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THESIS

**AIR FORCE SPECIAL OPERATIONS COMMAND
AS INNOVATION PATHFINDERS**

by

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December 2023

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AS INNOVATION PATHFINDERS**

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ABSTRACT

This thesis investigates Air Force Special Operations Command as innovation pathfinders for the Air Force, and answers how their performance in the role can be improved. This is accomplished through a review of AFSOC's suitability for pathfinding and exploration of the innovation ecosystem. The thesis finds AFSOC has limited influence over acquisition reform and relatively small size, but that small size presents opportunities of organizational agility and funding speed available at limited scale. Pathfinding can be enabled by powerful special operations culture and itself reinforces a culture of initiative and innovation which pays dividends in AFSOC's warfighting functions. Innovation pathfinding can benefit from understanding wicked problem methodologies and leveraging the power of trust and trustworthiness. Lastly, industry best practices provide means to structure and manage innovation. The concluding recommendations give stakeholders means to increase the effectiveness of AFSOC innovation pathfinding, including working within the scale of more agile acquisitions process, valuing colocation and relationships, identifying efficiencies to be gained in fast following, pathfinding adjacent innovation, and valuing trust beyond compliance.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACAT	Acquisition Category
ACE	Agile Combat Employment
AFSOC	Air Force Special Operations Command
ATAK	Android Team Awareness Kits
AWS	Amazon Web Services
CEO	Chief Executive Officer
DARPA	Defense Advanced Research Projects Agency
DIB	Defense Innovation Board
DIU	Defense Innovation Unit
DOD	Department of Defense
IPO	Initial Public Offering
JEDI	Joint Enterprise Defense Initiative
JSOC	Joint Special Operations Command
MAJCOM	Major Command
MFP	Major Force Programing
OODA	Observe Orient Decide Act
SOCOM	Special Operations Command
SOF	Special Operations Forces
WWII	World War Two

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EXECUTIVE SUMMARY

Air Force Special Operations Command’s efforts as a technology pathfinder stand to benefit from study of its innovation competencies and best practices in the innovation ecosystem. AFSOC has seen success and gained support in the pathfinding role, but the role remains ill-defined and insufficient academic study has been done to support the command. This thesis finds that key aspects of AFSOC makes it suitable in the role of pathfinding and the innovation ecosystem offers applicable lessons.

BACKGROUND

“Pathfinder” in the modern military parlance is a U.S. Army designation for specially qualified soldiers equipped with unique skills allowing them to serve as enablers for larger follow-on forces. They were born after the fraught parachute operations of the Sicily invasion demonstrated the need for an advance force to reduce risk to the main body. Subsequently, Pathfinders played a critical role in drop zone and landing zone identification and marking to enable the invasion of Normandy.¹ AFSOC tapped this legacy to coin the term *technology pathfinder* to communicate the role which it intends to play for the conventional Air Force.² This thesis recommends a change to the more encompassing *innovation pathfinder*.

AFSOC first stated its intent to fill this role in the 2020 AFSOC Strategic Guidance.³ Like many Special Operations elements, it considers itself uniquely capable of providing value to its parent service by acting as a source of innovation, a springboard for emerging technology, and an incubator of concepts and platforms. AFSOC has seen success in the role with programs such as the GBU-69 and assistance to Air Force

¹ Richard Scott Hickenbottom, “U.S. Army Pathfinders in World War II: The Mediterranean and Europe” (Thesis, Texas A&M University, 1995), <https://oaktrust.library.tamu.edu/handle/1969.1/ETD-TAMU-1995-THESIS-H53>.

² United States Air Force Special Operations Command, *AFSOC Strategic Guidance* (Hurlburt Field, Florida: Air Force Special Operations Command, 2020), 6.

³ United States Air Force Special Operations Command, *AFSOC Strategic Guidance*, 2020.

Research Lab on delivery of palletized effects assessed as “Rapid Dragon.”⁴ However, key questions need to be addressed, such as what tasks are appropriate for pathfinding, how can pathfinding be managed, and how much of the innovation portfolio should pathfinding represent. Also, AFSOC needs a humble and helpful explanation to other stakeholders as to why, or if, they are suited to the task. This thesis answers the overarching question: *How can the role of Air Force Special Operations Command as a pathfinder for the Air Force be better executed and understood?*

AFSOC SUITABILITY FOR PATHFINDING

Air Force Special Operations Command is suited to be an innovation pathfinder for the conventional Air Force so long as it leverages its strengths. AFSOC is not especially suited to affect change in the larger acquisition system but is of an agile size and culture which suits innovation within DOD confines. Smaller projects benefit from proven AFSOC and SOCOM methods to acquire and field quickly. Smaller projects are also more agile, being more wholly within AFSOC’s sphere of control. Equally important are innovation pathfinding efforts of organization or planning with low or no inherent cost, such as trial organizational structures, employment methodologies, and new workflows.

The work being done to create programmatic oases for emerging technologies for the Air Force can be utilized by AFSOC to ensure that those oases provide benefit to the force beyond programmatic life support. AFSOC pathfinding can operationalize oasis projects. This allows the cycle of destruction and creation to begin earlier, utility to be drawn from the technology sooner, and a more robust product complete with operational experience to be passed to the end customer. While the project exists in the oasis, AFSOC benefits from its use and gains experience employing cutting edge technology, strengthening AFSOC’s innovation culture.

⁴ Air Force Special Operations Command, “2021: AFSOC’s Year of Innovation,” Air Force Special Operations Command, January 12, 2022, <https://www.afsoc.af.mil/News/Article-Display/Article/2897230/2021-afsocs-year-of-innovation/https%3A%2F%2Fwww.afsoc.af.mil%2FNews%2FArticle-Display%2FArticle%2F2897230%2F2021-afsocs-year-of-innovation%2F>.

The innovative culture of AFSOC is vital to performing pathfinding missions despite few structural advantages relative to larger organizations. Reciprocally, activities which foster initiative and innovation build a culture which helps a unit exhibit those virtues in their war fighting roles. There will be failures of pathfinding and some projects which do not survive, as failing earlier at smaller scale is the risk AFSOC knowingly takes on for the larger force. These failures will not result in full success of wider adoption, but they will bolster AFSOC's innovative culture.

LESSONS FROM THE INNOVATION ECOSYSTEM

The innovation ecosystem offers insight on how AFSOC can more effectively pathfind innovation. First, being a technology first mover entails large amounts of cost and risk, much of which can be minimized by instead being a fast follower. There are drivers which make first-mover costs necessary, but seeking efficiency and return on investment, pathfinding should be a case of fast following wherever possible.

Innovation is given a wide berth and often managed vaguely, but effective strategies can be utilized to categorize and manage innovation. Industry best practices provide models for pathfinding to follow and guidance on how AFSOC can manage pathfinding while respecting its core missions. Of the three categories of core, adjacent, and transformational innovation, pathfinding should focus largely on adjacent innovation. This provides a moderation of risk and leverages either existing products or existing markets, to use the business vocabulary. These strategies can be employed to ensure that the AFSOC innovation portfolio remains balanced regarding risk and potential reward.

Trust is ever present even in organizations and processes which would be considered trust-free or entirely dependent on compliance. Pathfinding offers opportunities to increase trust as well as to demonstrate trustworthiness, such as close working relationships with the Defense Innovation Unit and industry. Relationships of trust are what enable performance in acquisitions beyond the minimum baselines.

RECOMMENDATIONS TO AFSOC PATHFINDING

Recommendations are presented for consideration, and each includes a current activity which represents the principle of the recommendation.

- Value access to resources and colocation with innovation centers in basing decisions. Adjacency of a base to industry and education hubs should be considered in the same vein as access to training space.

Example: Davis-Montham AFB adjacency to the University of Arizona.

- Formalize the seriousness of AFSOC's dedication to an innovative and initiative-driven culture by formalizing Innovation Pathfinding as a Special Operations Core Activity in AFDP 3–05.

Proposed Text: Innovation Pathfinding: Acquisition of technologies and development of organizational advances for the purpose of aiding strategic goals of the parent service. These advances support special operations missions in the short term with scale to wider adoption as the end state goal.

- Prioritize innovation pathfinding opportunities which are low cost and capitalize on culture relative technology acquisitions.

Example: AFSOC's proposal of Groupless Wings.

- Scale innovation pathfinding to remain within the narrow window of agility which SOCOM has found in the acquisitions world.

Example: SOCOM Ghost rapid acquisition teams

- Optimize pathfinding with focus on efforts of adjacent innovation by projecting core competencies into new mission areas or creating new competencies within existing mission areas. Pathfinding should comprise 18% of AFSOC's innovation portfolio.

Example: Forward arming and refueling procedures aiding Air Force Agile Combat Employment

- Make conscious judgement whether AFSOC is positioned to be a first mover or fast follower. Pathfinding efforts should be that of fast following. Risk should be pushed forward on pathfinding project timelines.

Example: Autonomous glide vehicles for airdrop

- Assign value to recurring partnerships, colocation, organizational flatness, and the factors which contribute to trustworthiness. Trust drives better outcomes than compliance.

Example: AFSOC liaison placement at Defense Innovation Unit

In conclusion, Air Force Special Operations Command is well positioned to lead innovation pathfinding to the benefit of the Air Force. It will move boldly, take on risk where appropriate, shield the larger force, and enable outsized strategic impact.

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I. RESEARCH QUESTION

Air Force Special Operations Command stated intent is to be the pathfinding element for the conventional Air Force regarding technology and organization. Like many special operations forces, it considers itself capable of providing value to its parent service in a unique way acting as a source of innovation, a springboard for emerging technology and an incubator of concepts and platforms. AFSOC has seen success in this role with programs such as Big Safari and assistance to Air Force Research Lab on delivery of palletized effects. However, the role is ambiguous and requires further study to be more effectively understood. There is advantage to ambiguity, but also complications as AFSOC matures into this mission set. Funding, difficulty programming and staffing, unclear expectations and end states, and a lack of guidance and boundaries can at times hamper the role. Complicating the issue further is the nature of the innovation ecosystem as it stands in 2023, which challenges all participants. Better understanding of the critical issues within this environment will better enable pathfinding efforts.

This thesis will investigate cases of SOF as a pathfinder, consider the strengths and weaknesses of AFSOC in filling this role, and ultimately present findings and recommendations as to the role of pathfinder to AFSOC. With these recommendations, AFSOC can reassure partner agencies, reduce mission creep or inefficiency, secure funding in a fiscally constrained environment and communicate pathfinding conventional Air Force. This thesis will wrestle with the question:

How can the role of Air Force Special Operations Command as a pathfinder for the Air Force be better understood and optimized?

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II. LITERATURE REVIEW

A. WHAT IS A PATHFINDER?

Pathfinders within U.S. Army doctrine are specially qualified soldiers who have been equipped with a combination of skills allowing them to serve as enablers for larger follow-on forces. They were created at the height of American involvement in WWII after the fraught parachute operations of the Sicily invasion and subsequently played a critical role in drop zone and landing zone identification and marking to enable the Normandy invasion.¹ Air Force Special Operations Command has tapped this legacy to coin the term of “technology pathfinder” to communicate the role which AFSOC hopes to play for the conventional Air Force.² This thesis broadens the term from technology to **Innovation Pathfinder**.

B. SOF AS INNOVATORS

In 2010, Joint Special Operations University published a report with the aggressive title “Innovate or Die: Innovation and Technology for Special Operations” authored by Dr Robert Spulak, which is notable for being ten years the forerunner of Air Force Chief of Staff Charles Brown’s “Accelerate Change or Lose.”³ The early appearance and the importance prescribed by special operations to what became an Air Force theme is notable. Given that the conventional force faces the same the challenge of rapid innovation, Spulak’s proposal can be expanded. An innovation braid of intertwined operational experts and technology developers, can broaden from an effort which rapidly

¹ Richard Scott Hickenbottom, “U.S. Army Pathfinders in World War II: The Mediterranean and Europe” (Thesis, Texas A&M University, 1995), <https://oaktrust.library.tamu.edu/handle/1969.1/etd-tamu-1995-thesis-h53>.

² United States Air Force Special Operations Command, *AFSOC Strategic Guidance*, (Hurlburt Field, Florida: Air Force Special Operations Command, 2020), 6.

³ Robert Spulak, *Innovate or Die: Innovation and Technology for Special Operations*, 10=7 (MacDill Air Force Base, Florida: JSOU, 2010), <https://apps.dtic.mil/sti/pdfs/ADA535701.pdf>; Brown C.Q., *Accelerate Change or Lose* (Washington, D.C: United States Air Force, 2020).

develops technology particular to the special operations needs and skillsets and serve broader Air Force priorities.⁴

Within “Innovate or Die” is an argument why SOF is uniquely suited to innovate rapidly as well as the reasons why the parent force should often be hesitant to do the same. Innovation in conventional forces can require lengthy timescales, institutional support, and financial risks to field broadly as well as what may be unacceptable operational risk.⁵ Some of Spulak’s could be perceived as lacking in institutional humility. However, high emphasis on the creativity and “elite warriorship” of special operations personnel has been generally accepted as justification in other instances such as higher acceptance of operational risk.⁶ Further, the organizational structure of SOF to be smaller and more independent, as well as beneficiaries of greater training investment does have relation to the role as innovation pathfinders.

The role that AFSOC plays as pathfinders for the conventional force is scoped to maintain credibility and make contributions in an effort already populated by capable entities such as Air Force Research Labs, the body of formal Air Force Test and Evaluation and the rest of the DOD Innovation Ecosystem. Spulak provides his process of innovation which can begin to be applied to this scoping effort. For a capability to be fielded by the conventional force, Spulak argues, these steps must occur: “someone must devise a new concept. Potential developers must accept the creative idea. The innovation must be made useful. The development must be transmitted to potential users. The users must adopt and learn to use the innovation.”⁷ In executing his strategy, Dr Spulak’s innovation braid puts high value on personal contact as a key to innovation.⁸ Spulak does not argue that the innovation braid and the personal contact returns should be limited to only SOF equipment. Innovating within this incubator is a valid precursor to more widely fielding tech for the conventional force.

⁴ Spulak, *Innovate or Die: Innovation and Technology for Special Operations*, 35.

⁵ Spulak, 19.

⁶ Spulak, 7.

⁷ Spulak, 13.

⁸ Spulak, 39.

C. A DOCTRINAL GAP: PATHFINDING AS AN SOF TASK

A disconnect exists between commanders' visions for SOF and the doctrinal tasks they are prescribed to do. Published on USSOCOM's website is a vision statement that includes "trail-blaze," and innovating.⁹ Yet, nowhere in Joint Publication 3-05 Special Operations is the task of innovating or trail blazing prescribed to be conducted as an end unto itself. It certainly is not a "special operations core activity."¹⁰ The 2020 AFSOC strategic guidance charges the command with "pathfinding and experimentation" to "pathfind new operational concepts and technologies for the Air Force while aligning experimentation efforts with the SOF enterprise."¹¹ It is unambiguous in stating the role as an incubator "successful concepts and technologies will be integrated into AFSOC for specialized SOF missions and scaled up by the Air Force [...] where applicable"¹² Yet, *Air Force Doctrine Publication 3-05 Special Operations* only parrots the "Special Operations Core Activities" found in the joint publication.¹³ Reinforcing the point, any assigning of pathfinding as a doctrinal task is absent from Field Manual 3-05 Army Special Operations, Army Techniques Publication 3-76 Special Operations Aviation and Field Manual 3-18 Special Forces Operation.¹⁴ The lack of guiding doctrine for innovation creates risk in planning, programming, funding, and execution of innovation efforts.

⁹ United States Special Operations Command, "About USSOCOM," About USSOCOM, accessed February 5, 2023, <https://www.socom.mil/about>.

¹⁰ Joint Chiefs of Staff, *Doctrine for the Armed Forces of the United States*, JP 1 (Washington D.C.: Joint Chiefs of Staff, 2020), xii.

¹¹ United States Air Force Special Operations Command, *AFSOC Strategic Guidance*, 2020, 6.

¹² United States Air Force Special Operations Command, *AFSOC Strategic Guidance* (Hurlburt Field, FL: Air Force Special Operations Command, 2020), 6.

¹³ Air Force, *Doctrine for the United States Air Force*, 3-05 Special Operations (Maxwell AFB AL: Air Force, 2020), 12, https://www.doctrine.af.mil/Portals/61/documents/AFDP_3-05/3-05-AFDP-SPECIAL-OPERATIONS.pdf.

¹⁴ Department of the Army, *Special Operations Aviation*, ATP 3-76 (Washington, D.C.: Department of the Army, 2017); Department of the Army, *Special Operations*, FM 3-05 (Washington, D.C.: Department of the Army, 2014); Department of the Army, *Special Forces Operations*, FM 3-18 (Washington, D.C.: Department of the Army, 2014).

D. PARENT SERVICE AND CONVENTIONAL FORCE RELATIONSHIPS

Stresses in the tangible and intangible aspects of relationships between SOF and their parent services have been a mainstay of the SOF narrative in the United States. Distrust and unfamiliarity festered between SOF and conventional forces after Vietnam and was only partially resolved by Goldwater-Nichols.¹⁵ Because Great Power Competition requires ever greater integration of SOF and conventional force, relations cannot decay in the same way post Global War on Terror. Admiral Crowe, Joint Chief of Staff 1985–1989 throughout the Goldwater-Nichols implementation, prophetically instructed, “educate the rest of the military—spread a recognition and understanding of what you do, why you do it, and how important it is that you do it. Last, integrate your efforts into the full spectrum of our military capabilities.”¹⁶ In remarks to the Naval Postgraduate School in 2023, a senior leader in special operations highlighted that the guise of silent professionalism has allowed some SOF to be negligent in communicating its capability to their peers in the conventional force.

AFSOC cannot exist outside of the patronage of its parent force. Though unique funding streams exist, they are not intended for the independent funding of SOCOM. Major Force Programming-11 (MFP-11) funding is guaranteed by Goldwater-Nichols but is not of the size which can procure airframes in the way MFP-4 can procure for mobility forces.¹⁷ MFP-11 was never intended to be a sole funding mechanism. The accepted model for SOF procurement has been the acquisition of service common airframes through MFP-4 mechanisms, with the follow-on modification for SOF specific purpose funded through MFP-11. The demonstration of value to the parent force is of tantamount importance to AFSOC due to this reliance on the conventional force for baseline funding of large programs. The proliferation of anti-access area denial systems has made the issue more acute, as a credible penetrating delivery or fires platform in the anti-access and area

¹⁵ James R. III Locker, *Victory on the Potomac The Goldwater-Nichols Act Unifies the Pentagon* (College Station: Texas A&M University Press, 2002).

¹⁶ Joseph K. Michalek, “The Need for the Next Special Operations Forces’ Mobility Aircraft:” (Fort Belvoir, VA: Defense Technical Information Center, March 1, 2012), 6, <https://doi.org/10.21236/ADA562545>.

¹⁷ Michalek, 7.

denial environment would potentially have a much more exquisite baseline aircraft than the workhorse C-130, as Joseph Michalek advocates in his thesis.¹⁸ Low observable mobility is a prime area of development where AFSOC pathfinding on an Air Force level initiative could be mutually beneficial. Michalek goes on to expound on the advantages that the conventional force has garnered by fielding equipment which was pioneered with SOF units citing night vision devices, modifications to the MV-22, and various infantry equipment.¹⁹ The same principle has potential on the larger scale, and Michalek takes this to its conclusion arguing that MFP-11 funds should be increased so as to allow procurement on the scale of MFP-4 partly under this justification.

SOF as an incubator of technology may be found to reduce risk for the DOD. “Predicting the future is an enterprise with a very poor record unless predictions are so broad as to be useless for setting priorities,” asserts John Jogerst in his exploration about the importance of special operations.²⁰ His recommended hedge against this uncertainty is a wide range of capabilities within the SOF community. He cites SOF core capabilities being brought to bear against conventional problems such as Scud hunting in Iraq. His case is one of training and readiness, but the same logic could find application to equipment which lives for a time, validated and with proven methods of employment in the SOF world, ready for rapid expansion to the parent force. AFSOC may have value as a sort of strategic reserve of niche capabilities waiting for their call to the mainstream.

E. THE NEED FOR AN HONEST AND HUMBLE APPROACH

SOCOM has advantages in acquisitions, but they must be outlined honestly and without ego or tribalism. Glenda Scheiner recommended the larger conventional force model reforms around some of these characteristics. SOCOM has leveraged a shorter chain of decision makers consolidated in fewer locations, close relationships with industry, perspective as a combatant command being both joint and warfighting, and

¹⁸ Michalek, 19.

¹⁹ Michalek, 29.

²⁰ John Jogerst, “What’s so Special about Special Operations?,” *Air & Space Power Journal* 16, no. 2 (Summer 2002): 98.

prudent risk acceptance.²¹ AFSOC enjoys many of these same advantages and further downstream of acquisition, has the potential to leverage them in the pathfinder role if appropriate. Lastly, Scheiner highlighted acquisitions successes where SOCOM by default served in the pathfinder role with the Mobile Multi-band Jammer and Stand-Off Precision Guided Munitions.²²

Leo Blanken and his team at Naval Postgraduate School published on the state of “Special Operations as an Innovation Laboratory.”²³ They found that despite the prevalence of innovation emphasis, the process themselves were in disarray. Their proposed solution is the linking of graduate researchers with fielded military units, specifically special operations forces. They chose to emphasize SOF for “the same reasons they are entrusted with high-risk missions—their maturity, flexibility, rigorous selection process and potential for risk tolerance.”²⁴ The team goes on to cite examples of SOF technology which has later gained wider proliferation, namely global positioning systems for ground vehicles and Android Team Awareness Kits (ATAK). They continue to advocate for the importance in taking advantage of rare natural experiments which occur as SOF units field new technology. In closing, they urge “three seemingly disparate activities can be intertwined to great effect: special operations deployments, military graduate education, and the quest for innovation.”²⁵ This thesis builds on Dr Blanken’s intent.

²¹ Glenda Scheiner, “A Pathfinder for DOD Acquisition Reform,” *The Journal of the American Society of Military Comptrollers* Fall (2009): 42.

²² Scheiner, 43.

²³ Leo Blanken, Philip Swintek, and Justin Davis, “Special Operations as an Innovation Laboratory,” *War on the Rocks*, February 25, 2020.

²⁴ Blanken, Swintek, and Davis.

²⁵ Blanken, Swintek, and Davis.

III. RESEARCH METHOD

How can the role of Air Force Special Operations Command as a pathfinder for the Air Force be better understood and optimized?

A. METHOD

This thesis contributes to the discussion on the role of AFSOC as a technology pathfinder through three methods. First, it considers the suitability of special operations forces as earlier adopters of technology with potential to broader adoption or conventional significance. Therein, it determines whether technology pathfinding is an appropriate task for special operations forces based on the competencies of the force. Second, the work reviews the innovation ecosystem and identifies frameworks and best practices most useful to innovation pathfinding. Lastly, this thesis makes recommendations for improvement to the role.

1. AFSOC Suitability as Innovators and Early Adopters

This thesis explores the suitability of special operations forces to serve as innovation pathfinders for the conventional force. Critically, whether AFSOC has unique contributions to offer the process which are outside the competencies of other DOD agencies or innovation sources. This includes assessment of what creates effective innovators, and how innovative culture and systems can be fostered. Also included are interviews with senior leadership on these questions.

2. Review of the Innovation Ecosystem

A review of the innovation ecosystem in 2023 identifies critical issues which are hindering the development and implementation of truly innovative technologies and discusses how AFSOC and other SOF elements can pathfind through them. These critical issues are the understanding of wicked problem, navigating the incompatibilities between civil innovation and military adoption, managing innovation within the portfolio of a larger organization, distinguishing what it means to be an early adopter, and bolstering trust in innovation.

3. Recommendations

The final chapter of this thesis includes recommendations which are implementable by organizations seeking to serve an innovation pathfinder role, but are specific to AFSOC and the United States Air Force. These recommendations are focused on AFSOC competencies and lessons from the innovation ecosystem.

B. JUSTIFICATION

The method utilized suitably contributes to the understanding of AFSOC as an innovation pathfinder by recognizing the complexity of the problem, addressing the issue on organizational, structural, and cultural levels, and providing recommendations which are suitable for implementation.

IV. WHY AFSOC?

The United States military and the DOD at large are large institutions of capable and naturally creative people. Within this context, what unique contribution does AFSOC have to the innovation ecosystem differing from what the Air Force can do for itself? It is essential to dispel myths as to the capability of SOF while at the same time humbly highlighting the areas of value. Pathfinders do not singlehandedly win campaigns. The purpose of their mission is to take on risk which is inappropriate for the larger force, reduce the overall risk, and enable the larger force to have strategic impact. Pathfinding is not the mission; it is a supporting effort. Pathfinders are not inherently special or advantaged. They may have training and equipment which enables the mission, but crucially, they have strength of culture and purpose.

A. THE MONEY MYTH AND CULTURE OVER STRUCTURE

It is important to dispel the myth that AFSOC has infinite funding or means by which they circumvent the acquisitions process, as neither is the case. Special operations forces do not have exception to the legal and financial framework to which the DOD is subject, but they do have a demonstrated track record of being able to field hardware in a responsive manor. Though SOCOM is granted funding through MFP-11 with which it can augment service common hardware, it does not have exception from the larger budgetary process. It is the less tangible elements focused on culture and position which make SOF more agile in the acquisitions field. It has been suggested that this “pathfinding” acquisitions culture makes the difference.²⁶

SOF acquisitions culture can be understood as having four critical facets. They are, first, a streamlined decision process resulting from collocated decision makers and users. This is in part because of the flattened nature of SOF organization, but also the collocation of acquisitions professionals, decision makers, and users. Second, a willingness to exploit commercial off the shelf to a greater degree (or committing to technology only at a greater level of maturity). Third is the inbuilt perspective of a joint

²⁶ Scheiner, “A Pathfinder for DOD Acquisition Reform,” 42.

warfighter which is pervasive through the community. Lastly, a willingness to accept risk.²⁷ That the differences are cultural over structural is a positive for the mission of AFSOC as a pathfinding force because culture is durable at its core, but flexible in its application. Innovative culture is the driver.

One structural aspect of the acquisitions process is critical for speed and innovation, and that is the size of SOF relative the conventional force. A representative of the SOCOM Ghost rapid acquisitions program states “92 percent of the programs in SOF AT&L are in Acquisition Category (ACAT) III, meaning the total program cost is less than that of the larger ACAT I and II programs.”²⁸ These programs can simply be executed faster and with lower levels of approval than more expensive categories. Pathfinding efforts at SOF scales can move at a more rapid pace than full scale acquisitions for the conventional force. Scale also relates to acceptability of risk. Desiring good stewardship of taxpayer funding, a higher degree of risk may be acceptable in ACAT III where it would not be in I or II. In these ways, the smaller formation of the SOF element within it’s conventional parent force represents advantage.

B. PATHFINDING THE VALLEY OF DEATH

The Defense Innovation Board (DIB) presented a model at the Naval Postgraduate School’s Acquisition Research Symposium which framed DOD acquisitions as a “Valley of Death” with the “investment side” and “procurement side” separated by an insurmountable distance for startups and innovative firms.²⁹ This image is intended to help illustrate the challenge which high tech firms face when working with the DOD. A civilian senior leader speaking at the Naval Postgraduate School repeatedly highlighted the valley as a challenge to innovation. The middle of the valley is considered uncrossable, despite attempts to minimize the gap with small business innovation reform, by in large due to the three-year nature of DOD funding. Many of the DIB’s proposed

²⁷ Scheiner, 41.

²⁸ Ann Vaughan, “Life as a Ghost - USAASC,” *Army ALT Magazine*, August 14, 2019, <https://asc.army.mil/web/news-alt-ond19-life-as-a-ghost/>.

²⁹ Defense Innovation Board Task Force on Strategic Investment Capital, “Terraforming the Valley of Death” (Monterey, California: Naval Postgraduate School, 2023), 1,2.

reforms are structural to the investment and procurement process, and beyond AFSOC's ability to address. The DIB report states the need for an oasis at the middle of the valley that makes it possible for firms to survive the crossing to full programmatic acquisition. The oasis is one of funding and sustainment meant to keep the firm alive and available to the DOD. However, AFSOC Pathfinding could augment such an oasis to one where the firms do not simply wait in stasis, they provide operational utility to the force.

If the oasis enabled by DIB's funding mechanisms and reforms is one of AFSOC Pathfinding, it comes with unique advantages.³⁰ The DIB recommendation is only funding; keep the company alive while they wait for procurement. The pathfinding AFSOC oasis has operational opportunity. AFSOC pathfinding can operationalize and potentially field the new tech as it develops and awaits broader implementation. This has the potential to create more robust end products, jumpstart broader operationalization, and provide capability earlier. Consider the impact of Palletized Effects (Rapid Dragon) as it developed in what was arguably an AFSOC oasis. During AFSOC's touch time with the project, it was fielded at exercises off the coast of Norway where it was employed as a live fire. Lt. Gen. James Slife stated when interviewed, "The whole idea with the Norway example was deterrent and to demonstrate that our partners don't need to have bombers or even high-performance fighters to be able to deliver long-range fires. Every country which employs airdrop-capable airlifters within a 463L pallet footprint can have the same capabilities."³¹ The technology incubating in the oasis provided the utility of deterrence, messaging to allies and partners, allowed SOF airmen to develop TTPs and best practices, and provided evaluation under real world field conditions. Altogether, a far greater return on investment than mere financial life support.

There are barriers to AFSOC becoming a fully realized oasis, and AFSOC does not hold significant structural advantage relative the larger force in how to overcome them. As previously highlighted, SOF does not have blanket authority to disregard acquisitions law, they simply have areas of increased maneuver within that law. Lt. Gen.

³⁰ Defense Innovation Board Task Force on Strategic Investment Capital, 10.

³¹ James Slife, personal communication, July 21, 2003.

Slife outlines further challenges. SOF are subject to the same bureaucracy as the conventional force. Namely the two-to-three-year timeline for budget inclusion, the necessity of fully formed requirements, and the zero-sum nature of the budget. To find funding, a new concept must compete directly with other programs within its portfolio.³² The timeline is the subject of much of the DIB discussion, but the zero-sum funding game has a chilling effect on innovation as well.

To fund a new innovative priority, that priority must displace others which are already established, as rarely does a new initiative come with an overall increase in funding specifically earmarked to it. The new technology will be at a disadvantage in this fight for several reasons. First, the new tech or potential innovation represents the inherent risk of emerging tech. Budget devoted to a failed initiative is not magically recovered, and if it can be, it cannot be rapidly and easily reallocated. Second, the existing priority will have stakeholders who advocate for it. Stakeholders range from industry to service chiefs to Congressional leaders. These stakeholders recognize the nature of the competition and see any competing priority as a potential threat. Accepting that AFSOC does not have power to overcome these structural challenges, the potential of an innovative culture is paramount.

Regarding an innovation culture, Slife states, “we do it because it’s who we are, not because we have a law or piece of doctrine which says we do it.”³³ Pathfinding as part of the cultural identity for AFSOC is within the sphere of control and influence of its leaders and airmen where structural changes are not. SOF culture prides itself on innovation and outside the box thinking, so directing pathfinding down that vector plays to the strengths of the organization rather than fighting against its structural disadvantages. Adaptation in mindset from innovation only for the sake of SOF employment to innovation for pathfinding the larger force is an extension of a core competency. Structurally, the size of SOF which makes it a small player in the field of acquisitions reform can be utilized as a strength in agility and adaptability of culture.

³² Slife.

³³ Slife.

Lastly, encouragement of innovation and initiative is a marker for a healthy warfighting military organization and must be encouraged as an overall culture. It cannot be stifled during the day to day and then drawn on during exceptional circumstance. General James Mattis wrote, “Instillation of personal initiative, aggressiveness, and risk-taking doesn’t spring forward spontaneously on the battlefield. It must be cultivated for years and inculcated, even rewarded, in an organization’s culture.”³⁴ Any chance for leaders to foster an aggressively innovative culture, including pathfinding, can also be expected to pay dividends in the unit’s wartime function.

AFSOC senior leaders both recognize and support the unique culture of innovation as well as recognizing the obligation which AFSOC has to its parent service. AFSOC’s structural position between SOCOM and the USAF is a benefit. Slife desires AFSOC airmen to be both aggressive SOF innovators, as well as “airmen in SOF” who are perceptive to areas of potential contribution to the parent force.³⁵ The term is meant to be a reminder of the unique capabilities airmen embody and the opportunity those present. Few other formations exist at such a unique nexus of competencies.

Culture presents opportunities to pathfind innovation for the Air Force beyond technology acquisitions. AFSOC’s culture can foster innovation in organization which can be equally valuable to the parent force but executed at small dollar costs and within AFSOC’s sphere of control. Some innovation concepts such as organizational structures and process have no inherent dollar cost but carry the potential to be identified as best practices and adopted across the Air Force. Though some tasks are inherently attractive and uniquely suited to SOF expertise, others are simple incremental change or important tasks without glamour. The cutting edge of combat power benefits from new methods to employ cruise missiles, but the whole of the military benefits from more reliable print servers handling or new Wing organization. SOF’s humble and problem-solving culture can embrace these challenges without any of the structural disadvantages.

³⁴ Mattis, Jim, *Call Sign Chaos* (New York, NY: Ballantine Books, 2019).

³⁵ Slife, personal communication.

Understanding of the structural challenges in play is crucial because there are efficiencies to be found, and AFSOC's own success depends on understanding its strengths and limitations within its ecosystem. However, systemic change is slow, often beyond the reach of AFSOC, and often antithetical to innovation. For these reasons, reliance on adaptable and powerful culture is of utmost importance. Figure 1 summarizes the strengths of AFSOC in the role of innovation pathfinders for its parent force.

1. Close teaming of acquisitions, decision makers, and users.
2. Willingness to exploit mature or existing technologies
3. Joint warfighter and SOF airman perspective
4. Comfort with acceptance and management of risk
5. Agile organizational size
6. Capability to operationalize and field innovation
7. Warfighting culture of innovation

Figure 1. AFSOC Pathfinding Strengths

V. PATHFINDING WICKED PROBLEMS

A. IS PATHFINDING WICKED?

Wicked problems are those which encompass such complexity or uncertainty that they cannot be defined, solved, or resolved. They characteristically involve elements impossible predict, systems too complex or random to be understood and modeled, and unforecastable human elements. Academic work on problems in the category focuses on living with, coping with, and enduring these problems while making incremental progress. They are never completed or fully answered, and often the problem evolves even as it is being studied. The goal then, is to avoid solving the wrong problem or mistakenly missing the scope and wickedness of true issues. The superficial answer to *is pathfinding a wicked problem?* is *yes* based on one of the early coiners of the term Horst Rittel. Rittel asserts that “planning problems are wicked problems.”³⁶ Acquisitions and pathfinding are certainly planning problems. So then, are there ways in which pathfinding is uniquely wicked from other problems of innovation and planning, and are there wicked problem methodologies which can help tame the wickedness? Does the utilization of AFSOC as a pathfinder reduce the wickedness of the problem on the DOD scale? To attempt to answer those questions, this chapter will apply wicked problems principles and judge if they help explore the problem. If wicked problem methodologies provide utility, pathfinding must have at least some element of wickedness to be tamed.

One of the human nature concerns which has arisen out of this research is that the other Air Force major commands would rather conduct the work of pathfinding within their own command than rely on AFSOC. There are human element reasons for this attitude such as the desire for control, issues of trust, and feelings of responsibility and ownership. There are also pragmatic and bureaucratic reasonings. Tasks come with or can be used to justify resources and the commands do not want their requirements to justify someone else’s resources. They also have reason to doubt the quality of outputs given

³⁶ Horst Rittel and Melvin Webber, “Dilemmas in a General Theory of Planning,” *Policy Sciences* 4, no. 2 (1973): 160.

that innovations developed by a different organization with differing skillsets, culture, priorities, and outlooks may not be the exact final product they desire.

Accepting the larger problem as wicked provides room to cope with these concerns. AFSOC as an Innovation Pathfinder is not perfect, but it is good enough, better than what we have, and an incremental improvement. A perfect solution will never exist for a wicked problem, so to refuse progress in the name of seeking perfection is unhelpful. The wicked problem understands that there are no ultimate solutions, so pathfinding is not the only or forever answer.³⁷

B. WORKING AT SCALE AND ACCEPTING INCREMENTAL PROGRESS

Pathfinding can help tame the aspect of a wicked problem in which “every implemented solution is consequential.”³⁸ Large programs at the service level have massive risk which pathfinding can reduce, just as Army Pathfinders marking the drop zone for an invasion force take on high risk with their small force to lower the risk for the large force. Large Air Force programs with massive budgets and extended timelines are exactly the kind of planning problems which drive wickedness to an extreme. The special operations subset of the Air Force community allows ideas to be implemented at a less wicked scale. This could mean a single squadron of new technology, a single wing or base testing a new process, or a fleetwide modification being evaluated on 45 MC-130J aircraft instead of the conventional forces 279 aircraft.³⁹ The adjustment in scale allows for cost to be reduced in time, dollars, opportunity cost, and risk to operational effectiveness. The wickedness of programmatic and budget complication is not solved, but pathfinding helps to cope. The adjustment in scale also provides an opportunity for faster iteration. Destruction and creation can live out more rapidly.

The application of John Boyd’s *Destruction and Creation* to pathfinding is a shift from the literal programs, models, and systems of acquisition into the more ethereal

³⁷ Rittel and Webber, 163.

³⁸ Rittel and Webber, 163.

³⁹ Jan Tegler, “Air Force Under Pressure as Airlift Capacity Falls,” National Defense, July 3, 2022, <https://www.nationaldefensemagazine.org/articles/2022/6/3/air-force-under-pressure-as-airlift-capacity-falls>.

mental models, relationships, communities, attitudes, and concepts.⁴⁰ However, the practical and ethereal are linked, and damage is done if they diverge. A program should not hollowly continue beyond when the thought underlying it is no longer relevant, and minds attempting to innovate and evolve should not be forced to stagnate for years as programs execute. Long running programs and processes anchor those involved in the mental state where they started and do not allow the chaos and destruction from which new creation occurs. Putting this in the context of innovation at organizational levels, the faster an organization can iterate program cycles and the associated process of destruction and creation, the greater its capacity for true innovation. Any shortening that pathfinding can contribute to the cycle of creation and destruction is taming aspects of wickedness.

AFSOC can better cope with chaos and disorder. It is key here for this argument to be understood as a humble one, and not an unhealthy attitude of superiority of special operations forces. No organization desires disorder and chaos, it is only a matter of how it can be best endured and allowed to exist at a level which does not break the organization. There are issues of how AFSOC is manned, trained, and equipped as a MAJCOM, the authorities it operates under, its relationships with JSOC and SOCOM, and its funding mechanisms previously discussed which make it suited. Not simple arrogance. Boyd's Observe, Orient, Decide, Act loop illustrates the point.⁴¹

⁴⁰ John R Boyd, "Destruction and Creation," September 3, 1976.

⁴¹ "The OODA Loop and the Half-Beat," The Strategy Bridge, March 17, 2020, <https://thestrategybridge.org/the-bridge/2020/3/17/the-ooda-loop-and-the-half-beat>.

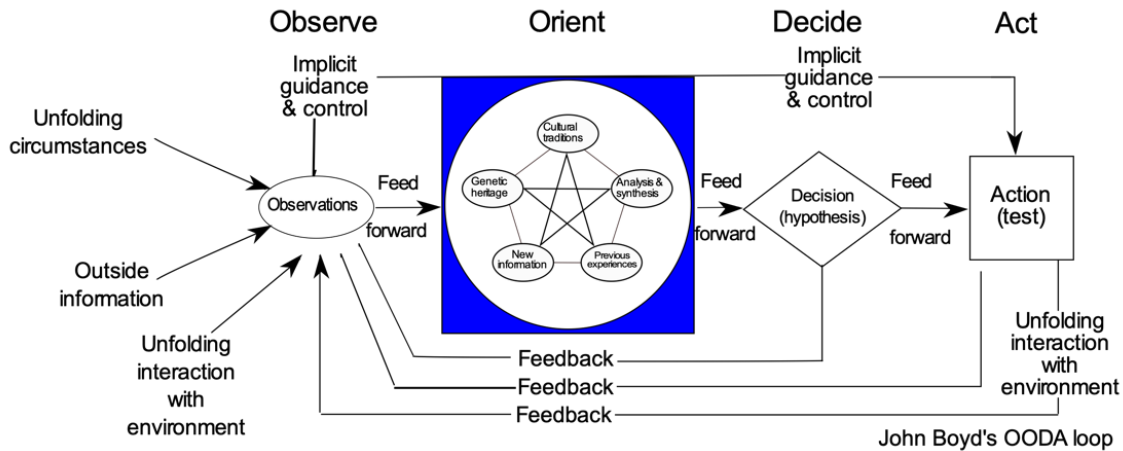


Figure 2. John Boyd's Expanded OODA Loop⁴²

The expanded model originally described, not the four-point model is required here to illustrate the point and show pathfinding's value. AFSOC can execute the cycle faster at small scale, but more importantly it can execute the model's cycle with greater fidelity and result in higher quality gains. AFSOC has greater opportunity for interaction with the environment relative a test organization or Materiel Command. It has exposure to operational and warfighting culture which think tanks and planners do not. It has no choice but to react to outside information and unfolding circumstances because it is an organization which conducts real world employment. Within this environment, innovations can iterate, improve, and await wider adoption or die off. Those that do survive, will then be available to the Air Force as a higher quality innovation which is accompanied by all that is needed to fast track its employment. The small AFSOC force absorbs the risk, so that the larger Air Force can make greater impact.

Herman Khan elegantly states a potential outlook that the future is "terra incognita" and will remain unknowable.⁴³ It's not hard to assert that complex and complicated planning for an unknowable future is a problem fraught with wickedness. One of the small ways we can cope is to apply the wicked problems principle that we are

⁴² Source: Richard Hughes-Jones, "The Strategic Genius of Colonel John Boyd," March 19, 2017, <https://www.richardhughesjones.com/john-boyd-strategy/>.

⁴³ Herman Kahn, "Choosing a Perspective on the Future," *American Outlook*, June 1, 1998.

not looking for the solution, but rather several solutions which at the time appear to move in the right direction. The problem then, is where these potential solutions can live within the structure of the DOD. AFSOC can provide a small space for these ideas. While there, they will contribute to AFSOC's mission and function as a strategic reserve of capability. This space is also the "oasis" required for startups to navigate the "Valley of Death."⁴⁴ Startups and even large public companies responsible to shareholders cannot endure the long timelines of DOD acquisition. They also cannot appropriately invest without knowing that their product has a better chance of adoption than winner take all DOD bids. Lastly, the safest way to market to the DOD is to sell a small improvement to an existing concept which is core innovation at best, as the next chapter will outline. Innovative companies, for whom leaping the valley is unrealistic, can strive to reach the oasis of AFSOC. Then, from there they can expect to be purchased in predictable numbers, sustained, and given a real-world opportunity to prove value to the larger Air Force customer.

C. COPING WITH WICKEDNESS

The lens of wicked problems does prove useful in understanding AFSOC pathfinding, so pathfinding must contain elements of wickedness. This is not surprising as innovation and acquisitions was the realm of several original thinkers who developed wicked problem methodologies. Pathfinding sits at an interconnected point of organizational culture, military planning, bureaucracy, legal complication, and hundreds of human elements that do make it decidedly wicked. The wickedness concept is useful for allowing for unknowns and unknowable without being dismissive or intellectually lazy. Wicked problem structures allow a pathfinding organization to think deeply on a problem, accept not reaching resolution, and value incremental progress. Pathfinding is an imperfect solution to an unsolvable problem, but it empowers movement in the right direction.

⁴⁴ Defense Innovation Board Task Force on Strategic Investment Capital, "Terraforming the Valley of Death."

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VI. PATHFINDING AS MANAGED INNOVATION

Innovation is valuable and worthy of pursuit on its own merit, but it has costs which compete with the other priorities of an organization. Meaningful innovation does not occur organically and without deliberate focus, so how much of an organization's given resources should it devote at the expense of their other focus areas? How much of its limited resources should AFSOC devote to pathfinding given its other critical mission areas?

A. WHAT CAN THE BUSINESS WORLD TEACH?

Business strategy, which also must balance near term needs against innovative efforts, provides insight into how to visualize innovation and allocate resources. Nasi Nagji and Geoff Tuff published a model based on the work of H. Igor Ansoff which mutated Ansoff's "Product/Market Expansion Grid" into their "Innovation Ambition Matrix."⁴⁵ Beginning with the older and simpler model, Ansoff's model is a four-by-four grid which represents *markets* across the vertical axis and *products* across the horizontal. Both *markets* and *products* are either *existing* or *new*. *Risk* on each axis is lowest associated with *existing* and highest with *new*. The grid is shown in Figure 3. This framework helps to understand that not all innovation carries the same risk or cost. For example, entering a new market with an existing product may carry cost of having to reduce prices to attract the new market's buyers. Pushing a new product into an existing market carries risk associate with new product introduction tempered by the knowledge of the market and the benefit of a customer base. The highest risk is *diversification* into new markets with new products.⁴⁶

⁴⁵ Bansi Nagji and Geoff Tuff, "A Simple Tool You Need to Manage Innovation," *Harvard Business Review*, May 31, 2012, <https://hbr.org/2012/05/a-simple-tool-you-need-to-mana>.

⁴⁶ Kyle Peterdy, "Ansoff Matrix," Corporate Finance Institute, accessed October 20, 2023, <https://corporatefinanceinstitute.com/resources/management/ansoff-matrix/>.



Figure 3. Product/Market Expansion Grid⁴⁷

Nagji and Tuff develop this model into a more nuanced tool which will apply to AFSOC Pathfinding. The Innovation Ambition Matrix shown in Figure 4 categorizes attempts at innovation and associates them with cost and risk through the categories of *core*, *adjacent* and *transformational*. Core innovation is incremental improvement in existing products, adjacent are those efforts “new to the company”⁴⁸ but which already exist, and finally, transformational are products which do not exist to be sold in markets which don’t exist. A core innovation is a 10% savings in distribution cost while a transformational innovation is an electronics company selling digital music to people in an internet marketplace, such as Apple and iTunes.⁴⁹

⁴⁷ Source: Peterdy.

⁴⁸ Tuff, “A Simple Tool You Need to Manage Innovation.”

⁴⁹ Tuff.

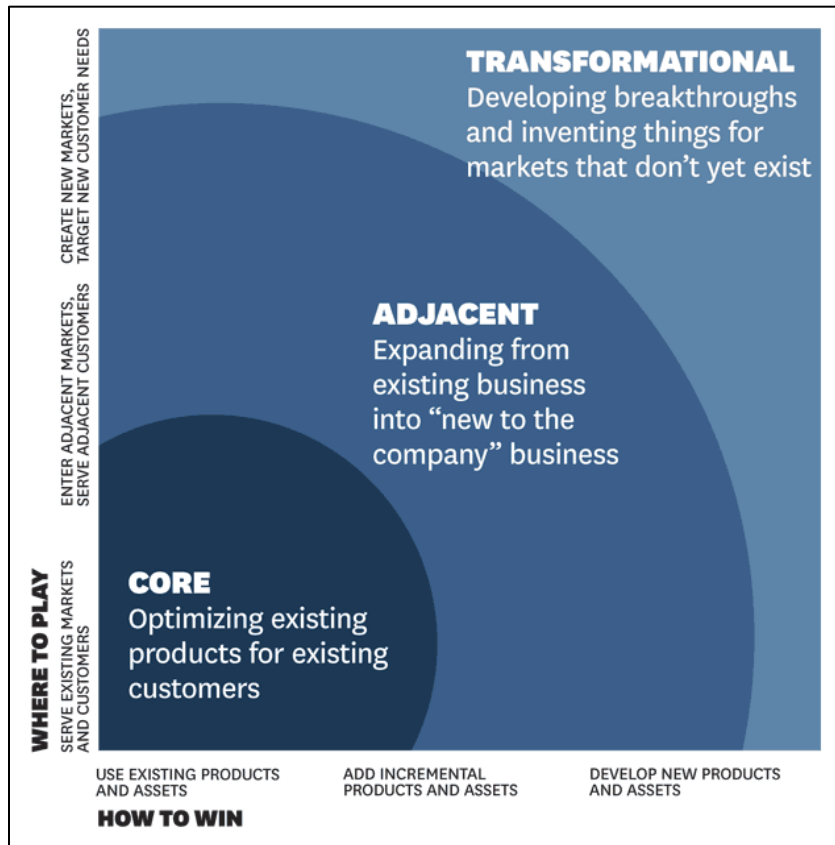


Figure 4. Innovation Ambition Matrix⁵⁰

B. WHAT SHOULD AFSOC LEARN?

Before proceeding into how these categories are helpful in determining investments, consider where some AFSOC efforts would fall on the model. Core innovation activities are process optimization as well as tactics and employment refinement. A maintenance airman finding a way to save an hour on a job and a Weapons School student developing new weapons employment tactics, techniques, and procedures are here on the scale. They “use existing products and assets” and “serve existing customers.”⁵¹ These efforts are valuable and low risk. The adjacent category is well represented by both palletized effects, launching long range munitions from MC-130 aircraft, and Mission Sustainment Teams. Both represent developing AFSOC capabilities

⁵⁰ Source: Bansi Nagji and Geoff Tuff, “Managing Your Innovation Portfolio,” *Harvard Business Review*, May 1, 2012, <https://hbr.org/2012/05/managing-your-innovation-portfolio>.

⁵¹ Tuff, “A Simple Tool You Need to Manage Innovation.”

which penetrate “new to the company business.”⁵² There are other platforms which deliver cruise munitions and other elements within the Air Force which present contingency airfield capability, but the unique products presented by AFSOC add to the market choices available with the potential to serve new customers. Innovation of this sort rises in cost and risk, but also potential reward. Finally, transformational, moonshot innovation such as the Amphibious MC-130, is high risk, high cost at the potential for high reward. It is a product which does not yet exist, intended to enter a market which does not currently exist. The United States has no military amphibious aircraft at present.⁵³ Understanding these categories, and the efforts they encompass is vital to answering the question of how to allocate scarce resources toward innovation.

Nagji and Tuft further their writing on the topic by expressing how many executives are frustrated that innovation within their companies feels “haphazard” and that they have little understanding of the initiatives being pursued and their payoffs.⁵⁴ Surely, many Air Force leaders would express the same. Some of this chaotic nature is the tension between investing in transformational innovation and focusing on innovation which improves accomplishment of core tasks. Using the identified categories, the authors state that their analysis has shown companies which allocate innovation resources to 70% core, 20% adjacent, and 10% transformational have “meaningfully higher share price.”⁵⁵ It can be accepted that share price is the meaningful metric for average or emerging companies, but AFSOC in this model is more closely represented by “a leading consumer goods company” in that it is mature in its market and must prioritize existing obligations. Based on this, the proffered innovation allocation is 80% core, 18% adjacent and 2% transformational.⁵⁶

Core innovation is the refinement of what AFSOC does for the customers it already has, not pathfinding. Transformational innovation is the true moonshot thinking

⁵² Tuff.

⁵³ Air Force Special Operations Command, “2021.”

⁵⁴ Nagji and Tuff, “Managing Your Innovation Portfolio.”

⁵⁵ Nagji and Tuff.

⁵⁶ Nagji and Tuff.

of doing entirely new things in never-before-seen ways, at great risk. The risk largely precludes AFSOC being able to offer pathfinding help to the larger force as an honest broker, so moonshots can remain the realm of DARPA and the like. Pathfinding, then, is adjacent innovation. An 18% segment of the innovation budget which can be dedicated to expanding mission sets or competencies into new markets such as offering Forward Arming Refueling Point expertise to conventional force ACE, or by finding ways to create new capabilities within existing markets such as autonomous glider delivered cargo.⁵⁷

⁵⁷ Brett Tingley, “Autonomous Resupply Gliders Made Successful Deliveries On Their First Overseas Deployment,” The Drive, February 2, 2022, <https://www.thedrive.com/the-war-zone/44111/autonomous-resupply-gliders-made-successful-deliveries-on-their-first-overseas-deployment>.

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VII. PATHFINDERS AS FIRST MOVERS AND FAST FOLLOWERS

Pathfinding does not always mean being the very first, it is rather about what is best to prepare for the follow-on force. Where the previous chapter directed pathfinding down a path of adjacent innovation, there are multiple paths to proceed through that category. Dependent on circumstance, there are times when pathfinders will be first movers on an initiative and at other times it will be advantageous to be fast followers. In a discussion with Mr. Snehal Antani, former Chief Technology Officer at Joint Special Operations Command, he framed this distinction and provided guidance on when each is appropriate.⁵⁸ Understanding the costs and benefits of these strategies is crucial to efficient innovation in a resource constrained environment.

A. WHEN SHOULD PATHFINDERS LEAD THE WAY?

To be a **first mover** is to be on the cutting edge of innovation doing work that no one else is accomplishing. Industry, especially tech, has the goal of being first movers because they want to reap the rewards of being the first into a space. The military can be lured into a desire to be a first mover by the want for an exquisite capability, but to be the first mover is both expensive and risky. It is appropriate to be a first mover if the solution you need does not exist, your organization is resourced to solve the problem, the problem is important enough to devote the energy of the organization, and the problem needs a solution faster than external processes can move.

Be a first mover when

1. The solution does not exist
2. The risk is worth the reward
3. Your organization has the resources and the will to solve the problem
4. Collaboration isn't appropriate due to limitations such as security or timeliness.

⁵⁸ Antani Snehal, personal communication, October 6, 2023.

There are success stories of SOF as a first mover. An operational need was identified to explore tunnel systems which presented too high a threat to human operators. The unique requirement had no existing solution to acquire so the solution of a small robotic vehicle was chosen. When SOCOM outlined the need to industry, the response was a proposed program of 10 months and 1.7 million dollars. The team decided the timeline was unacceptable, they were resourced to be first movers, and the risks of development were well worth they payoff, so they took on the project as first movers. They developed a solution in four days at the cost of \$7,000 dollars.⁵⁹ The internally built prototypes not only meet the operational need, they were used as basis for further acquisition in order to spread the capability to the conventional force, at low cost and low programmatic risk. Note how the SOCOM team employed Pathfinding Strengths of teaming, warfighter perspective, and capability to field innovation.

Being a first mover is not ideal. The first movers take risk, and even in ideal cases will have to expend great energy and resource to create from a clean sheet. There will also be many cases in which a given organization does not have the internal competencies required to create a solution to their problem. If this is true in the tech sector, then it is all the truer in the military where organizations are built for specific functions or warfighting, not research and development. In most cases, pathfinders should seek to be early adopters and fast followers.

B. WHEN SHOULD PATHFINDERS FAST FOLLOW?

Fast following is utilizing emerging technologies which solve an organization's problems, but have not yet been adopted to widespread use. Fast following seems like a given in that the solution exists and only needs to be used, but there are barriers which need to be overcome. Though the solution already exists, there is still risk in being among the first to employ it, especially if the solution is being adapted to a new context. That risk is not appropriate for all organizations. Also, not all organizations within the DOD are able to purchase commercial off the shelf or have the capabilities and funding

⁵⁹ Paul McLeary, "SOCOM Pivots Toward Great Power Competition," *Breaking Defense* (blog), May 21, 2019, <https://breakingdefense.sites.breakingmedia.com/2019/05/socom-pivots-toward-great-power-competition/>.

mechanisms to do so. More importantly, the organization must be ready to integrate these new solutions into their operating procedures, familiarize and train, and be in a position to employ them. The smaller scale of special operations units, and the training support they are given makes this possible. SOF are uniquely able to pathfind as fast followers and continue to leverage their advantage through programs such as Ghost, an initiative which embeds acquisitions professionals with operational and special mission units.⁶⁰

Be a fast follower when

1. The solution exists somewhere in the market
2. Your organization can take on early adopter risk
3. The organization is able to acquire
4. The organization can effectively integrate, train, and employ

The advantage of fast following can be seen in a comparison between the acquisition of the F-PANO night vision system from L3Harris compared against the fraught development of the Microsoft HoloLens. The HoloLens is an augmented reality vision system which the U.S. Army is seeking to develop with Microsoft. The program has been fraught with delays, failed use tests, and problems such as nausea by the user. The Army has also shown itself to be not particularly suited to be a first mover in the space as entire lots of 5,000 units have been purchased without passing testing, and the budget has varied wildly from an initial 400 million dollars to a congressionally mandated cuts down to 40 million dollars and is now recovering to 165 million as the system solves some of its early issues. These early pains do not bode well for a system which is planned to be implemented Army wide at a 21.9 billion dollar price tag.⁶¹

⁶⁰ Vaughan, “Life as a Ghost - USAASC.”

⁶¹ Mitchell Clark, “Congress Says the Army Can’t Spend \$400 Million Buying Microsoft HoloLens Headsets,” The Verge, January 12, 2023, <https://www.theverge.com/2023/1/12/23552132/microsoft-hololens-army-contract-denied-v1-2-improvements>; Jon Fingas, “Microsoft Will Deliver Improved HoloLens Combat Goggles to Army Testers This Month,” Engadget, July 19, 2023, <https://www.engadget.com/microsoft-will-deliver-improved-hololens-combat-goggles-to-army-testers-this-month-211521914.html>; Umar Shakir, “US Army Orders More Microsoft AR Headsets Now That They No Longer Make Soldiers Want to Barf,” The Verge, September 13, 2023, <https://www.theverge.com/2023/9/13/23871859/us-army-microsoft-ivas-ar-goggles-success-new-contract-hololens>.

In contrast, the SOCOM acquisition of F-Pano as a fast follower has been seamless.⁶² The system is an incremental improvement over the previous panoramic night vision goggle with the addition of an augmented reality capability as well as integration with the Android Tactical Assault Kit (another pathfinding success story). SOCOM looked at the operational need for improved vision and situational awareness tools, identified the solution in the existing marketplace, and deemed the early adopter risk to be appropriate. The risk is reduced by the incremental nature of the improvement and the habitual relationship between the industry partners involved. SOCOM is able to make the acquisition rapidly due largely to their user scale which makes the purchase only 7.9 million dollars. Lastly, they presumably will make first delivery to JSOC who will determine how to employ the new equipment.⁶³

Antani also offers the reminder to organizations to be cognizant of what needs to be “pushed off their plate altogether.”⁶⁴ When work can be identified as being outside the core competencies of the organization or outside of their primary lines of effort it needs to be divested. This is not to say that organizations do not change and evolve with time, reflected in changing lines of effort, but if auxiliary tasks are dominating core ones, they must be pruned. The third option of first mover, fast follower, or neither is valid. Especially, if partnerships with other more suited organizations can be leveraged.

C. A WICKED PATHFINDING FAILURE

The conventional force struggling as an ill-suited first mover while its SOF component excels as a fast follower is a failure to pathfind. The disjointed effort means the larger force is not being shielded from risk. A 7.9 million dollar acquisition going well at the expense of a 21.9 billion dollar program is not a success story. Yet, SOF must retain the ability to act with agility as they acquire equipment which enables their mission

⁶² Snehal, personal communication.

⁶³ Leigh N, “L3Harris F-Pano Quad Night Vision for USSOCOM and JSOC,” *Overt Defense* (blog), May 25, 2022, <https://www.overtdefense.com/2022/05/25/l3harris-begins-production-of-f-pano-nvgs-for-ussocom-and-jsoc/>.

⁶⁴ Snehal, personal communication.

and not be tied to cumbersome programs. The wicked tension between these two needs is a challenge to Pathfinding organizations.

Pathfinding organizations need to resist the urge to demonstrate short term success at the cost of ultimate success. There is a human nature as well as bureaucratic incentives to accomplish the safest aspects of a project first, to “crawl, walk, then run.” What is needed to innovate effectively instead is to take on the highest risk aspects of a project first.⁶⁵ Pathfinding serves its purpose by taking on risk for the larger organization, so it must boldly move that risk forward to the front of the timeline to serve its purpose. A better outcome for the Army’s next generation vision program could instead have been a SOCOM element acquiring a small initial purchase of HoloLens, evaluating the most difficult aspects of the program first, ‘failing’ due to the integration and nausea issues, and returning them to industry for further development. At that point the purchase of the proven F-Pano goggles ensures the operational need is met, keeping in mind, the total cost of the F-Pano purchase was five times lower than the Army’s initial outlay for the HoloLens program.

There are barriers to this optimistic perfect world outcome. As discussed, the Army must trust industry to work in good faith well beyond the letter of the contract. The Army must also trust SOCOM to take on the task on their behalf without conflicting hidden agendas. Lastly, the discovery of a bid as incompatible with the requirement must be seen as a success, and not a failure. The success of a pilot program in identifying critical shortfalls shields the organization from larger risk. Spending taxpayer dollars to do so, while unfortunate, is good stewardship. Running the program aggressively to push those risks forward is good management and officership. Seeing efforts in this light requires a change in organizational culture.

⁶⁵ Snehal.

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VIII. PATHFINDING TRUST

There is a gap in trust between the Department of Defense and the tech industrial base in the United States. The cyber and tech base is a critical component of strength of the United States, and the lack of trust creates significant barriers to maintaining a national advantage in strategic competition. This chapter will seek to outline the value of trust in acquisitions and the costs that failures of trust create. It will then discuss the unique challenge of trust within the tech industry, and lastly, provide recommendations for how negative outcomes can be minimized as the U.S. seeks to maintain its competitive advantage in areas of critical emerging technologies.

Little is written to address the problem statement directly. For this reason, we will seek to draw conclusions from the intersection of three adjacent areas which are well researched. These areas are understanding trust in the academic sense, the role which trust plays in DOD acquisitions, and the unique questions of trust and trustworthiness in Silicon Valley. Figure 1 shows this intersection.

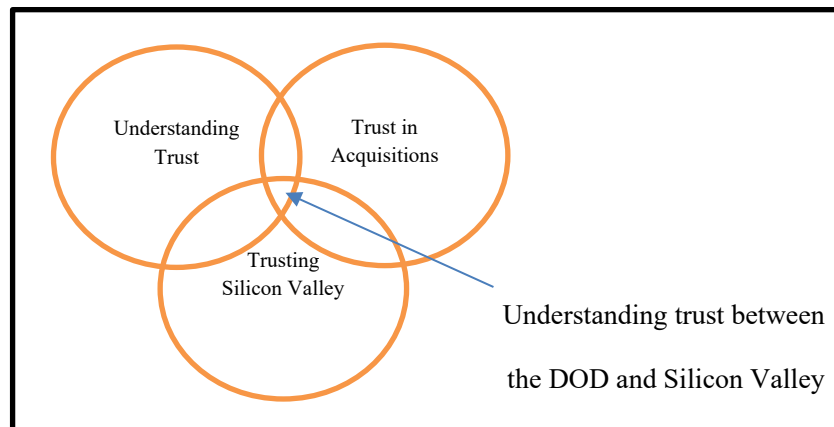


Figure 5. Problem at the Intersection

A. UNDERSTANDING TRUST

Discussions of trust are most useful if they begin with a definition of trust which goes the furthest in helping to understand such a nebulous concept in a specific way. The

colloquial use of the idea of trust can be difficult to grasp, but in this instance an academic definition will provide us a foundation: “Trust reflects a belief that others will act in a way to benefit or at least not harm us, before we know the outcome of their behaviors.”⁶⁶

Trust is a characterization of how groups relate within an environment which includes uncertainty. If uncertainty were not present, trust would not be required. The second essential element is the potential for one to be harmed by the actions of the other. This can be mutual or uneven exposure. Applying these elements as base assumptions for this study, this means that either the DOD or the tech industry or both will never be fully certain of outcomes, and that there is a potential of harm to one or both parties. Harm would be considered any outcome aside from successful acquisition and payment. Regarding uncertainty, the legal and contractual controls of the acquisitions process will never be so all encompassing as to eliminate this uncertainty, and a later section will explore the cost of relying solely on these controls.

In a further dissection of the idea of trust in the academic sense, it is worthwhile to challenge the assumption that more trust is always desirable. In a presentation she gave as a TED Talk, Dr. Nora O’Neil addressed the question of whether more trust is the answer, and pointedly expresses that it is not. She highlights the absurdity of blanket trust and makes the excellent case that it is far more reasonable to trust people in certain contexts and within certain limits. Second, she reframes the crisis of trust argument by pointing out the value instead of trustworthiness.⁶⁷ Espousing greater levels of trust as a solution when it is not warranted clearly solves nothing, and her framing is useful in this discussion. Following her guidance, this chapter will look at the specific role of trust within a limited context and regarding specific outcomes as well as discussing trustworthiness as being on equal footing with trust.

⁶⁶ Karen Cook, Margaret Levi, and Russell Hardin, *Whom Can We Trust?*, Russell Sage Foundation Series on Trust (New York: Russell Sage Foundation, 2009), 17.

⁶⁷ O’Neill Onora, “Onora O’Neill: What We Don’t Understand about Trust | TED Talk” (London, England, June 2013), https://www.ted.com/talks/onora_o_neill_what_we_don_t_understand_about_trust.

B. IS THERE TRUST IN DOD ACQUISITIONS?

Maser and Thompson assert that the flaws in the DOD acquisition system do not present themselves as fraud, waste, and abuse. If that were the case, there would be widespread protest of bids and contesting of contracts awarded, when only two percent of awards are protested and roughly five percent of those protests are successfully considered. The implication resulting is that only about “one in a thousand” contracts are awarded improperly.⁶⁸ To the degree that fraud, waste, and abuse are concerned, the institutional controls of the process are sufficient and neither party is overly exposed to uncertainty and risk. The system protects to a sufficient degree that trust is not required. However, compliance is not the same as trust.

Is a lack of trust not a problem if the DOD acquisitions machine is running at 99.9% effectiveness? What issues need to be resolved through pathfinding trust? Maser and Thompson highlight that there are other forms of cost which are critical to defense competitiveness and there is a large toll in “risk aversion, lack of initiative and imagination, and failed partnerships.”⁶⁹ Their work found that distrust is pervasive on both sides and the formal process in place to resolve disputes may do so in the legal and contractual sense while ever widening these gaps of trust. Winning the protests and legal battles becomes the goal and kills compromise in both the present and future.⁷⁰ Worse, for some tech companies these controls in and of themselves are reason to avoid working with the DOD altogether. Loren Thompson wrote a cynical but insightful *Forbes* op-ed which highlighted the ways in which the system of controls and regulations is so antithetical to Silicon Valley business success, that working with the Pentagon should be avoided despite short term profit.⁷¹ The system in place with a 99.9% effective rate at preventing fraud is capable of having a negative effect on real trust.

⁶⁸ Steve M. Maser and Fred Thompson, “Dispelling Fear and Loathing in Government Acquisition: A Proposal for Cultivational Governance in DOD Source Selections,” *Journal of Public Procurement* 13, no. 03 (March 1, 2013): 290, <https://doi.org/10.1108/JOPP-13-03-2013-B002>.

⁶⁹ Maser and Thompson, 290.

⁷⁰ Maser and Thompson, 293.

⁷¹ Loren Thompson, “Five Reasons Why Silicon Valley Won’t Partner With The Pentagon,” *Forbes*, April 27, 2015.

Mistrust is a degradation of what Raymond Jones asserts in his Naval Postgraduate Thesis is one of four pillars essential to navigating the chaotic program environment that is acquisitions. Along with sensemaking, and tacit and implicit knowledge, trust is an intangible that he links to ultimately successful decision making. The team of Maser and Thompson assert in their 2011 work that trust is the only virtue which can prevent “spirals of conflict” in acquisition which derail not only programs, but entire working relationships between DOD and corporate partners.⁷² Adding to the list of trust breaking sins, Maser and Thompson built on the work of La Porte and Metlay to assert that a specific subset of events are the primary drivers of mistrust in the acquisitions process. They are failures of communications or performance, rule breaking, incongruence, and failure to take responsibility in the institutional sense into which they include self-advancement and lack of ownership.

This small subset of the overall writing on the problem presents a strong case that trust is necessary in the acquisitions process and that a lack of trust imposes varied and significant costs onto both sides of the business relationship. The presence of a thick rulebook and a cadre of lawyers waiting in the wings amplifies rather than diminishes the role which trust plays in the complex system. Even distant from the specific case of acquisitions, writers on trust writ large insist that trust must compliment institutional structures and rules no matter how robust they may be.⁷³ Considering the public nature and end goal of government acquisitions, the tax paying public and war fighter are the ultimate party at risk should trust fail.

C. TRUST AND TRUSTWORTHINESS IN SILICON VALLEY

1. Should Silicon Valley Trust the Pentagon?

Literature within the last ten years appears in agreement that considerable distance exists between the Department of Defense and Silicon Valley culture and

⁷² Steven M. Maser and Fred Thompson, “Mitigating Spirals of Conflict in DOD Source Selections:” (Fort Belvoir, VA: Defense Technical Information Center, April 1, 2011), 164, <https://doi.org/10.21236/ADA539723>.

⁷³ Karen Cook, Russell Hardin, and Margaret Levi, *Cooperation Without Trust?*, vol. IX, Russell Sage Foundation Series on Trust (New York: Russell Sage Foundation, 2005).

organizational structure. Within the world of cybersecurity, it is practically taken as given that DOD and Silicon Valley distrust each other to a significant extent and are even incentivized by business to do so.⁷⁴ What took root in earlier exposure on the cyber security front is now spreading as tech expertise relying primarily in Silicon Valley gains DOD attention. Examples are artificial intelligence, autonomy, future wireless technology, integrated networks, and space.⁷⁵ In short, issues which prevent DOD and Silicon Valley cooperation are of national importance.

The tension between military realities and Silicon Valley culture manifests itself not only in the fault line between the corporation and DOD, but also within the tech company's organizations themselves and their corporate relationships with the ethics of war. Google dealt with significant employee discontent during their work on Project MAVEN which intended to use artificial intelligence to aid in intelligence, surveillance, and reconnaissance workflows within the Department of Defense. Presumably this processing would lead to targeting in certain instances, though that was not a stated goal of the program. Two key takeaways from MAVEN are of relevance to this issue.⁷⁶ First, Lt. Gen. Jack Shanahan attributed the breakdown to in trust between the players due to insufficient transparency and communication. Second, after the schism over Project MAVEN, the players eventually succumbed to incentives and were soon working together again. Google simply could not pass by the opportunity to bid on the Pentagon's ten-billion-dollar cloud computing effort, and the Pentagon showed no desire to hold a grudge against such a capable tech giant.⁷⁷

⁷⁴ Adam Segal, "Bridging the Cyberspace Gap: Washington and Silicon Valley," *PRISM* 7, no. 2 (2023): 66–77.

⁷⁵ Office of the Under Secretary of Defense, "USD(R&E) Strategic Vision and Critical Technology Areas – DOD Research & Engineering, OUSD(R&E)," accessed June 13, 2023, <https://www.cto.mil/usdre-strat-vision-critical-tech-areas/>.

⁷⁶ Daisuke Wakabayashi and Kate Conger, "Google Wants to Work With the Pentagon Again, Despite Employee Concerns," *The New York Times*, November 3, 2021, sec. Technology, <https://www.nytimes.com/2021/11/03/technology/google-pentagon-artificial-intelligence.html>.

⁷⁷ Sean Carberry, "Pentagon Cloud Computing Enterprise Finally Moves Forward," *National Defense*, December 20, 2022, <https://www.nationaldefensemagazine.org/articles/2022/12/20/pentagon-cloud-computing-enterprise-finally-moves-forward>.

There is concern that relationships between the DOD and U.S. Tech companies will be more stressed than those with players from the traditional defense industrial base, and that legal backstops are not enough to ensure optimal outcomes. The massive cloud computing modernization for the department named Joint Enterprise Defense Initiative (JEDI) was bid competitively between tech giants Microsoft and Amazon Web Services (AWS). This case exhibits complications which the procedural and legal bounds of the contracting process are poorly equipped to mitigate. AWS alleges that the contract was awarded to Microsoft as political retaliation by President Trump. The insinuation is that President Trump was seeking to damage Jeff Bezos for the reporting in *The Washington Post*, which he owns. The dispute stalled the entirety of the program with legal injunctions stopping Microsoft from continuing work on the project. Further, the DOD was blocked from changing requirements or contract structure without exposing themselves to further legal action by AWS.⁷⁸ A conflict stemming partly from a lack of trust spiraled into conflict hostile and complex enough to kill the JEDI program entirely.⁷⁹ The case shows complication and outgroup hostility which appears distinctly different from the habitual working relationships between the DOD and traditional defense industrial base contractors. Compliance is not enough to bridge the gap.

Scott Malcomson, an influential author in the tech field, went so far as to argue that tech and the DOD are so incompatible, that it is even against the DOD's interests to work closely with Silicon Valley because doing so would cripple the innovative industry in a way analogous to the Soviet choking of their defense industry through reactive overcontrol.⁸⁰ This is a truly unique argument about the special nature of America's tech competitive advantage, and it harkens back to many of the conflicts over cyber security where the argument was made that the key to Silicon Valley's cyber security was to avoid government cooperation and entanglement.

⁷⁸ ProQuest, "Murray Comments on the Future of DOD's Controversial Cloud Infrastructure Contract," May 10, 2021, 1, <https://libproxy.nps.edu/login?url=https://www.proquest.com/wire-feeds/foley-amplardner-llp-murray-comments-on-future/docview/2524024624/se-2?accountid=12702>.

⁷⁹ Carberry, "Pentagon Cloud Computing Enterprise Finally Moves Forward."

⁸⁰ Scott Malcomson, "Why Silicon Valley Shouldn't Work with the Pentagon," *The New York Times*, April 19, 2018, <https://www.nytimes.com/2018/04/19/opinion/silicon-valley-militarycontract.html>.

2. Should the Pentagon See Silicon Valley as Trustworthy?

The tech industry has suffered high profile cases of fraud and lapses in ethics which could reasonably cause an observer to wonder if they are worthy of the public trust.⁸¹ What's more, these frauds and failures happened near and under the scrutiny of the country's top venture capital firms, tech investors and regulatory bodies. If this specialized audience was not capable of sousing out the presence of such rot, how would the Pentagon's cumbersome bureaucracy do so?

Elizabeth Holmes was the founder and CEO of the biotech firm Theranos which promised home blood testing. In 2014 her personal wealth, primarily from a 50% ownership stake in the company, was valued at \$4.5 billion. The company had raised greater than \$400 million in investment. Investors included venture capital firms, but also Larry Ellison (Oracle) and Walgreens. Walgreens alone staked \$140 million. By 2018 the company was dissolved after a spectacular collapse to a zero-dollar valuation. In 2022 Holmes was jailed on 11 federal charges of fraud.⁸² The company's signature technology did not exist in any practical form, and they had been defrauding investors by faking demonstrations and providing repackaged lab results from a pre-existing third-party blood testing company.

Theranos as a small case study presents three sufficiently worrying points within its spectacular rise and fall. First, it manipulated a narrative and played on discrimination. Second, it succeeded in a medical device and testing field which is highly regulated. Third, it conned the top experts in both the technology and medical fields who should have been best positioned to see the deception.

Uber is an example of a dominant party within a tech sector who has shown themselves to be of dubious ethical quality. They have a history of behavior which does not align with the stated values of the DOD and would be largely disqualifying from winning contracts. The behavior ranges from treatment of employees, unfair business

⁸¹ "Big Tech's Breach of Trust," *The New York Times*, 2018, <https://www.nytimes.com/spotlight/big-techs-breach-of-trust>.

⁸² Sara Ashley O'Brien, "The Rise and Fall of Theranos: A Timeline | CNN Business," CNN, July 7, 2022, <https://www.cnn.com/2022/07/07/tech/theranos-rise-and-fall/index.html>.

practices, sexual harassment, suppression of media reporting, privacy and safety lapses, intellectual property theft, and legal non-compliance.⁸³ These ethical failings have provided reason for pause from market watchers and funding contributors, but despite it all, Uber achieved a market cap of \$75.5 billion at their IPO.⁸⁴ If the Theranos study is worrying because of the company's rapid implosion, Uber is worrying because of the company's continued success. Seemingly no level of scandal or failure of ethics will displace it as the market leader.

It is possible to assert that despite their clear dominance within their sector, and one which is adjacent to the DOD emphasis area of autonomy, Uber would be unlikely to survive the institutional scrutiny of DOD contracting and would fall well short of being seen as trustworthy. Uber also played a part in scandals in the world of AI. It is difficult to move through the list of critical research areas without seeing the ethical failings of each company leading the sector. Tesla is pioneering human machine interface and energy storage, Google and Amazon lead advanced computing, and so forth.⁸⁵ How then, can the DOD effectively work with the potentially untrustworthy partners it needs to remain competitive?

The intent here is not to mudsling without the awareness that the DOD acquisitions process has also demonstrated moral failings over the years. This must be acknowledged out of fairness, but is not found in the literature to be a significant driver of the mistrust Silicon Valley holds. Rather, tech's mistrust of DOD appears to be much more strongly influenced by ethics of war itself, differing cultures, and a strong distaste for burdensome bureaucracy.

⁸³ Kate Goggin and Benjamin Taylor, "49 of the Biggest Scandals in Uber's History," Business Insider, accessed June 13, 2023, <https://www.businessinsider.com/uber-company-scandals-and-controversies-2017-11>.

⁸⁴ Goggin and Taylor.

⁸⁵ Office of the Under Secretary of Defense, "USD(R&E) Strategic Vision and Critical Technology Areas – DOD Research & Engineering, OUSD(R&E)."

D. PATHFINDING THE WAY FORWARD

It can be accepted based on the structure laid out above that the U.S. tech industry and the Department of Defense have a uniquely difficult trust problem to solve if they want to achieve the best outcomes. Both partners have incentive to work closely, the DOD looking to acquire the best available and the tech industry motivated by such large budgets. However, there is a difficult catch-22 resulting from what has been discussed on trust in the acquisitions process; No venture of such large scale and cost should be pursued without trust, but trust of the type required is developed in a reciprocal nature over time. This is all akin to the job-hunting trope that getting work experience requires work experience. It would be unacceptable to allow large scale projects to fail and damage to be done to the parties involved if they were the DOD or the services at large and large efforts from companies responsible to their shareholders. This paper asserts that three pillars are essential to building trust in the unique relationship between the Pentagon and Silicon Valley:

1. *Build bonds of familiarity and relationship.*
2. *Execute with transparency and communication.*
3. *Seek shared incentives and encapsulated interests.*

Figure 6. Three Efforts to Pathfind Trust

The process of building trust should begin on the small scale so that the mechanisms are allowed to grow and fail without catastrophe. The proposed solution is to allow the small subset of the DOD force and budget represented by Special Operations Command to lead the way in developing trust and insulate the larger force from the associated risks and potential for failure.

The model for this exists with the uniquely successful relationship between Special Operations, the Defense Innovation Unit (DIU) and Silicon Valley tech corporations. The defense innovation unit was founded as a DOD presence which gives a

more palatable partner to the tech industry. This is accomplished by controlling classification and protecting intellectual property, being geographically convenient to San Jose and Palo Alto, and staffing with personnel who understand the unique nature of the industry and are open to the relationships. They also focus on transparency and speed with problems posted on their open access website and contracts awarded through funding mechanisms which do not require multiyear lead time to execute. Thus far, a significant proportion of their workflow has been with SOF.⁸⁶ DIU has accepted the realities required to work with Silicon Valley in a spirit of reasonable compromise and has become a strong model of success partially through shared trust. DIU has also positioned themselves to have encapsulated interests with their clients on both sides. DIU structures itself as a bridge, or middleman in the positive sense. DOD entities come to them with problem sets which they refine and shape before presenting to the tech industry. Instances where Special Operations are the client are especially positive because of the unique funding attitudes previously discussed, the maturity, experience, and training of their personnel and an assignment process which keeps personnel within a small community throughout their careers.

The combination of DIU and SOF is the best available to accomplish some pathfinding goals. First, DIU and SOF personnel can build the relationships of effort 1. Compare a consistent team of DIU representatives and a small pool of SOF clients against the larger DOD where the bidding company may deal with Air Force Materiel Command on one effort and Army Futures Command on the next with no familiar faces. Second, the DIU model of public problem statements and classified solutions where required is a best practice. SOF often functions with similar practices stating requirements and capabilities which can remain unclassified while their applications are heavily protected. Third, DIU has positioned themselves so that the success of a bid is a success for their program. All interested parties succeed if a bid is executed. The customer has their need addressed, the DIU program records a success, and the company is awarded a contract.

⁸⁶ Defense Innovation Unit, “Defense Innovation Unit,” accessed June 13, 2023, <https://www.diu.mil/>.

DIU and SOF should be taken as a model which successfully applies the pathfinding principles and showcases trust as a primary driver to minimize costs.

E. REASONABLE EXPECTATIONS

There are limitations in scale and scope that can be accomplished through a DIU model. This will not be the means through which the Air Force acquires the Next Gen Air Dominance fighter but it should be the way the DOD stops failing at clearing low bars such as the replacement for the Defense Travel System, a rather modest travel booking site. Small scales should be embraced because these were the cases where the traditional DOD acquisitions process was most maddening. The DIU-SOF model also thrives with dual-use civilian and military technology. This is a reality, but not a crippling one as all fourteen Critical Technology Areas referenced by DOD Undersecretary for Research and Engineering are just such dual use.

F. CONCLUSIONS

Trust and Trustworthiness are the keys to avoiding costly failure in high tech acquisitions for the DOD. By applying the work in adjacent fields, we can assert that though tech presents unique challenges, methods which build trust are possible. The Defensive Innovation Unit best practices and unique position of Special Operations as a customer should be taken as good example of the pathfinding principles to build trust. Despite their discomfort with each other, partnership between the tech industrial base and the Pentagon is vital to retaining an advantage in strategic competition and deterrence.

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IX. CONCLUSIONS AND RECOMMENDATIONS

Given the broad topic area explored, this conclusion will bring the research question back to the surface and present focused conclusions from the previous chapters. Regarding the research question, how can the role of Air Force Special Operations Command as a pathfinder for the Air Force be better understood and optimized? This chapter will present targeted recommendations.

A. AFSOC SUITABILITY TO BE INNOVATORS AND EARLY ADOPTERS

Air Force Special Operations command is suited to be an innovation pathfinder for the conventional Air Force so long as it leverages its strengths and avoids fighting against institutional factors it cannot affect. AFSOC is not especially suited to affect change in the larger acquisition system but is of an agile size and culture which suits innovation even within DOD confines. Smaller sized projects benefit from proven AFSOC and SOCOM methods to acquire and field quickly. Smaller projects are also more agile, being more wholly within AFSOC's sphere of control. Equally important are innovation pathfinding efforts of organization or planning with are low or no inherent cost such as trial organizational structures, employment methodologies and new workflows.

The work being done to create programmatic oasis for emerging technologies for the Air Force can be utilized by AFSOC to ensure that those oases provide benefit to the force beyond programmatic life support. AFSOC Pathfinding can operationalize these oasis projects. This allows the cycle of destruction and creating to begin earlier, utility to be drawn from the technology sooner, and a more robust product complete with operational experience to be passed to the end customer. While it exists in the oasis, AFSOC benefits from its use and gains experience employing with cutting edge technology, strengthening innovation culture.

Innovative culture of AFSOC is vital to performing pathfinding missions despite few structural advantages relative larger organizations. Reciprocally, encouraging activities which foster initiative and innovation build a culture which helps a unit exhibit

those virtues in their war fighting roles. There will be successes and failures of pathfinding and some projects which do not survive. These failures will not result in full success of wider adoption, but they will bolster AFSOC's innovative culture. Failing fast and strengthening a culture of innovation are beneficial pathfinding outcomes.

Innovation pathfinding benefits from the application of wicked problem methodologies, and AFSOC is well suited to apply those methodologies. The nature of AFSOC makes it more appropriate to quickly iterate through the cycle of destruction and creation which is essential to progress. The inevitability of failure in pathfinding is the risk that the pathfinder takes on because it is appropriate at their level, but the larger force must be shielded from it.

B. LESSONS FROM THE INNOVATION ECOSYSTEM

The larger innovation ecosystem offers insight on how AFSOC can more effectively pathfind innovation. These lessons from business and industry can be applied relatively directly to the appropriateness of an effort as pathfinding. First, being a technology first mover entails large amounts of cost and risk, much of which can be minimized by instead being a fast follower. There are drivers which make first mover costs necessary, but seeking efficiency and return on investment, pathfinding should be a case of fast following wherever possible.

Innovation is given a wide berth and often managed vaguely, but there are effective strategies which can be utilized to categorize and manage innovation. Industry best practices provide potential models for pathfinding to follow, and guidance on how AFSOC can manage pathfinding while respecting its core missions. Of the three categories of core, adjacent and transformational innovation, pathfinding should focus on adjacent innovation. This provides a moderation of the risk involved and leverages either existing products or existing markets, to use the business vocabulary. These strategies can be employed to ensure that the AFSOC innovation portfolio remains balanced regarding risk and potential reward.

Trust is ever present even in organizations and process which would be considered trust-free or entirely dependent on compliance. Pathfinding offers

opportunities to increase trust as well as to demonstrate trustworthiness such as close working relationships with the Defense Innovation Unit and industry. The relationships of trust are what enable performance in acquisitions beyond the minimum baselines.

C. RECOMMENDATIONS TO AFSOC PATHFINDING

- Recommendation

Example of an initiative which demonstrates the principle.

- Value access to resources and colocation with innovation centers in basing decisions. Adjacency of a base to industry and education hubs should be considered in the same vein as access to training space.

Example: Davis-Montham AFB adjacency to the University of Arizona.

- Formalize the seriousness of AFSOCs dedication to an innovative and initiative driven culture by formalizing Innovation Pathfinding as a Special Operations Core Activity in AFDP 3–05.

Proposed Text: Innovation Pathfinding: Acquisition of technologies and development of organizational advances specifically for the purpose of aiding strategic goals of the parent conventional force. These advances support special operations missions in the short term, and scale to wider adoption.

- Prioritize innovation pathfinding opportunities which are low cost and capitalize on culture relative technology driven programs.

Example: AFSOC’s proposal of Groupless Wings.

- Scale pathfinding to remain within the narrow window of agility which SOCOM has found in the acquisitions world. Expanding scale will be done by the parent force.

Example: SOCOM Ghost rapid acquisition teams

- Optimize Pathfinding by focusing on efforts of adjacent innovation by projecting core competencies into new mission areas or creating new competencies within existing mission areas. Pathfinding should comprise 18% of AFSOC's innovation portfolio.

Example: Forward area refueling procedures aiding Air Force Agile Combat Employment.

- Make conscious judgement whether AFSOC is positioned to be a first mover or fast follower regarding an initiative. Most pathfinding efforts should be that of fast following for the advantages it offers. Pathfinding should also push risk forward in program timelines.

Example: Autonomous glide vehicles for airdrop.

- Assign value to recurring partnerships, colocation, organizational flatness, and the other factors which contribute to trustworthiness. Trust drives better outcomes than compliance.

Example: AFSOC liaison placement at Defense Innovation Unit.

Air Force Special Operations command is well positioned to lead innovation pathfinding to the benefit of the larger conventional force. As pathfinders, they will move boldly, take on risk where appropriate, shield the larger force, and enable strategic impact in outsized ways.

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