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# Incentivizing Workforce Innovation and Culture Systemic Factors Influencing Risk Aversion: Piloting the Innovation Alliance Program

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## Acronyms and Abbreviations

| | |
|---|---|
| ACC | Army Contracting Command |
| AIRC | Acquisition Innovation Research Center |
| APG | Aberdeen Proving Ground |
| AQL | Acceptable Quality Level |
| CFO | Chief Financial Officer |
| COR | Contract Officer Representative |
| CR | Continuing Resolution |
| DAF | U.S. Department of the Air Force |
| DFARS | Defense Federal Acquisition Regulation Supplement |
| DoD | Department of Defense |
| FAR | Federal Acquisition Regulation |
| IAP | Innovation Alliance Program |
| KO | Contracting Officer |
| NDS | National Defense Strategy |
| OSU | The Ohio State University |
| OTA | Other Transaction Authority |
| OUSD(A&S) | Office of the Under Secretary of Defense for Acquisition and Sustainment |
| OUSD(R&E) | Office of the Under Secretary of Defense for Research and Engineering |
| PEO | Program Executive Officer |
| SCAD | Systemic Contributors and Adaptations Diagramming |
| SERC | Systems Engineering Research Center |
| UFR | Unfunded Requirement |

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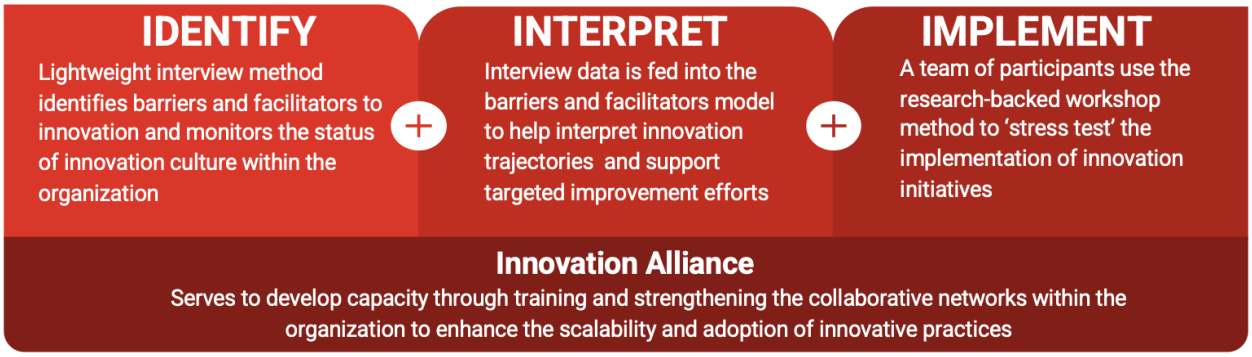
## Executive Summary

In this phase of work, the research team partnered with the Army Contracting Command (ACC) – Aberdeen Proving Ground (APG) to identify systemic pressures on the acquisition workforce that impede innovative behaviors.

The Ohio State University (OSU) team conducted a pilot of the novel Innovation Alliance Program (IAP), which is designed to foster a healthy innovation culture by enabling continuous monitoring to *identify barriers and facilitators*, providing *tools for informed decision-making*, and supporting a co-design process to refine and *scale high-potential innovations.*

**Figure 1. Innovation Alliance Program**




The scope of this study was limited to the first step of the IAP (Identify): To diagnose behaviors using the Systemic Contributors and Adaptations Diagramming (SCAD) technique where the acquisition workforce deviates from typical practice and innovate to accommodate situational constraints. During this five-month study period, 12 SCAD interviews were conducted with a diverse group of acquisition professionals at ACC-APG, as well as program representatives from mission partners ACC-APG supports.

The SCAD technique revealed the most critical *system pressures* identified in the ACC-APG interviews included **innovation prioritization, procedures, time constraints,** and **workload**, as these are the most frequently cited barriers and enablers of innovation. **Leadership support**, acting as a compound pressure, can either amplify or mitigate these challenges, significantly influencing the innovation landscape. To navigate these pressures, key *system attributes*—such as **goal alignment, collaboration, autonomy, room for failure, and organizational learning**—play a crucial role at ACC-APG in empowering the workforce to overcome obstacles and drive meaningful change.

As the scope and duration of this pilot were limited, the team proposes a one-year plan to establish a sustainable, self-sufficient IAP at ACC-APG, transitioning from the pilot phase to full-scale implementation. This includes conducting additional SCAD interviews to deepen insights into innovation, agility, and risk-taking behaviors. Intervention workshops leveraging SCAD findings will refine strategies using a bespoke framework (IMPActS; Balkin et al., 2024; Fitzgerald, 2019), stress-testing innovations for feasibility and sustainability for wider adoption. Additionally, the See-Do-Teach model will be employed to build internal capabilities at ACC-APG, enabling continuous innovation monitoring through training and knowledge transfer. This approach will foster long-term growth, ensuring IAP techniques become embedded within the organization for sustained impact.

## Background

The Ohio State University (OSU) team previously collaborated in two phases (2021-2022, 2023-2024) with the U.S. Department of the Air Force (DAF) to design and pilot an Innovation Alliance Program (IAP). The IAP is structured to uncover the systemic pressures on the acquisition workforce that impede innovative behaviors and produce a system-wide initiative that produces sustainable interventions to address these systemic contributors.

The core functions of the IAP are designed to foster a healthy innovation culture within an organization to ultimately improve the scalability and adoption of innovative practices. Figure 2 illustrates the core functions of the IAP. It provides a method for continuous monitoring to detect signals that indicate barriers and facilitators to innovation (**Identify**). Additionally, it offers a structured model and tool to aid in interpreting these signals, ensuring informed decision-making (**Interpret**). Lastly, the IAP supports a co-design process that refines high-potential ideas, enhancing their feasibility, sustainability, and scalability for broader implementation (**Implement**).

**Figure 2. Innovation Alliance Program**


This study extends the IAP pilot to a new Department of Defense (DoD) partner organization, the U.S. Army Contracting Command (ACC) – Aberdeen Proving Ground (APG), allowing for testing of the IAP in a different organizational context. It serves as a second use case for the Systemic Contributors and Adaptations Diagramming (SCAD) interview technique, designed in the context of the IAP to elicit a current state analysis of pressures impeding and/or facilitating innovation in the organization, understanding of the implications of those different pressures on acquisition agility.

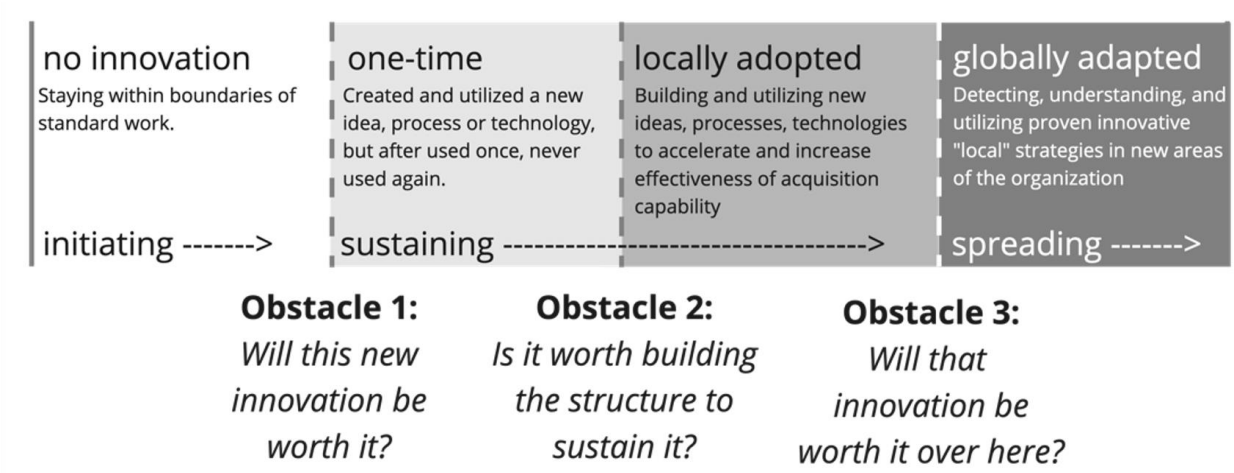
### ***Evolution of an acquisition innovation***

The team's prior research elucidated the process of ingraining a new acquisition innovation from inception to adoption (Girth, et al, 2022). Figure 3 illustrates this process as observed in the DAF, with the obstacles acquisition innovation encounters as it progresses.

The progression of innovation within an organization moves from no innovation to globally adapted practices. Once the decision is made to innovate, three (3) progressive phases are observed: initiating, sustaining, and spreading. The evolution begins with one-time innovation, where a new idea, process, or technology is introduced but not reused. If sustained, the innovation becomes locally adopted, where it is integrated into organizational practices to improve effectiveness. In the final stage, globally adapted,

successful innovations are recognized and scaled across the enterprise. Along this journey, acquisition professions face three major obstacles: (1) determining if the innovation is worthwhile, (2) deciding if it is worth building the structure required to sustain it, and (3) assessing if the innovation is valuable in other contexts. These challenges highlight the barriers organizations face in scaling and embedding innovation.

**Figure 3. Evolution of an acquisition innovation**



## Study Objectives

The primary objective for this study is to pilot the IAP within a second organization, ACC-APG, to facilitate deeper organizational understanding of the systemic contributors that support and impede innovative acquisition behaviors in the DoD. This study allowed for testing of the interview frameworks in a novel environment.

The purpose of the IAP is to help organizations incentivize lasting behavior changes leading to the kind of cultural change required to meet the National Defense Strategy (NDS) to block Russia and China and restore America's competitive edge.

The core functions of the IAP are to provide organizations with:

1. A method for continuous monitoring to **identify** signals of barriers and facilitators to a healthy innovation culture within an organization.
2. A model and a tool to aid in the **interpretation** of the signals collected in the identification activities.
3. A co-design process for supporting the refinement of high potential ideas to improve their i**mplementability** and sustainability at increasing scale.

Given the five-month period of performance, the scope of this phase of work was limited the first function in the IAP: Adapting a method for continuous monitoring to identify signals of barriers and facilitators to a healthy innovation culture within an organization and conducting SCAD interviews to assess current state analysis of the pressures on the acquisition workforce.

## Data & Methodology

The first objective within the IAP is to diagnose behaviors using the SCAD interview technique to identify situations where the acquisition workforce deviates from typical practice by innovating to accommodate situational constraints (Jefferies et al., 2022; Walker et al., 2016).

The novel, lightweight SCAD method surfaces conditions where adaptation was necessary for mission success or where the intent of leadership is not readily translated into the actions of the acquisition workforce. The technique enables the research team to chart observed patterns of pressures (expectations) and conflicts (trade-offs) that influence behaviors. SCAD is conducted through in-depth interviews that probe the dynamics of the pressures (positive and negative) in the system that contribute to the operationalization of leadership intent via "innovative" workforce behavior as well as "standard" workforce behavior. This is done through a semi-structured interview protocol designed to elicit innovation stories, which begin by asking participants to describe a time when they took action that differed from a "textbook" response.

Twelve (12) SCAD interviews were completed across ACC-APG during this period of performance. Eleven (11) interviews were conducted side-by-side with our ACC-APG Project Lead, and one (1) interview was conducted with OSU researchers only. The participants, all civilians, represented a cross-section of Contracting (10) and Program Management (2) professionals. Of these representatives, four (4) were in leadership positions at ACC-APG, six (6) were in workforce positions at ACC-APG, and two (2) representatives were from ACC-APG supported mission partners.

The scheduled interviews were one hour in length and attended by OSU researchers who led the interviews alongside the ACC-APG Project Lead. The interview process relies on a partnership between OSU researchers and the Project Lead for ACC-APG so that both the research and practice perspectives inform the data elicited. Immediately following the interviews, the team debriefed to discuss the findings and to clarify any organizational details or opaque terminology. The data was analyzed through iterative coding by two researchers on the project and reviewed by the Principal Investigators.

The ACC-APG Project Lead, after a brief period of observation, generated insightful questions in real time to enhance the elicitation. The interplay of the "outside" perspective from the OSU team and the "inside" perspective from the ACC-APG Project Lead enabled the combined team to simultaneously bring forth previously hidden assumptions or unchallenged beliefs and parse technical and nuanced operational details efficiently and effectively.

These interviews additionally provided experiential training for the ACC-APG Project Lead. The goal of the IAP is for members of the partner organization to gain the skills necessary to sustain the interviewing process and other aspects of the program with follow on training and coaching is planned to be delivered in the next phase of work.

## Model of pressure-driven systemic attributes that foster innovation

The team's prior work with DAF generated a model of ***system pressures*** and ***system attributes*** that serve to influence innovation behaviors (Rayo et al., 2024; Girth et al., 2022).

### ***System Attributes***

System attributes can support innovative behavior and drive organizational change for their moderating effect on innovation. DAF participants identified the following system attributes:

- **Goal alignment** ensures that individuals and teams, both horizontally and vertically within the organization, work toward a shared objective with a clear understanding of their roles.
- **Collaboration** strengthens innovation by facilitating teamwork across departments and with external industry partners throughout a project's lifecycle.
- **Autonomy** empowers employees by granting them the flexibility and authority to complete their work with minimal leadership intervention, fostering independent problem-solving and initiative.
- **Organizational learning** fosters continuous improvement by keeping individuals informed about new tools and methods while leveraging past experiences as learning opportunities.
- **Room for failure and risk-taking** encourages creativity by allowing employees to experiment without fear of punishment.

### ***System Pressures***

System pressures play a critical role in either strengthening or eroding system attributes linked to innovation. Pressures most often cited by DAF participants include:

- **Procedure** such as policies, processes, and regulations can both enable change (if not explicitly prohibited) or stifle it through rigid adherence.
- **Time** is another significant factor; the urgency to complete tasks quickly often reinforces the status quo, but crises or complex problems can accelerate creative problem-solving.
- **Innovation prioritization** reflects how an organization signals its commitment to innovation through resource allocation, messaging, policies, and support structures.
- **Workload** poses a challenge when there is a mismatch between work demands and available resources, making it difficult for employees to support one another.
- **Budget constraints** limit the ability to attract vendors and execute creative solutions.
- **Turnover,** particularly among enlisted personnel, disrupts momentum and can lead to employees delaying adoption of innovations in anticipation of leadership changes.

- **Reliance on routines** reinforces existing work habits, often making newer employees more open to change while longer-tenured members of the workforce may resist adopting new practices.

***Compound Pressure: Leadership Support***

Effective ***leadership support*** is crucial for fostering innovation behaviors within an organization. Leadership support can upregulate or downregulate system attributes, strengthening or eroding innovation system attributes. Leadership is a unique, compound pressure, which the team disaggregated into key characteristics, derived from DAF insights.

- **Authority-responsibility alignment** ensures that individuals have the flexibility and autonomy to complete tasks they are responsible for, giving them greater control over their work.
- **Availability** of leaders encourages problem-solving while providing necessary support when needed.
- **Openness** in leadership promotes a culture where it is acceptable not to have all the answers, encouraging knowledge sharing, learning, and providing "top cover" for teams experimenting with new solutions.
- **Frequent feedback** from leadership and customers helps realign goals, address challenges, and generate new insights.
- **Goal alignment** from leadership to the front-line is a shared understanding of objectives across the team; one person in the right position of authority can boost innovative efforts or vice versa, can stop an innovation in its tracks if goals are not shared.
- **Accounting for tradeoffs**, particularly in balancing risk and reward, is important in getting an innovation off the ground.
- **Incoming leadership's orientation toward innovation** has a significant impact—leaders who embrace innovation can create a risk-tolerant environment, while those who prioritize maintaining the status quo may stifle new ideas and halt progress.

## Findings

### ***Data Analysis – Validation***

One of the objectives of this pilot with ACC-APG was to validate the model first developed with DAF of systemic pressures' influences on system attributes that foster innovation. Data from the ACC-APG interviews was analyzed and cross referenced with the previously presented model (Rayo et al., 2024; Girth et al., 2022). The data provides a current state analysis of pressures impeding innovation in the organization, and an understanding of the implications of those different pressures on acquisition agility. It also validates the interpretations in the model developed in partnership with the DAF showing strong representation of prior themes.

The **system attributes** reliably associated with supporting innovative acquisitions behaviors in DAF are present in ACC-APG, including a) aligning team goals, b) collaboration, c) autonomy, d) organizational learning, and e) making room for failure and risk-taking. All the system attributes showed a significant increase in incidence by ACC-APG interviewees, compared to DAF, indicating more congruence around these factors.

The **systemic pressures** that either strengthened or eroded system attributes linked to innovation in the DAF are also present in the ACC-APG data. Innovation prioritization, procedural compliance, time, and workload were dominant in this data set. Reliance on routines, budget constraints, and organizational relationships appeared to a lesser degree, though all with higher incidence than in DAF.

**Leadership support**, a compounding pressure, is also a powerful influence on helping or hindering innovative behaviors in the ACC-APG interviews.

Appendix A indicates the integrated set of reported systems attributes that support innovation with raw counts for DAF Phase 1, 2, and ACC-APG Phase 1 interviewee indicators (i.e., number of participants citing the construct). Examples from ACC-APG Phase 1 SCAD interviews are also included in the appendix.

### ***Data Analysis – ACC-APG***

This section reports findings from the SCAD data collected and analyzed from discussions with ACC-APG personnel and mission support partners. The model was elaborated upon by determining high levels of specificity around several key **system attributes** that support innovation, including goal alignment, collaboration, autonomy, organizational learning, and room for failure and risk-taking. Each system attribute is elaborated in Appendix A, with select examples illustrated below (the number of participants mentioning each attribute is noted in square brackets).

- Interviewees discussed a sense of **autonomy** [10] in terms of leadership distributing authority to take action, possessing the knowledge and experience to match contracting needs with scope of regulations, and being aware of opportunities for flexibility within regulations so long as they can account for a particular constraint. Regulations that restrict the redistribution of authority as situations change, and emphasis on compliance and precedent, and the anticipation of needing to provide justification to multiple parties reduced participants' sense of autonomy.

- When there is a commitment to **organizational learning** [10], interviewees reported taking opportunities to engage themselves, their teams, and other teams with continuous learning, question and update common assumptions about the way work should be done and apply specialized knowledge to their advantage. Leaders assist with organizational learning by congenially engaging with reluctant or entrenched partners and by challenging innovators to explain their reasoning in an environment of collegiality, curiosity, and due diligence.
- **Room for failure and risk-taking** [10] is discussed in terms of leaders creating space for taking risks beyond those expected in everyday work, which may manifest as leaders delegating judgment or encouraging personnel to seek and seize opportunities to challenge the status quo. Furthermore, when innovative efforts that bring unexpected outcomes are valued as learning opportunities, barriers to attempting riskier options than usual are lowered.

ACC-APG personnel and mission support partners also contributed to a more thorough conception of the set of reported **system pressures** that strengthen and erode system attributes. While all participants [12] cite innovation prioritization pressures, most participants cite also procedures, time constraints, workload, organizational relationships, budget constraints, and reliance on routines. These pressures, among others, either reinforce or weaken system attributes essential to innovation.

- The pressure to adhere to **procedures** [11] and related concepts such as policy, process, rules, and regulation, while often recognized as a “backwards” pressure against a “forward” characterization of innovation, actually encourages personnel to continuously advance their learning and understanding of what verbiage is contained therein. Because they understand how to apply this catalogue of precision knowledge, they act with confidence when considering innovative strategies to match contracting needs to available resources. Difficulties sometimes arise, however, when collaborative teams include or require approval from individuals who seek to minimize risk via strict adherence to conventional or traditional interpretations of procedure, etc.
- Managing **workload** pressures [11] often requires reapportionment of resources and/or reprioritization of tasks and goals to accomplish the mission both by standard and by innovative means. When personnel are constrained from acting on their best judgment to mitigate these pressures, or when their highly attuned critical thinking skills are constrained by a culture of risk aversion or retribution, innovation may grind to a halt. Research indicates that workers under high workloads tend to reduce their discretionary effort, which in turn limits creativity in problem solving, proactive communication ahead of anticipated challenges, and synthesis of experiential learning (Woods & Hollnagel, 2006). ACC-APG participants described mitigating the effects of these compensatory behaviors, particularly in working cross-organizationally with contractors/vendors, which in turn generates additional workload for them.
- When the maintenance of **organizational relationships** [8] and engaging new relationships among contracting contacts acts as a pressure within the contracting workforce, experienced personnel respect the multiplicity of active goals among collaborators. Rather than viewing counterparts as threats to mission accomplishment, these practitioners leverage what they have learned from previous contracts to anticipate and seize opportunities for innovation that proactively assuage those potentially conflicting goals.

Influential relationships among the set of reported system pressures and system attributes were revealed through iterative comparison among narratives elicited in the interviews. Appendix B details the full list of pressures and their influences on system attributes, along with examples drawn from ACC-APG Phase 1 SCAD interviews. Relationships between the strongest pressure, innovation prioritization, and the two strongest system attributes, goal alignment and collaboration, are illustrated below.

- **Goal alignment** [12] positively influenced by **innovation prioritization** [12]: Goal alignment within ACC-APG teams, as well as with ACC-APG and contractors, program managers, and mission partners is strongly associated with the prioritization of innovative approaches to contracting. Goal alignment is described in terms of cognizance, buy-in, support, consent, and approval for the innovation [9], as well as leaders being a proponent of, creating push for, issuing directives for, and empowering people to pursue innovation [5].
- **Collaboration** [11] positively influenced by **innovation prioritization** [12]: Collaboration among ACC-APG contracting personnel, program managers, the program office, contractors, and mission partners is strongly associated with the application of innovative approaches to contracting. Working jointly to achieve a common goal, over and above individual coordinative efforts and everyday problem solving, was shown to enhance protections against current and future risk [7], facilitate increased workflow efficiency [6], generate value from incorporating multiple perspectives [4], and create opportunities to advocate for the needs of one's own workgroup and/or for other workgroups [3].

Notably, compound pressures, driven by degree of **leadership support**, simultaneously amplified and diminished various system pressures. This dual effect influenced the strength of systemic attributes and, in turn, shaped innovative behaviors. This data set afforded more granulated insights into how leadership support facilitates innovation and was again found to be particularly important at ACC-APG, including the ways in which:

- Leaders create a general environment of support for innovation [8], e.g.,
  - Making it known that they trust the judgment of highly skilled practitioners
  - Setting the vision for what needs to be done and empowering the workforce to consider both standard and novel solution opportunities
  - Emphasizing learning from mistakes and undesired outcomes
- Leaders respond to requests for support and approval of innovative approaches [9], e.g.,
  - Being available to provide consent and responding in a timely manner
  - Engaging in discussion and creative exploration of proposed innovations
  - Recognizing and utilizing the flexibility in the rules, and relying less on precedent to govern decisions
- Leaders actively drive innovation forward [9], e.g.,
  - Possessing and leveraging knowledge about how to change processes and regulations
  - Meeting cross-functional friction and resistance to an innovative solution with consideration and decisiveness

- Propagating understanding of new concepts, new ways of thinking, and new ways of accomplishing the mission

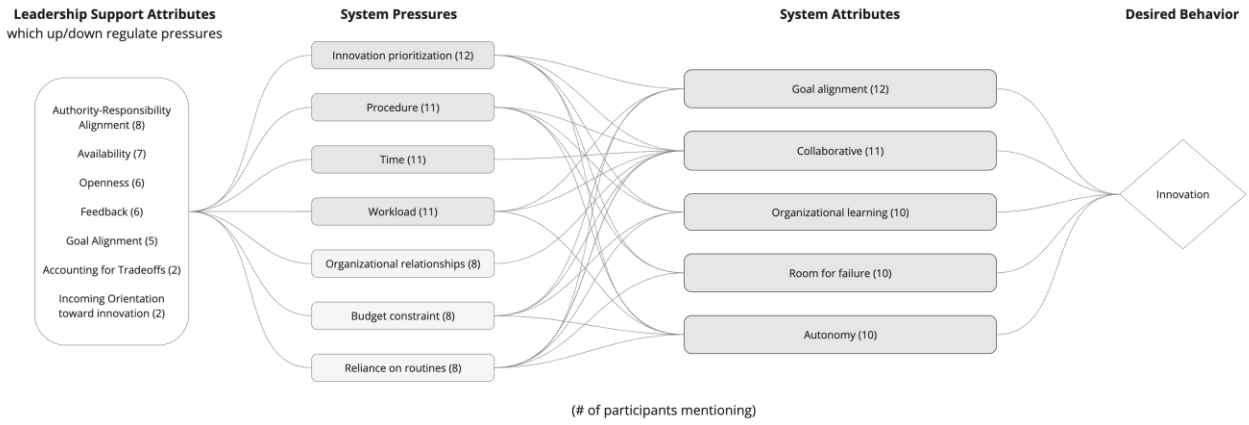
Importantly, ACC-APG interviewees noted “top cover,” [3] a leadership action that originally surfaced in DAF Phase 2 interviews, to be most effective in incentivizing innovation when it originates from immediate or near-immediate leaders, as this messaging loses its salience when the source is further up the chain of command.

It was again noted that a change in leadership greatly impacts the goals and innovative capabilities of a team, both facilitating and blocking innovation. This was found to be especially true during leadership turnover. For example, incoming leaders have particular impact when they have a:

- Strong desire to innovate, which fosters an environment where taking risks is encouraged, and boundaries can be expanded; and
- Focus on maintaining the status quo, which can hinder previously initiated and future innovations, preventing their progress or implementation.

Appendix C details the ways in which leadership support influence the innovative behavior reported in the ACC-APG Phase 1 SCAD interviews. This explication builds on insights gleaned in DAF, including the effects of management policies, concurrent interventions, and emerging environmental changes within acquisitions.

**Figure 4. Model of leadership support attributes and pressure-driven systemic attributes that foster innovation in ACC-APG**



## Next Steps & Proposed Plan

The research team proposes a 12-month plan to generate a sustainable, self-sufficient IAP at ACC-APG. Compared to the pilot which provided a test case of the SCAD interview element of the IAP, the next phase would be a full-scale implementation of the IAP at ACC-APG. This involves:

1. Conducting additional interviews to map observed patterns of pressures (both positive and negative) that influence innovation, agility, and risk-taking behaviors. Expanding the number of participants will enhance the depth and reliability of insights. A more comprehensive understanding of these dynamics in ACC-APG increases the impact of strategic decisions, ensuring increased value and likely realization of intended effects.
2. Facilitating intervention workshops leveraging SCAD findings to design and refine strategies that address system attributes found critical to enabling successful innovative behaviors. IMPActS workshops stress test innovations across the following criteria: Strength of **I**dea (grounded in evidence), alignment of the **M**ental model (agreement toward solution), **P**ragmatism (cost-benefit), availability of **A**ctors (resources), and **S**ustainability (alignment, validity to implement). IMPActS workshops are a co-created process that serve as proving grounds for new interventions, using workshop participants' mission-driven attitudes to boost creativity and lower risk-aversion to innovation. Simultaneously, workshops ensure that proposed solutions are practical, implementable, and sustainable within the organization.
3. Employing the See-Do-Teach model to build organic capabilities at ACC-APG for continuous innovation monitoring. The OSU team works alongside ACC-APG to build this capability within the organization. IAP activities transition during this phase of work from OSU-led / ACC-APG-supported to ACC-APG-led / OSU-supported. This work includes conducting SCAD interviews, facilitating IMPActS workshops, analyzing the data for continuous monitoring and improvement, and training additional ACC-APG resources on these lightweight tools. Building a cohort of trainers in IAP techniques for local implementation fosters organic capability development across the enterprise, ensuring sustainable growth and widespread expertise.

## Conclusions

The pilot study with ACC-APG has demonstrated early value of elicitations through the SCAD technique to (1) assess how leading acquisition organizations such as ACC-APG respond to pressures and opportunities within the acquisition process, and (2) provide the organization with a framework to understand the relationships between different systemic factors that drive or imped innovation.

The most critical *system pressures* that emerged from ACC-APG participants are **innovation prioritization, procedures, time constraints,** and **workload**, as these are the most frequently cited barriers and facilitators to innovation. **Leadership support**, a compound pressure, intensifies and/or alleviates system pressures, as these attributes are key to fostering a successful innovation culture. *System attributes*, such as **goal alignment**, **collaboration**, **autonomy, room for failure,** and **organizational learning**, helped the workforce to overcome obstacles to change.

While the study provides a valuable first step in uncovering system pressures, to support lasting cultural change full-scale implementation of the IAP is proposed.

- Adopting a lightweight, continuous monitoring strategy (SCAD) will enable ACC-APG leadership to assess the health of the organization's innovation culture, identifying whether innovative behaviors are increasing or declining, and gauge the relative velocity.
- IMPActS workshops will provide a new framework and process for ACC-APG to evaluate innovations for wider-scale adoption. The structured, collaborative process of designing and revising innovations ensures solutions are implementable and sustainable in the organization by increasing the motivation and reducing the cost of risk-taking behaviors.
- Building organic capacity through the See-Do-Teach approach will facilitate knowledge transfer, equipping personnel with IAP techniques for local implementation. By developing a cohort of trainers, this approach strengthens enterprise-wide capability, ensuring sustainable growth and the widespread adoption of expertise across the organization.

## Appendix A. Integrated set of reported systems attributes that support innovation

The number of participants mentioning each system attribute in each study is noted as follows: [DAF Ph 1] + [DAF Ph 2] + [ACC-APG Ph 1]. The total number of interviews in each study was 15, 10, and 12, respectively. The ACC-APG participant is anonymized and denoted by number prior to the example from his or her interview.

| Attribute | Definition | Example from Interviews |
|---|---|---|
| Goal alignment [5]+[4]+[12] | People and groups (moving horizontally and vertically through the organization) share the same goal and understand their role in reaching the goal. | 3: So that's on the program office side, them being open to it, seeing that as a potential solution, ...because they have the technical know-how I don't pretend to know. But then also on my side, too, on the contracting side, not shutting it down, saying no. ...Because originally, ...the textbook solution, it's only 1 round of paperwork, 1 round of it, but now I've signed up for 3 rounds of paperwork of every single document [and] create 3 awards. It was really being open to that being a solution... and being okay with kind of finding that new solution.<br><br>7: I think it's important that the contracting officer and the program officer discuss contracting strategies and acquisition strategies and have an alignment on how the contracting strategy can support the acquisition strategy. |
| Collaboration [5]+[7]+[11] | Organization facilitates collaboration internally and externally with other departments and industry partners throughout a project lifespan. | 3: Yesterday, I emailed the contractor saying, “Hey, I want to let you know, this is coming. And we need this back ASAP, because of the situation.” And I just explained the situation. And that was something that they appreciated, that clear communication.<br><br>7: …A contracting officer and a program manager… need to be joined at the hip if every degree of separation between you and the person who's actually executing the contract adds a layer of complexity that impedes your ability to be flexible and work the contract. |

| | | |
|---|---|---|
| | | 8: And then I heavily relied on my legal counsel. I was super happy to have three legal counsels, which is not normal, but one was very risk-okay with calculated risk, one was risk-averse, and one was right in the middle. And that was really good for me to make informed decisions. |
| Creating room for failure and risk-taking [7]+[4]+[10] | Organization encourages risks and creative solutions without fear of punishment for trying something new. | 1: When you have a leadership and a culture where mistakes are not only forgiven, but you're encouraged to make mistakes as long as you're learning from them.<br><br>5: When you hear the [Leader] telling you, "Take a chance," and welcoming innovation and showing that innovation is accepted and rewarded... The leadership from the [Senior Leader] down is what drives innovation ...because if not, you are working to stay within the regulations because you're afraid that if you go outside of the box that you may get in trouble. |
| Organizational learning [5]+[5]+[10] | Supports institutional learning, keeps people up to date on new tools and methods, and uses past situations as a source of information. | 8: I've learned now that not everybody knows what a cost [analysis] is, they've not even written them before. So we went through a whole thing where we basically taught this team how to write a cost [analysis], and then how to articulate on your standards and your AQLs [Acceptable Quality Levels], and the percentages of acceptable, and how you would actually inspect for them. And you have to make it reasonable, and you have to make it achievable. But you also have to be able to do those actions with accuracy.<br><br>10: One of the things with [Program] getting stood up and training more and having the integrators [is] being able to have people actually understand software concepts... Ideally, we needed to propagate understanding of these new concepts to drive new ways of |

| | | |
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| | | thinking and new ways of doing things for it. |
| Autonomy [3]+[5]+[10] | Organization allows people to have flexibility and freedom to complete work through their own means, less leadership involvement and more personal authority over projects. | 1: That's a huge concept that blew my mind: "Okay, let's do what makes sense, do what makes sense in this situation, and if the rules are in the way and you can't work around them, maybe we look at changing them."<br><br>9: I think trust is when someone doesn't feel like they have to check every word and every little thing on every document that you present to them, and you're relied upon as being trustworthy, independent, and they kind of give you that space to work in that way. |

## Appendix B. Integrated set of reported set of systems pressures that strengthen and erode system attributes

Pressures reported by more than half of ACC-APG participants are included, and pressure/attribute relationships unique to ACC-APG Ph 1 appear in **bold font**.

The number of participants mentioning each pressure in each study is noted as follows: [DAF Ph 1] + [DAF Ph 2] + [ACC-APG Ph 1]. The total number of interviews in each study was 15, 10, and 12, respectively. The ACC-APG participant is anonymized and denoted by number prior to the example from his or her interview.

| **Pressure** | **System attributes strengthened (+) or weakened (-) by the pressure** | **Example from Interviews** |
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| Innovation prioritization [4]+[5]+[12] | **Goal alignment (+): Desire for innovation is reflected in overt aligning of goals regarding innovative behavior.** | 11: There was major push from leadership here at ACC-APG. The [Leader] was pushing very hard to make those changes and get better outcomes. |
| | **Collaboration (+): The desire to innovate demands more collaborative means of pursuing system goals (vs. individual efforts).** | 8: But specifically, when you're dealing with very large visible and heavy money or challenged programs, and you're dealing with industry that they will fight over things, you have to come in with a very thoughtful strategy. Don't come in saying, "We're going to figure it out on the back end." It's like, "No, no, no, let's figure it out now." |
| | **Autonomy (+): Innovation favored over centralized control. Decentralized decision-making enables innovation.** | 1: …having a culture where you're able to explore those different things, apply them, not going to be micromanaged.<br><br>11: For us in [Program], we don't typically involve the branch chief that often. We're pretty independent. |
| | Organizational learning (+): Leads to developing critical thinking skills and seeking new information on improving current practices. | 10: One of the things with the [program] getting stood up and training more and having the integrators and being able to have people actually understand software concepts, I think, will allow that innovation to understand because there's going to be people that'll be able to say, "No, this doesn't quite fit better for it," where ideally, we needed to |

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| | | propagate understanding of these new concepts to drive new ways of thinking and new ways of doing things for it. |
| | Room for failure and risk-taking (+): The desire to innovate allows more risks to be taken and boundaries to be pushed. | 4: So, first you need to know what it says, and then two, you need to know what your left and right limitations are. How far can you go into that gray area, as we call it? As acquisition professionals, we always talk about the gray area in quotes, that gray area is thinking outside the box. …And so sometimes you have to think outside the box on how you can get that accomplished and also complete the mission at the same time. And so there's ways around it. You just have to think. You have to agree to think critically and be flexible. |
| Procedure [7]+[7]+[11] | Collaboration (+): When considering the degree to which procedures support innovative contracting efforts, strong cross-team collaboration and communication can support planning and next steps, especially when pursuing innovative approaches. | 7: This is an example of an organization that I think both sides [ACC-APG and vendors] did their own internal assessment and tried to find a process improvement. And this is one of those sort of examples of how both came together. I mean it definitely wasn't without discussion or maybe a little bit of friction, but ...it wasn't pushback. It was normal negotiation, and probing a problem, and coming together and solving it. |
| | **Collaboration (-): When considering the degree to which procedures support innovative contracting efforts, difficulties in cross-team collaboration and communication can hinder planning and next steps, especially when pursuing innovative approaches.** | 1: Every organization, every contractor should have somebody for a program, an effort, a process, who's the one to give clearance, whether they're the ones to delegate something down or what, but bring those people to the table. Because one of the biggest things that slows us down, either in whatever process we do interacting with a contractor is, "Okay, well I'm going to have to go back to my CFO [Chief Financial Officer] and they're going to have to check on that," |

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| | | or, I'm dealing with another vendor right now... and the response was, "I'm going to need a week and a half to get my president to sign off on that." Big problem when you're in a time crunch. |
| | Autonomy (+): Procedures that allow flexibility of execution encourages individualized solutions to problems. | 7: My starting factor… is don't break any laws but examine where everything else is tailorable or waivable. Anything that you can do to get to a faster answer under the law with the right answer is the right approach. |
| | **Autonomy (-): Procedure, or desire to adhere to regulations, constrains autonomy and authority to take action.** | 1: So when you have somebody at the top who is risk averse and not willing to push the envelope, or wants to make sure that the FAR [Federal Acquisition Regulation] and the DFARS [Defense Federal Acquisition Regulations Supplement] are adhered to with impeccable accuracy, it tightens things up and pushes you down that one lane road.<br><br>5: The regulations don't provide us a COR, a contracting officer representative, like when you're working on FAR-based contracts. And so I found myself needing that COR support but not having written authority to appoint someone to do these tasks. |
| | Organizational learning (+): Reducing the number of rules encouraged critical thinking around procedures and development of new skills in matching contract needs with regulation provisions (and the lack thereof). | 2: When we started the [program], I suggested to [them], "There's no rules about this, but why don't we just do it the same way we're doing the OTAs [Other Transaction Authorities]?"<br><br>8: If somebody was not required to sign something or they were not required to give a concurrence, I did not add them. ... The thresholds for requirements did not require [Leader]'s concurrence anymore. Well, [in] a lot of cases. I mean, "Put in, just keep going. I'll |

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| | | tell you about it, let me know if you have a problem." |
| | Room for failure and risk-taking (+): The desire to innovate allows more risks to be taken and boundaries to be pushed regarding procedures. | 3: This is a high-risk project. We are doing agreements for prototypes. So these are for things that have not been done before, so with it comes an inherent risk. So that was definitely something where we saw that opportunity where we could push, get to that limit of what [amount of money] was allowed... And we were actually able to award [more than one contract] with that pot of money that we have available. ...What we also did is we looked at how could we use all that money to give us the best chance to get what we wanted. But at the same time ...not just throwing all the money that we have at a problem.<br><br>7: We have a vendor who's like, “Hey, we have this solution.” You're like, “No, you have an idea, that's not a solution.” And so we actually used, I think, also a risk-based approach to this. ...If a product is not mature enough, but it's a really great idea, innovative, you might be willing to take more risk than, or you might be able to take more trade-off than you would if something is more certain, or vice versa. So in the case of the vendor that was selected, ...they were innovative, they had two of the three solutions sets, but they were only partially meeting our operational requirement. |
| Time [6]+[8]+[11] | Collaboration (+): Need for results in a strict timeframe encourages collaboration and communication. | 9: They knew we had to get awarded in a shortened time period, so that PEO [Program Executive Officer] did provide somewhat [of] a good support team. And at least us getting the documents moved pretty quickly and developed. I will say that we |

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| | | had non-government— there were contractors that were assisting. |
| Workload [3]+[5]+[11] | **Goal alignment (+): Management of workload is improved through the intentional aligning of goals regarding expectations for pursuing standard vs. innovative behavior.** | 7: As a former industry person, there's nothing worse than spending a million years on a proposal that you're never going to get, but you feel obligated to put it in. You know what I mean. |
| | **Collaboration (+): Management of workload is improved through new or enhanced means of collaboration and communication.** | 5: Now, with the reporting, we actually have a Teams channel that I share with the mission partner, and so we share a spreadsheet where I can go in and see at any point in time what reports [they have] received and reviewed, and [they] can go in and see at any time if I have approved an extension on those reports. |
| | **Autonomy (+): Workload is eased when authority is delegated, and autonomy is clearly delineated. Leadership top cover for teams pursuing innovative solutions can reduce workload on the team.** | 12: And so I talked to our [Leader] at the time and said, "Hey, the process was peer reviewed, right?" And we had heard that we had top cover from [Senior Leader] and whoever who was involved in the original, [who] said, "Yeah, you don't need to go through peer review. That process was reviewed." And so we just went with it and nobody asked any questions and it was great. But had we had to get a peer review, it would've been the same thing as use DoD source selection procedures, which means somebody other than the contracting officer is a source selection authority. You have to build a source selection advisory council, you have to do briefs. And it's very formal and it takes a long time. And we didn't have to do any of that and that's why it went so fast. |
| Organizational relationships [2]+[6]+[8] | Collaboration (+): Good relationships increase the likelihood for future collaboration. | 7: Your contracting officer is a team member. Your contracting officer deserves the same, even if they're not in your organization, the same respect you're going to give to your senior scientists, to |

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| | | your acquisition analyst, to your PM. Those folks are on your team and they need to be straight up integrated into your team. And I just feel like that relationship has been improved tremendously.<br><br>11: It's a partnership, it's not adversarial, or it shouldn't be adversarial. Obviously, in our role, we have to make sure that they're [contractors] doing all the right things and they're working within the contract. But it's ...where a lot of people take the approach of we're in competition with [contractors] and that they're the bad guy or something. |
| Budget constraints [3]+[4]+[8] | **Goal alignment (+): The need to meet cost, funding, and budgetary constraints encourages groups to look for innovative ways to align on goals.** | 1: So the contractor was in a difficult financial position with us, and we had to do a pretty in-depth negotiation with them on how to get it over the finish line and also award a [multi-] million delivery order before September 30th. |
| | **Collaboration (-): The need to meet cost, funding, and budgetary constraints limits the ways that groups have flexibility to proactively collaborate outside of previously established relationships.** | 7: In our fiscally constrained environment, if you don't have the ability to remain flexible and take money when you need to from a UFR [Unfunded Requirement] drill or grab money when you need to from a CR [Continuing Resolution] because you can't count on Congress to get their budget passed. You have to have that flexibility in this environment and so that direct relationship [with contracting officers and specialists] helps. |
| | **Autonomy (-): Uncertainty around cost, funding, and budgetary constraints limits personnel autonomy in planning innovative approaches.** | 2: In this case, I'm not sure that they knew how much money they were going to be able to get because they needed to go brief their senior procurement executive, or acquisition executive, and get from him a certain amount of money. |
| | **Organizational learning (+): The need to meet cost, funding, and budgetary constraints** | 4: And so what we have to do is their cost reimbursement agreement. So we have to |

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| | **encourages innovative thinking around expected procedural and relational behaviors.** | evaluate cost. One of the things that I know [Leader] always talks about with us is when you're doing a cost evaluation: “Do you need to evaluate every cost element?” And so that's something that I posed to the Kos [Contracting Officers] because I read their template, I think it was about a month ago, and they're evaluating every cost element. And my question to them is why? They said, "Well, because it's cost reimbursement." I said, "Okay, but do you have to evaluate every cost element?" Of course, there's always a pause depending on how you set up the evaluation. The answer is no, you don't have to, but you have to set it up that way. And so as long as you're telling them how you're going to evaluate. |
| Reliance on routines [3]+[4]+[8] | **Goal alignment (-): Reliance on routines inhibits innovative behavior by reinforcing work habits, especially those in which goal misalignment disincentivizes discretionary effort among the workforce.** | 10: I guess I would define the way people work less about policy and procedures. ...The way, especially on the acquisition side and less the contracting side, that it happens is you just do what you did before. It's like, "I have this contract, I got this contract," and they just recycle what they've already done for it. And so that's where one of the dangers in that is that there's almost no self-reflection of what went right with this contract, what went wrong, what do we want to improve? ...They just want to redo it so they “can get it over with” ...and get back to their day jobs. And the issues that I really see for it and why it's stagnant and stale is the amount of time and effort it takes to actually do it makes it so painful that you just want to find the easiest path possible for it. And so that, to me, is what stifles people from trying things. If it takes 12 months, 18 months or more and you have to go through so many painful revisions that, again, you're just looking for, "Make it |

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| | | stop, let me get out of here so I can get back to my day job," and that's not really what it is. |
| | **Collaboration (-): Preference for established work behaviors and dynamics inhibits collaboration on innovative approaches.** | 6: It's not uniform across any group or any agency, but there's always going to be some people who just don't want to help, who don't want to go outside their job description. |
| | **Autonomy (+): Ability to engage with innovative efforts is facilitated when routines are reevaluated and adapted to increase autonomy.** | 1: We have seen things like legal review thresholds that have been increased at the local level, so we aren't forced to get legal review on lower-risk things. So probably the better phrasing of that is tying legal reviews to situations where your risk is higher. |
| | **Organizational learning (+): Openness to reevaluating established models fosters organizational learning by encouraging adaptation and new approaches.** | 7: They just needed it explained. And because all of these other groups were following the same model we did before. That was sort of the assumption going in. And we pushed back on that, and honestly my leadership made me explain it. I think they did due diligence, but they were open to that change. So [I] think that's another thing that's important. People who are working at the contracting officer and at the execution level, the PM level, have good ideas, and it doesn't really help to have those good ideas if people aren't going to be open to other approaches. And in this case, both the contracting shop leadership and [Leader] and higher-level leadership, were open to that suggestion. And that's a credit to them, I would say, honestly. |
| | Organizational learning (-): People get attached to their way of doing things and create an environment that devalues new ideas. | 6: And again, I think, with the government, people get stuck. It's just because of probably a lack of innovation and a lack of competition, in my opinion. |

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| | **Room for failure and risk-taking (+): Creating room for failure within established routines fosters adaptive problem-solving and smarter decision-making while ensuring compliance.** | 4: And so I really learned to figure out, critically think, on how we can get the job done and then also meeting our obligations through the regulations, statutes, and policies. And I think ...a lot of things that we're trying to do now at ACC-APG, especially with [Leader] in charge, is trying to, not say no, it's just trying to find, through critical thinking, how we can achieve our jobs by following regulations, policy, and statutes, but not working as hard. So, working smarter, not harder, as the old saying goes. And so, I think that's one of our biggest challenges that I know [Leader] always challenges all the chiefs since [they've] been on board: to work smarter, not harder. |

## Appendix C. Leadership Support Attributes for supporting innovation behaviors

The number of participants mentioning each leadership support attribute in each study is noted as follows: [DAF Ph 2] + [ACC-APG Ph 1]. The total number of interviews in each study was 10 and 12, respectively. The ACC-APG participant is anonymized and denoted by number prior to the example from his or her interview.

| Leadership Support Attribute | Definition | Example from Interviews |
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| Goal alignment [4]+[11] | One person in the right position of authority who does or does not share common goals with the contracting team can boost innovative efforts or stop an innovation in its tracks. | 1: …you have to have a leader who is empowered to drive that culture change…<br><br>3: If program office says no, then too bad. Even though everybody saw value in it. I saw value in it. My boss saw value in it.<br><br>4: I think by the time it hits the division chief level, some of it [promoting change] is absorbed but doesn't necessarily get projected. And some division chiefs are really good at projection, others are just absorbed in [their individual mission]. |
| Openness [3]+[11] | Leadership makes it 'okay' not to know everything. They encourage people to ask questions and share knowledge to enable a culture of openness to learning. Leaders provide "top cover" for teams and individuals experimenting with innovative solutions. | 1: There's all sorts of stuff that we can do, and I'm sure plenty more that I don't know about, but being able to get that information out to people so that you can broaden that highway even more, I think, is really important.<br><br>4: What is leadership willing to give me top cover on?... |
| Authority-Responsibility Alignment [6]+[9] | Allowing people to have flexibility and freedom to complete work they are responsible for through their own means, (i.e. more personal authority over work). | 12: I really think it's pushing that [sense of working together to think through solutions] down as low as you can to that team lead level or below to lead those discussions. 'Cause they're the ones who know their specific action intimately. They have a rapport with their team and giving them some autonomy to use their brain power to make their own decisions and having their back. |
| Availability [3]+[8] | Leaders are available/accessible to their team encouraging them | 9: And so certain leadership let us through the door, so to speak, a little |

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| | to find solutions but providing support when needed. | quicker instead of through different channels.<br><br>11: I would say definitely with the contracting officers and contract specialists… if they have a requirement that is very novel and risky, or causing a lot of problems, or raising a lot of questions, or something that people haven't dealt with that much, then yeah, I would say the branch chief is going to be involved more. |
| Accounting for tradeoffs<br>[3]+[7] | Goal alignment specifically on the risk vs. reward tradeoff is important to getting an innovation off the ground. | 3: And that is also something where that is a higher-level directive that came down that also allowed the solution to take shape, which was there's a directive that basically is trying to get solutions out quicker than what they're currently going out to the workforce, especially with this solution being something that is something that would present itself on the front lines. So again, so we have the short-term solution, the on-par solution, and then the one that if that one were to hit, that's like hitting the jackpot in the lottery. …But I don't think we have all the funds to extend all three. |
| Incoming Orientation toward Innovation<br>[3]+[6] | A change in leadership greatly impacts the goals and innovation capability of the team.<br><br>(+) New leaders who have a desire to innovate can create an environment that allows more risks to be taken and boundaries to be pushed.<br><br>(-) New leaders who prioritize status quo can halt previously developed innovations as new ideas. | 2: [Other leadership] was very risk adverse. And [their] view of the world was everything needs to be approved by lawyer. Our current [Leadership]… is more like, "Why do you need to go to legal?" Right? That's [their] mindset. ...[Leader] was trying to solve a problem and I was explaining how I would do it. And [Leader] said, "Well, why is does legal need to be here?" |
| Feedback<br>[2]+[6] | Getting more frequent feedback from leadership and customers creates opportunities to (a) realign goals across levels, (b) address and learn from issues, and (c) generate new insights and innovations. | 9: [Leader] did an amazing job. [Leader] did most of the debriefing, when went through all of the strengths, weaknesses, deficiencies, and whatever other issues that we had... I believe the contractor did call [Leader] after a |

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| | | few days later and kind of said, "We think we have grounds to protest, but we're not going to." I don't know if any of that is truthful or not, but I think they were mostly appreciative of the time that we spent with them going through everything.<br><br>10: And so leadership was actually willing to delay things, willing to make it painful... the program office came, redid their contract multiple times and [Leader] rejected it a lot and delayed the project months because they kept doing the same thing and [Leader] was just rejecting it until we got involved and rewrote it for them. … And so that forced innovation because they had to do something different, they couldn't just continue the same things because [Leader] would reject it for it. |

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