command (MARSOC), Program Executive Office Simulation, Training and Instrumentation (PEO STRI), and Naval Air Warfare Center Training Systems Division (NAWCTSD). The Southeast Region therefore has an unparalleled combination of special operations and conventional units at the tactical, operational and strategic levels. Moreover, over 40% of active duty military are located in the Southeast Region. The region also contains more than a quarter of the total Tier 1 research universities in the country. Increased migration from the West Coast and Northeast to the Southeast are driving the growth of startup ecosystems in Atlanta, Raleigh-Durham, Central Florida, and Southern Florida, as measured by venture dollars invested and number of deals negotiated. Each of these hubs focuses on different technology areas, including biotech, pharma, data analysis, cyber, augmented reality (AR)/virtual reality (VR), gaming, simulation, lasers and space launch capabilities.

“This Memorandum of Understanding is an excellent opportunity for our 12 institutions to support an industry critical to the state of Florida. By preparing our graduates for the types of issues and real-world problems facing the defense industry, we build a dynamic talent pipeline for Florida that fosters innovation and problem-solving.”

—Syd Kitson, Chair of the Board of Governors at the State University System of Florida



# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

**11**

Universities engaged

**29**

Sponsored programs

**296**

Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

**20**

Hirethon

**26**

X-Force

**67**

National Service

## GENERATING NEW SOLUTIONS

**21**

Programs & pilots

**59**

DoD problems worked on

**31**

Ideas adopted

National Security Innovation Base programs & regional events:

**21**

New Entrants

**6**

Service members

Active UNUM users:

**259**

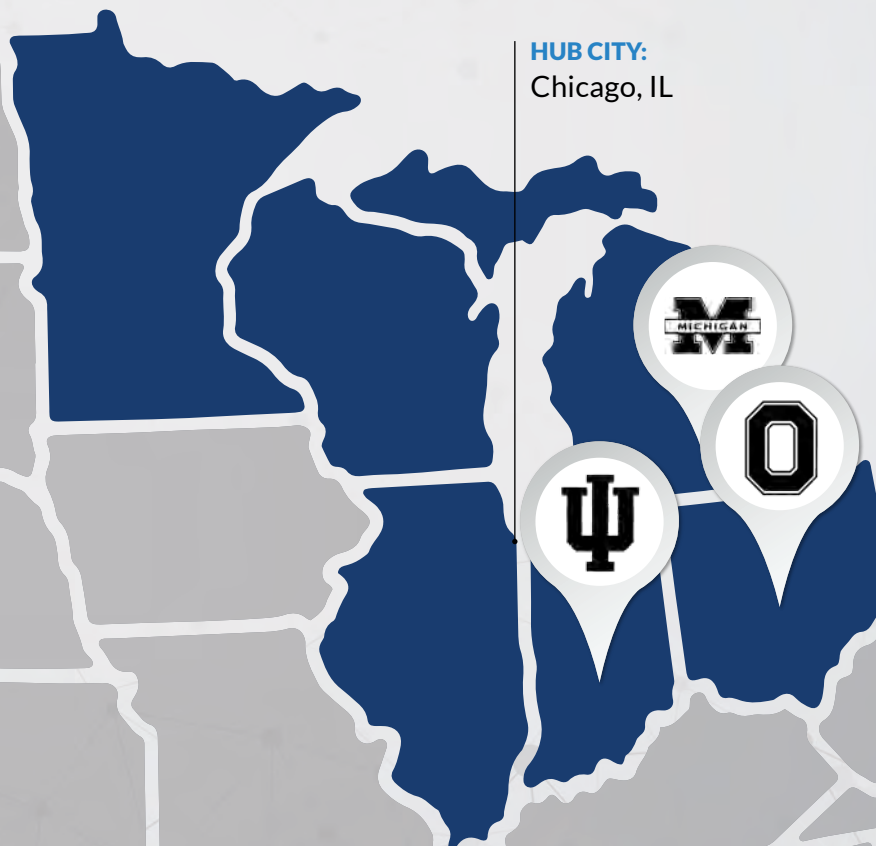
## NEW VENTURE CREATION

**29**

Dual-use ventures created from NSIN programs



**HUB CITY:**  
Chicago, IL





# GREAT LAKES REGION

**The Great Lakes Region has a wealth of resources geographically distributed across six states, with multiple large state National Guard forces, deep clusters of dense technological capabilities, and a significant number of established universities with research activity.**

The Great Lakes Region hosts key Department of Defense (DoD) Laboratories and Centers, organized and innovative National Guard commands, and Partnership Intermediary Agreement (PIA) entities and Other Transaction Authority (OTA) consortia to assist in non-traditional technology research and development and transition into the DoD. The Great Lakes Region is home to over 40 R1 and R2 universities (very high to high doctoral research activity) with international faculties and large student populations, posting four of the top 10 largest by enrollment. The heart of the region's venture ecosystem is in Chicago, the location of more than 100 incubators and accelerators. Other pockets of robust venture activity congregate around top research university ecosystems. Five prominent technology verticals in this region are advanced manufacturing and materials, energy, trusted microelectronics, hypersonics, and cybersecurity.

“Students’ experiences with NSIN challenges are transforming the way they think about themselves, opening their eyes to the importance of addressing national security and introducing them to career paths they’ve never considered before. The relationships we facilitate between academia’s talent pipeline and national and regional public sector employers are invaluable.”

—Elizabeth K. Newton, Ph.D., Executive Director of the Battelle Center for Science, Engineering, and Public Policy at The Ohio State University



# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

<b>3</b>	<b>29</b>	<b>314</b>
Universities engaged	Sponsored programs	Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

<b>15</b>	<b>65</b>	<b>88</b>
Hirethon	X-Force	National Service

## GENERATING NEW SOLUTIONS

<b>13</b>	<b>44</b>	<b>30</b>
Programs & pilots	DoD problems worked on	Ideas adopted

National Security Innovation Base programs & regional events:

<b>27</b>	<b>2</b>	<b>201</b>
New Entrants	Service members	

## NEW VENTURE CREATION

# 14

Dual-use ventures created from NSIN programs





# MIDWEST REGION

The Midwest Region hosts two combatant commands — **Strategic Command (STRATCOM)** and the **Transportation Command (TRANSCOM)** — as well as the **National Geospatial Intelligence Agency (NGA)**. These mission partners need engineering, logistics, location science, artificial intelligence (AI)/machine learning (ML) models, and data science respectively. The university ecosystem is anchored by a mix of public and private institutions, including Washington University in St. Louis, University of Missouri, and University of Nebraska Omaha. Because of nearby defense installations and the strength of the St. Louis medical community, these schools have competencies in computer science, medical research, and geospatial sciences. Similarly, the venture ecosystem in the Midwest has seen strong institutional investments in medical technology as well as growing investments in broader technology and, due to NGA's presence, geospatial capabilities.

“Expanding innovation capacity and entrepreneurial activity in St. Louis’ geospatial sector are at the very core of what GeoFutures is working to achieve. The work NSIN is doing to develop regional partnerships and engage talent not traditionally aligned with national security is in perfect alignment with the strategies laid out in the GeoFutures Strategic Roadmap, and we are glad to have them as such a strong and growing partner in the region.”

—Andy Dearing, Project Lead at GeoFutures





# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

**8**

Universities engaged

**15**

Sponsored programs

**149**

Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

**6**

Hirethon

**37**

X-Force

**55**

National Service

## GENERATING NEW SOLUTIONS

**23**

Programs & pilots

**54**

DoD problems worked on

**43**

Ideas adopted

National Security Innovation Base programs & regional events:

**44**

New Entrants

**11**

Service members

Active UNUM users:

**120**

## NEW VENTURE CREATION

**33**

Dual-use ventures created from NSIN programs



**HUB CITY:**  
Austin, TX



# SOUTHWEST REGION

**The Southwest Region has a robust base of Department of Defense (DoD) installations with a concentration of Major Commands and Army and Air Force end users, as well as a unique presence of National Guard units.** The region is home to 10 of the best 100 engineering schools, seven of the 15 best entrepreneurship schools, seven of the 50 best business schools, and four of the top 100 computer science schools in the country. The Southwest also has one of the strongest venture ecosystems in the country. Austin usually ranks fourth behind the Bay Area, Boston, and New York City in terms of venture dollars invested and the number of companies created. Texas A&M has developed the world's leading hypersonics and autonomous systems facility which serves local and national customers. The region has a strong record in hypersonics and autonomous systems, biological and medical technologies, materials sciences and advanced fabrics, and software and artificial intelligence (AI)/machine learning (ML).

"I'm really interested in expanding the way we think about problems, and I think just the conversations we have with people who think differently about how to solve problems is probably the biggest benefit we're going to get."

—**Gen. John. M. Murray**, Commanding General at Army Futures Command



# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

**5**

Universities engaged

**18**

Sponsored programs

**146**

Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

**20**

Hirethon

**26**

X-Force

**67**

National Service

## GENERATING NEW SOLUTIONS

**13**

Programs & pilots

**39**

DoD problems worked on

**30**

Ideas adopted

National Security Innovation Base programs & regional events:

**21**

New Entrants

**3**

Service members

Active UNUM users:

**112**

## NEW VENTURE CREATION

**18**

Dual-use ventures created from NSIN programs



**HUB CITY:**  
Denver, CO



# ROCKY MOUNTAIN REGION

The Rocky Mountain Region is home to the U.S. Space Force and a robust aerospace community, as well as customers with nuclear equities, including North American Aerospace Defense Command (NORAD) and United States Northern Command (NORTHCOM), both of which play vital roles in offensive and defensive command and control. The region features over a dozen high to very high doctoral research activity (4 R1 and 14 R2) institutes with a combined student population of 349,000. Science, technology, engineering, and mathematics (STEM) students who focus on space, energy, mining and unmanned aerial systems (UAS) represent the four leading areas of research within the region. The region's burgeoning venture landscape is led primarily by investments and growth in Colorado and Utah.

"[H4D] is a powerful platform and program for engaging and working with DoD. The business framework you presented throughout the semester was world class and has application far beyond the [co-eds] lucky enough to have joined the class. Additionally, I was struck by how it brought college kids closer to the military in a productive and collaborative way."

—Retired Air Force Col. David (Dash) Wilmot,  
Director of Live Flight Strategy at CAE





# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

**2**

Universities engaged

**10**

Sponsored programs

**63**

Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

**3**

Hirethon

**12**

X-Force

**16**

National Service

## GENERATING NEW SOLUTIONS

**3**

Programs & pilots

**5**

DoD problems worked on

National Security Innovation Base programs & regional events:

**5**

New Entrants

**1**

Service members

Active UNUM users:

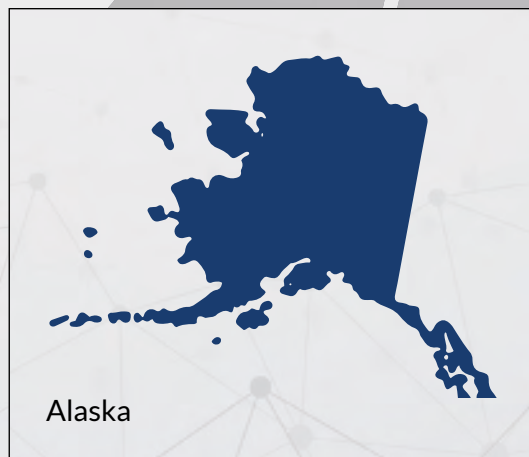
**135**

NEW VENTURE CREATION

**2**

Dual-use ventures created from NSIN programs

HUB CITY:  
Seattle, WA



Alaska





# NORTHWEST REGION

**With a strong legacy of defense industrial production dating from World War II, the Northwest Region hosts a wide variety of military units across all four branches of the armed services and the National Guard.** The academic research community is bolstered by the presence of multiple strong state university systems from Washington, Oregon, Alaska, and Idaho. Their strengths lie in computer science, software development, artificial intelligence (AI)/ machine learning (ML), robotics, data science, life sciences, and biotech. Seattle is the primary hub for the region for startups and venture capital. It is home to Microsoft and Amazon and host to outposts of other major tech companies including Facebook and Google. Industry trends around software development, AI/ML, aerospace, fintech, 5G, Cloud, and biotech. The venture capital community is led by Madrona Venture Group with over \$2 billion under management.

“UW has enormous strengths in many areas relevant to DoD priorities. The appointment of Justin and a formal relationship with NSIN will enhance the ability of our faculty to conduct research with the DoD, provide new learning opportunities for our students, and strengthen the regional entrepreneurial ecosystem by engaging innovators across the Pacific Northwest.”

—François Baneyx, Vice Provost for Innovation at UW and Director of CoMotion



# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

**4**

Universities engaged

**31**

Sponsored programs

**224**

Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

**16**

Hirethon

**30**

X-Force

**48**

National Service

## GENERATING NEW SOLUTIONS

**12**

Programs & pilots

**26**

DoD problems worked on

**11**

Ideas adopted

National Security Innovation Base programs & regional events:

**21**

New Entrants

**4**

Service members

Active UNUM users:

**417**

NEW VENTURE CREATION

**54**

Dual-use ventures created from NSIN programs

**HUB CITY:**  
San Francisco, CA





# PACIFIC-NORTH REGION

The Pacific-North Region is home to innovation partners such as the Defense Innovation Unit (DIU) and NavalX Central Coast, as well as Travis Air Force Base and the Naval Postgraduate School. The region also possesses a rich university ecosystem with strong public and private institutions; University of California, Davis, University of California, Berkeley, and Stanford University are among the top universities nationwide, and the latter two are tied as top schools to develop entrepreneurs. Ventura is the defining element of the Pacific North Region, where East Bay, San Francisco, and Silicon Valley collectively form the top venture ecosystem in the country. Home to noted incubators and accelerators, such as SkyDeck, The House, YCombinator, Founders Institute, Angel Pad, Plug and Play, and StartX, the Pacific North Region produced 30 unicorn start-ups in 2019. Their technologies range from artificial intelligence (AI), BioTech, Robotics, Cybersecurity, and Fintech, to food, data science, space, and semiconductors.

“Our campus is filled with problem-solvers who care deeply about innovations in national security that make our planet a safer place. This new partnership with NSIN and the OSD will provide opportunities for innovators working across disciplines to understand and solve the complex security challenges in areas ranging from humanitarian assistance and disaster relief to cybersecurity and preventing the spread of pandemics and misinformation.”

—Shankar Sastry, Faculty Director of the Blum Center at UC Berkeley



# FY 2021 BY THE NUMBERS

## GROWING A NETWORK OF PROBLEM SOLVERS

University program participation:

**13**

Universities engaged

**61**

Sponsored programs

**490**

Program participants

## PROVIDING OPPORTUNITIES TO SERVE

Students across the region engage in NSIN programs:

**48**

Hirethon

**196**

X-Force

**252**

National Service

## GENERATING NEW SOLUTIONS

**29**

Programs & pilots

**118**

DoD problems worked on

**149**

Ideas adopted

National Security Innovation Base programs & regional events:

**47**

New Entrants

**6**

Service members

Active UNUM users:

**417**

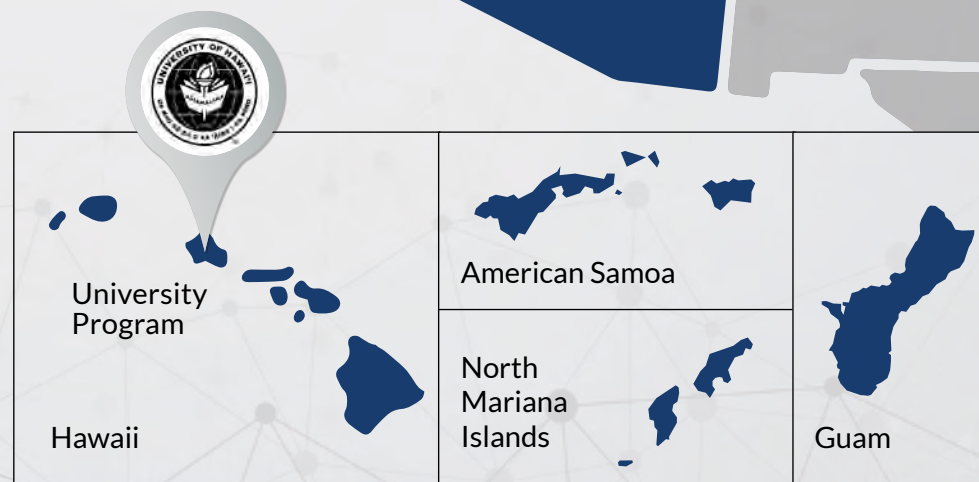
## NEW VENTURE CREATION

**36**

Dual-use ventures created from NSIN programs



**HUB CITY:**  
San Diego, CA





# PACIFIC-SOUTH REGION

**The Pacific-South Region has one of the largest and most diverse concentrations of military organizations representing each service.** With United States Indo-Pacific Command (INDOPACOM) headquartered in Hawaii, the region has the largest concentration of Naval and Marine Corps forces in the country. Additionally, the region is home to many Department of Defense (DoD) labs, warfare centers, Army, Space Force, and Air Force bases and training commands. The region has over one million university students enrolled in its public and private institutions, not including community colleges, which account for an additional 2.1 million students from California alone. These universities are highly ranked in science, technology, engineering, and math (STEM) and have developed robust research capacity in emerging technologies. The region contains three University Affiliated Research Centers (UARCs), 10 R1 universities (very high doctoral research activity), nine R2 universities (high doctoral research activity), four top 20 engineering schools, and eight top 50 computer science programs. The region has a highly diverse and innovative venture ecosystem with mature and emerging tech, biotech, communications, space, and aerospace clusters. The region's economic diversity, population, and geographic diversity makes it competitive in nearly all of the technology verticals highlighted in the 2018 National Defense Strategy.

"I initially expected there would be little crossover between defense and commercial applications, but I found that almost every innovation had practical applications for both," said Schumacher. "One of the innovations presented directly solves a real business problem for my teams today. The NSA2 showcase led to a follow-up meeting, and we are now co-innovating directly with the ASU participant, jointly solving a real-world challenge for us and providing an opportunity for him to showcase his innovation in a commercial setting."

—**Daniel Schumacher**, Director of Global IT Applications and Digital Innovation at Komatsu America and Komatsu Mining











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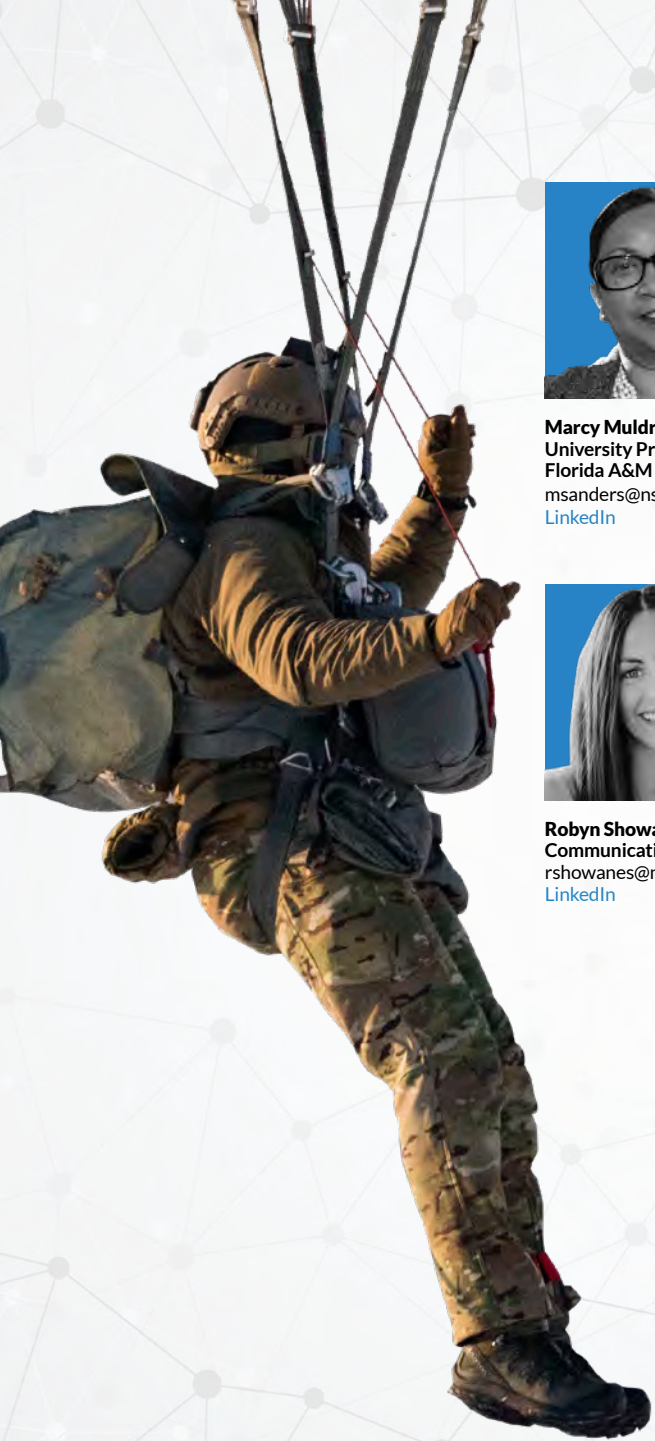
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# Collaboration and Networking Platform Re-Launches as UNUM

Formerly the Defense Innovation Network, NSIN re-launched the platform on May 7, 2021 as UNUM, with enhanced capabilities to support the growing community of collaborators from across the defense, academic, and venture communities.

The NSIN UNUM platform brings together innovation leaders from defense, academic, and venture communities with people of all ranks and expertise. **UNUM** is a collaboration and networking platform that serves the problem-solving needs of Department of Defense (DoD) customers. UNUM is the one platform built to support the collaboration of innovators from diverse backgrounds and warfighters seeking solutions.

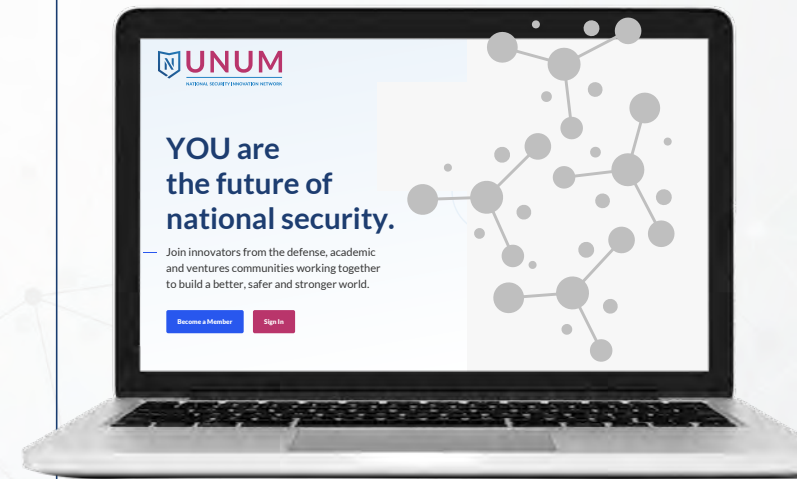
“UNUM is central to NSIN’s mission to build new networks of problem solvers. It enables users to connect in real time to the defense, academic, and venture communities across the nation,” former NSIN acting director, Jen Bird explained.

## UNUM Benefits:

- **Diverse Members:** UNUM brings together atypical collaborators from defense, academia and venture backgrounds.
- **Collaboration Communities:** Connect with innovators in your region or others working in the same problem areas.
- **Solve Technical and Policy Problems:** Bottom-up innovation challenges, online hackathons, and other problem-solving activities bring together diverse collaborators from across the network.
- **Mentoring and Peer Learning:** Support emerging practice and innovation methods.

The name UNUM invokes the spirit of the traditional Latin motto of the United States, ‘E Pluribus Unum (Out of Many, One)’ and signals our vision for an open space for innovators to connect and collaborate on common ground.

Log in today to see our enhanced network-building platform at [UNUM.nsin.us](https://unum.nsin.us).



A woman with dreadlocks, wearing a military uniform and a red sash, is operating a vehicle. In the background, a fighter jet is visible on a runway. The entire image is overlaid with a faint, light blue geometric pattern of dots and lines.

**NSIN Problem Submission Form**  
[www.nsin.mil/problem-intake-form](http://www.nsin.mil/problem-intake-form)

## Seeking Military Project Sponsors

We serve members of the Department of Defense interested in working with a dedicated team of problem solvers on their most pressing technical challenges. We accomplish our mission by bringing together defense, academic and entrepreneurial innovators to solve national security problems in new ways.

The process typically starts with the thought “there must be a better way.” If you’re a member of the military and think there must be a better way to solve a problem, contact us. Let us know the challenge you face, and we’ll work to find the best way to get it solved.

To get started, visit [www.nsin.mil/problem-intake-form](http://www.nsin.mil/problem-intake-form) and complete our Problem Intake Form. Be prepared to summarize the problem in a few sentences including why it’s important and who would benefit from it being solved. The application takes about 10-20 minutes to complete. Our team will review your submission and be in touch to discuss any potential next steps.

There is no fee for NSIN’s services. Participating organizations and its senior leader must commit their support and availability to participate in the process.



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The best way to keep in touch with the latest NSIN News is to sign up for our newsletter and follow us on social media.

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A weekly roundup of NSIN news and events, defense innovation news, and funding opportunities delivered to your inbox every Monday.

[www.nsin.mil/resources/newsletter-signup](http://www.nsin.mil/resources/newsletter-signup)

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