

# **DOMINATING AIR, SPACE, AND CYBERSPACE THROUGH INNOVATION**

**CGOS' PERSPECTIVE ON FOSTERING A USAF CULTURE OF INNOVATION**

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## ABSTRACT

Today, the United States Air Force faces unclear threats and an uncertain fiscal future. A scarcity of resources and the threat of future operational requirements drive the need to ‘do more with less,’ via new, innovative solutions. General Welsh, the Chief of Staff of the Air Force, has recently espoused the need to empower Airmen at all levels to innovate. Regrettably, the rate at which institutional structures like the Air Force innovate slows as the organization adapts to its current threat environment. The Air Force must find a method, besides an emergent crisis, to foster a culture of innovation throughout the ranks.

This proposal defines Innovation and proposes the Six Phases of Air Force Innovation. Utilizing the innovation model, analysis highlights existing barriers to innovation. These hurdles include an inability to identify organization issues, weak problem solving, bureaucratic complexity, perception issues, employee turnover, and organizational culture. To mitigate and overcome these barriers, all echelons of the Air Force must embrace the importance and immediate criticality of innovation.

By consulting current literature on innovation management, including over ten meta-level analysis studies on public and private organizations, a common trend of innovation enablers emerged, including: decentralization of action, synchronization of innovation efforts, use of push and pull innovation processes, cross-functional teams, feedback mechanisms, and rapid enterprise communication.

A heavy emphasis should be placed on training and education to inculcate a culture of innovation. This includes training Airmen on existing channels for elevating ideas and advice on how to effectively advocate for their ideas. Also recommended, is increased education of the total force, beginning in accessions and geared towards developing analytic thinkers through techniques such as Strategies to Task and the tactical debrief. Leaders must also communicate to their Airmen by using every opportunity from commander’s calls to leaders’ visits; demonstrating support for innovation and their acceptance for calculated risks—even if they result in failure. These words should also be supported by enduring incentives like local awards that communicate leader’s support for innovation.

A new Air Force Innovation Center at Headquarter Air Force will be the backbone for facilitating a new culture, supporting a decentralized and synchronized innovation climate that harnesses the industry-standard light touch approach, via Innovation Facilitators embedded throughout Air Force units. The Air Force Innovation Center will enable pull innovation efforts from leaders, as well as push innovation attempts from all ranks. ‘Flash Rewrites’ of existing Air Force instructions will streamline procedural fixes and cut through bureaucratic complexities. This construct will also establish and maintain a new Innovation Forum, to facilitate cross-functional teams and enterprise communication.

By establishing these new organizational structures and encouraging an innovation mindset, this paper posits that the Air Force can instill a new culture of innovation that will make every Airman an innovator. Through implementation of these solutions, the total force can meet General Welsh’s intent and rise to the challenges of the new era.

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## PART I: INTRODUCTION

*“If it doesn’t make common sense... don’t do it... [Airmen] don’t feel empowered. They don’t feel like they can make decisions or make suggestions because they don’t think anybody will listen to them. We’ve got to change that. If we don’t, we’ll fail.” (Welsh, 2013)*

Militaries have historically been associated with great innovation, but it does not necessarily come easily, or frequently. Innovation within militaristic, institutional structures can be a difficult and painful process for the innovator. In Interwar Europe on the eve of World War II, France, Germany and England all sought to innovate the technology and doctrine of armored warfare in a fiscally and politically constrained post-war climate. Both France and England had difficulty achieving buy-in within their chains of command, and even the now famous Charles De Gaulle was passed over for promotion because of advocating armored warfare<sup>1</sup> The advantage attained by Germany was evident, as early in the war they achieved great tactical success even with less developed technology.

As urgency subsides and complacency settles in due to peace or unrivaled power, “there is only one thing harder than getting a new idea into the military mind, and that is getting an old one out.”<sup>2</sup> After the initial wild success of the Blitzkrieg, German doctrine never evolved with the development of heavy and super heavy tanks, and on the high of their own early success, the Germans gradually became ineffective in combat.<sup>3</sup> This kind of stagnation threatens to erode any organization (military or private) that does not continually seek to become leaner and more effective at its mission.

As it did during the Interwar period, the US faces ambiguous threats, wider international commitments, new technological capabilities, and heavy fiscal constraints.<sup>4</sup> The current sequestration environment with Continuing Resolution Authorities presents a unique challenge to the US Department of Defense. Today, the Air Force must continue to innovate during a drawdown, following twelve years of war and amidst emergent threats and a fiscally uncertain future; it must innovate during peacetime to maintain its tactical and strategic contributions to the National Security Strategy. With potential competitor nations rapidly advancing their own warfighting capabilities, it is not enough to sustain current operations; the Air Force must continue to advance into the future, even as the budget shrinks. The Air Force must not only sustain and spend less, but continue to do more with less.

The Chief of Staff of the Air Force (CSAF) published guidance and intent with regards to innovation in his CSAF Vision 2013. He emphasized the development and implementation of

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1 Ian Roxborough, “Organization Innovation: Lessons from Military Organizations,” *Sociological Forum* 15, no. 2 (2000): 368.

2 *Ibid.*, 366-369

3 John Hinks, Martin Alexander, and Graham Dunlop, “Translating Military Experiences of Managing Innovation and Innovativeness Into FM,” *Journal of Facilities Management* 5, no. 4 (2007): 231.

4 Harold Winton, “Military Innovation in the Interwar Period,” *The Journal of Military History* 61, no. 1 (January 1997): 183.

creative new ideas: “[We] need bold leaders at every level who encourage innovation, embrace new thinking, and take prudent risks to achieve mission success.”<sup>5</sup> He directed leaders at all levels to grant Airmen the flexibility and power to innovate: “Leaders should empower Airmen to think creatively, find new solutions, and make decisions.”<sup>6</sup>

Pure innovation demands creativity, but how does one instill creativity in a military organization?<sup>7</sup> By its very nature, creativity thrives on chaos and disorganization. Even beneficial change is inherently disruptive, and the military relies on good order and discipline to be an effective fighting force. The problem then becomes, how does the Air Force foster a culture of innovation that maintains the integrity of the chain of command while still promoting innovation throughout the ranks? Although the Air Force currently possesses significant cultural and process barriers to innovation, a holistic approach involving light touch processes, full-spectrum education and training, and long-term rewards will foster a culture of sustained and effective innovation.

## **Methodology**

Innovation is a contentious term, used with various connotations within government and private sectors. Integrating over forty major studies from current innovation management literature; this paper begins by establishing common ground with an Air Force-appropriate definition for innovation. Through analyzing various definitions for public and private sector models, and how the definition of innovation was adapted to each specific industry and function, the authors then created a definition of innovation within the Air Force. Additionally, six generations worth of innovation models and diagrams were consulted to find a model which accurately represents the innovation process in the Air Force. However, finding no suitable model, this study will create a new six-phase innovation process model that builds off existing literature.

Next, consulting over ten meta-level analysis studies reviewing thousands of companies in the private and public sector, this study highlights common innovation barriers that exist across the spectrum of organizations. Using the six-phase innovation process model, this study then evaluates which barriers may impact the process, and at which points. Furthermore, this paper analyzes proven innovation enablers within public and private organizations by extracting trends from over forty-five scholarly studies and discussions. The research team relied heavily on peer-reviewed sources with special emphasis placed on meta-level analysis articles combining thousands of corporations and organizations into their research.

Finally, this document recommends solutions. The scope of this paper does not include recommendations to improve the operational effectiveness of any particular mission set, but instead argues for a holistic, decentralized approach to fostering a lasting culture of innovation by mitigating barriers, while bolstering proven innovation enablers within the Air Force.

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5 “CSAF Vision 2013,” U.S. Air Force Official Website, [http://www.af.mil/Portals/1/images/airpower/Vision\\_Brochure\\_300DPI.pdf](http://www.af.mil/Portals/1/images/airpower/Vision_Brochure_300DPI.pdf) (accessed 11 November 11, 2013).

6 Ibid., 4.

7 Dr. John Geis (Chief of Research, Air Force Research Institute), interviewed by author, Montgomery, AL, 6 November 2013.

## PART II: DEFINING INNOVATION

*“Necessity is the mother of invention.”*

*-Unknown*

Since the 1990s, scholarly journals and texts devoted to innovation management debated its precise definition. Innovation could be considered the adoption of lean process principles to increase efficiency or, separately, the procurement of new technologies to address expanding mission sets. One article on innovation management smartly defines innovation as “the introduction and application, within a group, organization, or wider society, of processes, products, or procedures new to the relevant unit of adoption and intended to benefit the group, individual, or wider society.”<sup>8</sup> The definition of innovation is fluid at best and it is often tailored to the needs of a specific community.

In times of prosperity, the Air Force can afford to ‘do more, with more.’ In the current fiscally constrained environment, the mantra changes to ‘do more [or the same] with less.’ As the reality of prolonged austerity sets in, some even subscribe to ‘doing less with less.’ In an interview on November 6, 2013, Dr. John Geis of the Air Force Research Institute highlighted the danger of such philosophies; “if we continue to do less with less, we become a second rate Air Force.”<sup>9</sup> In order to maintain a military edge over other international actors, the military must pursue material and non-material solutions to continue improving operational efficiency and effectiveness. This requires innovation across a broad spectrum including processes, procedures, tactics, and technology. Adopting West & Anderson’s (1996) definition above, innovation within this paper is defined as: the process within the Air Force, of developing, implementing, sustaining new technology, processes, tactics, or procedures in order to save money, increase efficiency, or expand capability.

### Types of Innovation

Innovation can be described in its different typology using terms such as radical innovation (such as designing the first tank) and incremental innovation (designing the next version of the tank).<sup>10</sup> Innovation is typically associated with leaps in technology or material solutions, but it is also possible to innovate new processes, tactics, and procedures within an organization.<sup>11</sup> It is critical for the Air Force to focus on both for organizational success. Radical innovation may earn more publicity, but incremental innovation tends to address the proverbial low-hanging fruit with less resource investment and risk. As such, incremental innovation is expected to be far more successful in today’s fiscal environment and ensures the Air Force’s superiority over competitor nations.

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8 Michael West and Neil Anderson, “Innovation in Top Management Teams,” *Journal of Applied Psychology* 81, no. 6 (December 1996): 680-93.

9 Dr. John Geis, interviewed by author, 6 November 2013.

10 Marli Bozac, “Are Innovative Organizational Concepts Enough for Fostering Innovation?,” *International Journal of Innovation Management* 16, no. 1 (February 2012): 2.

11 Ibid., 2

## The Innovation Process

Rigid institutional structures tend to stifle innovation; however, many scholars agree that levels of structure to facilitate innovation are crucial, as an absence of structure also inhibits innovation.<sup>12</sup> Research and modeling of general innovation processes identifies six generations of innovation process maturity:

**Table 1. Six Generations of Innovation Process Models**

Generation	Key Features
<b>First and Second</b>	The linear models – need-pull and technology-push
<b>Third</b>	Interaction between different elements and feedback loops among them – the coupling model
<b>Fourth</b>	The parallel lines model, integration with the firm, upstream with key suppliers and downstream with demanding and active customers, emphasis on linkages and alliances
<b>Fifth</b>	Systems integration and extensive networking, flexible and customized response, continuous
<b>Sixth</b>	Open innovation, self-learning system

Source: Koziol-Nadolna and Swiadek (2010, 169)

The authors posit that the Air Force currently most resembles a Fourth Generation innovation model, with innovative ideas elevated in parallel channels through the chain of command, but lacking lateral exchange that would transition the organization to a Fifth Generation Model. The Air Force does not have the structures and processes in place to enable extensive, cross-functional networking and enterprise-wide lateral exchange of ideas. While the open and self-sustaining innovation of Sixth Generation innovation is considered optimum, it is not compatible with the rigid hierarchy of the military.

In order to outline the flow of an idea from conception to permanent incorporation into Air Force operations, as well as identify appropriate branches for the exchange and evaluation of these ideas, apart from the standard chain of command, this paper outlines a series of innovation phases applicable to the Air Force. The following six-phase process outlines current phases of innovation within the Air Force based upon institutional hierarchical structures that will form the basis for solving the problem of fostering innovation.

### Six Phases of USAF Innovation

1. **Identification of a Problem or Opportunity:** Airmen of all ranks may identify a capability gap, inefficiency, or improvement area which acts as a trigger for the development of innovative ideas.
2. **Develop Possible Solutions:** Airmen must generate their own solutions to the identified issue. Sometimes, it may be a single idea. Other times, the Airmen may develop multiple

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<sup>12</sup> Bozac, “Organizational Concepts Fostering Innovation,” 3.

solutions to the same issue. The Airmen may evaluate possible solutions at their level, or they may elevate them for decision.

3. **Exchange Ideas / Elevate to Leaders:** Airmen laterally compare and exchange ideas, conducting peer reviews whenever possible. If there are multiple possible solutions, Airmen will evaluate and compare, and whenever possible, implement the solution at their level. If unable to execute solution at the lowest level, Airmen elevate the solution(s) via the chain of command for their action.
4. **Authorize / Approve Best Solution:** For approval, leaders evaluate the solution(s) and cost-benefit analysis. Once evaluation is complete, leaders decide whether or not to authorize the solution(s), taking into consideration the required resources for initial implementation and follow-on sustainment.
5. **Implement Solution:** If the solution(s) are approved, forces below authorization level implement the proposed solution as quickly as mission requirements allow and/or demand.
6. **Sustain:** Airmen evaluate success of the implemented solution and exchange findings. They then sustain and codify processes in current procedures and training. If re-evaluation is successful, then leaders distribute and share ideas across the Air Force, and recognize individuals for innovation contributions.

These six phases illustrate how the innovation process in the Air Force should currently work, but are otherwise inhibited due to specific barriers discussed in the following section.

## **PART III: BARRIERS TO INNOVATION**

*“There are certain periods in history when a society is more amenable to change and certain periods when there is a considerable amount of resistance.”*

*– Horat (Bollier 2000, 3)*

Barriers to innovation take many forms and exist throughout the previously outlined six phases of innovation. In order to derive solutions and implement fixes to existing process and culture issues, this paper will analyze barriers commonly occurring in institutional organizations (such as the Air Force) at each of the six phases.

### **Barriers to Identifying Problems and Opportunities**

If Airmen cannot recognize symptoms of an underlying issue or discover an opportunity for innovation, then they are unlikely to initiate the innovation process. A detectable need or area for improvement is an important trigger for innovative thought and Airmen will rarely innovate without it. For example, in WWII the German innovation of heavy tanks presented a difference with fast paced Blitzkrieg warfare, but German officers failed to recognize the

disparity and innovate new tactics, and thus continued repeated application of Blitzkrieg tactics with slower and less maneuverable heavy tanks.<sup>13</sup>

Inadequate operations assessments at units also present challenges in recognizing system shortfalls and mission inefficiencies. Reporting systems such as the Defense Readiness and Reporting System (DRRS) are designed to identify big picture capability gaps, but these systems are only effective if units accurately report metrics.<sup>14</sup> Units may feel compelled to report based on ‘how well are we doing based off what we *can* do,’ rather than ‘how well are we doing based off what we *should* be doing?’ Depending on the reporting philosophy, it is possible for an issue to be highlighted only after an observed mission impact, instead of an impending mission impact.

Airmen are also not always trained to define problems. If a symptom is identified, the Airman who detects the issue may not have the training to perform adequate root cause analysis. If the Airman fails to determine the actual problem, it affects the rest of the innovation process. For example, a potential innovator might identify a root cause as material requirement, when the correct root cause is actually a flawed procedure.

Root cause analysis is not specifically taught during officer or enlisted accessions training. Not all Airmen are trained in Air Force Smart Operations for the 21<sup>st</sup> Century (AFSO21), which encompasses many tools to conduct root cause analysis. Members of the US Air Force Weapons School community, weapons and tactics community, and flying community are intimately familiar with root cause analysis as a part of the tactical debrief process.<sup>15</sup> However, Airmen in some career fields do not regularly engage in tactical debriefs.

Another possible barrier to identification of innovation opportunities is clear commander’s guidance. If priorities are not clearly stated, Airmen have difficulties identifying focus areas. At times, “development efforts suffer because they lack clear, consistent guidance on which operational capabilities should be given highest priority.”<sup>16</sup> Without the guidance, skills, and training to identify problems and areas for improvement, the innovation process is stifled from the start.

## **Barriers to Developing Possible Solutions**

Once an Airman successfully identifies an area for improvement, developing a solution to address the problem has its own series of challenges. The genesis of a new idea requires imagination and motivation. The ability to innovate is not limited to a select few. In fact, trait-driven factors are not consistently related to innovative performance, according to research

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13 Hinks et al., “Military Experiences of Innovation,” 231.

14 *DRRS Primer for Senior Leaders. Defense Readiness and Reporting System Primer for Senior Leaders* 2011, [http://www.highgroundconsulting.net/uploads/3/0/0/4/3004662/drrs\\_psl\\_final\\_-\\_4\\_mar\\_11.pdf](http://www.highgroundconsulting.net/uploads/3/0/0/4/3004662/drrs_psl_final_-_4_mar_11.pdf) (accessed 16 Nov 2013).

15 Secretary of the Air Force, Air Force Instruction 11-415, *Flying Operations Weapons and Tactics Program*, August 17, 2010.

16 Glenn A. Kent, *Thinking About America’s Defense*, (Santa Monica, CA: RAND, 2008), 107.

studies of innovation.<sup>17</sup> More vital to innovation is motivating every Airman to become an innovator, requiring a combination of incentives and receptive audiences.

Incentives for innovation are limited and centralized at Headquarters Air Force (HAF). Named awards such as the General George C. Kenney Award recognize the year's most notable lesson learned.<sup>18</sup> The IDEA program awarded the development of ideas with monetary rewards, but only for the ideas with the most dramatic financial savings.<sup>19</sup> Many firms with central research and development organizations have evidence that short-term incentives such as time-off or one-time monetary rewards do not promote innovation as effectively as long-term incentives, such as recognition impacting an innovator's career.<sup>20</sup>

Furthermore, in today's world communication technologies provide information and power for decision making to the senior leaders far removed from battle. This technology-driven recentralization of organizational command and control can enable micromanagement. Mission impacting issues may put tactical issues under the microscope of operational or even strategic-level leaders, who may direct tactical-level direction from on high.

Micromanagement could stifle the development of innovative solutions to issues at the tactical level. Micromanagement in fact may become the directed execution of 'solutions' that do not address the root cause of the issue, and possibly generate excess work that depletes resources that could be used towards a real solution. Having every action prescribed to young leaders could effectively reduce them from the role of leader to the role of manager and messages a lack of trust in their capabilities. This may be demoralizing to the morale the leader and their Airmen.

### **Barriers to Elevating and Exchanging Ideas**

Once a new idea has been generated, the innovator must either implement it, exchange it laterally for use by another organization, or elevate it to the appropriate level for approval, otherwise the idea may not be realized.

A lack of effective communication channels limits the lateral exchange of ideas. Defense Connect Online and Air Force Global provide methods for the rapid exchange of information across the enterprise, but there is no mechanism for effective lateral exchange of ideas between similar communities of interest across the Air Force. Tactics development programs used by the Air Force are used for disseminating best practices, but this process only disseminates tactical information across the weapons and tactics community.<sup>21</sup> Also, the presence of a senior ranking

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17 Michelle Hammond et al., "Predictors of Individual-Level Innovation at Work: A Meta-Analysis," *Psychology of Aesthetics, Creativity, and the Arts* 5, no. 1 (2011): 99.

18 Air Force Instruction (AFI) 36-2844, *Analysis, Assessments, and Lessons Learned Recognition Program*, 5 July 2011.

19 Air Force Instruction 38-401, *The Air Force Innovative Development Through Employee Awareness (IDEA) Program*, 21 November 2007.

20 Josh Lerner and Julie Wulf, "Innovation and Incentive: Evidence from Corporate R," *The Review of Economics and Statistics* 89, no. 4 (November 2007): 634.

21 Air Force Instruction 11-415, *Flying Operations Weapons and Tactics Program*, 17 August 2010.

officer in any communication forum can impact the nature of what is discussed, as well as affect perceived likelihood of an innovation's success.

A best practice that solves an issue at one installation may not be shared with bases facing the same challenge. Instead the 'wheel is reinvented' repeatedly, expending unnecessary resources to accomplish the same end state. Studies have found that "discussion topics are more likely to diffuse vertically up and down the organizational hierarchy... while news is more likely to diffuse laterally as well as vertically."<sup>22</sup> Understanding these patterns of communication can help leaders overcome institutional barriers and conserve scarce resources.

Aspiring innovators may not know all the avenues available to them for elevating new ideas, such as AFSO21, A9 Lessons Learned, or the Air Force Tactics, Techniques and Procedures (AFTTP) processes. Large enterprises, such as the Air Force, face significant challenges when attempting to educate its workforce about existing processes and resources. Geographic separation, a wide range of specialties, and increasingly constrained resources compounds the difficulty. If Airmen have never been trained on the process in their work center, innovation will be stymied. Corporate leaders often lament, stating: "our people simply do not know what should be done in a well-executed project."<sup>23</sup> A workforce that is undereducated about available channels for innovation may develop good ideas that are never implemented.

Developers of a good idea that requires higher approval may also decide that the idea is not worth elevating. They may perceive that leaders will not be receptive to the idea. In the private sector, studies note that a culture of subordinates striving to conform to a superior's perceived intent often results in only the superior's idea moving forward.<sup>24</sup> Perhaps the innovator may be addressing an issue that has previously been downplayed with higher leaders, and by elevating the issue now risks reprisal from their supervisor. This culture of "yes men" can be a barrier to innovation, especially when the superior holds evaluative power.

Lastly, scholarly leaders are often pressured to prove that they are tactical experts, in touch with the front lines, whereas leaders with combat experience do not have to prove their academic pedigree.<sup>25</sup> This paradox may message to their subordinates that being a 'thinker' is not really a priority. The Airman may take this as a cue, and so the idea falters with the originator.

### **Barriers to Authorizing/Approving the Best Solution**

Although an idea is successfully elevated to the proper approval authority, even a beneficial idea may not be authorized. A leader's background, institutional pressure, and media pressure can cause leaders in public institutional organizations to be unreceptive to feedback and

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22 Sinan Aral, Erik Brynjolfsson, and Marshall van Alstyne, "Productivity Effects of Information Diffusion in Networks," *The MIT Center for Digital Business* 234 (July 2007): 39-40.

23 Sonny Ariss and Vafa Deilami, "An Integrated Framework for the Study of Organizational Innovation," *International Journal of Innovation and Technology Management* 9, no. 1 (2012): 10-18.

24 Canice Prendergast, "A Theory of 'Yes Men,'" *The American Economic Review* 83, no. 4 (September 1993): 757.

25 Williamson Murray, "Thinking About Innovation," *Naval War College Review* 54, no. 2 (Spring 2001): 6.

innovative ideas within the organization as they focus on external pressures.<sup>26</sup> Perhaps the approval authority simply does not understand the need, or they may have a ‘if it’s not broken now, don’t fix it’ philosophy. Getting buy-in to address issues before there is a quantifiable mission degradation can be difficult. This means that operational needs are not being anticipated but instead observed before they are addressed, putting operations behind the power curve.

Significant disparities in age and experience can also undermine a young innovator’s attempts to receive advocacy for their ideas. In both the military and private sector, generational gaps are common between leaders and frontline personnel. The time it takes to progress through the military rank structure builds broad experience, but it takes senior decision makers away from the everyday realities of executing the mission, impacting frames of reference for decisions of innovation. One industry study found, “young individuals that have less invested in the status quo are more likely to see that the current rules no longer define a playable game.”<sup>27</sup> Their fresh perspectives may meet these institutional barriers and go no further, which may lead to disenfranchisement amongst these younger innovators. This is an even greater risk with the upcoming generation of post-millennials entering the work force. A recent study shows that “post-millennials want to promote at the rate their skills and capabilities allow,” and are more likely to be embittered by bureaucratic shackles.<sup>28</sup>

More recently, the “rules” of the game frequently change according to fluctuating annual budgets, producing a climate of greater emphasis on short-term gains over long-term benefits. Leaders often make decisions about innovation within the confines of fiscal considerations that focus on the near-term. Drawing from a meta-analysis study on large public utilities, firms that are subject to the “most complete form of economic regulation (similar to the DoD),” are pushed to be guided by “public expectations and to exhibit high levels of social consciousness.”<sup>29</sup>

Risk aversion can drive a reduced desire to push for innovated processes or procedures when there is risk involved. Industry experts note that “acceptance of failure is a natural part of the innovation process... yet few managers wish to be associated with failed projects, as it damages their profile in the company; firms discourage failure as it reflects on the decision-making process within the company and on the participants who made the decision to carry a project forward.”<sup>30</sup> Additionally, when implementation costs are viewed as too risky in a fiscally constrained environment, it can generate a barrier to authorization of an otherwise innovative idea or concept.

Another barrier observed in the authorization process involves bureaucratic complexity. Emphasis on rigid rules, job descriptions and formal authority has been noted to negatively impact authorization.<sup>31</sup> For example, the perceived complexity of the Air Force IDEA program as outlined from a 31st Force Support Squadron document explains:

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26 Art Budros, “Organizational Types and Organizational Innovation: Downsizing Among Industrial, Financial, and Utility Firms,” *Sociological Forum* 15, no. 2 (June 2000): 301.

27 Ariss and Deilami, “Integrated Framework for Innovation,” 10-18.

28 Dr. John Geis, interviewed by author, 6 November 2013.

29 Budros, “Types and Organizational Innovation,” 279.

30 Antonio Hidalgo and Jose Albers, “Innovation Management Techniques and Tools: A Review from Theory and Practice,” *R&D Management* 38, no. 2 (2008): 122.

31 *Ibid.*, 10-18

During the input process, IPDS [IDEA Program Data System] assigns a number to each idea. IPDS then automatically sends it to the Manpower Office which receives a notification in its e-mail. The Idea Analyst accesses IPDS and completes the eligibility review. The idea is then sent via IPDS to the unit POC for the subject of the idea who assigns it to an evaluator. If the base-level evaluators can “implement” the idea, whether or not they want to, they have the authority to approve or disapprove the idea. If the base-level evaluators do not have the approval/disapproval authority, they must still provide an evaluation and either recommend approval or disapproval. If the idea requires MAJCOM-level evaluation, it is sent through the IPDS e-mail system to the unit POC for the subject of the idea who assigns it to an evaluator. The process continues until a final evaluation decision can be obtained. Throughout the entire evaluation process, the submitter, Idea Analyst, unit POC, evaluator and supervisor receive electronic IPDS notifications explaining the status of the idea in the evaluation process.<sup>32</sup>

While the benefits of the IDEA program are acknowledged, the complex process explained above demonstrates possible bureaucratic barriers to authorization. The IDEA program, in its effort to centralize the approval process, also creates greater structural rigidity and reinforces current organizational paradigms of power, control, and influence. When centralization occurs, a less participatory work environment and further concentration of power can result, further impacting authorization.<sup>33</sup> One scholar noted that any observer can note that the bureaucratic quagmire of slogans, briefings, electronic graphs, presentations and the general trend to procure increasingly expensive weapons systems does not equate to or aid in innovation.<sup>34</sup>

## **Barriers to Implementation**

Even if an idea is approved, it may never actually be implemented. The ‘putting-out-fires’ effect may drive leaders’ priorities to other more high profile events, or distract a commander from following up on the progress of implementation. In the military, frequent personnel turnover due to frequent duty station changes can further impact implementation. When an innovation’s “champion” departs, too often the drive to implement does as well.

When General Krulak, USMC Commandant, set in motion his goal to transform the Marine Corps to a 21<sup>st</sup> century innovation mindset, he was the program’s greatest champion; however, upon his retirement the implementation of his four-year innovation project faltered.<sup>35</sup> Scholars have observed that in order to “overcome innovative barriers in the hierarchical filtering of ideas, paradigm shifts, etc. there must be a diffusion of responsibility for innovation to the lowest levels.”<sup>36</sup> While General Krulak tried to diffuse responsibility through the Marine’s hierarchical structure, his departure prevented implementation.

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32 Idea Program FAQ, 31 Force Support Squadron Website, <http://www.31fss.com/manpower/IDEA-Program-faq.pdf> (accessed 12 November 2013).

33 Ariss and Deilami, “Integrated Framework for Innovation,” 10-18.

34 Williamson Murray, “Thinking About Innovation,” *Naval War College Review* 52, no. 2 (Spring 2001): 1.

35 Terry Terriff, “Warriors and Innovators: Military Change and Organizational Culture in the Us Marine Corps,” *Defence Studies* 6, no. 2 (June 2006): 215-47.

36 Hinks et al., “Military Experiences of Innovation,” 237.

Further impacting implementation, is the time it takes to update Air Force Instructions, Technical Orders, and other authoritative documents. The extensive time, paperwork and approval process required means that documents and guidance needed to execute that innovation may not be complete for many months or years. Situations such as these demonstrate desynchronized processes and offer opportunities to devise new ways to overcome these barriers.

## **Barriers to Sustainment**

Once the unit implements the innovation, sustaining the solution is not guaranteed. The idea's advocate may not codify the innovation in existing documentation. If the advocate leaves their current position, the idea, even an approved idea may not survive changeover. Perhaps the concept only exists as an on-the-job-training task, or in memorandum format. Many times, this tacit knowledge organic to more experienced Airmen is lost upon their departure. Without processes in place to move this tacit knowledge from years of experience or championing new ideas into explicit knowledge that the organization can continue to use, all previous effort could be undone.

Assuming successful implementation and sustainment, there is no formalized process to verify that the solution effectively addressed the issue. A true evaluation requires a valid assessment pre- implementation and post-implementation, and the pre-assessment is not always available. There may not even be an appropriate assessment process in place. Scholars emphasize the "importance of measurement versus measurement of importance."<sup>37</sup> While metrics are crucial in a performance driven organization, determining if those metrics are relevant to organizational objectives remains an essential step. It is not enough to do things well, if the organization determines that the unit is not even doing the right things, and this kind of analysis should be applied to continuously evaluating the applicability of solutions.

## **PART IV: PROVEN ENABLERS OF INNOVATION**

Once innovation management research took flight in the 1990s, scholars began to collect data on and evaluate how the corporate world and US military support innovation. Surprisingly, studies showed resource constraints were seldom an obstacle to innovation. Instead, resource limited environments frequently served as catalysts for innovation.<sup>38</sup> In the current environment of fiscal scarcity, it is crucial to understand the key enablers of innovation to maximize effectiveness of innovation efforts. After analyzing trends in innovation management literature, many firms and organizations are beginning to adopt an alternative to the open innovation style, called the 'light touch' approach.

The 'light touch' approach focuses on easing formal process controls and sharpening focus on critical elements by embodying four core principles: "1) elements of the organization [have] to be ready to trust each other and know how to use the existing processes and tools, 2) process complexity need[s] to match project complexity, 3) people who [take] responsibility for innovation projects [are] given personal prerogative to conduct projects as they [see] fit,

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37 Hinks et al., "Military Experiences of Innovation," 231-234.

38 Roxborough, "Organization Innovation," 372.

consistent with safety and good engineering practices, and 4) the light-touch process [is] based on the skill and experience of the innovators.”<sup>39</sup> The ‘light touch’ approach ensures a synchronization of effort through guidance and direction, while enabling control and power over the innovation process at the lower tiers of the organization. It serves to facilitate innovation processes throughout the entire organization through the use of a central structure that guides all innovation with a soft hand. The ‘light touch’ process involves a symphony of several key enablers of innovation that have been identified by over ten meta-level analyses: synchronization, decentralization, push and pull innovation support, cross functional teams, feedback mechanisms, and enterprise communication.

## **Synchronization**

Synchronization maximizes the effectiveness of innovations by coordinating efforts across administrative, operational, material, and non-material elements. Without synchronization, a singularly developed tactic or technology often proves far less effective. During World War I, the British introduced the Maxim Medium Machine Gun (MMG) to change the nature of trench warfare dominated by rush & counter-rush tactics. The British chose to employ the weapon by supporting infantry with interlocking fields of fire along the trench line, further stagnating the war by making assaults nearly impossible. Alternatively, the Germans employed a notably more successful technique by placing the MMG along the flank of an enemy line to provide enfilade fire in support of assaults. By not developing new tactics and techniques to pair with new technology, the British realized limited gain from their technological innovation and eventually mimicked German tactics.<sup>40</sup>

Frequently, innovation occurs across many different fields simultaneously. Synchronization is required to ensure unity of effort in line with organizational priorities. A clear sense of mission ensures laser-focus of innovation efforts.<sup>41</sup> Leaders must constantly strive to provide their teams with priorities and a clearly stated vision. Simultaneously, leaders must also promote high standards, support for innovation, and encourage subordinates to evaluate one another and engage in constructive criticism laterally.<sup>42</sup> If individuals within the organization understand and espouse an overarching vision and goals (as opposed to merely being presented with them), leadership empowers individuals to innovate while synchronizing efforts among all elements of the organization.

One notable example of successful synchronized innovation in the military is the US Army’s development of the Brigade Combat Team. During Operations Enduring Freedom and Iraqi Freedom, Secretary of Defense Rumsfeld called for a “light footprint” doctrine, requiring the Army to break one of its most enduring structures: the division. Instead of a brigade operating as part of a division and relying on the support of other brigades, it now operated as its own self-supported unit. Combining this new doctrine with technology improved the combat

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39 Stephen Markham and Hyunjung Lee, “Use of Innovation Board to Integrate the Front End of Innovation with Formal NDP Processes,” *Research-Technology Management* (July-August 2013): 40.

40 Hinks et al., “Military Experiences of Innovation,” 229.

41 Roxborough, “Organization Innovation,” 372.

42 Ute Hülsherger, Neil Anderson, and Jesus Salgado, “Team Level Predictors of Innovation at Work: A Comprehensive Meta-Analysis Spanning Three Decades of Research,” *Journal of Applied Psychology* 94, no. 5 (2009): 1139.

capability of the brigade through defensive capabilities (new armored transports, counter-improvised explosive device technology, [etc.]) and offensive capabilities (air support, drones, command & control capabilities, [etc.]), proving to be an incredibly effective showcase of synchronized innovation.<sup>43</sup>

## Decentralization

While synchronization is a vital innovation enabler, decentralization of the processes and resources of innovation to the lowest possible levels of an organization is also critical. Although structure aids synchronizing innovation efforts, leaders must not overly-centralize the innovation process. Strict control of resources, budgets, and limited autonomy can strongly inhibit sustained innovation. The greatest sustained innovation occurs when a leader creates and empowers autonomous teams which can then find courses of action, test proposed solutions, and present findings to the organization.<sup>44</sup> Many meta-level analyses state the importance of open debate and stress military organizations must inculcate this element if innovation is to thrive. It is critical to overcome the excessive bureaucracies common to institutional organizations by shaping policies to encourage innovation by reducing administrative procedures.<sup>45</sup> Pushing innovation to the lowest possible level achieves this goal.

Organizational autonomy is also critical for innovation. During WWII, Allied commanders empowered the Royal Air Force and the United States Army Air Forces with significant autonomy for tactical and technological development, while the Luftwaffe was still grounded in the Wehrmacht.<sup>46</sup> Although all three organizations possessed vast organizational competence, the Allies created the largest gains in innovation overall.<sup>47</sup> Another example was the incredible tactical successes of the German army early in WWII, due mostly to their use of “Auftragstaktik” – or “standing order tactics” – decentralizing the “how” in executing tactics to the lowest possible level.<sup>48</sup> Organizational leaders can be easily seduced by the relative ease of imposing centralized control and execution with advances in modern information technology, often forcing the “how.” In stark contrast, research determined creating latitude for local managers to determine the “how” is critical in allowing innovation to occur.<sup>49</sup>

## Push and Pull Innovation Support

From an economic perspective, innovation occurs through the interaction of user needs (market pull) and seller capabilities (market push).<sup>50</sup> In a free market, the notion of push/pull

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43 Matthew Ford, Patrick Rose, and Howard Body, “COIN is Dead- Long Live Transformation,” *Parameters* (Autumn 2012): 32. <http://strategicstudiesinstitute.army.mil/pubs/parameters/Articles/2012autumn/Fordetal.pdf> (accessed 16 November 2013).

44 Deborah Dougherty and Cynthia Hardy, “Sustained Product Innovation in Large, Mature Organizations: Overcoming Innovation-to-organization Problems,” *Academy of Management Journal* 39, no. 5 (October 1996): 1145-50.

45 Hidalgo and Albers, “Innovation Management Techniques,” 122.

46 Roxborough, “Organization Innovation,” 369-371.

47 Ibid.

48 Hinks et al., “Military Experiences of Innovation,” 230.

49 Ibid., 226-227.

50 Zoe Szajnarfarber, Matthew Richards, and Annalisa Weigel, *Challenges to Innovation in the Government Space Sector*, (Fort Belvoir, VA: Defense Acquisition University, July 2011), 261.

dynamics happens freely. As such, sellers constantly adapt to buyer needs to gain increased market share, or influence buyer needs by creating new markets entirely. Similarly, innovation within an organization can be enabled by the push of innovative ideas from members of all ranks and statuses, while simultaneously receiving the political support of pull efforts from the organization itself.

To cultivate the most productive culture of innovation, an organization must facilitate a constant push of ideas from the junior ranks. This allows the market of intellectual capital to constantly reinforce enablers of innovation, reveal previously unknown opportunities for improvement, and stand primed for the moment a leader demands a pull of innovative ideas. The Soviet Union, following World War II, effectively perpetuated a push and pull environment conducive to rapid and sustained innovation for its ground forces coming from all levels of membership.<sup>51</sup> The Soviet military's leaders focused on the ability to pull ideas and requirements from the bottom, and then apply centralized resources.

Meanwhile, the Office of Net Assessment dragged the United States through its innovation affairs.<sup>52</sup> Researchers indicate healthy innovation environments require the presence of both bottom-up push and top-down pull mechanisms.<sup>53</sup> These push and pull mechanisms can empower employees at the lowest level to generate, elevate, and implement innovative ideas. Furthermore, as subordinates see their ideas vigorously sought and implemented by leaders, the organization fosters a new climate receptive to innovation and empowerment.

## **Cross-Functional Teams**

Team composition in the innovation process is critical. Research studies show team-related variables display statistically stronger links with innovation than individual or input variables.<sup>54</sup> In order to achieve maximum effectiveness, team composition must span more than one career field. By brainstorming with people outside of their core specialty, new information and diverse perspectives are introduced into the group, thereby facilitating the generation of new ideas.<sup>55</sup> After researching 1,170 German corporations, one study indicated open innovation was greatest in organizations advocating for strong cross-functional collaboration on projects (along with other enablers listed in this section).<sup>56</sup>

There are a variety of flexible ways to reap the benefits of cross-functional teams. Cross-functional teams do not need to be geographically co-located. In fact, virtual teams are rapidly becoming the norm in corporate problem solving. Enabled by technology, these long-distance teams are able to share diverse experiences and perspectives, further enabling innovation. Cross-functional teams can be permanent or follow the short-term design of an integrated product team. Even low level, lateral discussions with other organizations unlocks many benefits of the cross-

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51 Dima Adamsky, *The Culture of Military Innovation: The Impact of Cultural Factors On the Revolution in Military Affairs in Russia, the Us, and Israel* (Palo Alto: Stanford University Press, 2010), 1-248.

52 Ibid., 1-248

53 Ibid., 1-248

54 Hülsherger et al., "Team Level Predictors," 1139.

55 Ibid., 1139.

56 Torsten Salge et al., "Harnessing the Value of Open Innovation: The Moderating Role of Innovation Management," *International Journal of Innovation Management* 16, no. 3 (June 2012): 1.

functional team.<sup>57</sup> Organizations wishing to have sustainable and effective innovation programs must foster an environment in which cross-functional discussion, team forming, and consistent intra-organizational communication are consistently encouraged.

## **Feedback Mechanisms**

No organization can function without effective feedback throughout the chain of command. Feedback is the simplest and most effective way of identifying organizational inefficiencies and opportunities for improvement. It enables effective implementation of solutions and can identify when an innovative idea does not fulfill a desired requirement. Feedback can take many different forms: tidings of victory after a unit implements a successful innovative idea, explanations of why leaders chose not to implement a proposed innovative solution, communication from the ranks identifying potential areas for innovation, and recognizing those who dare to innovate even if failure occurs.

Research indicates the principal predictor of successful innovation within an organization is leader support for innovation (often expressed through feedback), as 46% of the variance in overall innovation directly correlated to that variable.<sup>58</sup> Subordinates may even test leaders by elevating small-scale ideas. If the organization does not provide feedback and rationale regarding an idea's fate, subordinates may perceive leaders as unreceptive to innovative ideas.

Feedback in the form of performance incentives is also a powerful tool to enable innovation. Significant research indicates extrinsic and intrinsic motivation positively correlate with innovative organizations, with emphasis on long term (often intangible) rewards as more beneficial than short term financial incentives.<sup>59</sup> Without incentives, members of an organization possess little motivation to do more than basic duties. Organizations must create a culture to reward and encourage innovation through comprehensive recognition.<sup>60</sup>

## **Enterprise Communication**

To promote innovation, an organization must facilitate communication throughout all echelons of its structure and across other organizations of similar mission sets. Research identifies strong positive correlations between innovation and communication (particularly lateral communication) as a crucial element in fostering innovation within an organization.<sup>61</sup> When an organization facilitates enterprise communication it can enable, through open communication, peer review of innovative ideas and opportunities for cross-functional buy-in.

Communication fosters not only exchange, but also allows an organization to harness diversity. Every organization possesses some level of dissent among its members, but groups showing moderate levels of minority dissent combined with a high participation level typically

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57 Hülsherger et al., "Team Level Predictors," 1139.

58 Michael and Anderson, "Innovation in Top Management Teams," 680-93.

59 Michelle Hammond et al., "Predictors of Individual-Level Innovation at Work: A Meta-Analysis," *Psychology of Aesthetics, Creativity, and the Arts* 5, no. 1 (2011): 90-105.

60 Hidalgo and Albors, "Innovation Management Techniques," 120-121.

61 Hülsherger et al., "Team Level Predictors," 1139.

have the largest probability for innovation.<sup>62</sup> Groups lacking this level of participation but still possessing a moderate level of minority dissent tend to have lower levels of innovation.<sup>63</sup> Fostering an avenue for communication throughout the enterprise allows for free exchange of ideas and debate without inundating (or circumventing) the organization's chain of command.

As the research indicates, any organization desiring innovation must foster an environment of enterprise communication. With enterprise communication and a balance between synchronization and decentralization, an organization can rapidly identify areas for improvement, create cross-functional teams, develop innovative solutions, receive fast and relevant feedback, and leverage push and pull environments to sustain creative thought. With these elements in place, an organization possesses the greatest chance for innovation.<sup>64</sup>

## **PART V: RECOMMENDED SOLUTIONS**

*“The services that innovated with considerable success in the interwar period possessed internal cultures that encouraged debate, study, and honest experimentation in their preparations for war. Professional military education was clearly a part of the process; so was serious study and writing outside of the schoolhouse. Erwin Rommel, the preeminent “muddy-boots” soldier in the German army, not only read books but wrote them. Further, military cultures that innovated well cultivated substantive exchanges about the significant military issues of the day.” (Murray 2001, 4)*

Many have said that the only tradition in the Air Force is change, but that same concept can be embraced in the culture as well. Addressing barriers to innovation demands a direct approach, aimed at integrating an innovative mindset throughout the Air Force. A total force solution must include structural fixes to facilitate the flow of ideas and expedite the implementation of solutions. Additionally, efforts to foster a culture of innovation where leaders at all echelons promote and encourage the right kind of innovation are just as vital.

### **Fostering a Culture of Innovation**

No matter what organizational structures are put into place or what processes are modified, nothing will change unless innovation is part of the Airman culture.<sup>65</sup> Promoting this culture of innovation down to the lowest ranks will require leaders to enable, encourage and protect innovators.

This paper recommends that leaders internalize Mission Command-style leadership as a method to enable innovation (and decisive action overall) in their Airmen. Mission Command is defined in Joint Publication 3-0 as “the conduct of military operations through decentralized

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62 Carsten De Dreu and Michael West, “Minority Dissent and Team Innovation: The Importance of Participation in Decision Making,” *Journal of Applied Psychology* 86, no. 6 (2001): 1191-92.

63 Ibid., 1196-1197

64 Roxborough, “Organization Innovation,” 367.

65 Dr. John Geis, interviewed by author, 6 November 2013.

execution... [and] demands that subordinate leaders at all echelons exercise disciplined initiative and act aggressively and independently to accomplish the mission.”<sup>66</sup>

Joint Force 2020 will require that Commanders “clearly translate their intent (and that of higher) to their subordinates and trust them to perform with responsible initiative in complex, fast-changing, chaotic circumstances.”<sup>67</sup> The commander must be very clear in stating their overall mission priorities, so that Airmen can focus their efforts appropriately, but never be prescriptive in how to accomplish specific tasks. Increasing the complexity and autonomy of work centers will foster creativity and innovation at work.<sup>68</sup> By not prescribing a solution, a leader encourages innovation in subordinates.

Leaders at all echelons must communicate support for innovative thinking. Meta-analysis suggests that clearly requiring and encouraging creativity and innovation on the job will in fact foster innovation at work.<sup>69</sup> Be it commander’s calls, guard mounts, briefings and debriefings, education and training, public appearances, or work center visits, the desire for innovative thinking must be espoused by all levels of leaders down to the lowest ranks. It is vital leaders stress the importance of fostering a culture receptive to negative feedback as a method to improve their overall efficiency and effectiveness. They can achieve this through encouraging their Airmen to bring forward areas for improvement without a fear for reprisal, and approaching them through innovative venues such as ‘town-hall’ style meetings, or direct feedback. This allows commanders to identify new areas for improvement.

Leaders should also encourage calculated risks in their people and be willing to shield them when they fail. The success of the Green Berets in counterinsurgency grew only out of a long history of bitter failure by the allied nations in such tasks.<sup>70</sup> Sometimes an idea will not pan out, no matter how much time is dedicated to it. Innovation management scholarship argues that support for innovation occurs when innovative attempts that fail are rewarded rather than punished.<sup>71</sup> The CSAF has urged Airmen to take calculated risks, but somehow, leaders at all echelons have to make it alright for Airmen to try new things and sometimes fail.

## **Air Force Innovation Center**

Establishing an Air Force Innovation Center (AFIC) will provide enough structure to facilitate the exchange of ideas and instill an ‘innovation mindset’ throughout the ranks. The proposed Air Force Innovation Center is modeled loosely off the Air Force Safety program and extends Air Force-wide innovation from its current level at HAF, down to the units. Utilizing the “light touch” approach, it will provide synchronization between existing innovation centers such as the Air Force Academy Center of Innovation, Space Innovation and Development Center, and Air Force Research Laboratory, while also supporting low level needs.

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66 Joint Publication 3-0. *Joint Operations*. 11 Aug 2011.

67 Martin Dempsey. “Mission Command White Paper.” 3 April 2012.

68 Michelle Hammond et al., “Predictors of Individual-Level Innovation,” 101.

69 Michelle Hammond et al., “Predictors of Individual-Level Innovation,” 101.

70 David Cawood, “Managing Innovation: Military Strategy in Business,” *Business Horizons* (November-December 1984): 62.

71 West and Anderson, “Innovation in Top Management Teams,” 680-93.

The HAF-level AFIC will include four core divisions: the Analysis and Integration Division, the Processes and Procedures Innovation Division, the Personnel and Force Development Division, and the Technology Innovation Division. This four-division structure may be mirrored at the Major Commands if desired, but with reduced manning. The AFIC concept recommends an Innovation Facilitator at the NAF, wing, group (if desired), and squadron levels. This proposal recommends that the Innovation Facilitator be a dedicated position at the NAF and wing level, and an additional duty at the group and squadron level. The role of the Innovation Facilitator is not to develop or screen ideas, but to encourage other Airmen to innovate and to facilitate the success and exchange of beneficial ideas.

The first division is the Analysis and Integration Division. The primary role of this division is to synchronize innovation across procedures, processes, and technology in the Air Force with specific emphasis on far reaching and Air Force wide efforts. The division is responsible for standing up HAF-level “Innovation Planning Groups” to address special topics and overarching Air Force issues. The “Innovation Planning Group” is a temporary construct, similar to the Air Operations Cell’s Operational Planning Team (OPT) construct, which draws subject matter expertise from across the Air Force to attack a specific problem set. Other units may choose to adopt this construct as well to address their own internal issues.

The Analysis and Integration Division is also responsible for the establishment and maintenance of an Air Force-wide “Innovation Forum” that will foster an exchange of ideas. “Innovation occurs best when you can piggyback ideas,” claims Dr. Geis. “How can you do that? By talking to each other.” The Innovation Facilitators alone have submission permissions for their units, in order to facilitate standardization and correct use of the Innovation Forum; however, all Airmen will have access for peer review and exchange of ideas. The forum will be structured by shared missions and not organization, and should utilize a topic-tagging system similar to social networking sites.<sup>72</sup> Research indicates that high communication and contribution which is central to innovation is often inhibited by globally distributed teams (i.e. career field dispersion across bases).<sup>73</sup> A cross-functional, enterprise communication based forum, such as this, could mitigate these complications with globally distributed teams.

The second core division is the Processes and Procedures Innovation Division. This division will assist in synchronizing innovation projects through the Analysis and Integration Division and facilitate the implementation of non-material solutions across the Air Force. Research shows that “innovation goes far beyond the invention itself... [and] requires attention to organizational capacities, societal institutions...cultural norms, customer relationships, public policy, and financing mechanisms, among many others.”<sup>74</sup> When a beneficial non-material solution is identified, this division is responsible for looking for other cross-functional applications for the idea.

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72 Dr. John Geis, interviewed by author, 6 November 2013.

73 Ravi Gajendran and Aparna Joshi, “Innovation in Globally Distributed Teams: The Role of Lmx, Communication Frequency, and Member Influence On Team Decisions,” *Journal of Applied Psychology* 97, no. 6 (2012): 1252.

74 David Bollier, *Ecologies of Innovation: The Role of Information and Communication Technologies* (Queenstown: The Aspen Institute, 2000), 3.

The Processes and Procedures Innovation Division will also specialize in expediting updates to AFIs and TOs to facilitate the implementation of new processes. This division will work in close coordination with the MAJCOMs to facilitate rapid coordination and approval of documentation on a sixty day timeline from the date of electronic submission—a ‘Flash Rewrite.’ Flash Rewrites will improve efficiency, conserve resources, and/or improve operational effectiveness of the Air Force. Flash Rewrites honor the chain of command and existing regulations while being an excellent answer to the CSAF charge: “if it doesn’t make common sense...don’t do it.”<sup>75</sup>

Commanders in the chain of command beneath the approval authority (whomever the signatory is on the original regulation) will have the opportunity to comment and non-concur but will not have disapproval authority. The Innovation Facilitator at that tier is responsible for ensuring all Flash Rewrites are briefed within timelines and that feedback is provided to the originator of the idea. For all requests submitted through this process, feedback must be returned within sixty days. This feedback requirement is critical to encouraging innovators to continue coming up with new ideas.

The third core division is the Technology Innovation Division. This division will facilitate implementation of expedited material solutions to problems and needs throughout the Air Force. It will focus primarily on material solutions that are low cost and rapidly implementable, but will identify more revolutionary opportunities for development through existing acquisitions and contracting structures. The division will facilitate synchronization of efforts, needs, and programs with the Analysis and Integration Division and highlight cross-functional applications for identified material solutions.

The fourth core division is the Force Development Division. Its primary role is to foster a culture that develops every Airman as an innovator and to support the Air Force mission. This division will develop a new generation of critical thinkers capable of identifying inefficiencies and areas for improvement via a robust training and education program for all Airmen (enlisted and officer). Training will begin during accessions so that Airmen enter the Air Force as analytical problem solvers with an innovation mindset, and their education should carry through professional military education at all levels.

This training should include problem solving models such as the tactical debrief process (identifying issues, performing root cause analysis, and developing lessons learned), or General (Ret.) Glenn A. Kent’s Strategies to Tasks methodology (emphasizes the requirement to always ‘start with why’ and derive from that what must be done). “Central to this construct is to link the ‘system’ at hand to the larger picture,” which has a variety of possible applications including material and non-material innovative solutions.<sup>76</sup> Currently, advanced problem solving models such as these are not universally taught among all professional military education systems up and down the ranks.

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75 CSAF Vision 2013, 4.

76 Kent, *Thinking About America’s Defense*, 118.

The Force Development Division will also develop additional training to be disseminated to the units via the Innovation Facilitators. Topics may include training on existing processes for elevating new ideas (such as A9 Lessons Learned and the new Innovation Forum), the process and use for standing up Innovation Planning Groups, and educating Airmen on being effective advocates for their own ideas. The division will also oversee a robust awards program, including Headquarters Air Force level awards and publicize those named awards that currently exist. There will also be a new, special emphasis on wing level awards for innovation, encompassing a robust quarterly and annual award program modeled after Air Force Safety. The Innovation Facilitator will serve to promote incentive programs and distribute innovation public affairs pieces to their units.

The Force Development Division will also contain a Staff Judge Advocate office and a Public Affairs office. The Staff Judge Advocate will facilitate legal advice for innovation, contracts, and acquisition. The Public Affairs office will promote awareness, manage an official website, publish articles, photos, public service announcements, and maintain a quarterly innovation journal. This journal will broker support with the American public by demonstrating that the Air Force can be a cutting-edge force and still be good stewards of taxpayer's dollars. Just as important, it will message to Airmen that the Air Force is serious about innovation, which is the first step to fostering a culture more receptive to innovation.

## **CONCLUSION**

The Air Force stands at a crossroads today with unguaranteed levels of funding and an uncertain future. Despite the fact that militaries have proven to be capable innovators during times of war, its institutional structure encumbers agile adaptation and innovation during peacetime. Many barriers exist across the Six Phases of Air Force Innovation, which include a number of structural, procedural, and Air Force culture issues. Scholarly studies on innovation management from the 1990s to present day (which includes case studies and quantitative meta-analysis describing factors that enable innovation) offer a beacon of hope which the Air Force and the Department of Defense can move towards. Only through a change in institutional culture will the Air Force achieve meaningful and sustainable innovation processes.

To foster this culture of innovation, a heavy emphasis must be placed on training and education. Leaders must use every opportunity to emphasize innovation and behaviors conducive to innovation, whether the delivery method be commander's calls, base-wide messages, or leader visits. These messages must stress the requirement for innovation, forgiveness for calculated risks, and the importance of timely feedback and incentives (such as local awards). The institution of the Air Force must embrace the importance and immediate criticality of innovation at all levels, which begins with this culture change and must be sustained by structural changes.

This paper recommends the establishment of an AFIC that will support a decentralized and synchronized innovation process. AFIC processes will enable a light touch approach to innovation, via its Innovation Facilitators, encouraging innovation at all levels. The AFIC construct will also establish a cross-functional forum that encourages the fusion of ideas across organizations and greater enterprise communication. Furthermore, this structure will ensure that

innovation pull efforts from leaders, as well as push efforts from the most junior ranks, are facilitated quickly. Only through this holistic approach to fostering innovation in the Air Force can General Welsh's intent be realized.

General Krulak, former Commandant of the United States Marine Corps, offers a critical lesson in cultural change. General Krulak saw a need to change the Marine Corps culture to support lasting innovation in technologies, tactics, and doctrine. He set about implementing new programs like the Marine Corps Warfighting Laboratory to spearhead doctrinal and tactical innovation through research and development stylized wargaming, as well as establishing the Marine Mail system which allowed all Marines to submit innovative ideas to higher headquarters.<sup>77</sup> General Krulak also focused heavily on education for all Marines, and talked regularly with his senior leaders about his intent.<sup>78</sup> Despite a long-standing tradition of innovation within the United States Marine Corps, General Krulak's efforts met failure, and by the end of his tenure, few of his programs were in place.

Part of the reason for this failure was his own senior leaders. Many officers surveyed by a researcher stated they felt that they were open to innovation, but that the Marine Corps currently had no need to innovate.<sup>79</sup> Despite General Krulak's best efforts at affecting change within the Marine Corps towards innovation, the lack of buy-in and institutional change creating and empowering innovation at all levels drove the ultimate demise of the process. The Air Force can learn a great deal from this example. Fostering a culture of innovation in the Air Force is no easy task and will take time, manpower, and resources. Moreover, if the Air Force values innovation, the organization must promote the process and bring about institutional change that will ensure innovation's ultimate success.

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77 Terriff, "Warriors and Innovators," 234-237.

78 Ibid. 230-236.

79 Ibid., 236.

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