

# Percy Hobart Fellowship 2022

## U.S. Fellows Report

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This report outlines the experience and recommendations of the 2022 US Navy Percy Hobart Fellowship participants.

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## Executive Summary

The United Kingdom Ministry of Defence Percy Hobart Fellowship (PHF) Program, is a bespoke 12 week immersive curriculum designed to teach, inspire, and create innovative change agents for the military Services. The program is designed around four parts to instill an understanding of innovation and business practices to enhance defense innovation:

1. A rigorous academic schedule including lectures, workshops, and innovation talks.
2. A startup company placement that allows fellows to experience the culture and environment in working for a small, dynamic technology company.
3. An innovation project developed independently by each fellow to solve an operational problem within Defense that included deliverables for problem statement, solution statement, business case, culminating in the innovation pitch as the final product for graduation.
4. Expert support through a personal coach, an entrepreneurial mentor, and an intrapreneurial mentor to uniquely hone each fellow's personal and professional elements of leadership to benefit innovation.

Sponsored by the Assistant Secretary of the Navy, Research, Development, and Acquisition (ASN(RDA)), three US participants were selected from a nation-wide announcement and in January 2022, joined 40 others from the Royal Navy, Marines, Army, and AirForce in this program. It was designed and sponsored by the UK's Office of the Chief Technology Officer, conducted by [PUBLIC](#) and ran out of the NavalX London TechBridge shared facility in Whitehall London.

The program was an absolute success, providing an intensive and engaging learning environment to allow the fellows to become innovation evangelists and bring modern perspectives and tools back to their home commands. The true value of the program is immeasurable, as this experience does not necessarily result in a short-term tangible outcome, but a shift in mindset that infiltrates the future thoughts and behaviors of those that have learned it. The value is in creating better leaders that can identify when change needs to occur and have the tools and network to act upon it.

Based on this perspective, it is strongly recommended that ASN(RDA) continue to support US participation in this program to advance innovation across the US and Royal Naval enterprises.

## Introduction

Major General Percy Hobart is widely acknowledged as an innovator, change agent, intrapreneur and credited for his contributions in the Allied victory in World War 2 with his unique and innovative tank designs during the Normandy Beach operation. Fired twice by the UK Ministry of Defense organization and rehired directly by Prime Minister Churchill, Major General Hobart's mission driven innovation inside the bureaucratic organization is now considered an example to the UK Ministry of Defense and relevant to some of the recently observed successes in the Ukraine conflict.



The PHF program is developed to take the self-motivated individual through learning development centered on innovation within Defense. The fellowship program is designed around a curriculum that includes academics, startup company engagement, independent research, and formal mentoring and coaching - all with the goal of creating "trojan horse" change agents/innovators and releasing them back "into the wild" to gradually shift the culture and make important impacts within the UK and US Defense organizations. The curriculum is crafted with subject matter experts in career fields involving project management, business, finance, contracting, innovation, entrepreneurship, and start-up businesses that support nearly every aspect of Defense.

The following report details the specifics of the program, background and experiences of each of the three US Fellows, their observations, research and startup company experience as well as highlights the major outcomes and observations of the 12 week fellowship:

- 1) A culture of Innovation within a large Mission Driven organization must be deliberate and fostered at the highest levels and be pervasive throughout the organization. Culture can be influenced by the deliberate emphasis on capability, capacity, and motivation at all levels.
- 2) There exists a "frozen middle" layer inside the organization that is resistant to change and does not share in or understand the imperative from the top of the organization. The layer exists at multiple levels of the organization inside branches, divisions, departments, Commands and Program Offices and must be motivated to change.
- 3) An innovative culture is possible but will require a shift in mindset that infiltrates the thoughts and behaviors of leaders and a focus on proactive identification and solving of problems at all levels.

## PERCY HOBART | HOW IT WORKS



### **THEORY: LEARNING & POLICY**

Formal teaching led by academics, officials, innovators, entrepreneurs etc.



### **PRACTICE: EMBEDMENT**

10 week placement with a startup



### **INNOVATION PROJECT**

Identify problems within Defence to solve and develop individual projects to pitch



### **MENTORSHIP & COACHING**

Industry leaders mentor Fellows through the world of technology and innovation

PHF 2022 was the third year of the innovation program sponsored by the Office of the Chief Technology Officer (OCTO) within the Royal Navy and supported by PUBLIC, GovTech company working from Public Hall powered by Huckeltree. PUBLIC started as an accelerator and investor then evolved to become Europe's leading government-focused technology company.

This was the second year that included members from the US Navy, sponsored by the Assistant Secretary of the Navy, Research, Development, and Acquisition (ASN(RDA)). PHF 2023 and beyond will be contracted in the near future with PUBLIC to ensure the culture of innovation continues to grow within the Services.

## Curriculum Overview

The four elements, theory learning and policy, start-up embedment, innovation project, and mentoring and coaching, are woven through the 12 week program in an incremental or building block approach.

- The theory learning and policy focuses on four topics of startups: technology innovation, business principles, innovative thinking and agile working.
- The start-up placement matches Fellow interests with new technology business to provide hands-on application of academic content.
- The innovation Project is structured to help the Fellows identify and solve operational problems within defense.
- Mentoring and coaching is tailored to meet the Fellows needs for personal and professional growth and provide skills and experience to keep innovation growing within the Services.



# PERCY HOBART | MENTORSHIP & COACHING



## ENTREPRENEUR

The Entrepreneurs deliver advice based on their experiences of founding distinctive, world-class startups.

Fellows are being taught how Entrepreneurs have overcome challenges and gone on to thrive and build businesses.

1

## INTRAPRENEUR

Intrapreneurs provide Fellows with specific expertise on the ins-and-outs of innovating within large companies/government.

As the aim is for Fellows to return to service and champion innovation from within, this insight is crucial.

2

## PERFORMANCE COACH

Performance Coaches tailor their mentoring to show how life lessons from the Entrepreneurs and Intrapreneurs can be applied to challenges posed to leaders in the Defence.

3

The PHF used the Google suite of tools with Gmail, GCalendar, Google Meet, Google Drive, Google Slides, Google Docs, with third party Apps using Zoom for video conferencing with breakout rooms, Notion for documentation repository, and Slack for collaboration and sharing of announcements and interactive comms. The tools used by the PHF were very efficient and effective in the remote and onsite learning environment. The Microsoft tools behind the Flank Speed zero trust firewall, would not have allowed for this type of collaborative learning with people and organizations outside the military domains.

**Onsite Learning Experience.** Onsite learning was approved in early February once COVID restrictions were lifted. Despite in-person engagements still being limited depending on safety concerns, being in London and in the same time-zone as the other fellows proved to be very useful and productive. Cross communication (formally and informally) between fellows increased significantly and small social gatherings provided an opportunity to meet the other fellows and start to build relationships and trust. A few larger cohort in-person collaborations also occurred. Safety precautions were taken seriously, such as providing a negative COVID test prior to engaging with others. These larger meetings were extremely beneficial as they allowed for face to face meetings, lectures, workshops, and on-site participation that allowed for the development of cohesive teams and strong, long-lasting relationships.

## US Fellows

### Kevin Gross

**Background.** Kevin is currently the Director, Threat Target Systems Department leading surface, airborne, and land based threat and target presentations for T&E and Fleet Training. Kevin brings a background of combat operations, developmental test and evaluation, program and project management, and leadership of large, complex, and diverse teams that support the NAVAIR mission.



**Remote Learning Experience.** Remote learning from California with an 8 hour time differential required a change in the circadian rhythm to adjust the body clock for participation in the London, UK time zone. In this case, Kevin ramped into the Greenwich Mean Time (GMT) time zone by adjusting his sleep schedule to wake up an hour earlier every day between Christmas and New Years. This allowed Kevin to wake at midnight to begin participation at 0100 PST every day when the Fellowship started. This also required earlier bedtimes at 1300 to 1400 daily (with room darkening shades) to ensure sufficient sleep was provided. This sleep/work schedule was out of sync with the home schedule and presented challenges sharing meals and family time. This was more difficult for the family trying to be quiet from Kevin's bedtime until the family bedtime. This schedule was maintained on weekends until travel was approved to join the Cohort in person.

Remote learning also required a personal computer and gmail account for use during the program because the collaborative tools used during the fellowship were not approved on NMCI computers. Kevin purchased a MacBook Air for this purpose and used Google's suite of tools for scheduling, communication, and collaboration.

**Startup Experience.** Kevin was matched with Logically.ai (<https://www.logically.ai/>) Logically uses artificial intelligence and machine learning with natural language processing to sift through the social media and news media echosphere to identify dis and misinformation. Logically is a UK based company founded in 2017 following the dis and misinformation surrounding the 2016 Presidential election and the exit of the UK from the European Union. Logically spans across three continents with two offices in India, two in the UK, and one in Washington DC. Kevin participated in leadership meetings with the CEO, COO, Financial Officer, Head of Communications and Public Relations, Head of Product, Head of Data Science, Head of Editorial, and Head of Open Source Intelligence (OSINT). Kevin supported the US office with review and recommendations of engagement supporting the US Marine Corps and the NATO Exercise Cold Response in Norway. Logically provided a demonstration of open source news and information analysis of the social media echosphere surrounding the exercise. Kevin introduced

Logically to the seventh Joint Staff warfighting domain of Information Operations. Kevin also supported the analysis of Russia build up of military warfighting capability along the Ukraine border helping with OSINT fact checking within Twitter to identify mis and disinformation about Nazis in Ukraine and Ukrainian aggression in the Russian towns along the border. On 24 February, Russia invaded Ukraine and the weekly report to the UK Government ramped up to daily reports with an increase in workload for the analysis and editing team. Logically is balancing growth with product and service maturity, and financial investment with a goal to expand the customer base to increase revenue. Logically received their Series A investment of £24 M from investors and venture capitalists in mid-March.

- Logically is a brilliant company providing the most necessary analysis of mis and disinformation for Governments, businesses, and citizens.
- The products and services are in demand in our politically divided landscape with the insatiable appetite for fact checking instant news and information.
- Logically is the mis and disinformation filter sifting out and identifying false and misleading news and information.
- As a growing 'start-up,' Logically is on the path to expand and continue gaining customer accounts to bring in the revenue needed for investor's return on their investment.
- I witnessed start-up characteristics taught by the Percy Hobart Fellowship, enacted by every element of the Logically team that effectively demonstrated by practice the learned material.

**Innovation Project.** With the proliferation of small unmanned aerial systems (sUAS) that have sophisticated control systems, 4K high definition cameras, and a 3 to 5 pound payload that can be weaponized as a remote improvised explosive device, Navy Base Force Protection Systems require training and standardization to detect and defeat this emerging threat. Kevin's project provides a Counter Unmanned Aerial System (C-UAS) Training Team (C-UTT) designed to provide an 'outside the fence line' Opposing Force (OPFOR) to test and train Base force protection measures. The three person C-UTT (team lead and two air vehicle operators (AVO)) will travel to any of the 57 Naval Bases and Installations as a fee for service capability to conduct a vulnerability assessment, provide training, and test the detection and defeat of small UAS. The benefit of this team will provide training standardization across all Navy Bases to ensure each base has the ability to detect and defeat the threat and means that each base does not have to create this team on their own.

You can see Kevin's Business Case and Innovation Project Pitch in the Innovation Project Attachments Section below.

**Lessons Learned.** The immersive program set in London with attendance from the spectrum across the Defense Services provides too many lessons to describe. The following are provided for discussion:

- Limit 'home base' work and interaction to allow the Fellows to focus on the program to gain the most benefit of the learning. The immersive program was all consuming, typically 10-12 hours daily, and I had the support of my Military Director, Associate for Operations, and Chief of Staff that were empowered to lead my Department and make all decisions in my absence. I witnessed other UK Fellows struggle with home base demands while carving time to participate in the Fellowship which distracted them from the learning experience.
- Adjusting circadian rhythm to an 8 hour time zone differential requires strict discipline and adherence to a sleep and wake schedule, even on weekends.
- Innovation is a mindset that requires the ability to recognize a concept or idea with potential and the ability to nurture the idea to reality. This requires a foundation in project management, financial management, and contracting with the ability to lead the change desired.
- The Navy zero trust Flank Speed network tools are not as collaborative as the Google suite of tools.
- One is never too old to continue learning for professional and personal improvement.
- This curriculum instills the foundation of leading change toward innovation within all levels of Defense.

## **Alan Jaeger**

**Background.** Alan Jaeger is the Office of Research and Technology Applications Manager for the Naval Surface Warfare Center, Port Hueneme Division and the Director of the NavalX Ventura Tech Bridge. Alan is the command's primary contact to academic institutions and industry entities for partnerships and collaboration initiatives. He is responsible for building and maintaining strategic relationships that accelerate technology transition/transfer for the fleet and warfighter and administers non-federal acquisition agreements, partnership intermediary agreements and educational partnership agreements.



Prior to his position, Alan was a 10 year faculty member at the Naval Postgraduate School where he led a multi-disciplined federal operational research team. Alan began his career in Private Industry in various engineering and technology program development positions around the world. Alan has a BS in Mechanical Engineering, a Masters Degree in Business Management and is Level 3 Certified in Systems Planning, Research, Development and Engineering from the Defense Acquisition University with over 20 years of experience in research, program management, systems design and acquisition in the public and private sector.

**Remote Learning Experience.** Alan started the fellowship program from home in Southern California. This provided a challenging 8 hour time zone difference with the workday starting at 1am local time. Unlike Kevin, Alan was unable to completely switch his body time zone due to competing schedules with grade-school level children at home. To completely switch to Greenwich Mean Time would have met virtually zero interaction with family. In addition, local demands from the office continued to provide distractions as the fellowship day was ending and the local day was starting. Alan maintained this schedule for approx 10 days before traveling to Washington DC where the time zone difference was much more conducive to an early morning lifestyle. For the next month, Alan completed the fellowship activities from Washington DC where there were much less local office distractions and focus could remain on the program.

**Startup Experience.** Alan was paired with Hummingbird Technologies - a remote data capture and analysis company focused on the utilization of technology and data science for sustainable agriculture. Specifically, the use of overhead Satellite imagery in order to determine crop conditions and farming initiatives that would support carbon capture. This startup company is a couple of years old with approx 30 employees, but was in the process of a significant restructure and alignment based on investor funding and market conditions. The company did not have a CEO at the time of the fellowship program and the Vice President was the primary interface for the fellowship. In addition, due to COVID, the entire company

was working remotely for the initial part of the fellowship - which facilitated easy engagement, but also proved challenging as the company was also in some level of restructure with significant personnel turn-over.

The majority of the effort during the fellowship was as a “strategic advisor” to help the company understand potential business decisions related to legal and market conditions. This experience provided insight into how a small business can easily be affected by external forces and how a company can also react and pivot quickly. Although the subject matter was not related to the Navy applications, the overall experience of researching an external condition, assessing its impact on an organization, researching courses of action and implementing change was directly related to the core goals of the fellowship.

The startup experience is a valuable component of the program and should be considered a strategic opportunity for the fellows. However, care needs to be taken in choosing companies that are structured, mature enough, and have a clear understanding of the goals and outcomes of their fellowship involvement. Companies do not need to have direct alignment to a Navy mission or functional area, but should be in an appropriate maturity level to accommodate a senior level person joining their team.

**Innovation Project.** Alan’s independent research and Innovation Project was aligned directly with his home commands strategic goal of: “Creating a culture of innovation in order to deliver and sustain capability”. The experience gained during the PHF fellowship directly impacted his ability to understand this goal, dissect it into major elements, gain perspective in how the UK side as well as private sector were addressing this shared goal, as well as conduct an extensive literature review on the topic and best practices. His research was focused on the similarities of a start-up company and a large, but focused, mission driven organization such as the Navy.

One of the key baselines of Alan’s research was the shared definition of innovation. Oxford English Dictionary describes innovation (a noun) as the “introduction of new things, ideas, or ways of doing something”. From this basis, all areas of our business can and must innovate; from business operations, contracts, Human Resources, Facilities, traditional line-level support as well as technology. This fact was observed and shared across the fellows on virtually all of their start-up experiences. In addition, this perspective must be pervasive from the senior level management to the deliberate actions of each employee.

*“We Can't Solve Problems By Using The Same Kind Of Thinking We Used When We Created Them”. -quote attributed to Albert Einstein:*

Alan's research conclusion recommended leveraging the concepts of Nudge Theory and making deliberate decisions, focused choice architecture and providing the capability, capacity and motivation to innovate at all levels and functions of our organization, in order to create and maintain a culture of innovation.

You can see Alan's Business Case and Innovation Project Pitch in the Innovation Project Attachments Section below.

**Lessons Learned.** The most significant lesson learned throughout the experience was that innovation inside a large defense organization is difficult, but not impossible. The US Navy has a rich history of innovating when necessary, but also resorting back to a procedural and risk reducing policy comfort level when possible. The concept of a "frozen middle" inside an organization was abundantly clear and directly related to the US Navy's current innovation efforts. Leadership at the top of the organization clearly sees the need for a more innovative workforce and culture; seen directly in the CNO's strategy of "Get Real, Get Better", but there is an institutional resistance to change. Adm Michael Gildy stated: *"History shows the navy which adapts, learns, and improves the fastest gains an enduring warfighting advantage. The essential element is fostering an ecosystem – a culture – that assesses, corrects, and innovates better than the opposition"*. The lesson learned throughout the PHF program is that there is a real need for a cultural shift and that must happen inside the middle of the organization. Trained and motivated innovation change agents utilizing the concepts of Nudge Theory with the capability, capacity and motivation can gradually shift the culture and make important impacts within the US Navy.

## Jamie Lukos

**Background.** Jamie Lukos was a neuroscientist and branch head of the Intelligent Sensing Branch at the Naval Information Warfare Center (NIWC) Pacific in San Diego, CA where she supervised a diverse group of talented scientists and engineers. Her research focuses on dynamic measurements of operators during human-autonomy interactions and mobile brain imaging during demanding physical and cognitive tasks. This work leads to a better understanding of the neurological basis of human decision making in operationally-relevant environments and informing algorithm development for physiological monitoring devices, human-machine teaming communication and fieldable brain computer interfaces. However, since the culmination of the program, Jamie has used her new found knowledge of strategic innovation to take on the role of the Business Portfolio Manager for Battlespace Awareness in the ISR Department of NIWC Pacific. In this role, she helps to direct the strategic direction of the command by helping to support the projects within her portfolio and other innovative initiatives throughout the center. The Percy Hobart Fellowship definitely helped to provide a solid foundation to leverage in this impactful position.



**Remote Learning Experience.** For the initial six weeks of the program, during the height of the Omicron variant in the UK, Jamie worked remotely from the DC area. Although it was difficult being away from home, it was much more immersive in a new environment and with less of a time difference (5 vs. 8 hours) than from the west coast. Still, Jamie had to wake up at 3:30am every morning to start the day at 4am. Psychologically, this was much preferred over waking up at 1:30am every day and she adapted quickly. That said, it still took a toll on physical and mental stamina being out of sync from the local environment, so when the opportunity to go to London surfaced, it made the program so much better.

Jamie purchased a new personal computer and set up a new email to use for the program to help segregate personal correspondence as well as keep day-to-day NIWC Pacific work separate.

**Startup Experience.** Jamie was first matched with the startup company Pando. Pando is a communications platform to support day-to-day medical messaging across a network of clinicians. With our forces stationed throughout the world and deployed to remote locations, it is often extremely difficult to get specialized care in a timely fashion. Pando provides secure, timely and cost-effective communication channels across the military health system to ensure gold standard healthcare to patients around the world. Although it is a great company with a great mission, it wasn't a great fit. From the very first meeting, Jamie struggled to get

connected with the subject area. Despite having a background in human research, medical/clinical work is not within the scope of her research and outside of NIWC Pacific's mission areas. However, she was excited to be part of a startup company and gave it a shot anyway to see if the people and culture would make up for the lack of interest in the topic. She came up with a list of objectives.

- Business Development
  - Strategic plan for expanding to U.S. Market
  - Draft Statement of Work (SOW) for contract with the U.S. DoD
- Research Initiative
  - Abstract submitted to the U.S. Military Health Systems Research Symposium (MHSRS)
  - Draft publication of Pando MoD deployment data

Despite her best efforts, it was a slow start. It seemed as though the company were not prepared or just too busy to support a fellow. The point of contact was difficult to get a hold of in a timely manner. That said, there was a lot of good too.

- 1) There were SO many great people on the Pando team and many were very welcoming.
- 2) The people cared SO MUCH about the mission and you can feel the excitement they had for what they did.
- 3) They were very purpose driven.
- 4) They were very transparent with their communications. They literally recorded EVERY meeting. Even the Christmas party! This was great because you can catch up and feel like part of the team very quickly. Being more transparent and OK with recording meetings is definitely something the DoD should do more of. Worry less about attribution. Isn't that better than playing a game of telecon and someone misinterpreting you anyway?

Despite all the good, as much as she tried, it didn't feel like she was part of a team. She worked with Public and her mentors about it and over the course of a few weeks, it was clear that a change would be in everyone's best interest. And in week 5, almost half way through the program, she did. She originally thought this placement was going to be a lesson in finding or growing passion over time, or accomplishing a task despite challenges, but no. The lesson was learning how to pivot. How to "fail fast." How to change course when it feels like it is the right thing to do. To not buy into the "sunk cost" fallacy. Even though it would have probably been easier and less stressful to stick with Pando, it would not have been nearly as fulfilling or worthwhile.

Jamie was SO glad she made the change too, because she then got matched with Elemendar, a cyber threat intelligence (CTI) AI company. This was way more up her alley and something she could get excited about. What Elemendar is doing is building a natural language processing (NLP) graph neural network (GNN) AI tool for cyber analysts to take CTI documents, distill it down to all the important elements and visualize the connections between them in a graph network. Really cool tech

and really cool application. Besides having a passion about the topic area, her point of contact was terrific! He was the Chief Cyber Analyst of the company, super smart and willing to take the time to teach me so much. They hit it off right away and she instantly felt like I was part of the team. She quickly got wrapped into helping with an “Analysts Day” workshop that they were putting on for North Carolina State University (NCST) Laboratory for Analytical Sciences (LAS). LAS brought in cyber analysts from NSA, and Elemendar took them through two CTI exercises to help test the product and get some end user feedback. The team worked hard in the weeks leading up to the workshop to ensure all the details were considered and everything was ready to go the day of.

**Innovation Project.** Similar to her startup experience, her innovation project had many twists and turns. The journey was just as important as the end product for her since her final project idea was a wonderful harmonization of many of the concepts she learned along the way. Initially she thought that it had to be aligned with her startup placement (Pando), so her first problem statement centered around how to better create a network of doctors for better patient care. The solution was basically the company’s solution, not that innovative and not that exciting because they already came up with it.

When she switched companies, she tried to figure out what she was really passionate about. Like many in this program, she cared about how we can better instill a culture of innovation. How can we as disruptive leaders be the change from within? We all know that bureaucracy has created organizations that are not open to or don’t know how to change and this resulted in issues such as the “frozen middle” where good ideas cannot flourish into proper solutions. But how? Based on the research and reading, she determined that experimentation was key. Experimentation in everything. There needs to be constant dynamics and evolution for survival. So in order to truly innovate in Defense, we have to shift our mindset and those around us from “will it work?” to “is it safe to try?”. She came up with a solution of safe experimentation within the organization to: 1) try new things with minimal consequence if innovation fails, 2) advance or adopt new best practices that work for today’s organization, and 3) regardless of the outcome, there are huge gains because this enables the organization and its workforce to grow and learn. So how can we do that? Build and celebrate experimentation into every project and strategy meeting. Her goal was to develop a system that easily enables leaders and managers to develop, track and try out new ideas in a small, safe way. However, there was no clear execution of that solution. She knew transparency was key for this method. Technology that allows everyone to view the ideas and progress towards a solution is important; tools like Kanban boards, wiki sites, and/or other means to allow the entire organization to view progress. She worked on this idea for a few weeks, but struggled to bring it somewhere more tangible. It was enjoyable and valuable learning about change management and culture shift concepts, but still felt too vague.

Towards the end of one of her sessions with a mentor, she brought up a different idea she was thinking about – it revolved around using the knowledge and experience she was gaining with her current startup company about graph neural networks and applying it to a problem our command often faces: situational awareness of project connections and innovation investments. Finally, it was all coming together! We currently use rigid, static, outdated tools to track our projects and their interdependencies. This leaves us with a lack of a holistic understanding of how projects interact and work together towards a joint mission and the potential overlap and collaborative opportunities that exist. If we do not modernize our ways, we will continue to have limited situational awareness, not allowing us to see the connections needed to effectively navigate and see the bigger picture. Given the speed with which we need to move complex technologies into the Fleet, we cannot afford to continue this siloed approach to project management and execution. Using the power of advanced data analytics and visualizations to create project graph networks, we can enable much greater situational awareness of project relationships and connections. This simple, yet powerful solution could revolutionize the way we view our organizations and connect ideas to advance innovation.

Her innovation project came together as a harmonious combination of her experiences throughout the fellowship. Every element from her startup placement to her lessons learned in the lectures to the mentorship and recommendations of my mentors, everything was part of her solution and her pitch. It was the journey that got her there and she is very grateful for all the twists and turns along the way that made it happen.

You can see Jamie's Business Case and Innovation Project Pitch in the Innovation Project Attachments Section below.

**Lessons Learned.** It is difficult to put in words how much was truly gained from this experience because it is so integrated into the innovation mindset that emerges in so many facets at various times. There is no doubt that these lessons are lasting and are a step towards advancing the DoD innovation ecosystem.

- Getting an opportunity to step outside of the day-to-day DoD work and truly immerse yourself in something fulfilling and enlivening is extremely valuable. It brings back a refreshed sense of purpose and clarity to the job that is energizing and exciting.
- Flexibility is vital. Getting outside of the often rigid box of government work was so liberating and allowed for more creative thought and execution of ideas. Being bogged down by red tape has more than just a direct negative effect, but infiltrates the way you think.
- Getting out of the country and collaborating with new people brought more clarity to what should be done back home. Sometimes when you are in the middle of the storm, it is difficult to be able to track all the important pieces of

the puzzle and the remoteness of the PHF program enabled a different viewpoint. Additionally, learning from our UK partners and being able to approach DoD challenges from an “outsider’s” perspective was very valuable.

### **Benefits of the PHF Program**

The result of this program is a uniquely situated individual who understands the process of nurturing the spark of an idea and growing it into a minimum viable product for experimentation or evaluation on top of their knowledge of defense policies, technologies and acquisition. And when successful, scale the idea into a larger capability that fills a gap or creates a new capability for the Service member or military mission.

From a career perspective, stepping back from the day-to-day workload for 3 months to focus on better ways to innovate provides very valuable insight that is difficult to attain otherwise. The experience is intense, yet re-energizing and gives the fellows a new, exciting lens with which to see their home organizations and how to make them better.

In person engagement, interaction and forming relationships with our UK allies through the Percy Hobart Fellowship is critical and should be considered a must for future fellows. The relationships and bonds that are formed with other PHF Fellows are strong and result in a fantastic network that the entire alumni base can (and does) lean on. Perspective, diversity of thought and respect for the other fellow's experiences and points of view are one of the most valuable intangible aspects of the program. This engagement and relationship building simply isn't possible remotely, across time zones and continents. Bringing all FVEY partners into the program would be beneficial and may be possible with future growth of the RN/Public contracted program.

### **Sustainment of PHF Benefits**

The benefit will only continue through a growing network of innovation professionals across the spectrum of Naval Service that remains connected through tools and collaboration. Ideally, this foundation of innovation resides within the Systems Commands (NAVAIR, NAVSEA, NAVWAR) responsible and accountable for developing, producing, fielding, and sustaining innovative capabilities.

The problems that exist in the DoD/MoD are not going to be solved overnight or by a single person. The PHF is taking a "trojan horse" approach of training change agents and innovators and releasing them back "into the wild" to gradually shift the culture and make important impacts. It is a long game, but a smart one.

## **DoN's Return on Investment**

Like sustainment of benefit, the return on investment will be realized with a growing population of like minded innovation professionals embedded in the organization to affect culture..

The true value of the program is immeasurable, so it is difficult to truly equate a specific metric. This experience does not necessarily result in a tangible outcome, but a shift in mindset that infiltrates the future thoughts and behaviors of those that have learned it. The value is in creating better leaders that can identify when change needs to occur and have the tools to act upon it.

As stated by Christain Brose in *The Kill Chain*, "Do we now believe, viscerally and actually, that there is something worse than change?" We must. And the problems the DoD faces are MUCH more about a need for organizational change and adaptation rather than technological change. The future of warfighting is fast-paced and dynamic. The way we approach military innovation cannot continue to be slow and rigid if we expect to remain in the fight and continue to be a leader for global freedom.

## **Recommendations**

### **Future DoD PHF Engagement**

We highly recommend that ASN(RDA) continue to support US participation in this program to develop the intrapreneurial spirit and skills of the DoD while also advancing innovation across the US and Royal Naval enterprises. Ideally, there would be an even greater number of participants from the US in each cohort. Additional expansion to the US Army and Air Force would also be beneficial to provide alignment with Royal Air Force, Royal Marines, and British Army participation.

Another potential route is trying to recreate a similar program in the US to provide more opportunities to ambitious, innovative thinkers. The USN could replicate the curriculum created by the Royal Navy Office of Chief Technology Officer through a contract with one of the service providers within the National Capital Region. The syllabus would require the same or similar academic, lecture, workshop, innovation, entrepreneurship, intrapreneurship, with professional coaches and mentors. That said, given the scope and intensity of the program, the development of the curriculum, cost of the contract, and maintenance of the learning experience will most likely exceed the TDY costs of sending participants to join the current curriculum sponsored by the Royal Navy.

In regards to DoD engagement with alumni fellows, it would be most valuable for the fellows' home commands and for the DoD as a whole, if the fellows were utilized effectively upon their return. Commands sponsoring fellowship candidates should

have senior level engagement in their proposed independent research project and regular involvement throughout the process. Alumni can help facilitate these discussions based on first hand experience. True adoption and return on investment will be realized when the home command fully understands and supports the fellowship and recognizes it as a catalyst for their own innovation efforts.

### **Future Fellow Selections**

Selection of future fellows can be a challenge for this program given the wide range of applicants and diverse skill sets in the defense innovation ecosystem. Generally speaking, self-motivated individuals who truly care about the future of innovation within the DoD, with various levels of experience from mid-career professionals level to more senior journeymen should be selected to participate. Fellows should have the ability to lead and sustain the culture required to drive innovation and bring concepts or ideas to reality.

A mix of both civilian and active duty participants bring balance to the Navy's future innovation team. Civilians bring long term consistency and Active Duty members bring mission relation to the experience. Ideally, both groups have strong ties to Systems Commands and OPNAV Staff to ensure the continued benefit of their experiences/knowledge is realized through the development of new technologies.

### **DoD Innovation Needs**

In addition to building up the DoD workforce with a skill set to drive innovation through PHF and other vehicles, we need innovation/collaboration tools that work within the DoD. The Navy's 'zero trust' environments are very restrictive to research and development. For example, by only allowing tools such as Microsoft Teams Flank Speed, cross-service, -academia, -industry collaboration is extremely challenging. DoD innovators need access and approval to use collaboration tools like Google Apps for Government, Notion, GitHub, and Slack, which enable unique and flexible communication and collaboration. Restricting our workforce to single solution tools does not work for those on the frontier of innovation.

### **Contact information**

Please feel free to reach out to any of us for more details! We are happy to share more about our experience and perspectives:

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Jamie Lukos, jamie.r.lukos.civ@us.navy.mil, Cell 619-518-8638

### **Additional References**

PUBLIC'S PHF Overview

<https://www.thepublicschool.tech/phf-case-study>

<https://www.public.io/case-study/the-percy-hobart-fellowship>

PUBLIC Website

<https://www.public.io/>

RN and RAF PHF publicity

<https://www.royalnavy.mod.uk/news-and-latest-activity/news/2022/january/18/220118-percy-hobart-fellowship>

<https://www.raf.mod.uk/news/articles/royal-navy-and-royal-air-force-begin-second-year-of-the-percy-hobart-fellowship-to-become-innovative-by-instinct/>

PHF LinkedIn

<https://www.linkedin.com/company/the-percy-hobart-fellowship/>

PHF LinkedIn Alumni Network

<https://www.linkedin.com/groups/9174170/>

## **Innovation Project Attachments**

**Kevin Gross**

### **Innovation Project Business Case**

#### **Counter-UAS Training Team (C-UTT) Business Case**

**Situation.** There are 57 Naval bases and installations within the United States that each have their own security force exercising force protection measures that increase when the threat level increases. With the growing proliferation of small drones or small unmanned aerial systems (sUAS) that have 4K high-definition cameras able to collect imagery intelligence or easily weaponized with a 3-to-5-pound payload as a flying improvised explosive device, there is a requirement for Base and Installation Commanders to train their security forces and test their force protection measures in the detection and defeat of these potential threats. With decreasing budgets and manpower limits, Base Commanders will most likely fund other higher priority programs or projects unless a more cost effective and efficient solution is presented. (Note: I am still working on the physical cost or impact to the US – Intelligence collection, damage or destruction of property or injury to people. What is the potential cost? I still need to better define the impact of this threat.)

**Business Case.** The intent of this business case is to present an efficient and cost-effective solution with the formation of a traveling Counter-UAS Training Team or C-UTT that is manned, trained and certified, and equipped with the sUAS systems that together present the opposing force (OPFOR) threat to exercise and train the Base security forces.

**The Naval strategic value** of this proposal protects national security with the prevention of intelligence collection efforts and protects critical facilities from damage or destruction from the IED potential. The direct benefactor is the Commander, Naval Installations Command who is responsible for all Naval Bases and Installations within the US. The end point for the business case are the individual Base and Installation Commanding Officers, Tenant Commands, and families living in base housing who will rest easy knowing they are safe from this potential Threat.

#### **Details of the C-UTT as an OPFOR team for hire are as follows:**

Hiring the C-UTT. The C-UTT staff is the team that will provide this service to any one of the 57 Naval Bases, Naval Air Stations, Installations, and Ammunition Depots nationwide. This team may be a combination of government civilians and/or Navy Reserve Officers on assignment to support this mission. The size of the composite team should be nine (9) members strong to provide three teams of three members each (Team Lead and two air vehicle operators) for rotational assignment once training is complete and certification with currency is gained. They would travel to the installation, provide training, and operate the “threat” quadcopter from ‘outside the fence’ as an Opposing Force (OPFOR) Low Speed Aerial Target (LSAT). This will allow the installation to exercise the Force Protection ‘kill chain’ and gain confidence in the use and performance of their defensive systems in the C-UAS mission. A vulnerability evaluation can determine both the effectiveness and suitability of the C-UAS system(s) used by personnel in the intended environment.

The annual Labor Costs for this solution requires the growth of nine (9) civilians at a cost of \$828K. If each of the 57 Bases employed a Lieutenant (O-3) and two First Class Petty Officers to conduct this training, the labor cost would be just over \$27,129K.

**Training and Certification.** C-UTT Training is available in the Threat Target Systems Department School House, located at Point Mugu, CA, where we currently train the aerial target operating teams. Training includes academic classroom instruction with hands on simulation and open air flight training both ashore and at sea in currently approved airspace. The curriculum follows the Federal Aviation

Administration 14 CFR Part 107 “Unmanned Aircraft General – Small (UAG)” materials and prepares the Air Vehicle Operator (AVO) under instruction (AVO-UI) with sufficient knowledge and experience to pass the examination and gain the Airman Certification and Rating for the Small UAS. This Certification is a required element to operate the sUAS ashore within and around installation airspace. The cost of training and certification for the six (6) C-UTT AVOs is \$37.2K compared to the cost of training and certification for two active duty AVOs at each Naval Base at \$349K

**Procuring the OPFOR sUAS.** The sUAS of choice is the Da Jiang Innovations (DJI) Phantom 4 Pro V2 quadcopter, priced around \$1,500 for the air vehicle and controller and manufactured in China. This system is a compromise in cost, size, performance with integrated video capabilities, ease of flight, and expendability at the end of the C-UAS ‘kill chain’. Inventory of the Phantom 4 Pro quadcopters will grow to support the deployed training environments. If or when the quadcopter is negated beyond economical repair, the expending installation will pay for the replacement to maintain inventory. The capital investment cost of buying an initial inventory of 20 Phantom 4 Pro quadcopters is \$30K and the quadcopter cost with the purchase 3 sUAS at each Naval Base is \$256K.

**Authorization to fly DJI products.** The FY20 National Defense Authorization Act, Section 8 48, and Executive Order 13981, prohibits the purchase and use of unmanned systems from “covered” [read Chinese] manufacturers because of potential cybersecurity threats to national security. With the exception that the Secretary of Defense is exempt from the restriction of using covered systems IF the procurement or operation is for the purpose of (1) Counter-UAS surrogate testing and training; or (2) Intelligence, electronic warfare, and information warfare operations, testing, analysis, and training. With this exemption, the US Department of Defense established the UAS Waiver Board and delegated approval to the Navy Waiver Board operated at the Assistant Secretary of the Navy, Research Development and Acquisition level. To gain approval for the procurement and use of a DJI product for the C-UAS mission, a “RIZOR” software patch is installed into the DJI product as a cybersecurity measure to prohibit the system from reporting flight information back to the manufacturer in China. The waiver package is submitted to the Navy Waiver Board for review and approval every 24 months. To date, the Threat Target Systems Department has Navy Waiver Board approvals for the purchase and operations of the C-UAS mission for both DJI Phantom and Mavic quadcopter systems. The labor associated with the development of the waiver package and installation of the RIZOR software for cybersecurity mitigation is contained within the annual labor rate for both the CUTT and the Naval Bases.

**FAA Authorization to Fly.** Airspace authorization requires an FAA Airspace Certificate of Waiver or Authorization (COA). FAA ORDER JO 7200.23C, Subj: Processing of Unmanned Aircraft System Requests. This order establishes the process of Section 44809, 14 CFR Part 107, Small Unmanned Aircraft Systems (sUAS) and 14 CFR Part 91, Certificate of Waiver and Authorization (COA) applications. This process guides the application for sUAS operations within the National Airspace System using the Low Altitude Authorization and Notification Capability (LAANC) [<https://faa.gov/go/laanc>] or Manual Airspace Authorization Procedures [<https://faadronezone.faa.gov/>]. Airspace approval will require Lost Link Procedures that vary based upon the type of UAS and must be included in the request. The labor associated with the development of the FAA Certificate of Waiver and Authorization is contained within the annual labor rate for both the C-UTT and the Naval Bases. Cost and Initial Schedule. The comparative cost estimates for the Individual Base Approach versus the costs for a single C-UTT is provided in table 1.

Table 1 Cost Comparison

Individual Navy Base Approach		C-UTT Approach	
Labor	\$27,129,492	Labor	\$827,973
Equipment	\$256,500	Equipment	\$30,000
Training	\$348,761	Training	\$37,200
<b>Total</b>	<b>\$27,734,753</b>	<b>Total</b>	<b>\$895,173</b>

A proposed schedule to hire, train and certify, procure the sUAS, complete the RIZOR installation and submit the waiver package, attain the FAA COA, and create the DPA with our Comptroller is illustrated in Figure 1. The recurring schedule for the three (3) traveling teams will be dependent upon the FAA COA approval process which should be reduced from the initial nine (9) week period planned to less than two (2) weeks once we develop the procedures and the FAA gains confidence in our ability to plan our flights and fly our plans. This ‘learning curve’ will be critical to sustaining a pace of operations that will be required to train all 57 Naval Bases in as efficient a timeframe as possible. See Scalability paragraph for further discussion.

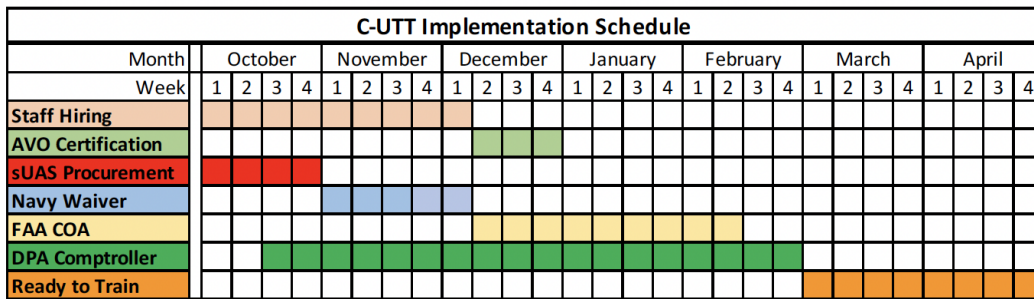


Figure 1 Proposed Initial Implementation Schedule

**Costs to Customer to be developed.** With the Comptroller’s support, we need to develop the ‘package costs’ for the C-UTT as a fee for service team that travels to each of the Naval Bases and Installations to conduct the vulnerability assessment and perform OPFOR flight operations to train the Security Forces. The total Navy Working Capital Fund cost accounting of the C-UTT needs to be determined by the Naval Air Warfare Center Weapons Division Comptroller. This cost account will include planning and preparation, team travel with per diem, labor, materials, and equipment to each Naval Base for the vulnerability assessment and security force training. The replacement cost for quadcopter damaged or destroyed beyond economical repair will be included in this cost account.

**Benefit of the Business Case.** The primary benefit of the C-UTT is to test the base security posture and provide confidence that the C-UAS system(s) employed for base defense work within and around the installation airspace in the “intended environment.” The secondary benefits of using this service for hire are twofold: first, the Navy invests in one C-UTT unit with personnel, training, certification, and quadcopter inventory that supports all 57 Naval installations; and second, as a single unit, the C-UTT provides a level of standardization to assess base vulnerability and training across all installations and commands. Scalability. The C-UTT can be scalable from just one team and 10 quadcopters supporting regional Navy Bases initially. The team has the potential to grow in size beyond the nine (9) members in this business case to provide the surge in training and vulnerability assessment timeline set by the Commander Naval Installations Command. One C-UTT can travel and perform an assessment and conduct training for a different Naval Base every three weeks. This time allows for FAA COA approval (requires learning curve and personal relationships established with FAA approval authority) travel

preparation, and 3 to 5 days on site with the Base Security Force. At this scale and pace, it will take 171 weeks or 3.2 years to train all 57 Naval Bases. Three teams can reduce this training time by half or more depending upon size and pace of travel. If we bring Naval Reserve Officers into the C-UTT, we can increase efficiency and reduce civilian labor costs proportionately.

**Risk of doing nothing.** The risk of maintaining the status quo may result in the loss of sensitive base information as a result of the collection of imagery that may compromise capability or mission readiness. Worse than the collection of information is the potential for property damage or injury to personnel because of the flying improvised explosive device that is flown 'over the fence line' and targets vulnerable infrastructure, property, and personnel. And the worst of the worst case is a synchronized attack across many military bases with weaponized quadcopters potentially using facial recognition software targeting key leadership that is available today with artificial intelligence algorithms. Unknowns. The unknowns at this point are three: First, the ability to hire nine (9) people within my department to support the manpower requirement for this mission. Second, if the Commander, Naval Installations Command, a Three Star Admiral, sees the value in this mission to ensure the safety and security of our installations. Third, if the Comptroller will support the development of the Cost Account for the reimbursable C-UTT.

**Kevin Gross**  
**Innovation Project Pitch**  
**Counter-UAS Training Team (C-UTT) Pitch Script**

**Slide 1. Counter UAS Training Team in Defense of Military Bases.**

Today, any one of us can go to the corner electronics store and for less than \$1,000 dollars, buy a small remotely operated quadcopter with a simple to use flight control system. Or, order it through Amazon Prime and have it delivered to your door the next day. Out of the box and a few hours of training, you can be flying a drone anywhere you please. This means that anyone with nefarious intent can do the same.



**Slide 2. Proliferation.** The proliferation of small drones brings a new threat to any location around the Navy's perimeter, not just the front, side, and back doors.



**Slide 3. Sophisticated Threat.** This is a sophisticated threat system with fully gimbaled 4K high-definition camera and a 1 to 2 pound payload.



**Slide 4. First Aid.** If this drone can be modified to carry first aid supplies, it can be modified



**Slide 5. Improvised Explosive Device.** To carry an improvised explosive device,



**Slide 6. Biological.** Or Biological agent, or worse yet,



**Slide 7. Radiological.** Radiological contamination.



**Slide 8. No Drone Zone.** While we have laws that govern when and where these drones can be operated, the threat actor will not care.



**Slide 9. Major Navy Bases.** and anyone one of our 57 Naval Bases is vulnerable to this New Threat.



**Slide 10. Surveillance is not enough.** And surveillance is not enough.



**Slide 11. Force Protection.** We need Force Protection. We need to protect personnel and property from a flying IED in a coordinated or isolated attack. At this time, there is no consolidated approach to train Base Security Personnel in the Counter UAS Mission using actual quadcopters as targets.



**Slide 12. Naval Base Point Loma.** This is an overhead of Naval Base Point Loma in San Diego, the home of Submarine Squadron 11. We have known and practiced force protection measures against underwater, surface, and land threats. The Airspace requires Protection against the new threat of flying IEDs.



**Slide 13. Inside the Fence Line.** There are two sides of the C-UAS Training problem for our military bases. The first side is from "inside the fence line" with Base Security providing protection with "Blue Systems." The Base Commander has Underwater, Surface, and Land threats sorted. And this has worked well until the change in warfare with the proliferation and weaponization of drones. So how do we test and train against flying IEDs?



**Slide 14. Outside the Fence Line.** We bring in the Red Team, My Team, as an Opposing Force from "outside the fence line." This team operates the Threat Quadcopter to train Base Security in their use of defensive systems. Like active shooter drills, the Base Security force needs confirmation their tactics, techniques, and procedures will defend the base when attacked. The Red Team provides this threat as a target system that can be destroyed when engaged properly. The Red Team will fly the drone to provide confidence that the Security Force can detect and defeat this emerging threat.



**Slide 15. C-UTT.** The Red Team is the solution to this problem. I propose the development of a three person C-UAS Training Team or C-UTT. The Minimum Viable Product is a Team Lead and two Air Vehicle Operators. That's only 3 people. They are trained, certified, and current in the use of the Threat system. The C-UTT is scalable with additional teams to grow in support of all Naval Bases as quickly as possible. A single C-UTT can train one Navy Base every three weeks



and at this pace will take 3.4 years to train all 57. Three C-UTT teams can train one Base every week, reducing the time to train to just over a year. This team can scale in size to train other US Military Services and thanks to Percy Hobart and my new relationships with MOD Fellows, we can bring this model to the UK for implementation here as well.

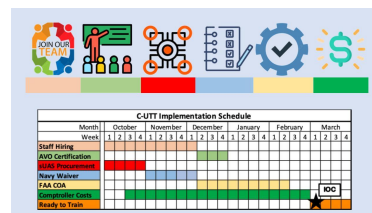
**Slide 16. Compare Approaches.** Let's compare the two models to provide Counter UAS Training. The first approach requires every Navy Base to designate their own team, certify their own AVOs, procure and maintain their own threat systems and gain approval by the Navy and FAA to fly their quadcopters for training at a total cost of more than 27 million dollars annually.

**57 Navy Bases Establish Own Teams  
vs.  
One C-UTT to Train 57 Navy Bases**

Individual Navy Base Approach		C-UTT Approach	
Team Size	171 (3@Each)	Team Size	9 (3X3)
Labor	\$27,129,492	Labor	\$827,973
sUAS Inventory	171	sUAS Inventory	20
Equipment	\$256,500	Equipment	\$30,000
Training	\$348,751	Training	\$37,200
<b>Total Annual</b>	<b>\$27,734,924</b>	<b>Total Annual</b>	<b>\$895,193</b>

The second approach creates Three C-UTTs with nine people to provide the same capability with personnel, threat systems, and AVO certification for less than 900 thousand dollars annually.

**Slide 17. Implementation Schedule.** The details behind this implementation schedule are known and in practice today with my team training Third Fleet Ships at Sea in the Counter UAS mission. I need approval to hire 9 new team members, the rest is easy. Once approved to hire the staff, I can declare Initial Operational Capability in Six Months and start this effort with a new team that will be ready to train Military Bases.



**Slide 18. Let's Get Started.** This is an easy solution. Bases must be ready for the Threat that is here now.

**C-UTT as a RED TEAM for Hire**



**Slide 19. Discussion**

**Discussion**  
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## **Alan Jaeger**

### **Innovation Project Business Case**

**How do we “Accelerate Capabilities to the Fleet and Warfighter” through an innovative culture in Defense organizations?**

#### **Elevator Pitch:**

The Naval Sea Systems Command (NAVSEA) is the largest of the United States Navy's five "systems commands," and includes four shipyards, ten "warfare centers" and other labs and facilities in 15 states and 3 continents. The organization's primary objective is to engineer, build, buy, and maintain the U.S. Navy's fleet of ships and its combat systems. With a budget of almost \$30 billion (one quarter of the Navy's entire budget), and more than 80k personnel and 150 acquisition programs under its oversight, the Naval Sea Systems Command (NAVSEA) is equivalent to a Fortune 100 company with arguably one of the most important missions for Global Security.

Almost 60 percent of our most senior technical and programmatic workforce is eligible and will be retiring in the next 5-10 years – leaving us with a knowledge and experience gap that needs to be filled with the next generation of graduates entering the workforce. These graduates are probably the most innovative, creative and technologically versed generation of students ever entering the workforce.

The problem is that NAVSEA, as a large, bureaucratic, risk averse organization which cannot compete with industry on initial compensation must attract and retain this generation of workforce in order to continue supporting our most critical mission of Global Security. The good news is that we have a really compelling mission, as well as interesting and challenging problems to solve, and the incoming workforce has been trained and has a culture to solve problems! Our challenge, and therefore opportunity is to create an organizational culture that will attract, retain and utilize this talent. We can do this by deliberately creating the capability, capacity and motivation inside NAVSEA that will harness this talent in order to solve problems and accelerate capability to the fleet and warfighter.

#### **What is the Problem:**

A successful start-up company and culture exist to solve a unique problem for a customer and this culture is understandably different from the culture found in many large businesses and organizations.

The innovative, responsive, and urgent nature of a start-up is necessary for its success and providing an initial product or Minimum Viable Product, however, at some point the organization must pivot and establish business practices, processes and administrative systems – in short, it becomes a bureaucracy and loses its ability to quickly provide capabilities to its stakeholders, despite the fact that most likely the organization now has the financial means and technical ability to .

Challenges: Defense is a huge, multi-faceted and bureaucratic organization that prioritizes stability and avoids risk over speed and responsiveness. The organization rewards status-quo and career paths over innovative solutions and capabilities; despite being founded on these principles.

#### **Innovative Culture Behavior Characteristics:**

- Maintaining a learning mindset (Choice architecture)
- Understand that knowledge is not power (Digital Leadership)
- Recognize past success does not mean future success

- Maintaining technical relevancy (Training and Investment in people)
- Long term mindset and investment (Frozen Middle)

### **A Solution Approach:**

My solution recognizes that this is a complex organization which nearly every organization is trying to solve, AND that there are many approaches and solutions. I am focused on my specific Command and am going to focus on the Key Variables and Measures in an Innovative Culture, with some specific tools to be utilized and deployed for each element:

*Capability* – Recognition that the opportunity and need to change exists at all levels in the organization and workforce. Everyone must be willing and empowered to question existing workplace practices, processes, communication channels, management norms as well as shared philosophies and beliefs. People must be empowered to identify ways to improve business as usual in order to increase capability.

*Capacity* – Build an ecosystem to provide space, tools, time and a collaborative environment for innovation to occur. Recognize that innovation is not linear and does not happen on an artificial timeline or with defined people and teams. Deploy tools to solve problems as well as to identify problems and search for solutions from non-traditional places and people. Remember the quote attributed to Albert Einstein: “We Can't Solve Problems By Using The Same Kind Of Thinking We Used When We Created Them”.

*Motivation* – Develop and reinforce deliberate behaviors and choice architecture to empower innovation. Leaders will utilize tools identified in Nudge Theory to motivate cultural change through deliberate choice architecture and decisions. Managers will be encouraged to facilitate culture changes and will be held accountable (positive and negative). In *Leading Change in organizations*, (Kotter 1996) identified an imperative for leaders to communicate a vision with a strategy and empower the employees for broad-based action. It's important that we recognize that leaders exist in all levels of the organization, and the Digital Age Leadership concept highlights agile leadership providing a clarity of purpose, compelling vision and action based management throughout the organization. Motivational behaviors must be identified, deliberate and recognized.

### **How do we do this?**

We enable this cultural change by 1) recognizing the need, 2) understanding the various roles and factors in order to affect change, 3) being deliberate in our actions to drive cultural change at all levels in the organization. 4) rewarding good activities and holding accountable those of the past. In this approach, I will focus on identifying capability, building capacity and implementing motivating techniques and processes. We recognize that transformational change inside a bureaucracy is nearly impossible without extreme drivers (internal or external) and thankfully the Department of Defense is not yet in a situation to have to face this kind of environment. Therefore, our solution will be aligned to the “nudge” theory in which small yet deliberate action will be utilized to influence culture and drive people to be more innovative.

### **Outstanding questions:**

So how do leaders at all levels balance this competing necessity to not only run an organization, but also maintain a culture of innovation in order to continue supporting new customer needs? How do leaders who are responsible and beholden to administrative bureaucracy also encourage innovative behavior? How do mid-level managers and leaders influence a Culture of Innovation within a large and

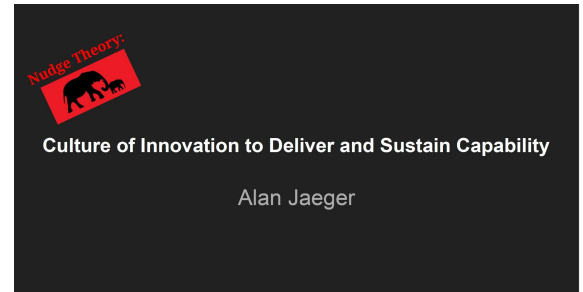
established organization? Is it possible inside a large organization to establish a start-up mentality, sense of urgency, and workforce engagement that supports an innovative culture?

**Why is it important:**

We are getting outpaced in innovative capabilities and are facing near-peer adversaries

**Alan Jaeger**  
**Innovation Project Pitch**

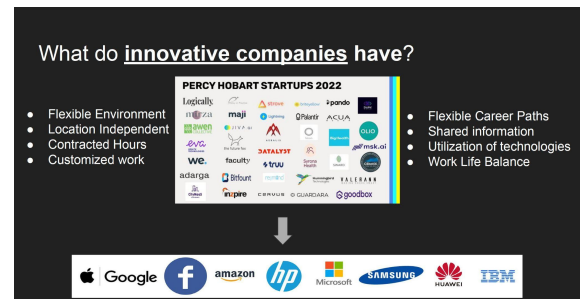
**SLIDE 1: INTRODUCTION:** My independent research effort throughout this program has been focused on how can we, as a Defense organization, can create and maintain a culture of innovation in order to deliver and sustain capability. This is near to me as this is actually a strategic goal of my home command and something that I have been focused on since my first day in this fellowship. Today, I will share the results of my research and explain how the basic concepts of Nudge Theory can and will be applied.



**SLIDE 2: DEFINITION:** So let's first start with the premise that Innovation isn't just about a thing or piece of technology. In fact, all areas of our business can and must innovate; from business operations, contracts and acquisition, Human Resources, facilities, traditional line-level support as well as technology. It's not just about solving a problem, but a culture of continuous improvement.



**SLIDE 3: INNOVATIVE COMPANIES:** Working the last couple of months with start-up companies, and researching successful commercial companies, I have found some commonality among the question of "what do innovative start-up companies have"? Today's innovative workforce is looking for, amongst other things, flexibility, engagement in their future, sharing of information and the utilization of technologies to perform their job. Larger successful companies are recognizing these desires and building them into their culture.



**SLIDE 4: MISSION DRIVEN ORGANIZATION:** This is in some regards counter to what current Defense workplace practices look like. However, much like a start-up, we offer a mission driven organization. In fact, I would argue we offer the most compelling mission! We are not selling online advertisements or doing search engine optimization, no, we are designing, building, delivering and maintaining the ships and combat systems that ensure democracy and our way of life. People

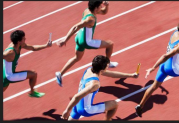


want to work on these real and challenging problems and want to be part of a mission driven organization.

**SLIDE 5: MISSION DRIVEN INNOVATIVE CULTURE:** Much like a successful start-up company singularly focused on a mission but with access to the most advanced technological tools, collaborative workforce and ecosystem to operate in, we must start to align our strong mission driven culture and build the traits which attracts and retains the innovative workforce necessary to continue delivering our critical mission. This isn't a race to learn new, but the basis to drive relevant innovation.

Mission Driven - Innovative Culture

**Mission Driven**  
Alignment to a goal that extends beyond profits for stakeholders, shareholders, and owners to include a societal benefit



**Innovation Driven**  
A social phenomenon that requires people to generate and implement ideas, interact, work together, and build on one another's perspective, thinking, and creativity

**SLIDE 6: TRAITS OF A MISSION DRIVEN INNOVATIVE CULTURE:** Okay, so we know what an innovative company looks like and the employees that they are attracting, and we understand that we are a mission driven organization, so let's define the traits of a mission driven innovative culture so we know how to start creating it. There exists a significant amount of literature and expertise on creating and changing culture. However, my time on this fellowship, engagement with startup companies and independent research as led me to identify the following three high level traits of a mission driven innovative culture:

Mission Driven Innovative Culture



Deliver and sustain capabilities

1. Fully engaged workforce
2. Strong alignment to a shared mission
3. Actively fostering ideas and shared successes

**SLIDE 7: CREATE CAPABILITY, CAPACITY AND MOTIVATION:** We can obtain those traits of a mission driven innovative culture by deliberately creating: Capability, Capacity and Motivation

**Capability:** The opportunity and need to change exists at all levels in the organization.

**Capacity:** A diverse and interdisciplinary ecosystem to provide space, tools, time and an open and collaborative environment

**Motivation:** Behaviors must be identified, deliberate and recognized and we must hold ourselves and each other accountable.

Create Capability, Capacity and Motivation



Deliver and sustain capabilities

1. Fully engaged workforce
2. Strong alignment to a shared mission
3. Actively fostering ideas and shared successes

**SLIDE 8: PERCY HOBART EXAMPLE:** I couldn't be a Percy Hobart Fellow talking about innovation and NOT include our namesake and his innovations in my presentation. So here we can see the results of a team that had capability, capacity and motivation to innovate! This was critical both in WW2 as well as what we are seeing today in Ukraine with the speed, agility, creativity and innovation the world is seeing. And it's also worth noting that Percy was fired 2 times but stuck with it and

Capability - Capacity - Motivation



Identify Opportunities Engage in Diversity of Thought Reinforce Behavior

continued to build capability and capacity within a very motivating environment.

**SLIDE 9: NUDGE THEORY APPROACH:** We must be a realist in the organization we live in vs the organization we might want and we must be cognizant of what we can and cannot change. No one person can simply dictate a cultural change. However, Innovation can occur at the individual, team, group and command level where we have direct influence and this is in fact where we can influence culture. My plan and recommendation is that we can create capability, capacity and motivation through deliberate actions, leadership behavior and choice architecture. This is the theory of Nudging.. We make decisions and create environments every day that have the ability to nudge us in the direction we want to be going.



**SLIDE 10: VALUE OF AN IDEA LIES IN USING IT:** So a great idea is only as good as using it! This is a topic that has been discussed and admired by many people for many years. What I intend to do is immediately return to my home command and take the lessons, observations, research and best practices identified over the course of this Fellowship and tailor them to our unique mission, role and responsibilities. I've outlined here some initial nudges aligned to capability, capacity and motivation and I will continue to refine this approach so that it becomes an aligned and comprehensive strategy from the senior most level to the entry level in order to move our organization into a mission driven innovative culture. I will communicate the urgency, stop looking for excuses and start practicing good friendly nudge behavior. In short, I will be an example of the change we need and start influencing the culture around me.

Thomas Edison: "The value of an idea lies in using it"

Deliver and sustain capabilities	
<b>COMPANITY</b>	<b>Identify opportunities</b>
	Empower the workforce to identify problems and opportunities
	Communication at all levels outside formal organizational structure
	Accountability of all efforts to the mission
	Encouragement and assumption of noble intent
	Barrier removal mentality
	Focus on solutions vs. challenges
<b>CAPACITY</b>	<b>Diversity of Thought</b>
	Provide the tools, time and space to collaborate
	Build diverse and cross-functional teams that are rank-independent
	Support an ecosystem of trial and error
	Build in space, time and expectation into everyone's job
	Minimize administrative tasks
<b>MOTIVATION</b>	<b>Reinforce Behavior</b>
	Deliberate communications on the progress/status
	Support open and honest communication over formality
	Hold all levels accountable for innovating efforts
	Recognize and celebrate attempts, not just success
	Continuous communication on mission
	Celebrate alternative viewpoints and perspectives

## Jamie Lukos

### Innovation Project Business Case

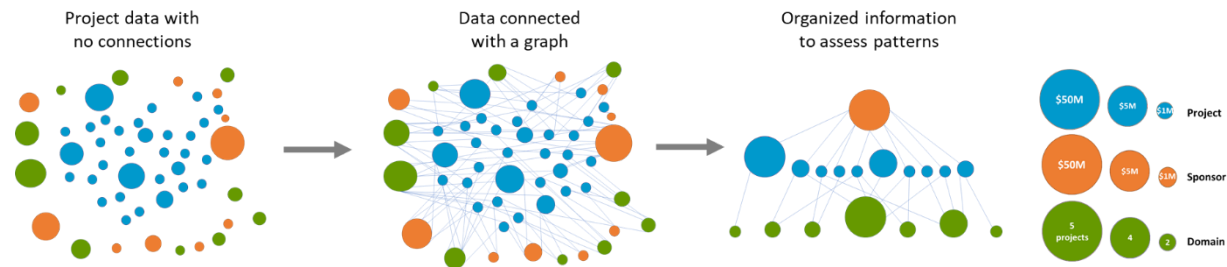
#### The Collective: Business Case

##### Problem

Just a single Naval organization can at one time be managing hundreds if not thousands of projects at once. For example, the Naval Information Warfare Center Pacific has over 700 active projects at any given time. However, we currently lack a holistic understanding of how all these projects interact and work together towards a joint mission and the potential overlap and collaborative opportunities that exist.

##### Solution

Use the power of advanced data analytics and visualizations to create project graph networks, enabling a much greater situational awareness of project relationships and connections. Specifically, develop graph neural networks (GNNs) with NetworkX to visualize and assess the connections between projects. This simple, yet powerful solution could revolutionize the way we view our organizations and connect ideas to advance innovation.



By visualizing the relationships between projects and their components, we can pick out important patterns. For example, on the right, one sponsor has funded 10 projects in domains with 5 projects sharing a single domain. Now we can look more closely at these project relationships to determine how they can compliment and leverage each other on a greater scale.

#### Strategy/Timeline

	Q1	Q2	Q3	Q4
<b>Stakeholder Engagement</b>				
Present Business Case	[Orange bar]			
Acquire Resources		[Orange bar]		
Road Show of Completed Product				[Orange bar]
<b>Data Acquisition/Curation</b>				
Obtain Data from Project Portal	[Blue bar]			
Check Data Quality with PMs		[Blue bar]		
Encode Data for GNN			[Blue bar]	
<b>Algorithm Development</b>				
Create Model Using Python NetworkX		[Green bar]		
Define Nodes and Edges			[Green bar]	
Generate/Refine Graph				[Green bar]

#### Key Benefits

- Enhanced overall situational awareness of project interconnectivity
- Ability for leadership to assess customer relations more effectively
- Ability for PMs to see connections between their projects and other projects
- Ability for the DoD to better understand their investments and predict future innovation trends

#### Cost

The data are already in-house, so the only cost to create a fully functional product for this project is the labor of the data curator/programmer for 3 months (~\$50K).

#### Impact of not proceeding

We will continue to be limited by our current ways of tracking projects, that does not allow us to see the connections needed to effectively navigate and see the bigger picture. Given the speed with which we need to move complex technologies into the Fleet, we cannot afford to continue this siloed approach to project management and execution.

#### Why hasn't this been done before

Data visualization has been around for a long time, but GNNs have only been formalized in recent years and have yet to be applied to this domain. The time is right to apply these analytical advancements to the way we understand our organizations and build more powerful project ecosystems.

**Jamie Lukos**  
**Innovation Project Pitch**

**Slide 1:** Did you know that \$112 BILLION of the US Department of Defense budget is going to innovate and modernize this year... but where does it all go? Although this budget document gives a broad overview, it is very difficult to pinpoint individual projects within the services and how they are all connected.



[https://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2022/FY2022\\_Budget\\_Request\\_Overview\\_Book.pdf](https://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2022/FY2022_Budget_Request_Overview_Book.pdf)

**Slide 2:** Hello. My name is Jamie Lukos and I am a U.S. Navy neuroscientist and I research warfighter performance and decision making. Now, it doesn't take a neuroscientist to tell you that situational awareness on the battlefield is absolutely critical for making good decisions.



Other notes

Arguably, nothing is more important in a military operation than battlespace situational awareness so that optimal decisions can be made. Situational awareness requires knowledge of what is happening around us in order to make sense of it and pivot as needed. Successful militaries are those that can make decisions and pivot quickly.

Image from: <https://www.sdbj.com/news/2018/nov/04/battlefield-ai-can-improvise-adapt-and-assist/>

**Slide 3:** However, I've noticed that oftentimes we don't have good situational awareness of what we're doing in our home organizations, never mind on the battlefield. We need to understand our innovation investments better so we can deliver more rapidly to the warfighter.

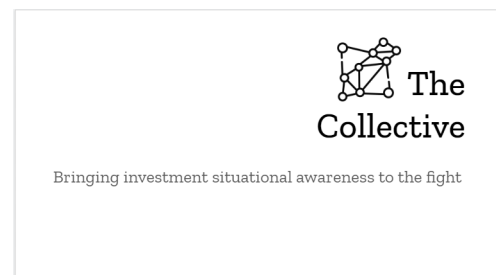


Other notes.

But how do we expect to be able to have situational awareness on the battlefield during the fog of war when we don't even have a solid understanding of what we're all working on from the civilian front?

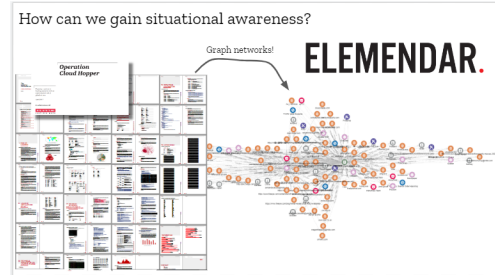
**Slide 4:** Enter, The Collective. A tool to bring investment situational awareness to the fight.

Given the speed with which we need to move complex technologies into the Fleet, we desperately need a modern method to track how we are getting there. Our innovation projects are the key to future warfare. The Collective uses the power of interactive AI data analytics to revolutionize the way we view project relationships and connect ideas across our organizations.

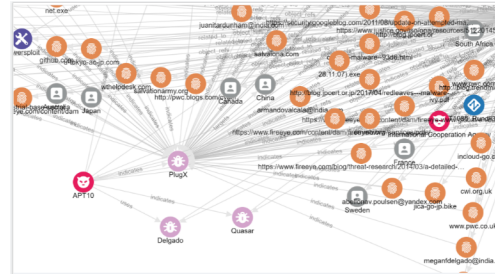


**Slide 5:** So how do we gain situational awareness? I have been very fortunate to be working with a Cyber Threat Intelligence company, Elemendar for my fellowship placement. In doing so, I have learned how they use graph neural networks to analyze cyber threat intelligence documents.

So shown here is a 50+ page cyber document that was turned into a graph network so you can visually see all the elements in the document.



**Slide 6:** What's important is that it's interactive, so you can pull out different elements and begin to really understand the relationships between nodes. So it's like a choose your own adventure! Depending on what I need from the data, I can easily play with the interconnections. {describe the nodes and the patterns that emerge}



**Slide 7:** After working with these graphs for a while, it came to me...

I manage 15 different projects and it's hard enough for me to see the connections between them, never mind beyond that...



**Slide 8:** Now, tackling \$112 billion of innovation investments right off the bat is a bit much. So I'm embracing two important concepts I learned from this program....

One from one of our many great lectures, James KOOT, Think big, start small, scale fast. All explain these 2 in a moment. And one from the favorite book I read during the program, Brave New Work, thanks to my mentor Liam Cahill. Shifting my mindset from will it work to is it safe to try.

"THINK BIG → start small → **scale fast**"

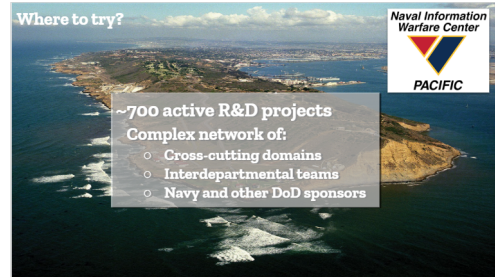
**James Koot**  
Military Technology Leader  
Special Projects Lead  
No.10 Data Science Team

Will it work? — **Brave New Work** by Aaron Dignan — Is it safe to try?

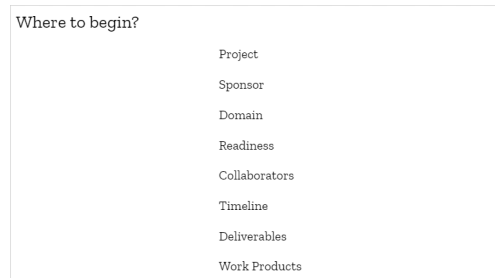
**Slide 9:** So where should we try? This is where I work in beautiful San Diego, CA at the Naval Information Warfare Center Pacific. So assuming I get the blessing of my leadership, this is where the fun will begin!



**Slide 10:** Projects are often siloed and it's difficult to make connections.



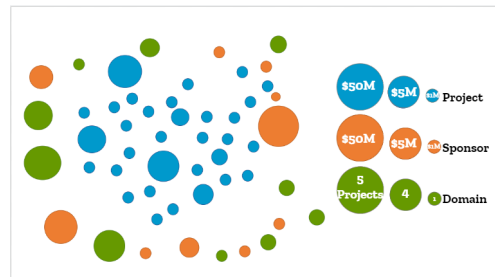
**Slide 11:** So if we were going to make a graph network for project relationships, we would have a lot of parameters to choose from.



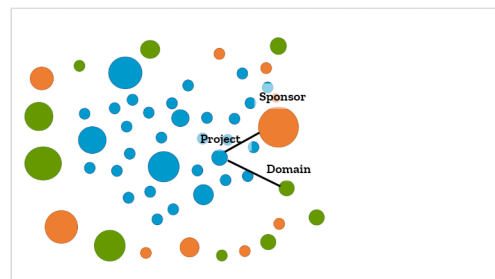
**Slide 12:** Let's keep it simple today and just start with 3. Project, sponsor, and domain.



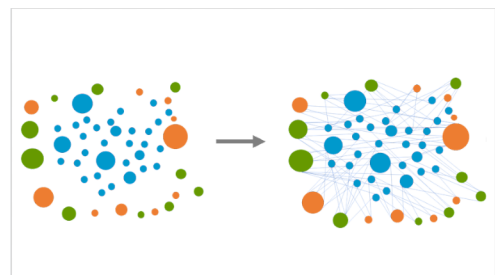
**Slide 13:** Here's some hypothetical data; projects in blue, sponsors in orange and domains in green...



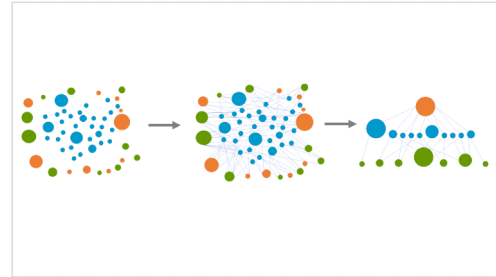
**Slide 14:** So every project has at least one sponsor and domain and you can begin to connect the dots.



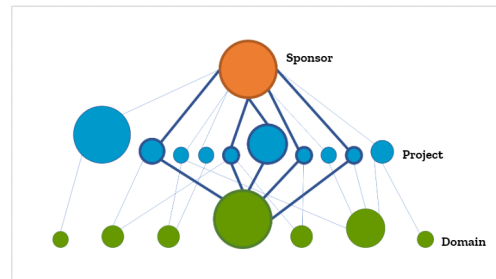
**Slide 15:** Like this.



**Slide 16:** From there, we can start to organize the data and pick out patterns of interest.



**Slide 17:** For example, this single sponsor is funding five projects in this single domain. Do they know about each other? Do they collaborate? Are there transition opportunities? How do these fit into the larger vision roadmap of the organization? There are lots of questions we can begin to tease out.



Now, this is just an example, but hopefully it gives you a sense of the patterns and questions that can emerge when this information is presented in a more sophisticated way.

**Slide 18:** Here are the key benefits.

**Key Benefits**

<p><b>Project Managers</b></p> <p>Ability for PMs to <b>see connections</b> between their projects and other projects</p>	<p><b>Command Leadership</b></p> <p>Ability for command leadership to <b>assess customer relations</b> more effectively</p>	<p><b>Larger Enterprise</b></p> <p>Ability for DoD to <b>better understand their investments</b> and <b>predict future innovation trends</b></p>
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**Slide 19:** Based on the research I've done and what I know about graph neural nets and the data we already have in-house, I believe it will take about 1 year and 50% effort of a programmer to deliver an interactive graph network of project connections.

What will it take to try this at NIWC Pacific?

	Q1	Q2	Q3	Q4
<b>Stakeholder Engagement</b>				
Present Business Case				
Acquire Resources				
Road Show of Completed Product				
<b>Data Acquisition/Curation</b>				
Obtain Data from Project Portal				
Check Data Quality with PMs				
Encode Data for GNN				
<b>Algorithm Development</b>				
Create Model				
Define Nodes and Edges				
Generate/Refine Graph				

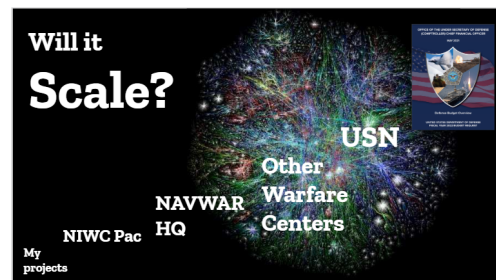
Project Data curator/programmer (5 FTE) - \$100K

**Deliverable:**  
Interactive graph network of project connections

**Metrics of Success:**

- Number of users
- Frequency of use
- Use in customer relations
- Use in technical roadmaps and investment strategies

**Slide 20:** So will it scale to the level of a \$112 Billion budget? Well this pretty image is a graph network of the internet, so from a big data analytics perspective, absolutely. From an organizational perspective, this is how I envision trying to scale...



**Slide 21:** So through The Collective...



**Slide 22:** We can understand and plan our innovation investments more effectively and in turn, deliver more rapidly to the warfighter.



**Slide 23:** Thank you for your attention. Any questions?

