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Navy Center for Innovation

Innovator's Guide

Navy Warfare Development
Command

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The Innovator's Guide

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Foreword

As the Navy's Center for Innovation, Navy Warfare Development Command is spearheading a campaign to reinvigorate a culture of innovation within the Navy. To shape the future to our advantage we must set the conditions that are conducive to innovation and create a channel that embraces and propels ideas from the deckplates to senior level decision makers.

To apply the American spirit of ingenuity that is ingrained in all of us to this task, you must have a solid understanding of what innovation is and why it's essential to the Navy. It is also important that you become familiar with proven techniques that will help you to become a more innovative thinker.

This guide is intended to help innovators of all ages – especially junior leaders – to develop creative solutions and push them forward to become new warfighting capabilities. You own the future. And as such, you have a professional obligation and vested personal interest to shape the capabilities and the culture of tomorrow's Fleet. To do this, you must:

- Think deeply
- Question continuously
- Debate rigorously
- Read broadly
- Write boldly
- Propose and drive ideas forward

I ask for your full commitment in this important endeavor. We must work together to reinvigorate a spirit of creativity across the Fleet that produces advantages for future warfighters.

Terry B. Kraft
RADM USN

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Warning: This guide is not for the faint of heart. It will challenge your perspectives on the power of ideas and alter your outlook of how you can help shape our future Navy.

Introduction

The world is experiencing an explosion of new ideas. Social networks and internet-enabled connections allow previously unconnected ideas to be fused and transformed into reality at an astonishing rate. The speed and reach of information systems have radically transformed the time and space dimensions of war. To exploit the era's rich atmosphere of ideas, and prepare for new challenges, the Navy must energize and capitalize on the enterprising resourcefulness of professionals, like you.

This Innovator's Guide is designed to help you become more innovative and facilitate the transformation of good ideas into real capabilities that improve the Navy. This guide provides a background understanding of what innovation is and why it is important. It offers ways to become a more creative thinker and prepare you for the challenges associated with moving ideas into realities. And finally, it will introduce you to processes presently in existence within the Navy that can be used to develop your ideas into new concepts, technologies, or operating procedures.

This guide offers advice to innovators of all ranks, but was written primarily with junior leaders like you in mind. Junior members of the Navy today are the key to success in the future. You own the future. As such, you have a professional obligation and a vested interest to shape the capabilities and culture that you will operate and lead tomorrow.

Granted, that the farther you attempt to look into the future the less you will see, one thing is certain, future maritime operating environments will be volatile and complex. To thrive in these conditions we must prepare our forces, now, to become more innovative and adaptable. Within this context, junior leaders are often uniquely positioned to recognize emerging problems and propose new ways to employ the latest technology.

The ability to adapt on short notice, or better yet anticipate and shape the operating environment beforehand in our favor, will depend on the creative agility of our people. With contributions from individuals at all levels, and a responsive process, Navy will be better able to define and develop the capabilities to tackle near and far term demands. To confront emerging challenges and exploit opportunities in the maritime operating environment we must embrace a culture of innovation.

Cultures change continuously. Left to chance or the devices of others, Navy culture will evolve in reaction to environmental factors – following not leading. In the absence of a vision and a driving force the cultural conditions of the future will at best become unexpected and at worst undesirable. On the other hand, we can choose to shape and master our destiny by establishing and nurturing the cultural values and attributes we will need for success in the future. In concert with other initiatives underway at NWDC,

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the underlining purpose of this guide is to sow the seeds for a future Navy culture that is innovative and adaptable. By awakening the creative spirit of our junior members today, we will ensure that our future Navy remains second to none.

What is Innovation and Why is it Important

All manmade objects and human actions start with an idea. Creativity is the universal human ability to generate new ideas. Innovation is creativity applied to a purpose to realize value. In a naval context the value of innovation is the fulfillment of a new or improved warfighting capability.

Naval innovation begins with ideas that originate from people like you. Ideation is the starting point of innovation. It is the practice of splicing together separate thoughts to generate new ideas. Once an idea takes shape and is applied to improve or solve a problem, the innovation game is on and the uphill climb begins. In a larger context, innovation is the practice of using ideas to realize a desired future.

The Navy needs innovation to maintain an advantage over competition in the field of arms. Fighting and winning the Nation's wars – our ultimate purpose – depends on innovating better than potential adversaries. Reflecting on the devastation and suffering that accompanies war the importance of a first rate military can never be overstated. Building and sustaining a combat capable force in the face of budgetary constraints and other headwinds will require new ideas created and forged into reality by relentless “Young Turk” innovators.

Creating an innovative force is top priority at the highest levels of Navy leadership. For example, the CNO's recent Sailing Directions stress the importance of staying ahead of competitors in the arena of warfighting ideas. He states that:

We will innovate to:

- Use new technologies and operating concepts to sharpen our warfighting advantage

We will evolve & remain the preeminent maritime force

- Reach & effectiveness will be greatly expanded through new and updated weapons, unmanned systems, sensors, & increased power
- Unmanned systems will employ greater autonomy and be fully integrated with their manned counterparts

Our primary mission is warfighting. Efforts to improve capabilities, develop people, & structure our organizations should be grounded in this fundamental responsibility

For decades the Navy has held a comfortable advantage over adversaries. This advantage is at risk, due in part to the rising peer nations and the proliferation of low-cost information technologies available to non-state actors. If the Navy is to hold operational advantages in future conflicts it must be able to out-think and out-maneuver adversaries through effective innovation.

The Human Element of Innovation

Elements Conducive to Creative Thought

To become an innovator it is important to understand the characteristics of creative thought and what fuels it. New ideas cannot be forced, but can be induced and captured by a prepared mind. Research shows that the skills that most lend themselves to the discovery of new ideas are:

1. Associating. Connecting seemingly unrelated questions, problems, or ideas from different fields.
2. Questioning. Asking questions to understand how things really are today, why they are that way, and how they might be changed or disrupted.
3. Observing. Carefully watching the world to help gain insights into and ideas for new ways of doing things.
4. Experimenting. Constantly visiting new places, trying new things, seeking new information, and experimenting to learn new things.
5. Networking. Going out of the way to meet people with wildly different backgrounds and perspectives to extend your own knowledge.

Innovation is enabled by pluralism and the collision of diverse perspectives. The recombination of previous ideas in light of a new challenge can cause innovative connections. Exposure to broad unrelated subjects, such as reading a variety of books simultaneously can generate new ideas. The movement of an idea from one context to another allows for the tools of one discipline to solve the problems of another discipline. However, to recognize the value of an idea emerging from the collision of thoughts from different fields, it must be seen against the backdrop of a preconceived inadequacy.

Innovation can even emerge from stifling conditions. To understand what causes bursts of innovation in oppressive settings, we need only to look to the past. In his book *Agents of Innovation*, John Kuehn points out that innovation often occurs in the face of constraints. For example, Germans, American, and Japanese experiences in the period of 1919 to 1937 show how naval innovation was affected in a positive way by physical, strategic, and materiel constraints. The curiosity and resolve of military leaders was piqued, rather than dulled, by limitations and disarmament. If the interwar era of Admirals Moffett and Reeves, the founding fathers of Naval Aviation, teach us anything it is that constraints, along with questions and debate inspire ideas.

Environments that expose us to a wide variety of pre-existing spare parts - mechanical or conceptual - and encourage the recombination of parts in new ways is conducive to creativity. The most fertile zone of innovation is the seam between order and chaos; where allowance is granted for meandering and tinkering. After the right mental and physical conditions are in place, an approach that captures hunches - but doesn't bin them into categories that become barriers - and allows time to nurture and shake out ideas is indispensable.¹

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Negative factors such as crises or errors can also be conducive to innovation. Hostile or urgent conditions drive up the pressure to innovate due to new levels of risk tolerance. Wars in general unleashed an avalanche of new ideas on the frontlines and in laboratories. Similarly, faulty assumptions or errors also accelerate innovation. As eloquently stated by author William James, “Error is needed to set off the truth, much as a dark background is required for exhibiting the brightness of a picture.”² Errors and mistakes tend to promote the pursuit of alternative paths beyond comfortable assumptions and force exploration.

Steps for Generating and Moving Ideas

Innovation begins with a problem and a question. The first step of the innovation process is problem framing. This means examining the subject to understand its composition, function, and the context or field in which it exists. Problem framing sets the stage for understanding the deficiency that needs to be addressed. After establishing a baseline understanding of the problem, the next step is to ask the right question. Once the right question is uncovered you can then move into the mental problem solving phase.

With the problem defined and a question in hand to approach the problem, you can start the idea generation phase. Known as ideation, this step in the creative process is often associated with a flash of insight. However, many researchers consider the blinding insight phenomenon a myth. Rather, it is more aptly the result of a slow rumination around the peripheral of a problem that likely began years back with a hunch that something was not quite right and could be improved. Another myth researchers reject is that the ability to ideate is innate and rare. In fact, much can be done to develop an innovative mind.

One of the best ways to stimulate ideas is to read a broad array of subjects from the arts to the sciences, and especially history and biographies. New ideas are typically just the recombination of old ideas. Reading with an eye toward seeing how experts from across the ages approach problems in different fields will shine new light onto current predicaments. Understanding how work is performed in different fields of endeavor, even those seemingly unrelated, provides the mental grist for the ideation mill.

Gain awareness of the issues. Challenges that seem obvious may be just the tip of the iceberg of a more complex problem. You must have expertise within your field to understand the root of problems before you can pursue the right path of ideation. Learn what issues trouble your organization through all available means, including discussions with supervisors, peers, and subordinates. Seek out places where diverse groups gather to talk and tee-up thought provoking discussions. Facebook and other virtual forums are excellent places to cross-talk ideas with different personalities. Bounce hunches off other people. Seek different points of view, especially contrary ones. Attempt to understand opposing positions as well as the reasoning behind those positions. If the idea crumbles under the stress of peer review do not be discouraged, move on. Remember this is part of the ideation vetting process.

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A broad awareness of issues will help you better understand the problem as well as arm you with more ideas to throw at the problem. What are your boss's issues? What are the challenges at the next echelon of your command? This line of reasoning will expand your horizon beyond day-to-day activities. An understanding of higher objectives combined with junior level, hands-on experience, forms a well rounded perspective. A junior leader able to view the Navy from the nexus of the tactical and the operational perspective is uniquely positioned to propose solutions that address larger problems. This understanding is of great importance when the time comes to confront resistance to transformational ideas.

Ideas need time to germinate. Conduct thought experiments, mull over different variants of the idea to better refine it. Not every idea is worth pursuing. Conventional wisdom says that from thousands of good ideas only a few useful innovations will form. False starts should be expected; formulate new ones each week. Discard the runts and give double rations to the strong ones.

Maturing your idea. What often goes underappreciated is how hard it is to sell an idea to a large organization. Analyze opposing viewpoints and develop mitigating arguments requires effort well beyond the initial ideation stage. You must be prepared to aggressively champion your idea. Not only must you clearly articulate the idea, painting a picture of how it will benefit the Navy, but you must also address critics. The failure of many ideas stems from a lack of conceptual development of how the idea will effect positive change. If you lack the willpower to rigorously mature your idea, don't expect anyone else to get onboard.

It is too easy to chalk up resistance to "old think" and risk aversion. You must become empathetic to the problems and priorities of others to understand their resistance. If possible, provide data that refutes opposing opinions, or better yet, addresses the point of resistance by illustrating how the idea can improve the condition related to the resistance. Keep in mind that if an idea doesn't ruffle a few feathers it probably does not have much value.

Take action. Once an idea is mature, it must be communicated to the right audience create change. Creating change within a large organization involves convincing others to that the benefits from your proposal will lead to individual and organizational advantages. This means you must find advocates and build a constituency behind your idea that will enable it to proliferate beyond your sphere of influence.

Many mechanisms exist to communicate ideas. Although many are feedback mechanisms designed to capture and incorporate minor changes for existing systems, feedback is equally important for larger changes. Consider pushing your idea directly up your chain of command and ask your leadership for their endorsement.

Another approach is to socialize your idea first with peers and subject matter experts. Informal blogs or other professional venues can offer valuable peer review. The Sailor

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Bob blog site (<http://www.sailorbob.com>) exemplifies this type of informal venue. Keep in mind that an idea that does not draw criticism is probably not worth pursuing.

After you test the informal waters, consider publishing your idea in professional journals such as US Naval Institute Proceedings. If your idea has the potential to affect change beyond the unit or tactical level, you should contact NWDC, the Navy's Center for Innovation at <https://www.nwdc.navy.mil/ncoi/default.aspx> for additional guidance.

The Organizational Element

Conditions and Processes of Innovative Organizations

In addition to understanding individual creativity, innovators must be aware of conditions and processes within a large organization affect the generation of and respond to new ideas. The stereotypical view of an innovative organization is an abundantly financed establishment that is staffed with well connected, creative people. Yet research shows that slack resources, independent lines of analysis and development, and creative frictions are important drivers of innovation within many organizations.

Large organizations are inherently status quo oriented, so any change automatically faces systemic resistance. Armed with an understanding of how the Navy fields new capabilities will help you see shoals that must be circumnavigated. Fielding a new Navy capability is complicated first and foremost by the fact that funds must be budgeted and approved by Congress years in advance. Aside from the politics and lobbying that is a necessary evil of the process, internal within the Navy, hard decisions must be made to balance the allocation of funds between near term operating costs and longer term investments. Last, and certainly not least, is the time and effort associated with testing, integrating, and procuring new solutions as programs of record.

Most organizations welcome fresh ideas and recognize the innovator's dilemma. They know that ideas often come from the fringes and need a facilitator to move into the mainstream. As a result most organizations offer avenues and processes to help cut through the bureaucratic friction associated with change. You should also bear in mind when dealing with Navy bureaucracy, that the value of your idea is only as good as the written word that conveys it. Clearly written proposals that show a linkage with the organization's strategic goals will resonate with senior leaders and embolden them to mobilize support for your idea.

Author John Kotter does an excellent job outlining eight essential steps for creating organizational change. Figure 1 shows these key steps.

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Figure 1. Kotter's Eight Steps

Anticipate real and imagined risk. Organizations, like organisms, seek self preservation. This is done by managing risks. Ideas that offer change are viewed as new risks. Many will perceive that if your idea is successful, the change will be disruptive, cause additional work, and divert resource from other protected areas. On the other hand, given that most ideas fail, organizations by default will assume that your recommendation is just another wasteful distraction from the fringe that will hopefully soon fade away.

Gaining organizational support. For an idea to catch on within an organization it must be embraced by key stakeholders. Identify who stands to gain the most from your idea, then shape your idea to gain their support. To convince a decision maker you need to show the idea's value in terms of warfare effectiveness. Naval innovations can realize value by several ways:³

1. As a force multiplier (i.e., enhancing a current capability)
2. As a way to disrupt or degrade the capabilities of a current or potential military adversary
3. As an enabler of warfare domain superiority
4. As an enabler of warfare domain dominance⁴

Share your idea widely and refine it through feedback. Illustrate its value against adversaries. Mobilize support for your idea by building a network of advocates and allies. The bottom line is, your idea must be seen by others within the Navy as benefiting warfighting effectiveness.

Authors, Tom Keller and Jonathon Littman describe six personas that innovators can take on to move their ideas through an organization.⁵ The first three are learning roles

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that take advantage of the fact that organizations continuously need new sources of information to grow.

1. The Anthropologist – brings new learning and insights by observing human behavior and developing a deep understanding of how people interact physically and emotionally with capabilities.
2. The Experimenter – prototypes new ideas continuously, learning by a process of enlightened trial and error.
3. The Cross-Pollinator – explores other fields of expertise then translates those findings and revelations to fit the unique needs of the Navy.

The next three personas are organizing roles, played by individuals who are savvy about how the Navy moves ideas forward. Even the best ideas must continually compete for time, attention, and resources. Those who adopt these organizing roles exploit the rules of the game and play to win.

4. The Hurdler – knows that the path to innovation is strewn with obstacles and develops a knack for overcoming or outsmarting those roadblocks.
5. The Collaborator – helps bring eclectic groups together, and often leads from the middle of the pack to create new combinations and multidisciplinary solutions.
6. The Director – not only gathers together a talented cast and crew but also helps to spark their creative talents.

Navigating obstacles and naysayers. As much as we glorify innovation, let's remember some cold hard facts. The implementation of a new idea is extremely difficult within large organizations. Ideas are necessary for innovation but not sufficient; they also need to be developed and adopted. Rigorous trial and error is required to refine your idea. The first thing you must accept is the fact that the adoption of an innovation into the mainstream of an organization as large as the Navy takes years to complete. Next, expect opposition at every turn. As managers of the Navy's resources, decision makers will rightly challenge ideas to validate their value. Ideas will face unbelievers and foes from the start. Know who the decision makers are and who the noisemakers are. Stay upbeat. Don't give up at the first "no." When you hear the words "you can't", smile and redouble your resolve to succeed.

The Navy Innovation Process

The Navy has a Concept Generation Concept Development (CGCD) program⁶ led by NWDC designed to provide a collaborative approach for harvesting and transforming ideas into new capabilities. The intent of the process is to create a channel for innovation that spurs creativity and input from the deckplates as well as informing and responding to top-down demands for new capabilities. It is intended to energize creativity and convert ideas into Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) solutions. It should be noted that the CGCD program is not the only vehicle for moving ideas, and that you should use the method that best matches the type of recommendation you are pushing. As Figure 2 reveals, the Navy CGCD process which begins with innovation.

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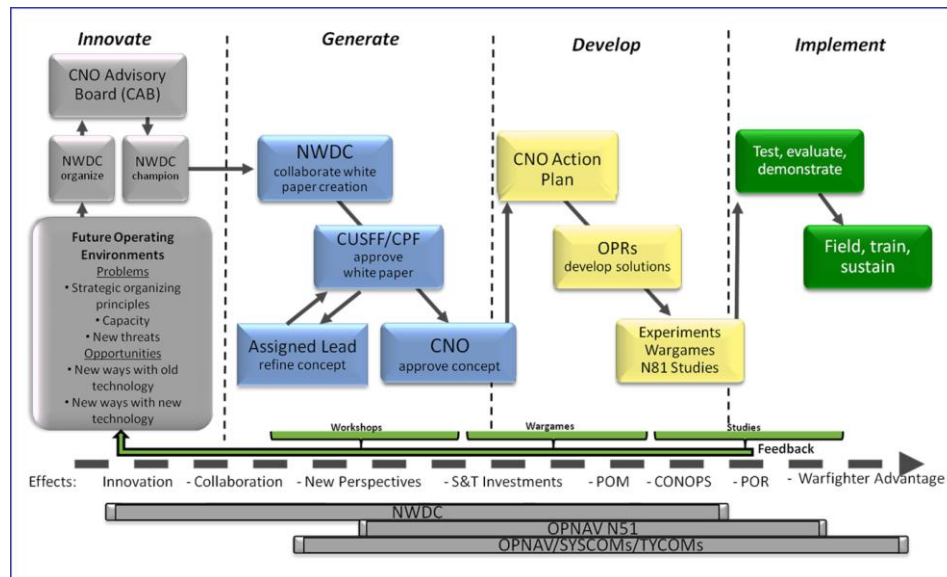


Figure 2. Navy CGCD Program Process

As the Navy Center for Innovation NWDC is the entry point for ideas and manager of the CGCD process. In addition to elevating awareness of the importance of innovation, NWDC can assist innovators generate their ideas and propel them through the process. For ideas that do not meet the threshold for a new concept NWDC can direct the submitter to the organizations that can take action on the idea.

Additionally, NWDC periodically conducts live and online forums to expand the understanding of innovation, harvest new ideas, and advance the campaign to instill a culture of innovation. Information on upcoming (and previous) events can be found at <https://www.nwdc.navy.mil/ncoi/default.aspx>.

Conclusion

To become a permanent feature of Navy culture, innovation must be woven into the daily fabric of the organization through a renewed emphasis on individual creativity. For Navy to maintain an edge in rapidly changing information-dependent operating environments, we must exploit the unique American traits of ingenuity and initiative. We must start now to set the conditions for a culture of innovation. You are the Navy's source for innovative ideas. Your creativity, your advocacy, and your hard work are required to ensure our future Navy will prevail in future conflicts.

Study the broader issues. Continuously question why and how things are done. Look for different ways to solve old problems. Seek out like-minded idea hunters. Engage your leadership and give them alternatives to outdated practices. Learn to use the power of the written word to express your thoughts. Be bold and don't take no for an answer.

Now get out there and innovate!

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Innovator's Reading List

Agents of Innovation: The General Board and the Design of the Fleet that Defeated the Japanese Navy, John T. Kuehn

The Other Side of Innovation: Solving the Execution Challenge, Vijay Govindarajan and Chris Trimble

Where Good Ideas Come From: The Natural History of Innovation, Steven Johnson

The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail, Clayton M. Christenson

The Innovator's Solution: Creating and Sustaining Successful Growth, Clayton M. Christenson

The Innovator's DNA: Master the Five Skills of Disruptive Innovators, Jeff Dyer, Hal Gregersen, Clayton M. Christenson

The Medici Effect: What Elephants and Epidemics Can Teach Us About Innovation, Frans Johansson

Leading Change: An Action Plan from the World's Foremost Expert on Business Leadership, John P. Kotter

Creating Innovators: The Making of Young People Who Will Change the World, Tony Wagner

Innovation to the Core: A Blueprint for Transforming the Way Your Company Innovates, Peter Skarzynski and Rowan Gibson

The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm, Tom Kelley, Jonathan Littman, and Tom Peters

The Ten Faces of Innovation: IDEO's Strategy for Defeating the Devil's Advocate and Driving Creativity Throughout Your Organization, Tom Kelley and Jonathan Littman

The New Realities, Peter F. Drucker

The Innovator's Way, Robert Dunham and Peter Denning

The Social Life of Information, John Seely Brown and Paul Duguid

The Myths of Innovation, Scott Berkun

Imagine: How Creativity Works, Jonah Lehrer

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Quote Callout Boxes:

“Victory will smile upon those who anticipate changes in the character of war, not upon those who wait to adapt themselves after changes occur.” General Giulio Douhet

“Let it be noted that there is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things... For the reformer has enemies in all those who profit by the old order, and only lukewarm defenders in all those who would profit by the new order, this lukewarmness arising partly from fear of their adversaries, and partly from the incredulity of mankind, who do not truly believe in anything new until they have had actual experience of it.” Niccolò Machiavelli

“An important scientific innovation rarely makes its way by gradually winning over and converting opponents; what does happen is that the opponents gradually die out.” Max Planck

“In a volatile ambiguous environment the preeminent advantage that should be pursued is to be superior in the art of learning and adaptation. We must create a culture of innovation where everyone is invested in the organization’s success and feels a responsibility to implement better ways to achieve organizational objectives. Where people are encouraged to try alternative paths, test ideas to the point of failure, and learn from the experience. Where experimentation and prudent risk taking are admired and encouraged.” BG David Fastabend

“First they ignore you, then they laugh at you, then they fight you, then you win.”
Mahatma Gandhi

“We cannot solve our problems with the same thinking we used when we created them.”
Albert Einstein

“Vision without execution is hallucination.” Thomas Edison

“Mission command and control offers the flexibility to deal with rapidly changing situations and to exploit fleeting windows of opportunity. It provides for the degree of cooperation necessary to achieve harmony of effort yet gives commanders at all levels the latitude to act with initiative and boldness.” - Marine Corps Doctrinal Publication 6

Endnotes

¹ Steven Johnson: *Where Good Ideas Come From: The Natural History of Innovation* (2010)

² Ibid. Johnson

³ This is derived from the article “Selling Innovation to Your Boss” by Jeffrey Phillips posted on March 1, 2010 to the Innovate on Purpose blog paraphrased and translated into a military context.

⁴ Superiority in a military context means that if force strengths are equal, we win. Dominance means that we so exceed the adversary’s capabilities that they cannot win. Germany flying over the French Maginot line in WWII demonstrated dominance. Warfare area superiority and dominance have specific Joint Pub 1-02 definitions.

⁵ The personas are adapted to a military context from “The 10 Faces of Innovation” by IDEO authors Tom Keller and Jonathon Littman.

⁶ CNO Decision Memorandum dated 27 June 2008