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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

DEFENSE ANALYSIS CAPSTONE REPORT

**ALIGNING USAF STUDENT RESEARCH
WITH STRATEGIC PRIORITIES**

by

Dustin M. Merritt and Thomas P. Haney

December 2022

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ALIGNING USAF STUDENT RESEARCH WITH STRATEGIC PRIORITIES

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ABSTRACT

The United States Air Force (USAF) is not effectively utilizing the student research ecosystem to contribute toward USAF strategic priorities. This project researched how the USAF can enhance student research to contribute toward senior leaders' requirements. The USAF needs to align academic research to provide solutions toward strategic competition in a resource-constrained environment. Aligning research to problems can only enhance the resulting innovation. We submitted a survey to 1,175 USAF students at civilian institutions. Of 266 responses, 83% had a deliverable requirement, 81% did not receive information about current USAF research priorities and funding opportunities, 91% would have considered incorporating USAF research priorities into their graduate research if they had received information about them, and 95% would potentially use a mobile application that gives access to prioritized USAF research questions, command sponsorships, and funding. Not aligning USAF-sponsored academic research with strategic priorities is mainly an organizational problem. First, the USAF should improve the talent management process to match students to appropriate research fields. Second, the USAF should improve education about academic resources for aligning research, finding sponsors, and securing funding. Lastly, the USAF should connect existing AFIT/CI students across the research ecosystem via a mobile application endorsed by Air Education and Training Command.

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LIST OF ACRONYMS AND ABBREVIATIONS

A2/AD	anti-access / area-denial
ACSC	Air Command and Staff College
AD4I	Applied Design for Innovation
AETC	Air Education and Training Command
AFIT	Air Force Institute of Technology
AFRL	Air Force Research Lab
AFSOC	Air Force Special Operations Command
AI	artificial intelligence
ALS	Airmen Leadership School
AU	Air University
AUiX	Air University Innovation Accelerator
C-IADS	counter-integrated air defense system
CAF	Combat Air Force
CI	civilian institution
CLC	Chief Leadership Course
CRADA	cooperative research and development agreement
CSAF	Chief of Staff of the Air Force
DA	Defense Analysis
DIU	Defense Innovation Unit
DOD	Department of Defense
FMP	full mission profile
GPC	great power competition

IDE	intermediate developmental education
LNO	liaison officer
MOA	memorandum of agreement
MOU	memorandum of understanding
NATO	North Atlantic Treaty Organization
NCOA	Non-commissioned Officer Academy
NDA	non-disclosure agreement
NPS	Naval Postgraduate School
OPT	operational planning team
PME	professional military education
POC	point of contact
ROI	return on investment
SBIR	small business innovation research
SDE	senior developmental education
SME	subject matter expert
SNCOA	Senior Non-commissioned Officer Academy
SOCEUR	Special Operations Command Europe
STTR	small business technology transfer
USAF	United States Air Force
VCSAF	Vice chief of staff of the air force

EXECUTIVE SUMMARY

The United States Air Force (USAF) is not effectively utilizing the student research ecosystem to contribute towards USAF strategic priorities. There is a lack of guidance for student research topics across the USAF. Students are an untapped resource with tactical and operational levels of experience with time to conduct in-depth research but limited access to strategic guidance and funding. Research and operational organizations have access to funding and current strategic guidance but often lack access to experienced airmen with dedicated time to help conduct research. This capstone project researched how the USAF can enhance student research to effectively contribute toward senior leadership requirements. The USAF needs to align and capitalize on academic research to provide unique and creative solutions toward strategic competition in a resource-constrained environment. Researching innovative ideas is not optimized unless it is aligned with a particular problem set. The USAF can improve its return on investment (ROI) in education by aligning student research with senior leader strategic priorities.

The authors submitted a survey to 1,175 USAF students at civilian institutions. Of the 266 students that responded, 83% had a deliverable requirement in the form of a thesis, dissertation, capstone, or similar research product. 81% did not receive information about current USAF research priorities and funding opportunities before or during their graduate program. The following anonymous comment captures the sentiment of the students surveyed: “I felt like I was in a vacuum in my program and had to figure these things out by myself. If I was more connected with the big AF, I think my research would have been of higher quality and more applicable to the DOD in general.” Of the students surveyed, 91% would have considered incorporating USAF research priorities into their graduate research if they had received information about them. Lastly, 95% would potentially use a collaborative mobile application that gives access to prioritized USAF research questions, command sponsorships, and funding.

Not aligning USAF-sponsored academic research with strategic priorities is mainly an organizational problem, and it is one that can be fixed. First, the USAF should improve the talent management process for matching students to appropriate research fields of study. Second, the USAF should improve education about academic resources for aligning research, finding sponsors, and securing funding. Lastly, to have the greatest impact, the USAF should connect existing AFIT/CI students across the research ecosystem through a mobile application endorsed by Air Education Training Command and sponsored by Air University Innovation Accelerator (AUix). A user-friendly mobile application will enable communication between research students and senior leaders. The mobile application will aid students in choosing relevant thesis topics, benefit the sponsoring agencies at no cost to the organization, and provide the USAF with an increased student ROI in a resource-constrained, dynamic environment.

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I. INTRODUCTION

Without [guardrails], there is a strong prospect of developing an “experiment zoo,” where people and resources are fragmented across multiple potential areas of opportunity.

— Charles O’Reilly and Andrew J. M. Binns,
The Three Stages of Disruptive Innovation

A. PROBLEM STATEMENT

The United States Air Force (USAF) is not effectively utilizing the research ecosystem present in the U.S., especially its own students who attend civilian institutions (CI) as part of their professional education. These students are an unaligned resource with valuable tactical and operational levels of experience, with immense latent value in understanding USAF problems and their own possible solutions. Students have time to conduct in-depth research but have limited access to strategic guidance and funding. Research and operational organizations have access to funding and current strategic guidance but often lack access to experienced airmen to help conduct research.

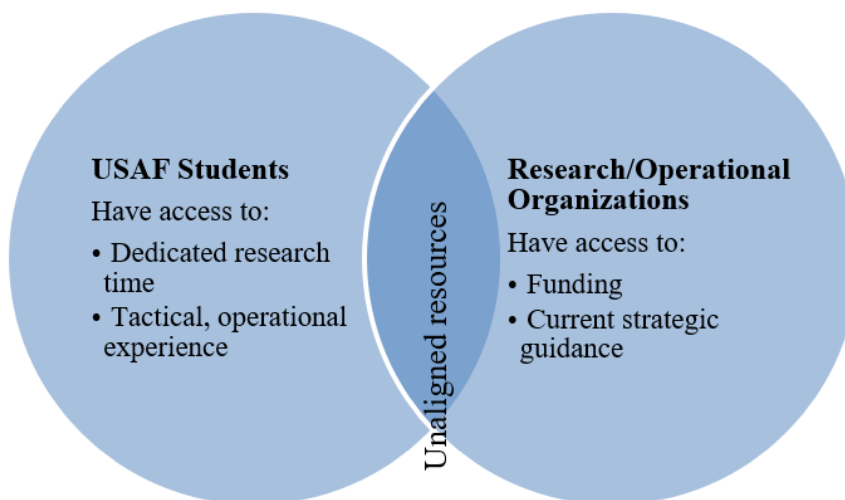


Figure 1. Venn Diagram of Unaligned USAF Student Research

The purpose of this capstone project was to figure out ways of connecting USAF students conducting thesis or capstone research with command sponsors, USAF priorities, and available funding. Students are a valuable resource who have time to devote to USAF priorities and often have relevant operational experience. There is a small subset of Professional Military Education (PME) culture that believes education is a time to take a break from their high operational tempo and focus on resiliency and mental health. While this is incredibly important, there still exists a capacity to affect USAF priorities and strategic goals during the time at school. USAF students attending civilian institutions such as Naval Postgraduate School (NPS) have a requirement to complete a thesis or capstone project. Therefore, students should have the ability to make their research impactful and contribute to an existing problem that they will encounter once they return to the force.

The USAF's main priority is to gain and maintain air superiority. Although the USAF has been uncontested since the 1990s, this may not be the case in the next conflict. General Brown, the USAF Chief of Staff, published his strategic approach on August 20, 2020, to "Accelerate Change or Lose." He stated, "Without the U.S. Air Force's unprecedented control of the air and enabling domains, no other U.S. military mission enjoys full freedom of maneuver. Therefore, it is no surprise that our competitors are posturing aggressively to first contest U.S. air superiority, reconnaissance, and strike capabilities, using advanced weapon systems to directly confront and deny U.S. Air Force combat power."¹ The USAF must continue to foster innovation and ensure strategic capabilities do not become outdated and irrelevant while adversaries seek to compete in the air domain. Leveraging student research is critical to accomplishing the USAF mission.

Preserving academic freedom in this process is important. Aligning airmen is not the same as confining airmen. Students should continue to have the freedom to pursue their interests. However, their preferred research area can still benefit from senior leader

¹ Charles Q. Brown, "Accelerate Change or Lose," August 2020, 3, https://www.af.mil/Portals/1/documents/csaf/CSAF_22/CSAF_22_Strategic_Approach_Accelerate_Change_or_Lose_31_Aug_2020.pdf.

inputs and feedback. These students should have access to collaborate on similar projects to eliminate duplication of effort. In a resource-constrained environment, the USAF must leverage every available resource, especially students, to maximize their return on investment (ROI).

B. RESEARCH QUESTION

How can the USAF enhance student research to effectively contribute toward senior leadership requirements?

C. BACKGROUND

The authors of this capstone project were two of the three Combat Air Force (CAF) students selected in the academic year 2022 to attend NPS in the Defense Analysis (DA) Department. They both chose the Applied Design for Innovation (AD4I) curriculum to best leverage their respective backgrounds and expertise. One author's background is as an F-35 pilot with his previous assignment as a Weapon School instructor. The other author's background is a USAF special warfare officer with a previous assignment working in Special Operations Command Europe (SOCEUR). After discussing possible capstone topics, both authors started scoping the anti-access area denial (A2/AD) problem in a Great Power Competition (GPC) context. The F-35 pilot provided a unique air perspective with experience in A2/AD full mission profiles (FMPs) at the Weapon School on Nellis Air Force Base. The special warfare officer provided a unique ground perspective with experience working on an Operational Planning Team (OPT) in direct support of General Harrigan, USAFE Commanding General, on Counter-Integrated Air Defense Systems (C-IADs).

After extensive research, both authors began to explore if artificial intelligent (AI) drone swarms could help augment F-35 weapons, sensors, and or communications in a denied environment. Much of the research conducted involved talking with subject matter experts (SMEs) throughout the USAF to see what was currently being researched and if this idea could be a viable A2/AD solution. This led to securing a command sponsorship on the Air Force Special Operations Command (AFSOC) staff. However, the command

sponsor was unable to fund the project. The lack of funding signaled to the authors that their capstone project was not one of the command's priorities.

The authors continued their research and found an operational organization that was studying this specific problem. Unfortunately, the authors determined their capstone project would be a duplication of efforts. Additionally, the project would require research at a higher classification that was not possible for the authors at NPS. After spending three months conducting research, the authors decided to start a new project that might be a more efficient use of their time and experience. It was possible to continue with a theoretical thesis, but they desired to work on a tangible project that could directly impact the USAF.

The inspiration for change occurred when Colonel William "Mamo" Mamourieh, from Air Education Training Command (AETC), hosted a professional development meeting with current USAF Intermediate Developmental Education students at NPS. The colonel asked the approximately fourteen students what some of their main career challenges were. A common theme in academic research was a lack of senior leader guidance, lack of funding for research, and difficulty obtaining a command sponsor to align research with strategic priorities. Even more broadly, students appear to have a difficult time simply finding and understanding existing problems. This combination of issues seemed like something the authors could help solve, as well as empathize with their similar frustrations. The authors chose to change their project, as the new topic had great potential to increase the ROI on student research.²

D. METHODOLOGY

The authors sought to map out the educational ecosystem within the USAF to comprehend how student research receives guidance, funding, and prioritization. First, the authors identified existing educational institutions and contacted them via email or telephone. They then conducted virtual interviews to solicit feedback on the author's research question. The following list of USAF education and innovation institutions

² See Appendix B for a hypothetical scenario of aligning student research.

served as a starting point for establishing contacts and helped the authors solidify a sponsorship at Air University Innovation Accelerator (AUiX). Attaining sponsorship from AUiX provided credibility to subsequent conversations with additional institutions.

List of education and innovation institutions:

- Air Education and Training Command (AETC)
- Air University (AU)
- Air Force Institute of Technology (AFIT)
- Air University Innovation Accelerator (AUiX)
- Air Command and Staff College (ACSC)
- Air Force Research Laboratory (AFRL)
- AFWERX
- Blue Horizons
- Defense Innovation Unit (DIU)
- USAF Morpheus Group

After analyzing PME research requirements and the USAF innovation ecosystem, the thesis research transitioned to exploring various options that could solve the organizational student research problem. The author's explored potential solutions and received quotes from two software development companies, Infuse and Altimeter group. AUiX submitted a letter of support on behalf of the students for a Small Business Innovation Research (SBIR) to receive phase 1 funding.

In the final quarter at NPS, both authors were invited to the first USAF Learning Symposium in September 2022 hosted by Dr. Wendy Walsh, Chief Learning Officer of the Air Force. They participated in mapping out the learning ecosystem within the USAF

and discussed it with Maj. Gen. Sears, Deputy Commander AETC, on their capstone project to align USAF priorities with student research.

II. LITERATURE REVIEW

Education without application is a non-starter. Without meaningful opportunities to put problem-solving skills to work, student learning suffers.

— Lt Col Erin Berard, *The Future of Marine PME*

As the DOD transitions from a focus on counterinsurgency and counterterrorism to strategic competition, the military is primed for advancement in its educational system. The 2018 National Defense Strategy outlined building a more lethal force by cultivating workforce talent.³ As the former Secretary of Defense James Mattis noted, “PME has stagnated, focused more on the accomplishment of mandatory credit at the expense of lethality and ingenuity.”⁴ Each service has its unique challenges in the contemporary context of strategic competition, and it will be critical to adapt and gain efficiencies in a resource-constrained environment. The academic research accomplished by military members should provide an ROI not just at the individual level but also at the service and joint level.

No systemized method exists to connect top-level guidance and student research topics, from the top down nor the bottom up, in the USAF, much less across the DOD. A 2021 RAND study on USAF PME regarding how to improve the appeal of AU recommended that students at AU be offered “enhanced engagement with high levels of Air Force leadership, learning by observation how these strategic thinkers approach and solve problems, would be a clear advantage not offered by other educational programs.”⁵ This recommendation suggests that this high-level senior leadership communication with research students does not happen but should. This chapter discusses current USAF

³ Jim Mattis, *Summary of the 2018 National Defense Strategy* (Washington, D.C.: Department of Defense, 2018), <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>.

⁴ Mattis.

⁵ Lawrence M. Hanser et al., “Air Force Professional Military Education: Considerations for Change” (RAND Corporation, July 12, 2021), https://www.rand.org/pubs/research_reports/RRA401-1.html.

connection avenues and provides a brief analysis of the USAF organizational structure as it pertains to the innovation and learning ecosystem.

A. CONNECTION AVENUES

The authors analyzed the USAF networks and methods to determine the optimum method to connect USAF senior leaders with academic students. The authors identified three avenues that categorize the various forms of existing communication methods. The first avenue is utilizing the traditional military chain of command. The second avenue is identifying and utilizing various USAF research organizations that connect airmen to senior leaders, primarily with websites. The final avenue is leveraging personal networks and connections that students have developed throughout their careers. Each avenue has distinct advantages, disadvantages, and areas requiring improvement.

1. Military Chain of Command

The first avenue requires understanding how USAF senior leaders generate command guidance. The President of the United States disseminates direction to senior leaders within the DOD through the National Security Strategy. The DOD then translates this into military guidance for the respective services via the National Defense Strategy and the National Military Strategy.⁶ The Chief of Staff of the Air Force (CSAF) then guides the major commands via memorandums such as the CSAF Strategic Approach from December 2020 to the CSAF Action Orders of February 2022.⁷ Beyond the CSAF Action Orders, the guidance to subordinate units is tailored to subordinate commands and organizations via the chain of command.

The advantages of the military chain of command are a process to communicate priorities from senior leadership down to the lowest-ranking military member. The disadvantage of the chain of command is that it inherently makes the USAF a centralized organization. Communicating guidance needs to be accurate and timely. An improvement

⁶ Jim Mattis, “Summary of the 2018 National Defense Strategy,” n.d., 14.

⁷ Charles Q. Brown, *CSAF Action Orders: To Accelerate Change Across the Air Force* (Washington, D.C.: Department of Defense, 2022).

for having guidance transmitted across the force is to have an informal communication avenue for senior leaders to directly communicate their priorities to USAF students in an academic environment.

2. Websites

The USAF utilizes various websites to communicate research priorities across the learning ecosystem. The advantages of leveraging websites allow wide dissemination of information and the ability to quickly update information. Websites also foster a streamlined process for student connections with organizations. However, websites have several limitations, including that they do not always provide a clear linkage to strategic priorities or provide easy access to prioritized research questions. Often, it is not intuitive for students to locate unanswered or prioritized research questions and topics, nor broad categorical guidance. A notable disadvantage is many websites lack friendly user interfaces that effectively limit access to the data. Many students simply do not know whether information exists or where to look.

Navigating various organizations' websites in search of prioritized research topics proved difficult. For example, RAND Project Air Force, AFIT Civilian Institutions Program, and Air University (AU) websites illustrated the previous point.⁸ While not inclusive, these websites should represent a common starting point for USAF students to view strategic priorities. AU's site referenced a research topic list for CSAF priority guidance and was the most useful for finding research topic information, but this information was difficult to find. The website states that "The AU Research Topics List is comprised of questions given to Air University by organizations with the USAF and other DOD organizations," and it remains unclear if there exists a direct link from USAF senior leadership.⁹ It also did not provide access to research funding and POCs already

⁸ "RAND Project AIR FORCE," accessed October 26, 2022, <https://www.rand.org/paf.html>; "AFIT / Civilian Institution Programs," Air Force Institute of Technology, accessed October 26, 2022, <https://www.afit.edu/CIP/#>; "Air University," Air University, accessed October 26, 2022, <https://www.airuniversity.af.edu/>.

⁹ Air University, "Air University Office of Sponsored Programs (OSP)," Air University, accessed March 13, 2022, <https://www.airuniversity.af.edu/Office-of-Sponsored-Programs/Research/>.

working on the specific topics. The authors were only able to obtain this type of information via informal networks by placing multiple phone calls and meetings.

An additional website the authors referenced in search of research priorities was that of USAF Blue Horizons, Center for Strategy and Technology. After finding limited information on the website, the authors conducted an interview with Ben Philips, managing director of USAF Blue Horizons. He informed the authors of the process by which they receive an annually updated research question from the CSAF. However, this one research question is very broad in scope and not disseminated across the force; the only way to receive this guidance is via direct communication with Blue Horizon's director. An improvement for research websites is to easily display research priorities for academic students to reference. It would be most beneficial if one website could aggregate all past, present, and pertinent research information for USAF academic students into one location.

3. Personal networks

Lastly, the third avenue is leveraging personal networks to connect students with ongoing research. An advantage of student personal networks is the ability to reach back to their career field communities to work on timely and relevant operational projects. However, a disadvantage is that no process exists for students to develop formal or informal networks for academic research. Many working relationships or informal agreements that allow collaboration occur based on various personalities. Airmen attending civilian institutions come from a variety of backgrounds, bringing unique working relationships and connections that allow an advantage in gaining sponsorship or funding. An improvement is that personal networks are captured, developed, and made available for subsequent students. Students building upon colleagues' personal networks would provide informal ties throughout the learning ecosystem.

B. ORGANIZATIONAL STRUCTURE

The USAF can enhance the academic environment by analyzing ways successful organizations foster innovation. The organizational structure directly impacts how much

innovation and adoption occurs within organizations. There are three key processes that an organizational structure must support to innovate successfully: people must be able to identify an opportunity to innovate, they must have a process to refine the innovation into a marketable form, and they must have a method in place to market and capture a return.¹⁰ The two most important systems that must be in place are “those that fund and those that evaluate innovation efforts.”¹¹ Following this process, to increase innovation and ROI from students at civilian institutions, the USAF may provide access to ongoing projects and research topics with access to funding and link them to an operational commander, the so-called evaluator. Accomplishing this would be a monumental task; thus, utilizing the minimum viable product approach, the focus should start with how NPS can incorporate scalable changes that can propagate throughout the USAF academic ecosystem while leveraging student feedback.¹²

Other innovation insights that apply to academic research include the principle of minimizing interdependence risk, which is the probability that different partners, or key players, will satisfy a commitment within a specified time frame; the higher the number of key players involved, the lower the probability of success and the higher the chance of delays.¹³ Following this same construct, the USAF may link operational problems to students and bypass the typical chain of command processes absent in the academic environment.

There is a lack of research guidance in place for USAF students to align their research toward strategic priorities. The USAF can ensure a greater ROI by aligning academic student research with topics and problems that senior leaders have approved or requested. For example, there is an opportunity to optimize the USAF ecosystem by connecting USAF students in the NPS Defense Analysis program to the greater USAF to

¹⁰ Nathan Bennett and Jacob Parks, “Struggling to Innovate? Examine Your Structure, Systems, and Culture,” *Business Horizons* 58 (July 1, 2015): 567, <https://doi.org/10.1016/j.bushor.2015.05.009>.

¹¹ Bennett and Parks, 568.

¹² Charles O’Reilly and Andrew J. M. Binns, “The Three Stages of Disruptive Innovation: Idea Generation, Incubation, and Scaling,” *California Management Review* 61, no. 3 (May 2019): 55, <https://doi.org/10.1177/0008125619841878>.

¹³ Ron Adner, “Match Your Innovation Strategy to Your Innovation Ecosystem,” *Harvard Business Review*, 2006, 1,4.

provide prioritized research topics, funding, access to potential sponsors, and community of interest.

III. MILITARY EDUCATION ECOSYSTEM

If one can better understand how innovations diffuse, one can better predict and manage that diffusion.

— John T. Gourville, *Note on Innovation Diffusion: Rodgers' Five Factors*

This chapter provides an effective overview of the USAF educational ecosystem and how academic institutions tie in with research organizations and the operational warfighter. It is not exhaustive nor all-inclusive. It should provide the reader with a starting point for further research or networking. This chapter also lays the foundation for understanding the inter-workings of how USAF strategy makes its way to student research; this understanding provides value by reducing the friction from searching for places to start student research that aligns with strategic priorities.

This chapter is not about how to improve PME curriculums; it is about understanding an ecosystem to primarily enhance USAF students' research at civilian institutions. It also will aid students attending the traditional command and staff colleges. Students at civilian institutions typically must complete a thesis or dissertation, while students at command and staff colleges do not. That does not mean command and staff college students would not benefit, as they do have open-ended research projects that could benefit from increased collaboration with other institutions. The key distinction for this chapter is that PME encompasses any academic education endorsed or paid for by the USAF.

A. USAF STUDENT RESEARCH

The purpose of PME, broadly speaking, focuses on developing the individual as opposed to a direct ROI in the form of a deliverable; the stated purpose of USAF PME is to prepare officers for future staff and command assignments by developing critical

thinking skills and improving strategic thinking.¹⁴ General Brown, Chief of Staff of the Air Force (CSAF), provided guidance that PME and civilian education should focus on educating Airmen in “strategy, force design, and warfighting approaches of key adversaries.”¹⁵

Qualified airmen can attend various PME institutions throughout their careers. The core enlisted force education includes Airman Leadership School (ALS), Non-commissioned Officer Academy (NCOA), Senior Noncommissioned Officer Academy (SNCOA), and Chief Leadership Course (CLC). The core education for officers includes Squadron Officer School (SOS), Intermediate Development School (IDE), and Senior Development School (SDE). All PME education can benefit from understanding USAF’s strategic direction and guidance.

The USAF’s traditional PME curriculums are developed under Air University, which is part of the Air Education and Training Command (AETC). These programs include thoroughly critiqued syllabi from many professional military scholars.¹⁶ In the academic year 2021, 545 majors were selected to attend intermediate developmental education (IDE) for in-residence programs spread amongst 69 schools; these students are typically the most qualified and will likely hold future leadership positions.¹⁷ Not all programs in IDE require a thesis, but the curriculums still include projects and papers that allow the students to conduct research.¹⁸

USAF students, in general, are an untapped resource spread across various institutions, and these students are completing a variety of degree programs. 2,400 USAF members are pursuing advanced academic degrees and certifications at nearly 350

¹⁴ Lawrence M. Hanser et al., “Air Force Professional Military Education: Considerations for Change” (RAND Corporation, July 12, 2021), 48, https://www.rand.org/pubs/research_reports/RRA401-1.html.

¹⁵ Brown, *CSAF Action Orders: To Accelerate Change Across the Air Force*.

¹⁶ Billy Blankenship, “Air University Overhauls Curriculum to Focus on Competition,” Air University (AU), accessed March 13, 2022, <https://www.maxwell.af.mil/News/Display/Article/2920485/air-university-overhauls-curriculum-to-focus-on-competition/>.

¹⁷ Hanser et al., “Air Force Professional Military Education,” July 12, 2021, 11.

¹⁸ “Air Command and Staff College,” accessed March 13, 2022, <https://www.airuniversity.af.edu/ACSC/>.

civilian institutions spread across thirteen different countries.¹⁹ The total budget for AFIT/CI student education is estimated at approximately \$90 million annually.²⁰ AFIT/CI is solely responsible for funding students' tuition and does not direct students to research specified topics.²¹ In the academic year 2022, there were approximately 700 master's candidates and nearly 300 PhDs candidates spread across 95 civilian institutions.²²

1. Survey Questions

The authors conducted a survey to identify areas of improvement for AFIT/CI students to conduct effective research. This sample of student researchers was asked to complete a survey based on their personal academic experience. The purpose of the survey was to help inform and enhance the USAF civilian institution program. The survey was anonymous and optional for all participants. The questions are listed below.

1. Do you have a deliverable requirement for your CI program in the form of a thesis, dissertation, capstone, or similar research product? Yes/No
2. Did you receive information about current USAF research priorities and funding opportunities before or during your graduate program? Yes/No
3. *2a (If Yes). Did you incorporate USAF research priorities into your graduate research?
4. **2b (If No). Would you have considered incorporating USAF research priorities into your graduate research if you had received information about them?

¹⁹ "AFIT Bio for Col William F. Julian," accessed September 1, 2022, <https://www.afit.edu/BIOS/bio.cfm?facID=1915>.

²⁰ "AFIT Bio for Col William F. Julian."

²¹ Authors are awaiting results on reason why AFIT/CI cannot influence research areas. AFIT/CI Director Col Julian suspects it is a legal issue.

²² Data obtained directly from Air Force Institute of Technology, Academic Program Manager for Civilian Institutions with permission for use in NPS Capstone.

5. Would you have used a collaborative mobile application that gives you access to prioritized research questions, command sponsorships, and funding? Yes/No
6. What additional resources do you not currently have that would you find useful for your educational experience? Type in response.

2. Survey Results

The survey was emailed to 1,175 academic students, and 266 responded during the survey window of 18 OCT 2022 to 31 OCT 2022. The data obtained from the survey largely supported the authors' assumptions that a need exists for connecting students to research organizations. However, response bias is expected as only those with passionate views, positive and negative, are likely to respond to surveys, and the results may not reflect the views of those in between. The authors provide a brief analysis of the response data for each question after Figure 2.

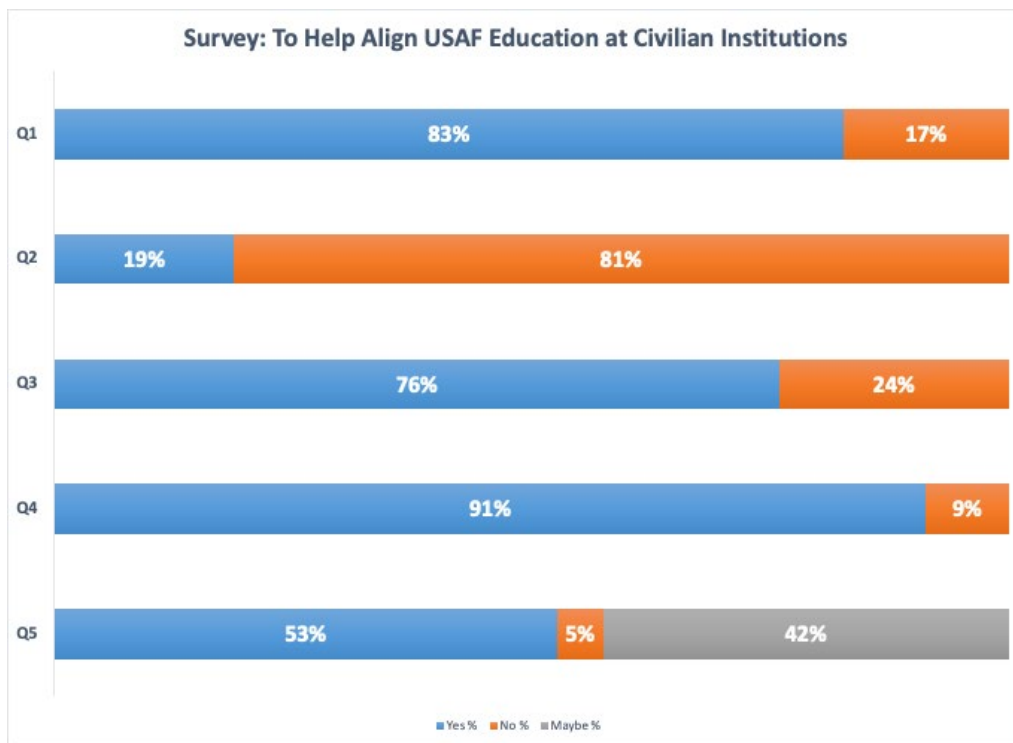


Figure 2. Survey Response Horizontal Stacked Bar Chart

Q1: Do you have a deliverable requirement for your CI program in the form of a thesis, dissertation, capstone, or similar research product?



220 USAF CI students reported that they have a deliverable requirement in the form of a thesis, dissertation, capstone, or similar research product. This is a large opportunity for the USAF to align with its strategic priorities. If aligned, the annual ROI for USAF student contribution would increase exponentially.

- “We have an extremely talented group of CI students motivated to provide insight into how to make the Air Force better.” –Anonymous student

Q2: Did you receive information about current USAF research priorities and funding opportunities before or during your graduate program?



The authors found it surprising that 216 USAF CI students did not receive information about current USAF research priorities and funding opportunities before attending their graduate program. This supports the authors’ assumption that other CI students were not receiving information about USAF research priorities. USAF students that are selected for higher education desire to contribute to the USAF mission.

- “I always wanted to ask a senior official, what would you want me to study to benefit the Air Force the most?” –Anonymous student

Q3: Did you incorporate USAF research priorities into your graduate research?



The third question was conditionally based on how they answered the second question. On the second question, 50 USAF CI students received information on USAF priorities prior to attending their institution. Of those students, 38 of them incorporated

that information into their graduate research, whereas 12 students did not. This suggests that if students are given research priorities, then a majority will likely incorporate them into their research.

- One student commented, “when I started my CI program, I reached out to AFIT for data and research ideas. They told me this was my time to research whatever I wanted and did not provide anything. I like the freedom to do what I want during my CI tenure, but having data sources and research ideas that are USAF specific would be a nice resource.”

Q4: Would you have considered incorporating USAF research priorities into your graduate research if you had received information about them?



243 USAF CI students would consider incorporating USAF research priorities into their graduate research. This data continues to reinforce that USAF students are frustrated because they want their research to be valuable. They all have a vested interest in making the service better, as most of them will return to the force after they graduate.

- One student wrote in the survey, “Feels like I’m on an island with a very singular experience, though I know other people out there are going through the program.”
- Another student wrote, “It would be useful if someone from AFIT/AFRL/AFOSR maintained an in-depth list of open challenges that the Air Force is working on, so that AFIT/CI students are more aware of the priorities of the Air Force research enterprise. These lists could be managed by professors/researchers in each field, e.g., open challenges in computer science, aeronautical engineering, etc.”

Q5: During your research, would you use a collaborative mobile application that gives you access to prioritized USAF research questions, command sponsorships, and funding?



For the last question, 140 students said they would use a collaborative mobile application that gives access to prioritize USAF research questions, command sponsorships, and funding. 113 students said they might use the mobile application, and thirteen said they would not. This is positive feedback that a mobile application that meets students' needs would be useful. The authors only received two comments that were opposed to a collaborative mobile application. Some additional supporting quotes from students are below. The full list of 120 comments from the survey can be referenced in Appendix G.

- “If there can be a USAF direct source (USAF to student) containing a list of USAF research priorities vs. relying on the institution we are a part of to relay these priorities, that would be really helpful.”
- “An up-to-date list of POCs/ connections to military agencies or USAF organizations that are either interested in research conducted by USAF CI students or other DOD grad students. Perhaps the list (or database) lists what general research areas the organization has an interest in. Also, potentially, a way to know if there are follow-on jobs that can be filled due to research conducted in support of an organization.”
- “Your app could help connect people in a given field of research with one another. It would have been incredibly helpful to speak with airmen who have either completed similar degrees in the past or people who are actually working in my field of research within DOD. I felt like I was in a vacuum in my program and had to figure these things out by myself. If I was more connected with the big AF, I think my research would have been of higher quality and more applicable to the DOD in general.”

B. RESEARCH ORGANIZATIONS

The DOD will continue to operate in a resource-constrained environment requiring the dissemination of effective research across the force. Student research is not being leveraged at research organizations or shared across the force. Eric Schmidt, an American businessman and software engineer, stressed in a statement to the House Armed Service Committee that the DOD needs to foster a culture of experimentation and calculated risk-taking through inspiring service members.²³ He also said that successful countries are the ones that better integrate technology.²⁴ Understanding research organizations can provide a useful framework on how to improve the existing USAF PME ecosystem.

As noted in the purpose section, the USAF lacks a formal process that connects students to ongoing research projects. Numerous research organizations in the USAF are could stand to improve how they collaborate. The largest USAF research organization is the Air Force Research Lab (AFRL). They employ approximately 11,500 personnel to include military, civilian, and contractor personnel and manage a \$7 billion portfolio of investments.²⁵ AFRL's mission is to lead "the discovery, development, and delivery of warfighting technologies for our air, space, and cyberspace forces."²⁶ However, a gap that AFRL has, similar to other research organizations, is access to airmen with tactical and operational levels of knowledge and experience.²⁷

AFWERX, an extension of AFRL, is the organization responsible for the innovation arm of the USAF. AFWERX's "mission is to accelerate agile and affordable capability transitions by teaming innovative technology developers with Airman and Guardian talent."²⁸ Within AFWERX, there are three programs: AFVentures, Spark, and

²³ Eric Schmidt, "Statement from House Armed Services Committee," 10.

²⁴ Schmidt, 10.

²⁵ "Air Force Research Laboratory," Air Force, accessed October 26, 2022, <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104463/air-force-research-laboratory/>.

²⁶ "About – Air Force Research Laboratory," accessed August 29, 2022, <https://afresearchlab.com/about/>.

²⁷ John M. Miller, AFMC AFRL/XP, Personal communication, April 6, 2022.

²⁸ "AFWERX," AFWERX, accessed August 29, 2022, <https://www.afwerx.af.mil/>.

Prime. AFVentures help create “simple pathways for commercial innovators and private capital investment to help the Department of the Air Force solve problems.”²⁹ Spark connects Airman and Space Force Guardians with “commercial innovators using virtual collaboration.”³⁰ Lastly, Prime is an industry accelerator program that combines government resources and U.S. technical advantages.

Military student researchers are a free and valuable resource that these organizations could more effectively collaborate on research projects. Currently, there is no forum for students and research organizations to collaborate on research and have a consolidated repository of past, present, and future research.

C. USAF SENIOR LEADERS

The Chief of Staff of the Air Force (CSAF) establishes strategic priorities for the USAF. Different priorities are communicated in a variety of mediums throughout the force. As an example, the current CSAF communicates annual research questions to Blue Horizons, a USAF-dedicated think tank, via a memorandum.³¹ The VCSAF writes a similar product that is disseminated to wing commanders and the Morpheus team with an innovation focus for research.³² USAF headquarter staff will translate the strategic guidance into operational and tactical guidance. Combatant Commanders and USAF Major Commands will, in return, give guidance to their subordinate units via various methods, often depending on organization standards. From one of the author’s personal experiences working with operational staff, organizations will internally attempt to solve operational or research priorities rather than communicate with other research organizations or academic students looking at similar problems.

USAF leadership at tactical, operational, and strategic levels could have a better connection with students to fund, guide, and propose research for their studies; it would open a vast amount of brainpower and efficiency for the USAF. The student researcher

²⁹ “Front Page - AFWERX,” accessed October 21, 2022, <https://afwerx.com/>.

³⁰ “Front Page - AFWERX,”

³¹ Ben Phillips, Managing Director at Blue Horizons, personal communication, April 18, 2022.

³² SMSgt Elizabeth Garcia, USAF Project Morpheus, personal communication, August 10, 2022.

has the time and capacity to put forth deep work and thought, while the operational leaders are focused on the mission. Both students and the USAF benefit if the research aligns with USAF's strategic priorities and contributes to known problems. Aside from the added benefit of contributing to real-world problems and projects, students will be better prepared upon graduation to get back into the operational force from having worked on current issues, which aligns with the purpose of PME and the CSAF's guidance.

IV. OBSTACLES WITHIN STUDENT RESEARCH

The society that separates its scholars from its warriors will have its thinking done by cowards and its fighting done by fools.

— Thucydides

The USAF education ecosystem is vast, diverse, and difficult to navigate unless one is familiar with the numerous research organizations. The main obstacles to accomplishing effective student research can be distilled into two categories with the assumption that faculty expertise is available. The first category is students' access to current and relevant strategic guidance according to national defense priorities. The second category is students' ability to acquire the right type and amount of research funding.

A. STRATEGIC GUIDANCE

Students generally have access to or can find strategic guidance to help guide or steer their work.³³ However, translating the guidance into a manageable portion may be difficult and likely will result in duplication of effort without coordinating efforts. Furthermore, correctly interpreting the broad guidance into a meaningful and impactful thesis or project is challenging. Strategic guidance is dynamic; without close ties to current guidance, the finished product risks being obsolete.

Currently, AFIT/CI does not vector students to specific research areas or topics. AFIT/CI has administrative oversight of civilian institution students and ensures their tuition is paid for but does not provide students with research funding. This inhibits students who crave collaboration to work on operational problems with outside organizations.³⁴ As an example, AFRL provides research topics to AFIT/CI, but AFIT/

³³ "Air University Office of Sponsored Programs (OSP)."

³⁴ Col William Julian, AFIT/CI Director, personal communication, September 1, 2022.

CI then does not provide that funding directly to student research. This puts the burden on academic students to procure funding rather than focus on their research topic.

Professional military students attending civilian institutions should continue to have the academic freedom to choose research topics that interest them. Students who are inspired by their research topic will not only enjoy the experience more, but they will also work harder to solve a problem. According to a 2016 study from the Policy Insights from the Behavioral and Brain Sciences Journal, student interest is essential to academic success.³⁵ Overall, encouraging students to pursue their interests will benefit the USAF in the long term.

Many professors at civilian institutions advise and encourage students to focus on certain research topics. As a result, students often are vectored by the professor's research interests and priorities.³⁶ However, professors may not have intimate knowledge of USAF research priorities nor have the incentive to pursue them. To enhance the academic experience, students should receive academic guidance from professors while also incorporating USAF direction. Professor guidance and USAF priorities may not always be aligned. This lack of direction causes unnecessary friction for students who then, in return, primarily work on academic advisor priorities.

It should not be a requirement for students accepted into the academic environment to know precisely what they want to research. Some students have more of an operational background than others, which could lead to research interests. However, having no operational experience does not preclude students from contributing to strategic problems. All students can provide unique experiences and perspectives. Students may have recent operational experience, but without a connection to an organization for feedback, the work's relevancy and impact are likely to decrease. As

³⁵ Judith M. Harackiewicz, Jessi L. Smith, and Stacy J. Priniski, "Interest Matters: The Importance of Promoting Interest in Education," *Policy Insights from the Behavioral and Brain Sciences* 3, no. 2 (October 1, 2016): 220, <https://doi.org/10.1177/2372732216655542>.

³⁶ This was a common point during discussions with multiple NPS and AFIT professors throughout research, to include Col Shawn McCamish, Active Duty USAF NPS Professor and Dr. Ahner, AFIT Dean of Research. Traditionally, the funding follows the professors and faculty, not the students.

previously mentioned, AFRL, a behemoth of a research organization, conducts many research projects incorporating limited operational users into the technology research.

This lack of collaboration is not the most effective way to capitalize on USAF-sponsored academic education and results in the under-utilization of resources. The misalignment of USAF academic research is a subset of a larger DOD problem for PME to contribute towards the National Defense Strategy. In Chairwoman Jackie Speier's opening statement during a subcommittee on military personnel hearing to discuss PME and the National Defense Strategy in May of 2022, she asked the panel, "What is the intended and the actual return on the significant investment of both time and resources — estimated at over 8 billion dollars per year — and how that return is measured?"³⁷ This statement suggests there is an abundance of PME financial resources without an accurate assessment of ROI.

Students receiving command sponsorship for their research need only receive a commander's verbal agreement to provide research support. The sponsor's responsibility is to simply answer questions or provide relevant research questions or topics. It could be as involved as funding travel and providing access to operational units in a deployed environment, as was the case with an NPS Defense Analysis cohort in 2018.³⁸ A group of students conducted a six-month seminar and traveled to Afghanistan to support the NATO Special Operations Component Command-Afghanistan/Special Operations Joint Task Force-Afghanistan commander, who was leading troops in combat at the time of the study, and the result of the study had direct impacts on an operational problem. This type of academic-operational relationship is nothing new but is far underutilized. Even at NPS, this type of work is rare but does not have to be.³⁹

³⁷ Jackie Speier, *Subcommittee on Military Personnel Hearing: Professional Military Education and the National Defense Strategy*, 115th Cong. (2022) (statement of Chairwoman Jackie Speier).

³⁸ "Ignorance and Professional Military Education: The Case for Operational Engagement," War on the Rocks, November 7, 2018, <https://warontherocks.com/2018/11/ignorance-and-professional-military-education-the-case-for-operational-engagement/>.

³⁹ Prof. Leo Blanken and Prof. Brian Greenshields, Naval Postgraduate School professors, personal communication, August 25, 2022.

In recent history, one significant example of successfully aligning student research with strategic priorities is War Plan Orange. In the same subcommittee on military personnel hearing to discuss PME and the National Defense Strategy mentioned above, Lt. Gen. (ret.) Schmidle used this operation as an academic case study showing how military students can effectively contribute to strategic and operational problems. During his address to the subcommittee, Schmidle said:

An example of successful and influential wargaming at the senior Service school level is the development of “War Plan Orange.” This was the plan for the U.S. Navy’s war at sea against Japan in World War II. “War Plan Orange” was created and subsequently refined through an elaborate series of wargames conducted over many years at the Naval War College. Of note, the premise of the wargame, that Japan would attack and conquer islands across the Pacific Ocean was, at the time, unthinkable.⁴⁰

B. FUNDING

Student research often remains theoretical and rarely culminates into a tangible project for force implementation, likely due to a lack of funding.⁴¹ Purely having a good research idea is inadequate for acquiring funding. Not having access to research funding is not only an obstacle for students but, more importantly, does not contribute to maintaining a competitive military advantage. While successful research can often translate into a monetary gain for businesses, successful research for the military can determine the nature of warfare. Access to funding is critical for high-caliber and practical research. Military leaders need to understand how to provide access to research funding for military students to champion a culture of inspiration and creativity.

External research entities do not allow students easy access to research funding. There are innovative research organizations to which students can submit ideas, like the USAF Spark Tank, but they only meet once a year to determine winners. That does not provide enough time for students to acquire funding and complete their research within

⁴⁰ Schmidle Jr., *Subcommittee on Military Personnel Hearing: Professional Military Education and the National Defense Strategy*, 115th Cong. (2022) (statement of Robert E. Schmidle Jr., Lt. Gen. (ret.), USMC).

⁴¹ According to data obtained from the NPS Graduate Writing Center, approximately 83% of students wrote a thesis while the remaining 17% generated a capstone project. Reference Appendix F for more information. Sandra R. Leavett, PhD, email message to authors, October 24, 2022.

the constraints of a ten-month or eighteen-month academic program. The amount of time a student attends a research institution severely limits the funding options they can pursue. There is often not enough time to identify an external funding entity and then convince them of a research proposal that a student may only work on for realistically a few months before graduation.

One of the best options for students with an innovative idea that requires a business partnership is to apply for an SBIR or Small Business Technology Transfer (STTR) program.⁴² The issue, once again, is the time students are attending an academic institution. The Phase I SBIR process is a proof of concept and can take anywhere from six to twelve months to get \$50,000 to \$275,000.⁴³ The Phase II SBIR process is the actual technology development and can take up to twenty-four months with the possibility of receiving \$750,000 to \$1.8 million.⁴⁴ Phase III is the commercialization phase, when the idea can be sold to the public or private sector.⁴⁵ This program, while valuable, once again takes too long for students attending civilian institutions to apply the research money to their thesis or capstone projects.

Timely and easy access to funding for military students would likely increase the ROI for student research. Understandably, senior leaders may be risk-averse to funding student research because they have limited resources. Student researchers are, however, valuable resources in themselves with tactical and operational knowledge. They frequently not only experience first-hand the problem they are researching, but they are also returning to the force as an end user of the product. Experimenting with research can lead to failure, and the military has a poor culture of accepting failure. The best way to inspire creativity, show a culture that values innovation, and reach their full potential is to provide research funding to military students that can help solve future complex problems.

⁴² Further information regarding the SBIR process can be found at <https://beta.www.sbir.gov>, and in Appendix E.

⁴³ “About | SBIR.Gov,” accessed October 12, 2022, <https://www.sbir.gov/about>.

⁴⁴ “About | SBIR.Gov.”

⁴⁵ “About | SBIR.Gov.”

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V. CONCLUSION

Institutional self-reform is rare; the conscience is willing, but the culture is tough.

— Jacques Barzun, *From Dawn to Decadence: 500 Years of Western Cultural Life, 1500 to the Present*

This project initially focused on USAF PME at the Major (O-4) level. However, the concept of leveraging student research should be applied to the entire USAF and, eventually, the DOD. There are many positive effects of consolidating and collaborating on research. More military members can contribute and provide subject matter expertise on difficult problems. The USAF must leverage academic student research through a collaborative platform to maintain a competitive advantage and efficiently use resources.

Numerous USAF research studies and theses are being written each year, only to remain in a digital library with few views. This research should be applied to complex and dynamic problems. Researching random innovative ideas is not effective for USAF unless it is aligned to a particular problem set. USAF research has the potential to be enhanced while in a resource-constrained environment. There are too many hard strategic competition problems to solve; therefore, the USAF needs to capitalize on academic research. This project sought to fulfill a need that centered on connecting students to relevant operational problems while also increasing the USAF's ROI for military students attending civilian institutions.

A. RECOMMENDATIONS

The recommendations to enhance USAF student research at civilian institutions can be broken down into two main sections, organizational and collaborative efforts. There is a spectrum of recommendations varying in level of complexity and cost to the USAF.

1. USAF Organizational Recommendations

Not aligning USAF-sponsored academic research with strategic priorities is an organizational problem. To fix it, three fundamental changes must occur. First, the USAF should improve the talent management process for matching students to appropriate degree types and research fields of study. Second, the USAF should improve awareness about academic resources for aligning research, finding warfighter sponsors, and securing funding. Third, an office or organization within the USAF should take on the role of facilitating collaboration for AFIT/CI students and the USAF education system writ large.

Talent management is an opportunity to effectively select and focus individuals based on the needs of the organization. The USAF spends valuable resources selecting the most qualified airman to attend various programs to further their education. However, the USAF could enhance airmen's educational experience and have an ROI for the USAF. For example, students selected to attend civilian institutions should be vectored into specific degrees that will maximize benefits for the airman and the USAF. Lastly, the USAF should have a formal avenue to communicate with students at civilian institutions regarding recommended areas of research.

To improve education on academic resources, students from all disciplines should be provided information on the following key topics and items. This will ensure students can properly navigate the educational ecosystem to maximize their research impacts by effectively collaborating with research entities, commercial companies, and other defense organizations. For research institutions or defense organizations, students should look to form Memorandums of Understanding (MOU) and Memorandums of Agreement (MOA) to formalize working relationships that will outlast their tenure. For working with commercial companies, students should pursue the applicable Cooperative Research and

Development Agreement (CRADA), Non-disclosure Agreement (NDA), or contract(s), depending on the project requirement.⁴⁶

Lastly, a small USAF office should be chartered to foster collaboration amongst AFIT/CI students, research organizations, and the operational warfighter. This office should be at a high enough level to allow oversight across AFIT/CI, Air University, and other research institutions. This office would serve as the focal point to ensure collaboration, alignment of research with strategic priorities, and minimize duplication of efforts. In addition to a central office, liaison officers (LNO) should be emplaced at various locations across the education ecosystem. For example, the USAF students attending the NPS Defense Analysis department would benefit from an LNO to coordinate research efforts. The LNO would also provide continuity for research projects beyond students' normal program length.

2. USAF Collaboration Recommendations

Restructuring the entire USAF education ecosystem is a vast and complicated problem. The solutions presented an attempt to maximize innovation adoption in relatively cheap, accessible ways that do not require top-down direction or bureaucratic restructuring. To increase the chances of success, the following tiered approach for increasing collaboration with or without structural changes should be adopted. The tiers increase in complexity and adoption difficulty.

The first tier recommendation is to focus on simple solutions while utilizing existing technology. Harnessing collaborative platforms such as Teams or Google Drive can improve communication between various institutions. Teams can facilitate making cross-departmental research groups that could leverage various areas of expertise. While Teams works well inside an organization, spanning outside an organization can often prove difficult due to software restrictions. Advantages of this tier include no cost for

⁴⁶ "CRADAs - Cooperative Research & Development Agreements," U.S. Department of the Interior, accessed September 15, 2022, <https://www.doi.gov/techtransfer/crada>; "227.7103-7 Use and Non-Disclosure Agreement. | Acquisition.GOV," Acquisition.gov, accessed September 15, 2022, <https://www.acquisition.gov/dfars/227.7103-7-use-and-non-disclosure-agreement>.

implementation. Disadvantages include the inability to collaborate across organizations, limited access for users only inside the network, and inherent software rigidity.

The second tier focuses on leveraging platforms that require registration or subscription. Slack, or a similar platform, could be required to help connect AFIT/CI students outside NPS to allow cross-collaboration.⁴⁷ Slack is only as useful as the users that register and communicate within the platform. Someone from a position of authority would have to incentivize or mandate students to utilize the platform to make it useful. Athena is another example of a platform that would require registration. Athena is an online collaborative research tool developed by the NPS Foundation that connects researchers, sponsors, and leaders across the Naval Education Enterprise.⁴⁸ Athena allows connections across NPS but does not currently include USAF connections. Todd Lyons, NPS Foundation vice president, said expanding Athena to other civilian institutions would be a major project.⁴⁹ Each institution that desires to incorporate Athena would require an additional local software setup. The only students that would benefit from Athena would be the organizations that registered with the software.

Lastly, the third tier is the most complex but provides the best collaboration and has the potential to connect existing AFIT/CI students across the research ecosystem. A mobile application built with stakeholder feedback will provide the greatest benefit to all users. The main stakeholders are students, USAF senior leaders, resource organizations, and academic institutions. Initial complexity comes with reducing security measures and permissions to incorporate users from the entire research ecosystem. However, a mobile application is convenient and reduces friction. A user can simply download it on their

⁴⁷ “Solutions | Slack for Business,” Slack, accessed September 15, 2022, <https://slack.com/solutions>.

⁴⁸ “Athena - Naval Warfare Studies Institute,” Naval Postgraduate School, accessed September 15, 2022, <https://nps.edu/web/nwsi/athena-information>.

⁴⁹ Setting up a second Athena network at a different institution like Air University would require a significant amount of time and funding. Interested institutions would first need to be educated on Athena, then coordinate with an Athena representative at NPS. No software development is required to modify Athena for use by other organizations. Organizations would need to create application programming interface to link their databases with the Athena taxonomy and would receive NPS support. Todd Lyons, personal communication, August 2, 2022.

mobile device and access anywhere without the burden of a firewall.⁵⁰ The additional complexity of this approach requires gaining funding and support to build a mobile application. The authors received two quotes from software development companies; Infuse provided a written proposal for approximately \$500k, while a second company offered a verbal proposal of \$100k to build a mobile application.⁵¹ However, this small price pales in comparison to the overall AFIT/CI tuition cost and the benefits the USAF would gain from long-term collaborative research.⁵²

General Charles Q. Brown, USAF Chief of Staff, stated in his 2020 strategic approach, “only through collaboration within and throughout will we succeed and we must empower our incredible Airmen to solve any problem.”⁵³ With limited resources, every USAF student should have access to a list of current senior leader priorities. There needs to be a collaborative platform that is easily navigable and accessible to USAF students.

In conclusion, students should have academic freedom to choose a research topic that interests them. The more passionate and invested a student is in a research topic, the better the research will most likely be. The purpose of a collaborative research platform is not to mandate research topics to students. Rather, it will provide a consolidated location for students to choose a topic of interest or propose a new research question. New topics can be validated by senior leaders and receive funding once vetted. A mobile application platform would allow graduate students a forum to communicate with other students on related topics.

B. MOBILE APPLICATION STAKEHOLDERS

The authors spent most of their research time identifying and collaborating with key individuals that make up the USAF’s academic civilian institution ecosystem. While most senior leaders found this project valuable, they were unable to fund the development

⁵⁰ Applications such as Athena have a firewall and this limits collaboration across organizations.

⁵¹ See Appendix A for first quote from Infuse.

⁵² “AFIT Bio for Col William F. Julian.”

⁵³ Brown, *CSAF Action Orders: To Accelerate Change Across the Air Force*.

of a collaborative platform. However, the authors' project was awarded a phase I SBIR in the amount of \$75,000 in October of 2022, allowing the software company, Infuse, to start working on a mobile application. Additional funding options were explored, but the authors ran out of time to develop a prototype with Infuse before graduation. Hopefully, future USAF civilian institution students will find this project valuable and can continue to help develop a collaborative mobile application. Supplemental information for the mobile application can be found in Appendix A. This section focuses on the relationships the authors cultivated during their time at NPS.

The Air Education Training Command (AETC) provided pivotal support for this project. Dr. Wendy Walsh, AETC's Chief Learning Officer, visited NPS in July 2022. The authors briefed her on this capstone project to enhance the civilian institution's USAF PME experience. She was an avid supporter and invited both authors to an AETC-sponsored Learning Symposium in San Antonio, Texas, in September 2022. There, the authors collaborated with other senior leaders on mapping out the learning ecosystem within the USAF. The experience and knowledge gained can be referenced in Appendix B. This network is critical to incorporate into a future collaborative research platform.

Subordinate to AETC is the Air Force Institute of Technology (AFIT), which is responsible for all USAF PME civilian institutions. The authors coordinated with the director of the civilian institute programs, who in 2022 was Col. William Julian. Col. Julian supported this capstone project and sponsored the authors' survey. During a phone call, Col. Julian explained to the authors that based on policy, he was unable to vector any USAF students to study a particular subject or conduct thesis research on specific topics.⁵⁴ This issue of not aligning USAF priorities with student research needs to change at the policy level and is a project for another thesis. The organization in charge of all USAF civilian institutions should be able to talent-manage students.

Air University, also subordinate to AETC, is located at Maxwell Air Force Base, Alabama, and is the lead organization responsible for USAF PME. The Air University Innovation Accelerator (AUiX) was the primary organizational sponsor of the authors'

⁵⁴ Col. William F. Julian, personal communication, September 1, 2022.

project. AUiX is responsible for connecting USAF student research with partners throughout the DOD and private sector to solve USAF problems. Bill DeMarco, AUiX Chief of Innovation Development, submitted the letter of support for an SBIR to fund a collaborative platform. He supported the idea of helping facilitate PME students' access to prioritized research questions, command sponsorship, and research funding.

Bill DeMarco introduced the authors to Infuse, a software development company staged out of San Francisco, California. Mike Cunningham, Director of Product Strategy, primarily interfaced with the authors via video conferences on developing a quote for the mobile application that cost approximately \$500,000. The cost estimate for the mobile application can be referenced in Appendix A. AUiX planned to manage the mobile application after it was created by Infuse. AUiX's responsibility is to network with USAF, academia, and the private sector. AUiX is the right organization to remain the focal point of innovative collaboration.

After the SBIR application was submitted, the authors talked with a professor at the Rhode Island School of Design that is also the chief creative officer of Altimeter Group, another software development company. Tom Weis provided valuable feedback on the authors' mobile application vision. Tom provided a substantially smaller quote than Infuse to build a Pitch Brief for distinguished visitors and a wiring diagram to construct the mobile application. The authors requested research funding through NPS Defense Analysis Department; however, limited funding was available. The authors also requested funding from AFIT for \$100,000, but Col Julian was unable to acquire the funding during the authors' remaining time at NPS.

The identified points of contact in this section are key nodes to understanding the USAF education ecosystem and potential commercial solutions. The next academic student(s) that want to continue this research should first contact these POCs for continuity and to build a shared vision.

C. FUTURE RESEARCH

The authors recommend the following items to further the research and findings of this project. First, a cost analysis study should be conducted that compares the ROIs

between varying tiered collaboration options mentioned in the recommendations section. Second, a survey may be required to clarify data points as well as target students before and after attending a civilian institution. Third, the connection to incorporate USAF entities into Athena should be evaluated. Fourth, researchers should seek out mandates for mobile application use, should the application be created, via AETC or AFPC Personnel Services Delivery Memorandum (PSDM) messages. Regarding travel, future contributors to the project would benefit from traveling to AFIT in Dayton, Ohio, and Maxwell AFB in Montgomery, Alabama, to talk with key POCs. The programs of interest at Maxwell AFB include AUiX and Blue Horizons. The key offices at AFIT include the AFIT/CI director and the AFIT Dean for Research. Lastly, the USAF could assign members to civilian institutions, like NPS, to serve as LNOs outside of their normal duties to represent USAF interests.

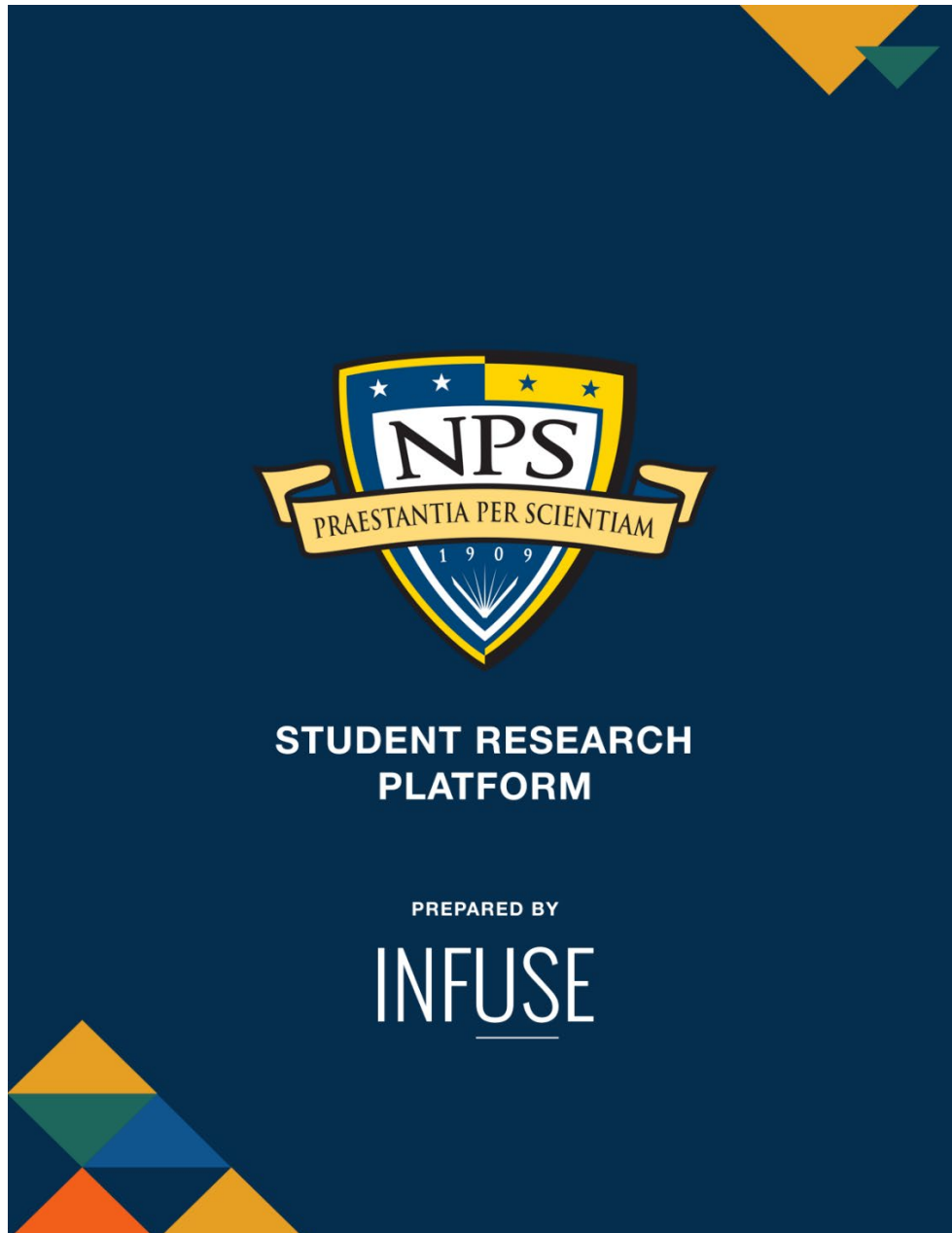
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General Brown, USAF Chief of Staff, stated, “Only through collaboration within and throughout will we succeed...we must empower our incredible Airmen to solve any problem.”⁵⁵ With limited resources, every USAF PME student should have access to a list of current senior leader priorities. Furthermore, there needs to be a collaborative platform that is easily navigable and accessible to USAF students.

⁵⁵ Charles Q. Brown, *Accelerate Change or Lose* (Washington, D.C.: Department of Defense, 2020), 2, https://www.af.mil/Portals/1/documents/csaf/CSAF_22/CSAF_22_Strategic_Approach_Accelerate_Change_or_Lose_31_Aug_2020.pdf.

APPENDIX A. MOBILE APPLICATION

The following is a proposal from a software company, Infuse. Infuse provided the quote on August 3, 2022. Scanning the Horizon was the original name the authors developed for the mobile application. The timeline therein is no longer current.





PROJECT OVERVIEW

Scanning the Horizon* seeks to provide USAF students with a strong research ecosystem by serving as the one-stop hub for their ongoing projects. In order to satisfy their senior leadership requirements, students must complete a thesis. The priorities and immediate needs of research organizations and leading personnel across the USAF are apt topics that students could select for their theses, however, there is a disconnect between these two communities. As a result, key priorities are left to be triaged and investigated at the current speed of inertia, while the untapped resource of eager students are left to create and develop ideas in the vacuum of their individual network.

With this platform, current research initiatives can be optimized by leveraging student talent to tackle the most pressing priorities at the USAF. The platform will serve as:

- **Research Knowledge Base:** Links to research organizations, contact information for key personnel, and best practices for research will expedite the initial step of developing an idea and connecting with the appropriate parties.
- **Curated Research Feed:** Students can browse through research projects related to their areas of interest, and leadership can contribute suggested topic ideas.
- **Project Management & Feedback:** Once a topic has been selected, progress can be shared through the platform with milestone updates. Users can rate, share related content, and provide feedback on projects as they progress to completion.

PHASED APPROACH

We will develop the platform with a phased approach in order to validate our assumptions and inform the priorities of features to be developed. The phases will be broken down as follows:

Phase 1: Proof of Concept

The focus during this phase will be to collect information from relevant stakeholders and lay the groundwork on platform development. During this process, prototypes can be shared with potential users to gather feedback.

Phase 2: MVP

The second phase will be where we execute on significant feature development: curated newsfeeds base on user interest, the ability for contributors to submit their topics, and additional polish to improve the user experience.

Phase 3: Scale

In the third phase, we will refine existing features and continue to add value that keeps users coming back such as the project management tools and the talent marketplace. We'll seek to maximize engagement to prove out the value for other departments to expand our reach.



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DEVELOPMENT - PHASE 3

TASK	WORK DAYS
Update platform architecture	4
Additional integrations to platform	10
Student - Project interactions	5
Student - Project management tools	10
Student - Project forum, reviews, ratings	3
Admin - Review posts & activity	5
Admin - Additional platform moderation tools	8
Contributor - Talent marketplace interaction	10
Contributor - Project comments & feedback	10
Sub-total Development Days	65
Estimated Cost @ \$195/hr	\$101,400



PRODUCT MANAGEMENT - PHASE 3

TASK	WORK DAYS
Customer discovery & information gathering	5
Phase 3 requirements development	3
Sprint management	6
Iterative testing	4
Verification & testing for launch	3
Deployment	2
Project management	9
Sub-total Product Management Days	32
Estimated Cost @ \$195/hr	\$49,920

DESIGN - PHASE 3

TASK	WORK DAYS
Wireframes	5
UI/UX	7
Sub-total Design Days	12
Estimated Cost @ \$175/hr	\$16,800



DEVELOPMENT - PHASE 2

TASK	WORK DAYS
Update platform architecture	4
Create curated content algorithm	6
Add integrations for data sources	10
Permission levels	5
Notifications & email integration	6
Create curated email newsletter	5
Student - Updated profile features	4
Student - Newsfeed of research topics	5
Student - View topic details	5
Student - View related projects	3
Admin - Added authentication security	3
Admin - User management	3
Admin - Platform moderation tools	5
Admin - TBD modules*	5
Contributor - Create profile & view	6
Contributor - Submit & Browse topics	6
Contributor - TBD modules*	5
Sub-total Development Days	86
Estimated Cost @ \$195/hr	\$134,160



PRODUCT MANAGEMENT - PHASE 2

TASK	WORK DAYS
Customer discovery & information gathering	5
Phase 2 requirements development	3
Sprint management	6
Iterative testing	4
Verification & testing for launch	3
Deployment	2
Project management	12
Sub-total Product Management Days	35
Estimated Cost @ \$195/hr	\$54,600

DESIGN - PHASE 2

TASK	WORK DAYS
Wireframes	6
UI/UX	8
Sub-total Design Days	14
Estimated Cost @ \$175/hr	\$19,600



DEVELOPMENT - PHASE 1

Our development team will work in sprints, with milestones and completed features that will be communicated during the weekly status update meeting. Prototypes will be shared as early as they are available so you can have a hands-on look during the development process.

TASK	WORK DAYS
Platform architecture development	3
Set up dev environments and infrastructure	3
General app navigation	2
Student - Register, login, profile	3
Student - Access link libraries	2
Student - Research best practices repository	3
Student - Access Innovation Wiki	2
Admin - Login	2
Admin - Add/update wiki information	6
Logging & user analytics	3
Sub-total Development Days	29
Estimated Cost @ \$195/hr	\$45,240



PRODUCT MANAGEMENT - PHASE 1

Your Product Manager (PM) will be the main point of contact throughout the development process. The PM will provide weekly budget updates and will lead weekly check-in calls with your team to keep timelines up-to-date and to prepare for significant milestones such as app submission and release.

TASK	WORK DAYS
Customer discovery & information gathering	3
Phase 1 requirements development	2
Sprint management	3
Iterative testing	3
Verification & testing for launch	2
Deployment	2
Project management	4
Sub-total Product Management Days	19
Estimated Cost @ \$195/hr	\$29,640

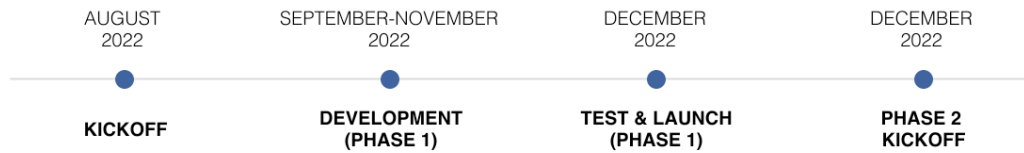
DESIGN - PHASE 1

Our designers will work with your team to match branding and style guidelines set forth by the company. Our team will adhere to current best practices for the platform. This estimate incorporates two (2) iterations of design feedback, and additional iterations may be provided upon request and written approval.

TASK	WORK DAYS
Wireframes	3
UI/UX	2
Sub-total Design Days	5
Estimated Cost @ \$175/hr	\$7,000



ESTIMATED TIMELINE



PROJECT COST

The estimated cost set forth in this proposal is based on our team's previous experience with projects of similar nature and the understanding of your business use-case. We bill using a time & materials model and provide budget and project updates on a weekly basis.

ROLE	COST
Phase 1: Proof of Concept	\$81,880
Phase 2: MVP	\$208,360
Phase 3: Scale	\$168,120
10% contingency	\$45,836
Project Total	\$504,196

APPENDIX B. ECOSYSTEM

DEF INNOVATION ECOSYSTEM MAP

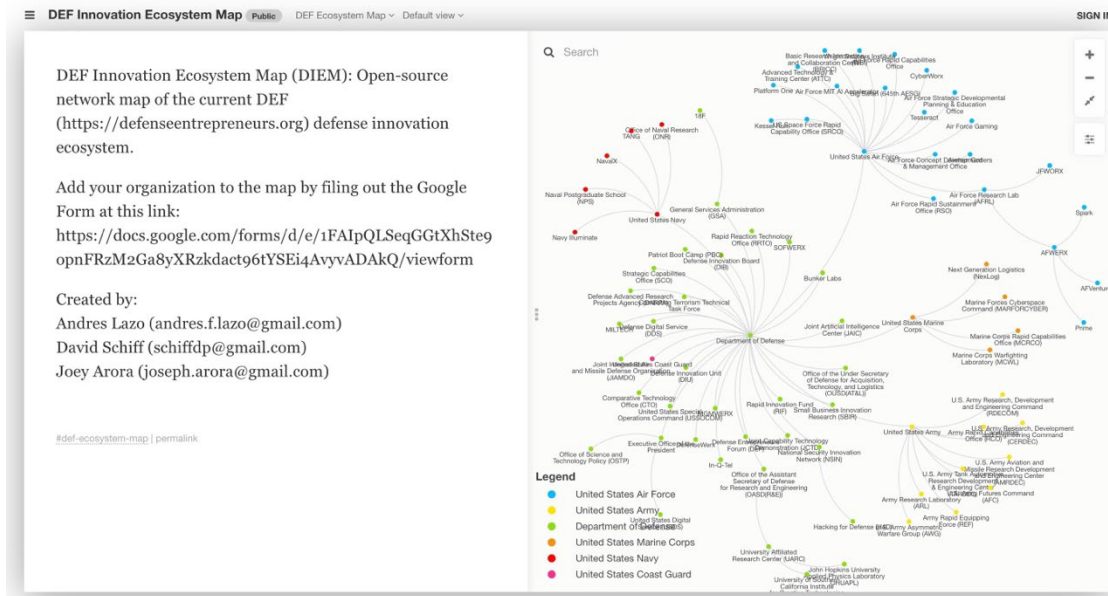


Figure 3. DEF Innovation Ecosystem Map.⁵⁶

HYPOTHETICAL SCENARIO OF ALIGNING STUDENT RESEARCH

Consider the following hypothetical scenario: a USAF student is selected to attend a civilian institution and has multiple years of tactical and operational experience. For the first time in their career, they will have dedicated time to conduct academic research. They arrive at their institution with limited USAF research guidance and are unable to easily navigate the research ecosystem. They begin their research, desiring to contribute to USAF priorities based on their individualized experience and interests.

⁵⁶ Source: DEF Innovation, https://kumu.io/aflazo/def-innovation-ecosystem-map?fbclid=IwAR01wH_L6Z2VqiYujlhZWtu1_Tmt0yF_SxgTHrQ98jWpa2BWAXOoba_vjnQ#def-ecosystem-map.

To better illustrate how different experiences can affect senior leaders, consider the following related example. Two senior Air Force leaders of equal rank with similar capabilities are tasked with challenging and complex problems. They both have access to current strategic guidance and relevant funding, but they may not have access to certain subject matter experts that have dedicated time to research. Leader A, earlier in their career, was vectored to a civilian institution, whereas leader B completed PME via distance learning. Leader A that attended a civilian institution, has maintained relationships with academic instructors and, therefore, has access to potential students that could work on research. Leader B does not have knowledge or easy access to civilian institutional resources. Both leaders should have the capability to propose their most challenging questions and have access to the USAF students conducting research at civilian institutions to help contribute to solving their operational problems.

USAF AETC LEARNING SYMPOSIUM 2022

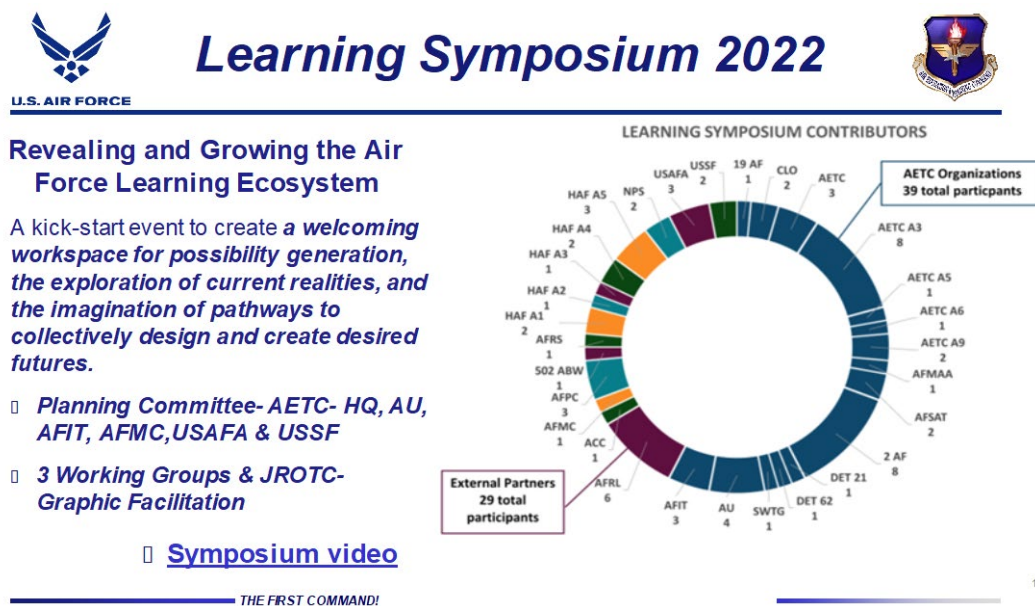


Figure 4. AETC Learning Symposium 2022 Output⁵⁷

⁵⁷ Wendy Walsh, email message to authors, November 7, 2022.

APPENDIX C. COLLABORATION AND SPONSORSHIP

SPONSORSHIP LETTER⁵⁸



NAVAL POSTGRADUATE SCHOOL
1 University Circle, Monterey, CA 93940 | (831) 656-1068 | www.nps.edu

06 October 2022

MEMORANDUM FOR Air University Innovation Accelerator (AUIX)

FROM: Lt Col Dustin Merritt and Maj Thomas Haney

SUBJECT: Naval Postgraduate School Student Capstone Sponsorship

1. **PURPOSE:** To formally request endorsement from AUIX as sponsors for a capstone project at the Naval Postgraduate School (NPS), NSA Monterey, CA. The project team includes Lt Col Dustin Merritt and Maj Thomas Haney.

2. **RESPONSIBILITIES:** This project requests AUIX sponsorship to assist in shaping student research and ensure relevancy to the USAF community. This will be accomplished by providing access to pertinent working groups, information, and contacts that may assist in answering the posed research question below. In return, sponsors can request additional specific deliverables to be presented at the conclusion of the NPS team's research.

3. **RESEARCH QUESTION:** How can the USAF enhance student research to effectively contribute toward senior leadership requirements?

4. **METHODOLOGY:** The research approach to answering this question is summarized in the following sections:

- a. Map out the educational ecosystem within the USAF to comprehend how student research receives guidance, funding, and prioritization.
- b. Identify and contact existing USAF research institutions.
- c. Develop the concept for a mobile application with a software development company.
- d. Submit an SBIR for mobile application funding.
- e. Attend a USAF Learning Symposium hosted by Air Education and Training Command to understand the USAF learning ecosystem.

5. **DELIVERABLES:** We propose the following deliverables as outputs of our research:

- a. White paper to share unclassified results and recommendations.
- b. Connect relevant stakeholders in the learning ecosystem.
- c. Recommendations of how to enhance USAF student research with access to command sponsorship, funding, and research priorities.


6. The project team can be reached at dustin.merritt@nps.edu or thomas.haney@nps.edu.

⁵⁸ The authors email addresses post-graduation will be thomas.haney.4@usaf.af.mil and dustin.merritt.2@us.af.mil.

SUBJECT: Naval Postgraduate School Student Capstone Sponsorship



DUSTIN MERRITT
Lt Col, USAF
Student



THOMAS P. HANEY
Maj, USAF
Student

Endorsed by:

WILLIAM "BILL" DEMARCO
Chief Innovation Development
AU/A3iX

NON-DISCLOSURE AGREEMENT

DocuSign Envelope ID: 654F01BC-4A42-40EA-A797-B279FAD94382

Non-Disclosure Agreement

This Agreement is made by and between **Naval Postgraduate School**, a United States Federal Government Laboratory of the Department of the Navy, located at **1 University Circle, Monterey, CA 93943**, and **Optimized Aspects, LLC dba Infuse** a software company organized and existing under the laws of the State of **California**, and whose principal address is located at **5925 Belmont Ave, Cincinnati, 45224**, [hereinafter referred to individually as a Party or collectively as the Parties] to facilitate the following described "Stated Purpose" by protecting non-public and proprietary information from misuse and unauthorized disclosure. This Agreement shall become effective upon the date of last signature by the authorized representatives of each of the Parties.

Subject Matter and Stated Purpose:

- a. The general subject of information to be exchanged is **information pertaining to developing a mobile application as part of a student capstone project, "Aligning USAF Education with Strategic Priorities". Such information could include potential customers and applications of the mobile app outside the NPS environment to include the USAF and potentially in the commercial sector. USAF information will center on the Air Force Institute of Technology / Civilian Institutions (AFIT/CI) Program, to include student demographics. Additionally, insight into the USAF education ecosystem will be discussed to develop the mobile application.**
- b. The Stated Purpose of this Agreement is to **protect shared information regarding the development of the aforementioned mobile application.**

The Parties Agree as Follows:

1. Definitions and Specific Requirements. As used in this Agreement, the following terms shall have the meanings as defined.
 - 1.1. Information. As used in this Agreement, the term "Information" includes, but is not limited to, knowledge relating to research, inventions, trade secrets, technology (including designs and specifications of components and systems, the composition of matter, methods and processes, machines and articles of manufacture, applications, and performance data), and business and financial records.
 - 1.2. Disclosure of Information. As used in this Agreement, "Disclosure of Information" shall mean the exchange of Information orally, visually, or on any human or machine readable medium including, but not limited to, oral and visual expressions, demonstrations, audio tapes, video tapes, drawings, computer memory devices, models, prototypes and samples.
 - 1.3. Disclosing Party. As used in this Agreement, "Disclosing Party" shall mean the Party making a Disclosure of Information to the other.
 - 1.4. Receiving Party. As used in this Agreement, "Receiving Party" shall mean the Party receiving a "Disclosure of Information" from the other.
 - 1.5. Protected Information. As used in this Agreement, "Protected Information" shall

mean Information provided by a Disclosing Party to a Receiving Party under this Agreement that has been clearly identified through the use of an appropriate marking that puts the Receiving Party on notice that the Disclosing Party considers the Information to be Protected Information under the terms of this Agreement. Protected Information shall not include, and the identification of Information as Protected Information shall not affect the rights of the Parties to use or disclose, Information that:

- 1.5.1. Was available in the public domain at the time of disclosure and receipt, or subsequently becomes available in the public domain from a source other than the Receiving Party, or
 - 1.5.2. Was in the possession of or known by the Receiving Party prior to the time of the receipt from the Disclosing Party, or
 - 1.5.3. Becomes available to the Receiving Party without restriction as to its disclosure or use from a third party under circumstances permitting its disclosure by the Receiving Party, or
 - 1.5.4. Is developed at any time by or for the Receiving Party independently of the Protected Information.
- 1.6. Appropriate Markings. As used in this Agreement, "Appropriate Markings" shall mean any reasonable method by which a Disclosing Party clearly identifies to a Receiving Party that Information is being disclosed under this Agreement, and is considered by the Disclosing Party to be Protected Information. Protected Information that is disclosed in tangible form shall be clearly marked with a human readable legend, stamp or other written identification prominently affixed or attached to the medium in which the Information is conveyed. Use of the marking "Protected Information" is preferred, but the Parties will also recognize other appropriate markings such as "Sensitive Information," "Proprietary Information," "Non-Disclosure Information," and "Business Sensitive Information". The terms Confidential, Secret and Top Secret are established security classifications within the U.S. Government and shall not be used to mark or identify Information as Protected Information.
- 1.6.1. If Protected Information is disclosed orally or visually in an intangible form, the Disclosing Party shall, prior to or contemporaneously with disclosure, provide oral or written notice to the Receiving Party that it considers the Information to be Protected Information, and the Receiving Party shall treat such intangible Information as Protected Information. Within thirty (30) calendar days after notice and disclosure, the Disclosing Party shall provide an appropriately marked written summary describing the nature and content of the intangible Information to the Receiving Party. If a properly marked written summary is not provided by the Disclosing Party within thirty (30) calendar days, the Information previously conveyed in intangible form will not be Protected Information under this Agreement.
 - 1.6.2. If a Receiving Party has any objection to a marking placed on Information or to any summary of intangible Information transferred to it by the Disclosing Party as Protected Information, the Receiving Party shall, within ten (10) business days of receipt of such Information or summary of intangible

Information, bring such objection to the attention of the Disclosing Party. If the Parties are unable to mutually resolve the objection, the Receiving Party shall immediately return the challenged Information or summary to the Disclosing Party.

2. Authorized Access and Disclosure.

- 2.1. A Receiving Party shall not use or disclose Protected Information other than in accordance with the terms and conditions of this Agreement.
- 2.2. A Receiving Party shall take reasonable and appropriate measures to safeguard Protected Information from misuse, theft, loss, destruction, and unauthorized disclosure. Such measures shall be no less than that degree of care the Receiving Party normally takes to preserve and safeguard its own proprietary Information. The Parties shall not be liable for the use or disclosure of Protected Information used or disclosed despite the exercise of reasonable care provided that, upon discovery of any unauthorized use or disclosure, it promptly notifies the Disclosing Party in writing and takes action to prevent further disclosure and to recover any Protected Information already disclosed.
- 2.3. If Protected Information is included in any analyses, reports, or other documents or physical embodiments prepared by the Receiving Party, all such documents and embodiments shall be appropriately protected by the Receiving Party in the same manner as the Receiving Party protects the source Protected Information.
- 2.4. A Receiving Party may provide access to Protected Information to its own employees who reasonably require such access in order to accomplish the Stated Purpose of this Agreement. Prior to being granted access to Protected Information, employees of a Receiving Party shall be advised concerning the requirements and restrictions of this Agreement, directed to use and protect the Protected Information properly, and not to disclose Protected Information without proper authorization. The Receiving Party will document which of its employees have been granted access to Protected Information and so advise the Disclosing Party upon written request.
- 2.5. A Receiving Party may provide access to Protected Information to its agents, service contractor employees, collaborators and other non-Parties to this Agreement who reasonably require such access in order to accomplish the Stated Purpose of this Agreement. Before any such non-Party organizations or individuals are granted access to Protected Information, the Receiving Party shall notify and obtain the concurrence of the Disclosing Party. The Receiving Party shall also require non-Party organizations and individuals (other than U.S. Government officers and employees who are prohibited by the Trade Secrets Act, 18 U.S.C. 1905, from making unauthorized use or disclosure of Protected Information) to execute the Supplemental Agreement at Appendix I prior to disclosing any Protected Information.
- 2.6. A Receiving Party shall not disclose Protected Information to any person (including its own employees), nor shall a Receiving Party export any Protected Information from the United States, if such disclosure or export would violate the Arms Export Control Act, the International Traffic in Arms Regulation (22 C.F.R. Part 121 et seq.), the Export Administration Act, the Department of Commerce Export Regulation (15

C.F.R. Part 770 et seq.), the DoD Industrial Security Regulation (DoD 5220.22-R), or any other law or regulation of the United States (collectively, the "Export Control Regulations"). Naval Postgraduate School acknowledges that if it desires to disclose technical data that is subject to control under the Export Control Regulations (collectively, "export controlled information"), there exists a strong likelihood that faculty or students involved with the project may be foreign persons. Naval Postgraduate School agrees to cooperate with GTARC in assuring compliance with such Export Control Regulations by marking such export controlled information with a statement identifying the applicable Export Control Regulations.

- 2.7. The following individuals are designated as the principal points of contact for the transmittal and receipt of Protected Information under this Agreement.

For **Naval Postgraduate School**:

Name: Nick Dew, PhD

Phone:

E-Mail:

For **Optimized Aspects, LLC dba Infuse**:

Name: Mike Cunningham, Product Strategy

Phone:

E-Mail:

Either Party may change its point of contact upon written notice to the other Party.

3. General Provisions.

- 3.1. All Protected Information owned by a Disclosing Party shall remain the property of the Disclosing Party. Protected Information in tangible form may be retained in the possession of the Receiving Party after termination or expiration of this Agreement only to the extent expressly authorized by the Disclosing Party. Within thirty (30) days after termination or expiration of this Agreement, or upon receipt of a written demand from the Disclosing Party for the return of Protected Information, the Receiving Party shall promptly return (or destroy, if so requested) all tangible forms of Protected Information received from the Disclosing Party. If destruction is requested, the Receiving Party will provide written notification to the Disclosing Party certifying that the destruction has been accomplished.
- 3.2. If samples, models, prototypes, computer programs, or other such embodiments are disclosed as Protected Information, the Receiving Party will not attempt to reverse engineer or otherwise analyze such items unless the written approval of the Disclosing Party is obtained prior to engaging in reverse engineering or analysis.
- 3.3. Each Party shall bear its own costs and expenses incurred under or in connection with this Agreement. Nothing in this Agreement shall be construed as an obligation by either Party to enter into a contract, subcontract, or other business relationship with the other Party.
- 3.4. This Agreement shall not be construed as a Teaming Agreement, Joint Venture, or any other such agreement nor shall it be construed as a commitment to procure or provide any specific products or services. Nothing contained herein shall be construed to grant or confer any rights other than to use the Protected Information for the Stated Purpose under the terms of this Agreement, nor shall anything herein

be construed to grant license or other rights to any patents, trademarks, copyrights or other intellectual property whatsoever. The Parties expressly agree that this is an Agreement for protecting Information only.

- 3.5. A RECEIVING PARTY SHALL ACCEPT ALL PROTECTED INFORMATION AND EMBODIMENTS THEREOF ON AN "AS IS" BASIS. THE DISCLOSING PARTY MAKES NO WARRANTY OR REPRESENTATION OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE.
- 3.6. Either Party, upon thirty (30) days written notice to the other Party, may terminate this Agreement.
 - a. Duration. Unless sooner terminated, this Agreement shall expire **five (5) years** from its effective date.
 - b. Effective Period. Notwithstanding the termination or expiration of this Agreement, all obligations incurred by a Receiving Party with respect to protection, use, disclosure and return or destruction of Protected Information shall survive and remain in effect for **five (5) years** from the date of initial disclosure of Protected Information hereunder.
- 3.7. This Agreement may not be assigned by either Party without the prior express written authorization of the other Party. All obligations incurred by a Receiving Party under this Agreement with respect to Protected Information shall be binding on its authorized successors and assigns.
- 3.8. This Agreement shall be governed by the Federal laws of the United States.
- 3.9. In the event a Receiving Party is subjected to any legal process that seeks to require it to produce Protected Information for inspection or review in a judicial or administrative proceeding, the Receiving Party shall promptly provide notice and a copy of the legal process to the Disclosing Party in order that the Disclosing Party may have an opportunity to challenge the legal process or seek a protective order. If, in the absence of a protective order, a Receiving Party is compelled to produce Protected Information to a tribunal or be found liable in contempt and subjected to a penalty, the Receiving Party may disclose such Protected Information to the tribunal provided the Protected Information so disclosed is clearly marked as Protected Information.

4. This Agreement constitutes the entire agreement between the Parties, and supersedes any prior or contemporaneous agreements, representations and understandings of the Parties with respect to the disclosure of Information covered by this Agreement. It shall not be suspended, modified, or amended except by written agreement signed by duly authorized representatives of the Parties. The provisions of this Agreement are independent of and separable from each other, and no provision shall be affected or rendered invalid or unenforceable by virtue of the fact that any other provision may be found invalid or unenforceable.

IN WITNESS WHEREOF, the Parties hereto have caused this instrument to be executed by their duly authorized representatives who also warrant their authority to enter into the Agreement on behalf of their respective Parties:

For: **Naval Postgraduate School**
SMITH KEVIN.B.123002
6366
Digitally signed by
SMITH KEVIN.B.1230026366
Date: 2022.09.21 17:51:39 -07'00'
Kevin B. Smith
Vice Provost for Research

For: **Optimized Aspects, LLC dba Infuse**
Digitally signed by
Mike Cunningham
Mike Cunningham
Director of Product Strategy

Date: _____

Date:

APPENDIX I
Supplemental
Non-Disclosure Agreement

In consideration of being allowed access to Protected Information under the above Non-Disclosure Agreement between Naval Postgraduate School and Optimized Aspects, LLC dba Infuse dated 11/11/11 (the "Non-Disclosure Agreement") the Undersigned agrees that:

The Non-Disclosure Agreement has been read and the requirements and restrictions with respect to the use, protection, disclosure, and return or destruction of Protected Information are understood. The terms of the Agreement with respect to the use, protection, disclosure, and return or destruction of Protected Information will be complied with by the Undersigned to the same extent as if the Undersigned were an original Party and signatory to the Non-Disclosure Agreement. When the Undersigned signs this Agreement as the representative of an Organization, the Undersigned will ensure that all individuals who are authorized access to Protected Information through the Organization will sign and enter into this Supplemental Non-Disclosure Agreement before being granted access to Protected Information.

IN WITNESS WHEREOF, the Undersigned has hereto subscribed individually and/or as representatives of the named Organization.

DocuSigned by:
Mike Cunningham
Signature
Mike Cunningham
Name (Print or Type)
11/11/11
Date

Optimized Aspects, LLC dba Infuse
5925 Belmont Avenue
Cincinnati, OH 45224
Name and Address of Organization

⁵⁹ The key POCs at NPS for the NDS are Scott Bell (scott.bell@nps.edu), patent attorney, and Agata Maslowska (agata.maslowska@nps.edu), technology transfer specialist.

LETTER OF SUPPORT



DEPARTMENT OF THE AIR FORCE

Aug 01, 2022

MEMORANDUM FOR AFWERX SBIR TEAM

FROM: Air University Innovation Accelerator (AUiX)


SUBJECT: Letter of Support for Infuse

1. This memorandum is to indicate AUiX's support for Infuse in consideration of a Small Business Innovation and Research (SBIR) contract award. AUiX's mission is to educate Military members across the Department of Defense and AUiX's focus is education of USAF Airmen to be innovators and mission-connected guidance of their capstone projects. We have noticed that there is a disconnect between military academic institutions to other innovation spaces such as AFWERX, as well as a lack of an open platform (off NIPR) to more freely connect operational USAF commanders to academic research and resources. We have discussed this problem set with Infuse and believe they are superbly suited to build an open innovation software platform to solve these collaboration needs in the innovation space. We have named this effort "Scanning the Horizon."

The main goal of our involvement in this project is to drive development of an innovation platform in conjunction with NPS, AUiX (Air University Innovation Accelerator), PME (Professional Military Education) Offices and with AFWERX, AFVentures, and Spark Cells across the USAF. We envision a platform that shortens the distance between the warfighter and the forefront of R&D innovation to maximize effectiveness in technology advancement for the USAF.

2. We believe technology developed under the SBIR award will contribute greatly to solving our mission needs for "Scanning the Horizon." The work being conducted by Infuse is of great interest to AUiX. Should they be selected for award under the SBIR program, it would provide a great opportunity to rapidly provide capability to the warfighter to meet our mission needs.

3. This does not constitute a promise of funding. Selection of Infuse for an SBIR award would provide the initial contract, funding, and opportunity to work with AUiX.



J. WILLIAM DEMARCO, AD-25, DAF
Chief, Innovation Development, AUiX

APPENDIX D. PITCH BRIEF

USAF CI Student Research

Thomas Haney, Maj, USAF
Dustin Merritt, Lt Col, USAF
Advisor: Dr. Nick Dew
2nd Reader: Dr. Kaley Sepp

Research Question: How can the USAF enhance student research to effectively contribute towards senior leadership requirements?

Problem:

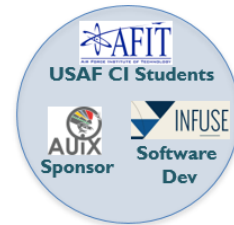
- AF student research is not aligned to AF priorities.
- Students have time but lack easy access to resources and guidance.
- Research organizations have resources & guidance but lack easy access to end user feedback.

Survey Data:

- USAF Civilian Institution (CI) students (n=1175) with 264 responses.
- 82% had a deliverable requirement.
- 81% did not receive information about USAF research priorities/funding opportunities.
- 91% consider incorporating USAF research priorities into their graduate research.
- 95% consider using a collaborative mobile application.

Solution:

- **Link research organizations & USAF CI students**
- SBIR – Phase 1 contract awarded (\$75,000)
 - Phase 1: Proof of Concept (Sept-Nov 22)
 - Phase 2: MVP (Dec 2022)
 - Phase 3: Scale
- Expand research ecosystem to incorporate AF Civilian Institutes, AF PME students, and AF research organizations.



Intent

- What is it for:
 - Align AF student research with AF priorities
- Who is it for:
 - AF PME students & AF senior leaders
- Why do they need it
 - Alignment
 - Resource constrained environment
 - Great Power Competition
- How will they use it
 - Mobile application will connect AF student research, resource organizations, and senior leaders

Phase I App Dev

- Intent:
 - Scalable, user friendly, requires little admin support
 - Require AF NPS DA students to download / build interest
- Attributes:
 - Connect AF NPS students with AUix
 - Display links to research organizations
 - AFRL, AFWERX, CYBERWERX, DIU, AF Future, Blue Horizon...
 - Display links to AF PME Schools
 - SOS, IDE, SDE, Civilian Institutes...
 - Display links to AF priority guiding documents
 - NDS, NMS, AF CoS Goals, Jt Pubs, AU research questions...
 - Display resource tab
 - How to research best practices
 - Generic AF ecosystem w/ POCs & Offices, key terms, processes – interactive for updating (think Wikipedia)

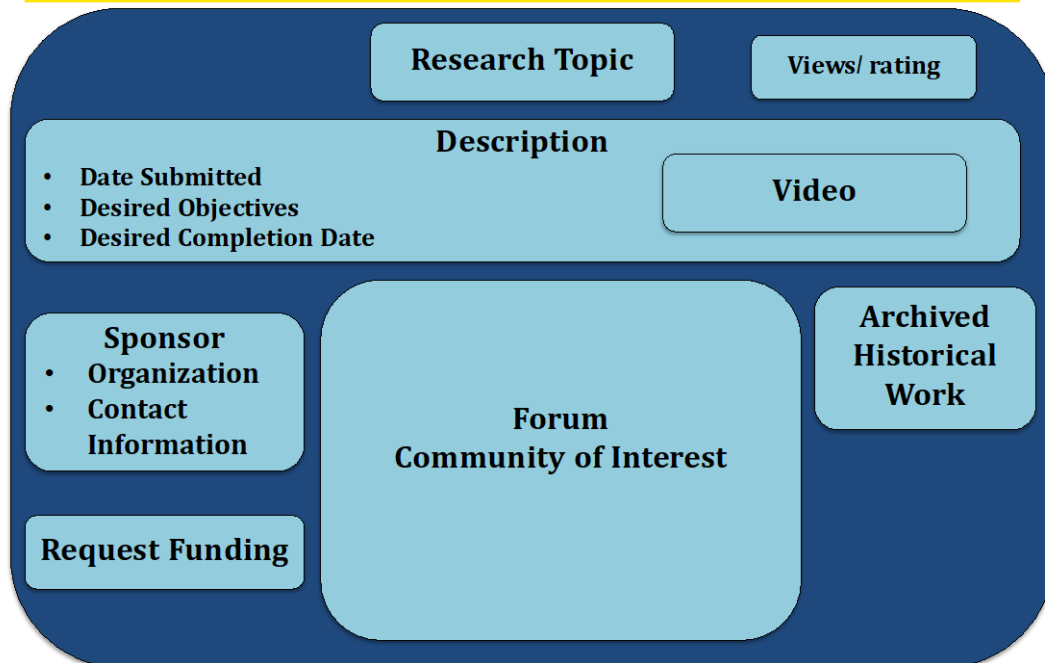
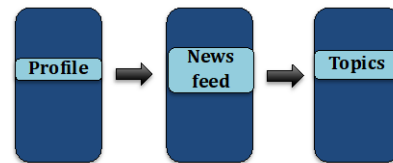
Phase II App Dev

- Intent:
 - User interactive
 - Grow customer/user base. Require IDE students to download. Showcase
- Attributes:
 - Provide access to sponsors
 - Provide access to funding
 - Build user profiles with intent to match with research projects
 - Tailoring user experience based off PME location & interests

Phase III App Dev

- Intent
 - User and customer interactive
- Attributes
 - Talent Marketplace
 - Feedback / Rating mechanism
 - Repository of research
 - Project Canvas / Progress heatmap
 - Tailor based email notifications on interested topics

AF App Pretotype



APPENDIX E. SMALL BUSINESS INNOVATION RESEARCH (SBIR) INFORMATION GRAPHICS

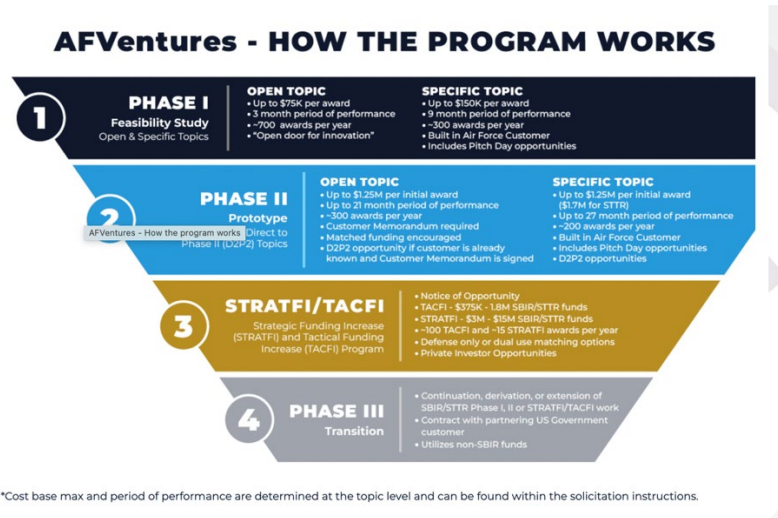


Figure 5. How AFVentures Works⁶⁰

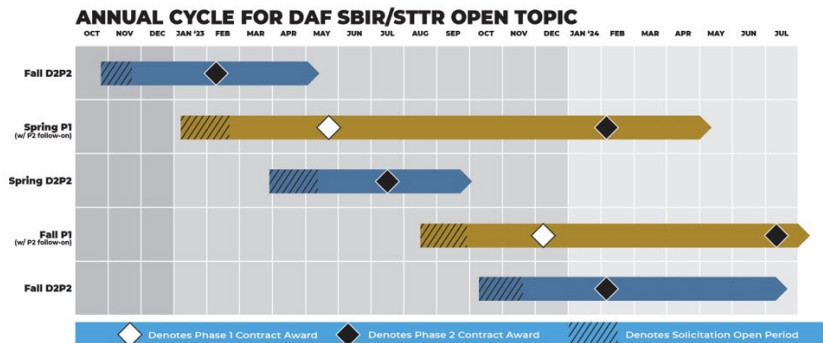


Figure 6. Annual Cycle for DAF SBIR/STTR Open Topics⁶¹

⁶⁰ Joseph Royer from SBIR Advisors provided this resource and can also be found here: <https://afwerx.com/afventures-overview/>.

⁶¹ Source: AFRL, <https://www.afrl.af.mil/News/Photos/igphoto/2003102126/mediaid/6435904/>.

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APPENDIX F. NPS THESIS VERSUS CAPSTONE DATA⁶²

NPS Academic Year 2022 Thesis Publication Data

Document Type	# Docs	% Docs	# Students	% Students
Theses	560	82%	560	65%
Dissertations	10	1%	10	1%
Capstone: Applied Cyber Ops	2	0%	2	0.23%
Capstone: Defense Analysis	5	1%	9	1%
Capstone: Joint Applied Project	25	4%	37	4%
Capstone: MBA Professional Project	45	7%	87	10%
Capstone: SE	31	5%	142	17%
Capstone: SEA	2	0%	9	1%
Capstones:	110	16%	286	33%
	Average # students/capstone	2.6		
Total unique documents	680	Total unique students	856	

⁶² Data supplied by Naval Postgraduate School, Thesis Processing Office.

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APPENDIX G. SURVEY DATA WRITTEN RESPONSES

The following table includes responses to the fifth survey question, “What additional resources do you not currently have that you would find useful for your educational experience? Type in response.”

1	anonymous	Lines of funding to support research
		
3	anonymous	Access to senior leader inputs
4	anonymous	I had to work hard to find funding for a CI. Additionally, almost every school I applied to denied me because of the 3-year restriction. I determined my thesis topic solely on the research currently being done by the advisor who accepted the 3-year restriction. Ideally, I would have liked to align my research to the USAF's research priorities, but I don't think I could have practically. I don't think I would have found an advisor/school if I had restricted the research topic. In terms of resources currently, I can't think of anything I am lacking. Lifting the burden of ACSC would be nice. Thinking about doing that in addition to my PhD is daunting, and I need to have it done because of promotion timing.
5	anonymous	When I started my CI program I reached out to AFIT for data and research ideas. They told me this was my time to research whatever I wanted and did not provide anything. I like the freedom to do what I want during my CI tenure but having data sources and research ideas that are USAF specific would be a nice resource.
6	anonymous	Sometimes the Air Force does not ask the right questions, so I would like to have access to the data to make my own assessments based on the trends that I have witnessed.
7	anonymous	Access to Airmen for surveys without going through the AF survey office considering we are on a tight timeline (about one month) to gather data for our research projects.
8	anonymous	In-processing This was my first "real" PCS being my second assignment. The AFROTC detachment here had no information or indication of my arrival--I understand that this may be typical for a PCS in general. Thankfully, I knew a Major at the school who directed me to the right people. While Desktop Anywhere is a great resource, it is not as reliable as having a dedicated NIPR/DREN machine that allows access to the Comptroller Service Portal for smoother finance in-processing. This would be especially useful if the C.I. is not very close to the assigned AFB. This is something that I will bring up with the AFROTC detachment. Searching for the right school and P.I It would be interesting to align AF research priorities with the CI's. However, this may potentially limit the P.I and school choice to some degree. For example, my choice in the institute and P.I mainly stems from my research interest that was developed during my time at AFRL. I can make the argument that this aligns with AF research priorities as my research interests stemmed from active AF research projects. However, if I did not have the prior experience, my search would have been very different. Maybe there could be a list of AF research priorities with the P.I and school listed under each one as sort of a guide/suggestion. The list could be generated from listing civilian P.I's that have active projects that are funded by the DoD. After AAD I am aware that it is the individual's




		responsibility to check the talent marketplace from time to time to gauge the possible career directions. However, if certain assignments have specific research interests, then maybe that could be incorporated into the AF research priority list. For example: Focus Mitigating Occupational Health Risks for Airmen P.I. / School Dr. [REDACTED] / Institute (email: [REDACTED]@institute.edu) AF Unit [REDACTED]
9	anonymous	Time....At a CI, it is hard to get the advisor or advisors to understand the compressed timeline. Typically money and system access isn't the issue. TDY opportunities back to units (not only conferences) that may find the research useful would be helpful from a professional (and corporate) standpoint.
[REDACTED]	[REDACTED]	[REDACTED]
11	anonymous	I would love to know what base I would be assigned to afterwards and to get in contact with them to see if my research could be helpful there.
12	anonymous	I think just having more discussion and guidance about how I could make my thesis/research more pertinent to the interests of the Air Force would be beneficial for both parties.
13	anonymous	In comparison to other service programs, such as the Army's ASP3 program, there is little to no collaboration among USAF officers in PhD programs. The Army convenes a 2 week-long summer event in which officers enrolled in the program meet one another, learn about research topics in which the Army is interested, and are introduced to ways in which they might leverage their PhD experience in follow-on jobs. The opportunities in the Air Force for PhD programs are incredible and many officers do some form of the above on their own. Yet, the creation of an intentional network, I believe, would serve the Army well. The Army also affords students TDY funds for research trips, but that, of course, is another story entirely.
14	anonymous	Beyond the forms provided in the AFIT/CI portal, I've been provided very few resources or information even when requested. I had to track down my program manager at the beginning of getting accepted and continually request to be sent the program guidance/specifications/criteria for school selection. I had to find my AFIT/CI liaison contact information myself, I'm already working on tracking down information regarding the AFIT/CI deliverables (i.e. training reports), and I would find it useful to also be provided current USAF research initiatives (such as at AFRL) that may be applicable to the research I'm currently doing. This is my second time through the AFIT/CI program and both times I've felt a distinct lack of support from my PM, AFIT, and the Air Force in general. At least the AFROTC program/leadership at my current school seems willing to support, but other than that, I feel I've been left alone to flounder. It's a big lift condensing a 5-7 year PhD program down to 3 years and the

		least I expect from AFIT/CI is for my program manager to respond to an email without me having to send it 3+ times.
16	anonymous	The email situation could be better. I have to go to the air force virtual machine to receive and send encrypted emails. Its a bit of a pain. I'd also like to have the option to forward my npr emails to my univ email.
17	anonymous	more industry input/reimbursements to visit industry in SJ/academic industry days
18	anonymous	Concentrated distro access to alumni of the program
19	anonymous	Listing of current and prior PhD students and their dissertation topics to facilitate networking
20	anonymous	Although I wouldn't NEED it, an app or some kind of resource which keeps the most current and prioritized USAF research questions, sponsorships, and funding in one place would be great to have!
23	anonymous	I would find an AFIT advisor useful. Someone in addition to your primary civilian advisor that can guide you through some of the requirements of AFIT.
25	anonymous	More effort on the DAF side to integrate/motivate their needs with the student's expertise. There are many opportunities and efforts in the DAF (and DOD) as whole that could benefit from the student's research experience, collaborations, and relationships in the PhD. It's unfortunate that there is no organization that actively matches student expertise to Air Force needs DURING the PhD. Also, the DAF needs to do a much better job at helping develop the officer in the PhD program - there are many missed opportunities to allow us to grow/shape our career in the AF during the program.
26	anonymous	Some sort of database with prior service member's work to find potential collaborators
27	anonymous	Better connectivity with ongoing research.
28	anonymous	A CC that's familiar with the program we are in to best support each program. I think the AF professors (all O-5s anyways) for each program should act as the supervisor of the AF students in that program. Then the professors can report to the equivalent. It would feel like a more supportive environment and entice students to study AF supported topics

29	anonymous	Some PhD programs/committees require students to submit their research to reputable conferences/publication sources and present their research. Unfortunately, the costs associated with this requirement comes out of pocket for the students. TDY funds or funding opportunities could potentially help lessen the blow to prevent students from pulling from their personal savings account to fund these school-related expenses. If there are funds available to support these initiatives, there is a lack of communication down the pipeline. A monthly newsletter would be beneficial to communicate new funding initiatives, how to apply, and deadlines associated would be a great help.
30	anonymous	I think a consolidated list of AFIT/CI students and their topic of study, research interests, etc would be useful to coordinate research and assessment efforts. I highly commend your effort for prioritizing Air Force research priorities, because ideally I could use my CI experience to make progress towards areas that the Air Force priorities and most needs attention. I think it would also be interesting to set up a mentor system with AFIT where CI students are paired with more senior mentors to help them hone their research. I always wanted to ask a senior official "what would you want me to study to benefit the Air Force the most?"
31	anonymous	All programs in my field are designed to be completed in 5 years. Even without the TA/RA requirements that my civilian classmates have, I am forced to cut a lot of corners and make significant sacrifices in research quality in order to graduate in 3. What I really need is (at least) an extra year.
32	anonymous	Any source of funding to support research to include a computer capable of modeling some of my research or to purchase some of the smaller/simpler components I need in the lab to perform my research. I would also find that support for childcare would also be a tremendous benefit due to the fact that I am without the standard military benefits being in a "remote" location nowhere near a base as an AFIT-CI student. Additionally, no one in the DOD really know what I am doing my research on or that I'm a military student, it would be great to have that in a searchable database such the DoD and contractors can easily search that database and identify research opportunities to help them advance their DoD focused R&D (since my research could be tailored during my PhD if such an entity was interested).
33	anonymous	A guide for graduate students on navigating the Air Force Survey Control Office and secondary review boards. More importantly, a streamlined way to get approval for research within the Air Force. Active duty Air Force personnel in graduate school programs should not face the level of barriers and hurdles currently in place on conducting research trying to improve our organization. We have an extremely talented group of CI students motivated to provide insight into how to make the Air Force better, and it is increasingly difficult to collect data in a timely manner due to bureaucratic regulations.
34	anonymous	Sometimes program-funded travel to conduct and strengthen research would be helpful. However, it is not clear to what extent this is allowed/encouraged.

35	anonymous	My program is legal education so I don't have a deliverable in the same way some other programs do. I hope the input still helps!
36	anonymous	My faculty advisors guiding my thesis and research are frequently involved with AFRL discussions out of WPAFB. After several months of my progress, they discussed the end goal of my graduate research with AFRL members and received feedback that was extremely helpful in guiding my research more towards AF interests. If I had a designated advisor within AFRL from the start of my program to consult on a regular basis (once biweekly or monthly) rather than talking with AFRL scientists just twice during my degree program (almost two years), I would be able to tailor my research more towards AF interests as well as be more interested/involved in them. This is tough since university projects don't always line up to AFRL projects/interests, but feedback nonetheless from AFRL scientists was extremely helpful the two times I was able to get it -- having an established person to reach out to within AFRL would be helpful to push my research towards USAF research priorities/funding opportunities.
37	anonymous	An AFIT CI Alumni network in the same field could be helpful to provide mentorship and research feedback.
38	anonymous	At NPS (specifically for the [REDACTED]) USAF related topics are made available to us via the Acquisition Research Program (ARP) and our instructors. While these are available, there seem to be a limited number of topics exposed to us - it drives the question of, "Is this all?" or "Is this a slimmed down version of topic ideas and is it intentional to have so little?" To put it into perspective, the topics made available to us here at NPS are predominantly Navy and DoD-wide topics vs actual USAF related research topics. If there can be a USAF direct source (USAF to student), containing a list of USAF research priorities vs relying on the institution we are a part of to relay these priorities, that would be really helpful. If a source like this does exist, it is not widely advertised or made available to students. To date, my point of reference has been the ARP here at NPS for discovering a thesis topic.
39	anonymous	A textbook funding/allowance would have been helpful and appreciated.
		[REDACTED]
41	anonymous	AFIT only provides unnecessary coordination requirements (e.g., the leave policy is not IAW the AFI; certain annual training requirements/processes are parallel to things we already have to do with the AFROTC Detachment CCs) while neglecting career-impacting things (e.g., MyVector comments for boards, not allowed to compete for awards, doesn't pass along information from careerfields/developmental categories). Honestly, having access to a First Sergeant who could call MPFs/Finance/etc. entities at our "host wings" who don't help us consistently would free us up to focus on our studies. Easier access to funding, travel, etc. related to our research would be nice to have, especially given the number of Fellows that are scattered throughout academia and other CIs - networking should be more readily facilitated (heck, there's other Air

		Force students at my school that I've found out about by accident rather than AFIT saying "hey, there's X people there and here's their contact info").
43	anonymous	Some form of official networking and/or senior leader direct engagement would be motivational. For example, I'm in the Boston area, would be nice to have *informal and optional* chances to sit down with savvy O-6/Gens to discuss research topics. As the program currently exists, I feel like I am on an island and nobody cares about anything I am working on.
44	anonymous	At a civilian institution that requires books and civilian clothes, an allowance for both would be incredibly helpful! It would be useful to know the "plan" prior to arriving at school. For example, where is my next assignment, what region of the world will I be going to, etc. The answer to these questions would better shape decision making in deciding which courses/electives would be most beneficial in following assignments.
45	anonymous	Not necessarily research, but I am in a direct from AFROTC to AFIT program and it would be helpful to have a "way ahead" list of the opportunities and assignment billets available to AFIT Grads. I'm a prior enlisted officer and would have like less ambiguity on what happens post AFIT. Specifically career options to emulate post-doc experiences as applicable and/or an ability to apply for faculty positions at either AFIT/USAF.
46	anonymous	Are these resources from USAF, AFIT, or from my institution? I think for other Air Force personnel especially pursuing surveys, greater support from approving authorities at USAF to help them get the surveys they need to in order to finish their program. They shouldn't need a 3-star to intervene or a high level sponsor to get the paperwork pushed.
47	anonymous	Connections to other local AFIT-CI officers and their research projects, fields of study, and interests for resource sharing and collaboration
49	anonymous	An up-to-date list of POCs/ connections to military agencies or USAF organizations that are either interested in research conducted by USAF CI students or other DoD grad students. Perhaps the list (or database) lists what general research areas the organization has an interest in. Also, potentially, a way to know if there are follow-on jobs that can be filled due to research conducted in support of an organization.
50	anonymous	I would find a suggested course list helpful for those of us attending law school under the FLEP program. While we are free to choose classes that interest us and must of course take courses that are mandatory at the schools we are attending, it would be interesting to know which courses the AF believes have the most value and are the most beneficial for future JAGs to take.

51	anonymous	I've got everything I need. It just so happened that Virginia Tech's civil engineering department had a project working with a private company on an AFCEC contract to develop a polymer concrete for rapid repair of airfields that I was able to jump on.
52	anonymous	More time to complete graduate CI programs, especially if the CI is willing and able to fund additional semesters; support systems for CI students (mentorship groups, or opportunities to connect with other mil students in similar graduate programs); explanation for why some programs have a deliverable requirement and others do not
53	anonymous	A large part of earning an advanced degree is collaborating with others and presenting at conferences. AFIT/CI's funding options and support for traveling to conferences makes this very difficult and de-incentivizes it. Would like to see more funding offered for travel or an easing of requirements for the CI university to fund the travel.
54	anonymous	Easy to find AFIT portal with list of available software
55	anonymous	While I appreciate the independence, I find it institutionally wasteful there is not more emphasis on targeting current Air Force or DoD issues with a particular focus for what can and should be changed in policy, organization, structure or strategic focus through graduate/post-graduate program deliverables. That said, once we determine our deliverable topic, I think it would be valuable to be connected with senior level AF and DOD leaders who can guide and mentor our deliverable from the senior military perspective to ensure our efforts can, in fact, have the opportunity to affect change in our organization.
		
57	anonymous	AFIT research grants to hire RAs and for research related travel expenses
58	anonymous	I actually think the lack of resources is helpful to allow me to research and write up my arguments with no strings attached. If I was receiving funding and command sponsorship I wonder if I would feel pressure to arrive at certain conclusions.
59	anonymous	A list of research priorities would've been nice, however I did do my own research on AF priorities by sifting through the DAF Women's Initiative Team (WIT) LOEs and emailing the POC for the priority I felt I'd most be interested in contributing to. I would also appreciate having POCs or a database for the pertinent A1 or service survey offices to point me to basic current data on my service.
60	anonymous	An improved on-boarding process for AFIT CI would be excellent.
61	anonymous	I am not in an educational environment. I'm in a fellowship at a government agency where I work a regular job in my field. Not sure this survey is meant for me but good luck!

62	anonymous	Maybe access to USAF super computing resources or funding for conference attendance (having the civilian university pay, even if they are willing, can be a pain with hoops you have to jump through)
63	anonymous	An avenue to acquire USAF data. For example, my focus is in organizational behavior/industrial-organizational Psychology. I want to do my dissertation on USAF personnel. I require archival data but have no leverage to work with AFPC (or any other org) for data acquisitions/collection. My research would certainly inform DAF leadership on current and future personnel topics. If there was a platform to see/find prioritized USAF research questions it might be lucrative to also have a section in which CIP students can post proposal synopses for sponsorship. Some data collection efforts/interests of the students may not be known by leadership who could (and would want to) help.
64	anonymous	Just looking at the survey, it appears you want to show support for a "collaborative mobile application." Note that a list (PDF, via email) would work; a website (non-CAC enabled preferred); or even a conference call with big-thinkers in my area of study. Ultimately, my program allowed me to pick anything with a military nexus. It would have been neat (and useful) to look at issues big-AF was dealing with such that I could do research into one of those issues, as well as having a sounding board in the form of someone dealing with this issue already.
65	anonymous	a .mil email address so I can sync with the Air Force. It is so complicated keeping in touch with so many different people in different places without one.
66	anonymous	Money from AFIT for conferences Forums for discussion amongst AFIT/CI students not just in the local area - I'm in an area with majority med school AFIT students but I'm not in med school and it would have been nice to have the ability to reach out and see other AFIT/CI students studying the same thing as me even at different schools
67	anonymous	In a perfect world, more space and time to work. While that has many of the same Grad Student complaints as anyone, my comment relates more to the continued Air Force requirements that are made manifestly more difficult by the geographic separation of schools, servicing AFROTC detachments, and owning installations. In my case, assigned to a college in North Philadelphia, my ROTC Det is in West Philadelphia (over a 30 minute drive), and my owning installation (including my medical care and pharmacy) are at McGuire AFB in New Jersey, a full hour drive in good traffic. And there's no such thing as good traffic in Philadelphia. Two hours of driving for a medical appointment and picking up a prescription wastes an entire day. Never mind the amount of sunk time to get a medical appointment in order to get a referral to somewhere else in New Jersey, for the purpose of getting a PT waiver for the fitness test I have to take at the AFROTC Det. It's just a lot of extra things that are not made simpler through either centralization or blanket wavering. However, I would like to take a moment to address the question you've asked here. Firstly, compared to our civilian counterparts and colleagues at the universities, our paychecks alone are about 200% or more than the

		pittance they receive as teaching assistants or adjuncts. I would not accept outside funding on principle. Secondly, to me, the Air Force's research priorities should be scholarship that is excellent, thorough, and beyond any reproach or hint of lacking objectivity. Academic work is about scholarship, not the priorities of the service (which, by their nature, are policy positions). In my position, when I finish here, I am expected to educate Air Force officers in an academic setting. It would be far better for the Air Force to challenge those priorities with historical context, and thought provoking scholarship that creates a corps of critically thinking officers. I would only value the Air Force research priorities if the implication was not that I should forsake my own academic goals and the requirements of scholarship to produce something in line with the political goals of the service.
68	anonymous	Being a funded student is great and professors love you as "free" labor. But then there isn't an easy source for funding the research as if you were part of a grant. Would be nice to have some sort of funding rather than having to beg borrow and steal
69	anonymous	Stipend for books and research trips. More time...3 years is doable but just barely (4 years would be better). Grad schools are moving to 5 years as the standard timeline.
70	anonymous	An easier way to search for people or offices and their contact info. Half of the battle is finding people to talk to but you can't just search the GAL based on topic or type of work.
71	anonymous	USAF data for econometric project
73	anonymous	Known career path or reassurances that higher education is valued within the USAF and that academics can obtain higher rank without completing the typical command-staff track.
74	anonymous	I am too early in my program to be able to provide an accurate response.
75	anonymous	This is a silly question, I don't know what tools I don't have access too.. because I don't know about them nor have access to them.
76	anonymous	More integration at the DOD strategic level. This would let me get a better sense of specific assumptions we are using that I could orient research around
77	anonymous	A more user friendly CIP student portal
78	anonymous	Consolidated Portals for remotely accessing DOD/USAF websites that are normally accessible from an on base location

79	anonymous	A powerpoint or pdf file which outlines medical, insurance, finances, reporting requirements, AFIT contacts, and any other relevant information during our time at a civilian institution. This is especially critical for 2d Lt's who have just commissioned, but even long-term officers have expressed confusion with things such as Tricare remote, which medical providers are in network, and necessary paperwork to complete for AFIT and medical requirements. A document which compiles this information and relevant resources/ contacts would be monumental in decreasing confusion and saving time spent searching for information. This leaves more time for studying and adjusting to the civilian institution, and hopefully better research to benefit the Air Force at the end of our time at the institution.
80	anonymous	Funding for dissertation data collection
81	anonymous	My masters program has an option to complete a thesis or just do coursework. If I had any idea what I would be working on after this program, I would try to get more specialized and do a thesis in the area instead of keeping it broad nuclear engineering.
82	anonymous	I would like to see funding for travel to conferences to present research. This is a critical part of many graduate degree programs, and government travel rules can make it difficult to accept funding from schools or other sources. It would be better if AFIT could fund some of this type of travel for us. As I understand the current policy, such travel will not be considered unless it is required for the degree program. While conference presentations are rarely strict requirement, they still form an important piece of the graduate education experience.
83	anonymous	A network of people who have been through the AFIT-CI program before (or currently). Being paired up with someone may be nice for some sanity checks or even explaining basic processes like how to get tuition paid. Feels like I'm on an island with a very singular experience, though I know other people out there are going through the program
84	anonymous	More support from my command at AFIT. I find that my experience with AFIT CI has been more reactionary than proactive. I only hear from my chain when something needs to be done or when something should have been done. It would be nice to have more support for the Air Force side of our duties so we do not have to do so much work in trying to stay in the loop while also pursuing our degrees in civilian institutions, which do not understand our positions.
85	anonymous	More integration to the military community and mission, I feel that would help increase my motivation and provide more direction to my studies.
86	anonymous	inprocessing info like what accounts to make, where to find our records, how to enroll in non-military base medical/dental, remote ITT support
87	anonymous	TDY funding for conferences and other academic related events

88	anonymous	Better awareness of classified research priorities and data availability (i.e. given a certain clearance, a process for requesting data or classified papers in order to understand the current state of the field)
89	anonymous	I'm genuinely just still overwhelmed by all the opportunities. I spend a good amount of time trying to get as much as humanly possible out of this Masters so that I can bring these skills and knowledge back to my career field and advance the Air Force.
90	anonymous	TDY and research funds. Science at civilian schools costs money, and advisors can be unwilling/reluctant to spend money on instrumentation time (research funds of ~\$1K/year would be ideal).
91	anonymous	An information packet detailing military benefits that are more applicable to CI students e.g. DOD YMCA and similar initiatives.
93	anonymous	It would be useful if someone from AFIT/AFRL/AFOSR maintained an in-depth list of open challenges that the Air Force is working on, so that AFIT/CI students are more aware of the priorities of the Air Force research enterprise. These lists could be managed by professors/researchers in each field, e.g. open challenges in computer science, aeronautical engineering, etc.
95	anonymous	Anything would be a start.
96	anonymous	Access to paid applications such as Tableau or even paid journals that cannot be accessed through online school libraries.
97	anonymous	It would be helpful to have resources which explain how to navigate the funding process of a thesis/dissertation. I received very little guidance on how to fund my research in a way that both meets the Air Force's requirements for accepting NFF sources, while still allowing me to actually conduct my mandatory project. Also, your app could help connect people in a given field of research with one another. It would have been incredibly helpful to speak with airmen who have either completed similar degrees in the past or people who are actually working in my field of research within DOD. I felt like I was in a vacuum in my program and had to figure these things out by myself. If I was more connected with the big AF, I think my research would have been of higher quality and more applicable to the DOD in general.
98	anonymous	I think as a 62E we are often engaged in many active areas or USAF research, commonly engaging with the research labs AFOSR, or DARPA. I have reached out to contacts I have made over my USAF career to help direct my research, but it also does require some massaging to align with the capabilities of the research group/institution in which you are working.

99	anonymous	A collaborative one stop platform for USAF research priorities is a great idea and would be very helpful.
100	anonymous	Maybe an RSS feed of AFRL / USAF Research vectors, accomplishments / PA reports.
101	anonymous	Additional funding for research expenses (lab equipment, travel).
102	anonymous	1. What my career field wants me to research 2. More connectivity for the O-1s who are at Master's programs around the U.S. 3. Teams group or something for the people in my community who are in Masters/PhD programs around the U.S. What are they researching? What did they research?
		
104	anonymous	Anyone willing to actually help me logistically. My AFIT/CI manager never replies to me, I don't have access to my .mil email, I don't know how/when to request leave, I feel stranded and isolated from the USAF with no single point of contact to solve my issues. I didn't even get a sponsor for my PCS. People at the base don't know how to handle me because they all think I am someone else's problem. Some kind of AFIT/CI orientation, mentor, sponsor, would be SO helpful.
105	anonymous	Dedicated travel for conference/research travel would be really nice. I'm fortunate to work in a well-funded lab so most travel should be covered but I'm also expected to apply for a university grant to help with travel costs. I was also told that students sometimes pay out-of-pocket for travel. It seems odd that all this money is invested into the CI program and travel is overlooked.
106	anonymous	AFIT-specific email account rather than using our own personal email.
107	anonymous	Actual instructions on how to navigate administrative requirements when attending a school geographically separated from AFIT. Specific topics include: identifying a PCM, detailing support requirements and POCs specific to Rated Officers, creating a mechanism to acquire AFIT-specific patches and uniform items in the even we must wear uniforms. Everything currently feels ad hoc and unstructured.
108	anonymous	Any insight from relate DARPA/ARFL/AROSR research programs would be very helpful especially in my lane (EE PhD candidate).
109	anonymous	Funding would have been helpful. Something annoying: Last fall I was notified that I needed to drive ASAP from my civilian school to my servicing base which was 8 hr drive away (16 hrs round trip... relying on DEERS not to go down). They needed me to get a Space Force CAC. The guard unit in town could not help me. It was a total pain and friends doing AFIT-CI who were also in the Space Force were affected as well.
110	anonymous	Money to support research and conference travel! The communication I have with AFIT prior to starting at a CI serves only three purposes: 1) get them to approve list of school

		to which I may apply, 2) complete the ADSC agreement, and 3) be sure to negotiate tuition below the \$19,500/academic year threshold. Based on this, it seems as though AFIT should POM/budget for \$19,500/academic year (i.e., secure \$58,500 total for my PhD program). If I negotiate tuition below that amount, the remainder should be available to support my research and conference travel (since presentations and publications are expected from CI students). Opportunities to consult with USAF/DAF/DoD organizations would be nice. My PhD program faculty have said that the two biggest reasons they accept active duty military on a 3-year timeline are: 1) positive effect on departmental and doctoral cohort cultures, and 2) their [presumed] access to data from military organizations. The USAF collects annual organizational climate data across its reporting units. Even access to this data would be useful for many researchers. Additionally, it would be very useful to understand what AFIT/OATs/CSBs look(s) for on TRs (or OPRs in the future). We have a very truncated timeline to complete courses and a dissertation, so prioritizing our time properly from Day 1 would be invaluable. Unfortunately, this is not possible without clear guidance and expectations. The generic instructions for CI students conflict with feedback from the aforementioned rating/selection sources.
111	anonymous	N/A
112	anonymous	Easier access to administrative help from the Air Force (personnel, finance, housing office, etc)
113	anonymous	I think there needs to be organized cohorts of collaboration and connection for the various AFSC's that are in the academic world. As students, we are sent off to school with very little tether to the operational AF. I think regular meetings (perhaps quarterly) between all of the AFSC's (with highly encouraged participation) that are in school at the time and perhaps a slack channel or some way to stay in touch would be very helpful and could go a long way to syndicating research ideas that are relevant to Air Force interests.
114	anonymous	I have not received any information regarding USAF Research topics. I have been working with the CI department to generate research topics, but would benefit greatly from USAF research questions.
115	anonymous	The ability to attend conferences without personal expense. Current procedure for approving TDY and handling travel payment/reimbursement is difficult to navigate and disincentivizes participating in research conferences — and it appears that AFIT CI lacks funding for student conference travel even with expected reimbursement from the school/research group.
116	anonymous	Funding to attend conferences or visit USAF research centers to collaborate on research priorities.

117	anonymous	I am a recipient of the DAWN-ED PhD program. While still instructing in the F-15E formal training unit pipeline and waiting for my program to start. I spent lots of time and personal money traveling to technical conferences on permissive TDY and reaching out to the network of academics in my flying community. I was trying to find what the USAF research priorities are and get plugged into them. I was told by my AFIT program managers that I was on my own. DAWN-ED and similar programs are great, but they seem to be lacking any kind of pre-program resources to maximize the impact of these rare education opportunities. I think the flexibility of my process was a good thing, but some resources to help students explore this flexible space are needed.
118	anonymous	Relevant research topics that allow me to network with the Air Force while completing my degree. Finding the common balance between Air Force and advisor priorities can help the Air Force vector its resources towards graduating students and supportive research institutions
119	anonymous	I'm at National Intelligence University, we <u>actually have a ton of resources</u> here. But more time would be nice...we are required to blast through a full <u>masters</u> program, with a completed thesis, in 10 months...
120	anonymous	Access to Windows 8 and Microsoft software before starting class.

LIST OF REFERENCES

- “About | SBIR.Gov.” Accessed October 12, 2022. <https://www.sbir.gov/about>.
- “About – Air Force Research Laboratory.” Accessed August 29, 2022. <https://afresearchlab.com/about/>.
- Adner, Ron. “Match Your Innovation Strategy to Your Innovation Ecosystem.” *Harvard Business Review*, 2006, 12.
- “AFIT Bio for Col William F. Julian.” Accessed September 1, 2022. <https://www.afit.edu/BIOS/bio.cfm?facID=1915>.
- “Air Command and Staff College.” Accessed March 13, 2022. <https://www.airuniversity.af.edu/ACSC/>.
- Air Force Institute of Technology. “AFIT / Civilian Institution Programs.” Air Force Institute of Technology. Accessed October 26, 2022. <https://www.afit.edu/CIP/#>.
- Air Force Research Laboratory. “AFWERX.” AFWERX. Accessed August 29, 2022. <https://www.afwerx.af.mil/>.
- Air Force. “Air Force Research Laboratory.” Accessed October 26, 2022. <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104463/air-force-research-laboratory/>.
- . “Front Page – AFWERX.” Accessed October 21, 2022. <https://afwerx.com/>.
- Air University. “Air University Office of Sponsored Programs (OSP).” Air University. Accessed March 13, 2022. <https://www.airuniversity.af.edu/Office-of-Sponsored-Programs/Research/>.
- Bennett, Nathan, and Jacob Parks. “Struggling to Innovate? Examine Your Structure, Systems, and Culture.” *Business Horizons* 58 (July 1, 2015). <https://doi.org/10.1016/j.bushor.2015.05.009>.
- Blankenship, Billy. “Air University Overhauls Curriculum to Focus on Competition.” Air University (AU). Accessed March 13, 2022. <https://www.maxwell.af.mil/News/Display/Article/2920485/air-university-overhauls-curriculum-to-focus-on-competition/>.
- Brown, Charles Q. “Accelerate Change or Lose,” August 2020. https://www.af.mil/Portals/1/documents/csaf/CSAF_22/CSAF_22_Strategic_Approach_Accelerate_Change_or_Lose_31_Aug_2020.pdf.

- . *Accelerate Change or Lose*. Washington, D.C.: Department of Defense, 2020. https://www.af.mil/Portals/1/documents/csaf/CSAF_22/CSAF_22_Strategic_Approach_Accelerate_Change_or_Lose_31_Aug_2020.pdf.
- . *CSAF Action Orders: To Accelerate Change Across the Air Force*. Washington, D.C.: Department of Defense, 2022.
- Department of the Air Force. “Air University.” Air University. Accessed October 26, 2022. <https://www.airuniversity.af.edu/>.
- Hanser, Lawrence M., Jennifer J. Li, Carra S. Sims, Norah Griffin, and Spencer R. Case. “Air Force Professional Military Education: Considerations for Change.” RAND Corporation, July 12, 2021. https://www.rand.org/pubs/research_reports/RRA401-1.html.
- . “Air Force Professional Military Education: Considerations for Change.” RAND Corporation, July 12, 2021. https://www.rand.org/pubs/research_reports/RRA401-1.html.
- Harackiewicz, Judith M., Jessi L. Smith, and Stacy J. Priniski. “Interest Matters: The Importance of Promoting Interest in Education.” *Policy Insights from the Behavioral and Brain Sciences* 3, no. 2 (October 1, 2016): 220–27. <https://doi.org/10.1177/2372732216655542>.
- War on the Rocks. “Ignorance and Professional Military Education: The Case for Operational Engagement,” November 7, 2018. <https://warontherocks.com/2018/11/ignorance-and-professional-military-education-the-case-for-operational-engagement/>.
- Mattis, Jim. *Summary of the 2018 National Defense Strategy*. Washington, D.C.: Department of Defense, 2018. <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>.
- . “Summary of the 2018 National Defense Strategy,” n.d., 14.
- Naval Postgraduate School. “Athena - Naval Warfare Studies Institute.” Naval Postgraduate School. Accessed September 15, 2022. <https://nps.edu/web/nwsi/athena-information>.
- O’Reilly, Charles, and Andrew J. M. Binns. “The Three Stages of Disruptive Innovation: Idea Generation, Incubation, and Scaling.” *California Management Review* 61, no. 3 (May 2019): 49–71. <https://doi.org/10.1177/0008125619841878>.
- RAND Corporation. “RAND Project AIR FORCE.” Accessed October 26, 2022. <https://www.rand.org/paf.html>.

Schmidle Jr. *Subcommittee on Military Personnel Hearing: Professional Military Education and the National Defense Strategy*, 115th Cong. (2022) (statement of Robert E. Schmidle Jr., Lt. Gen. (ret.), USMC), n.d.

Schmidt, Eric. “Statement from House Armed Services Committee.” April 17, 2018.

Slack. “Solutions | Slack for Business.” Slack. Accessed September 15, 2022.
<https://slack.com/solutions>.

Speier, Jackie. *Subcommittee on Military Personnel Hearing: Professional Military Education and the National Defense Strategy*, 115th Cong. (2022) (statement of Chairwoman Jackie Speier), n.d.

United States Government. “227.7103-7 Use and Non-Disclosure Agreement. | Acquisition.GOV.” Acquisition.gov. Accessed September 15, 2022.
<https://www.acquisition.gov/dfars/227.7103-7-use-and-non-disclosure-agreement>.

U.S. Department of the Interior. “CRADAs – Cooperative Research & Development Agreements.” U.S. Department of the Interior. Accessed September 15, 2022.
<https://www.doi.gov/techtransfer/crada>.

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