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“C2 and Agility”

**“Feeling the Need for Speed: Naval Aviation Bridges Stovepipes to Create an Enterprise”**

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## **“Feeling the Need for Speed: Naval Aviation Bridges Stovepipes to Create an Enterprise”**

**Abstract:** Operations like the International Security Assistance Force Afghanistan, U.S.A.’s new Africa Command, or the militaries’ ever increasing involvement with cooperative security and natural disasters ... often call on disparate systems to reach beyond their usual comfort zones to address complex, cross-domain challenges. This requires operationalizing the principles of “focus, agility and convergence” – and it is difficult – especially when sometimes complementary and often competing systems find themselves together at the point of action despite widely different cultures, fitness metrics and perhaps most critical ... separate funding streams. This paper examines all of these elements through an ongoing and successful experiment within U.S. Naval Aviation. Faced with two wars and a strapped budget, Navy was forced to get “lean” and better harmonize their operations, maintenance and supply stovepipes. Getting beyond theory with a well defined contextual challenge, naval aviation merged disparate cultures and modified practices and procedures of ostensibly successful and proud entities to form a holistic enterprise – one that had only loosely existed before the intervention.

## **Introduction**

In the 1990’s naval aviation was spinning out of control. There was virtually no correlation to monies spent on improving readiness and actual readiness levels. It was clear that naval aviation was mortgaging its future by spending a larger portion of a finite budget on readiness at the cost of recapitalizing the force. This meant new aircraft purchases and fleet size was decreasing while average aircraft age was increasing – a death spiral. The various stakeholders involved were good organizations who wanted to do the right thing. The problem was that the people in these organizations resided in classic stovepipes with disparate metrics, cultures and funding streams.

Several papers were presented at the 12<sup>th</sup> and 13<sup>th</sup> ICCRTS that explored the complex battle space where disparate groups needed to harmonize actions and capability to solve challenges that crossed traditional domain boundaries<sup>1</sup>. In these cases we witnessed actors with high capacity, yet minimal capability forced to harmonize actions with actors of low capacity, but high task

related capability. From Hurricane Katrina in New Orleans, where local, state, federal, Non-governmental and international entities merged together to assist in the aftermath of a horrific storm; to NATO in Afghanistan trying to wrestle with the complexity of fighting a “3-Block War”<sup>2</sup> where cooperative security and nation building are more pertinent to the battle space than traditional combat, these are truly messy, wicked, complex challenges<sup>3</sup> that do not lend themselves to simple or linear solutions. While these seemingly intractable cases – those that demand whole-of-government, interagency, or multi-national approaches – beg for solutions, their enormity might just blind us from envisioning practical solutions to real problems.

This case study explores the creation of the U.S. Naval Aviation enterprise (NAE). This example is admittedly not as challenging as a Katrina or Afghanistan. That said, the successful creation of the NAE is a historical example of multiple loosely linked systems harmonizing activity, with the result being increased productivity at reduced cost. Certainly some of these lessons can be learned and applied to larger problem sets.<sup>4</sup>

## **Command and Control of a Complex System**

The paper takes a very pragmatic operator's eye view of a wicked problem. This study proceeds from the idea that the real challenge is complexity, and failing to realize that organizations are complex adaptive systems composed of countless interdependent variables, and made up of people who make innumerable decisions to optimize or advance their personal and organizational fitness. In a complex environment, command is illusory, and outright control is virtually impossible. The U. S. Department of Defense Command and Control Research Program (CCRP) framed this complex challenge with a new conceptual foundation for C2 based on focus, agility and convergence.

“Focus provides the context and defines the purposes of an endeavor; agility is the critical capability that organizations need to meet the challenges of complexity and uncertainty; and convergence is the goal-seeking process that guides actions and effects.”<sup>5</sup>

This case study will be framed by focus, agility and convergence – and how the NAE case addressed their own complex challenge. We too often search for technological solutions for

what are fundamental human problems. Harmonizing disparate entities to address a complex challenge may call for the introduction of new technology, but it will almost certainly also demand new work processes and different organizational constructs.

## Focus

### *Alignment*

With “*Execution: The Discipline of Getting Things Done*” by Larry Bossidy and Ram Charan perennially located on top of his executive desk, one of Admiral Vern Clark’s driving passions was flawless execution and productivity improvement. Admiral Clark believed that many parts of the Navy were like big business – and needed to benefit from best business practices. So when he called upon his “Echelon two” commands (those large commands directly reporting to CNO with fiduciary responsibility) he refused to just give inspirational speeches, or hand out medals. His role was to engage in a robust discussion about the enterprise, seek metrics, measure the return on investment, and ensure the various elements had the tools and visibility to measure the value they brought to the enterprise.

When Clark took over as Chief of Naval Operations in 2000, he outlined his “Top Five Priorities” he wanted to accomplish as CNO. One of those was to improve current readiness, which was a primary driver for the creation of the NAE. But another priority that would be a critical enabler to improving readiness was proper alignment.<sup>6</sup> As the head of the world’s largest Navy, Vern Clark realized that part of the problem was he had several Navies, and they were not always acting in harmony, in fact in some ways, they were at cross purposes and competing for resources. There was a U.S. West Coast Fleet, a U.S. East Coast Fleet and a Pacific Fleet operating out in Hawaii – all of which had their own instructions, best practices and cultures. And on each coast, there were separate but equal “type commanders,” who were responsible for standards and readiness; one for aviation, one for surface ships, and one for submarines – who also had their own instructions, procedures and cultures. While a particular theater of operations may call for capabilities that are different from another theater (due to geography or potential threat characteristics), there was much needless duplicity and minimal sharing of best practices.

Admiral Clark knew that to institutionalize change he would need to change the structure of the organization.

Combining the two fleets into a new command called “Commander Fleet Forces Command” brought the East and West Coasts into alignment. In addition, while both coasts needed type commanders close to the waterfront to conduct day-to-day business, he subordinated one command, which would handle local execution on one coast to the other type commander who would handle both local execution and overall force policy. This created a “lead-follow” system which would lead to an alignment of policy and procedures and a single voice to speak for the fleet on both readiness issues and future needs. Bringing the Hawaii Pacific Fleet command into alignment proved more difficult, as political anti-bodies weighed in to preserve the physical control of naval assets which equates to a fairly large regional investment. That said, Admiral Clark was determined that his leadership would no longer measure themselves by the size of their commands or budget, but by how much they contributed to the enterprise. There was now a lead type commander for naval aviation, the next challenge was to align the various functional stakeholders to focus on a unified enterprise vision.

### ***Driving out waste through a more “comprehensive approach”***

Three large systems that drive the business of naval aviation are operations, maintenance, and supply. Each had their own metrics, traditions and cultures, which if not aligned and focused, would sub-optimize to the detriment of the enterprise. It would require top-down support from senior leadership – leadership that was tied to requirements, operations and most important, the resources to address issues that arose. But to create an enterprise, all stakeholders had to start “singing from the same sheet of music.” The NAE needed governance and metrics:

- Who would be the Single Process Owner -- the final say when there were disputes between entities and
- What would be the Single Fleet Driven Metric for success. A single high level metric by which all entities would be measured.

## The Single Process Owner

The enterprise was forming and the new effort was called initially called the Naval Aviation Readiness Integrated Improvement Program (NAVRIIP) -- and the single process owner would be the lead type commander, informally called the “Air Boss,” who would take the lead for NAE governance. Vice Admiral John “Black” Nathman had just left the Pentagon as the chief requirements officer for naval aviation -- where he helped create the new policies he would get to execute in the fleet as the first lead type commander for the NAE.

Naval officers are competitive by nature, and are promoted based on the success of their previous tours of duty. One curious phenomenon observed was that even if their operations/maintenance resources were reduced, most commanders would return from deployment and report unmitigated success. Identifying system shortfalls might improve the enterprise, but it was interpreted as weakness, so optimism if not outright mendacity reigned. There was little incentive for commanders to show degradation in readiness during the short time they were in command. After all, everyone else seemed to be able to do make do. This “can-do” attitude, that is inbred in military officers – adapt, overcome, prevail – can be both a blessing and a curse: a blessing at the tactical level, when executing with resources at hand, and a curse at the type and wing commander level, where the job description changes from being ready for operations to creating a culture or environment that produces readiness. Sometimes it’s difficult to change mindsets – this is a challenge for military officers honed to a tactical edge who later advance into senior management.

Vice Admiral Nathman was the “Air Boss,” but his efforts would have been for naught if he didn’t get support and buy-in from another three-star command; Naval Air Systems Command (NAVAIR). NAVAIR not only oversaw maintenance and repair functions – but also had the lead for acquisition of new aircraft and systems. They also husbanded the business expertise to grow and maintain the fleet. New programs brought in new monies, and the new monies kept the lights on and the enterprise afloat. But the legacy programs – especially aircraft that were no longer in production – were the ones that would benefit the most from this new infusion of attention from the NAE. The champion of readiness improvement within Naval Air System’s Command was Vice Admiral Wally Massenberg, who was eventually promoted by Admiral

Clark and given command of the entire Naval Aviation Systems Command. Equal in military rank to the “Air Boss,” a critical component to success, was Vice Admiral Massenberg repeated and pointed assertion that he was there to serve the Air Boss and the enterprise as a supporting commander.

The third part of this triangle was the tie to Navy leadership within the Pentagon who prepared programs and allocated funding. Without a tie to the money – elevated issues had no way of putting resources where they were needed.

## **Agility**

### **Single Fleet Driven Metric**

Admiral Clark knew that the Navy’s current readiness had suffered years of neglect and he wanted to give the President more options by increasing the operational availability and agility of the Navy. Naval Aviation in particular was distressed, and to keep the deployed carrier groups at top readiness, they were taking assets from non-deployed carrier groups and pushing them forward. This left squadrons and shore installations at unacceptably low levels of readiness, creating a “bathtub” (see Figure 1) that was difficult to fill and the steep climb back up was often painful. But the main problem was a lack of agility – the squadrons and aircraft carriers not deployed or just about to deploy could not be surged to meet an emergent need.

One of the keys to bringing this enterprise together was going to be determining the metric – one measure that all other measures would roll up to and support. As this was after all, the naval aviation enterprise, one of the metrics would have to be a number of different types of airframes. But how many were required? And when did they need to be ready?

Clark declared that he would “buy out the readiness” while still being a steward of the tax payers dollars. Not every squadron and ship had to be at 100% readiness, all the time. A ship just back from deployment that was going into a major depot overhaul could afford to not be 100% manned or send it’s sailors to education opportunities. The key was determining how much readiness was required for each unit and when, and to shallow that climb back to 100% ready.

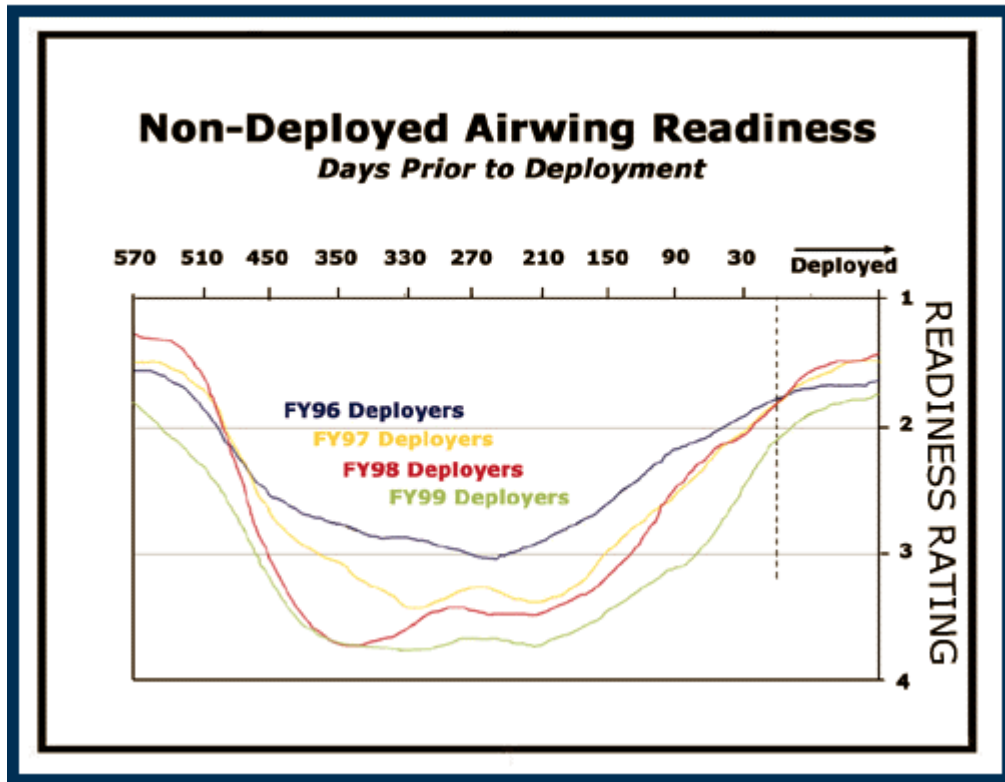


Figure 1 The Readiness “Bathtub”<sup>7</sup>

Admiral Clark decided that the readiness he would fund to both meet warfighting and other combative commanders requirements necessitated that he have 6 carriers ready to get underway within 30 days, and another two ready within 90 days. This was dubbed the Fleet Response Plan, and was what the CNO told the President he could count on from his Navy. The NAE now had a common, fleet driven and focused metric. It did not have to be absolutely right, and it could be changed when circumstances demanded it, but now the enterprise could measure itself right down to the training, planes and piece parts required to meet the new validated requirement. Everyone from the CNO down to the shop floor; from pilots, maintainers, the supply system and industry partners – were able to measure their contribution by this new metric. Prior to this, the disparate systems that make up the NAE might have measured their fitness with whatever metrics made sense in their domain ... now, at least at the top level, the metric was – can we get 6 Carrier Strike Groups ready to go within 30 days; and if not, what it will specifically take to get there.



## ***Aviation Culture***

Perhaps one of the reasons this enterprise approach was successfully piloted with naval aviation may be the unique nature of the aviation profession. Being agile and adaptive is a required skill set when flying high speed aircraft. Aviation mission commanders have to be ready and willing to relinquish their leadership position to a junior wingman if a human or system malfunction leave the junior airman with better situational awareness.

The Navy in general fosters a culture of risk avoidance, and often for good reason. Nuclear submariners are at one extreme, formed in the crucible of Admiral Rickover<sup>8</sup>, absolute control of all facets of the nuclear power plant was necessary to avoid a catastrophic mishap. Surface ship captains are no less concerned with their engineering and propulsion systems which never really “shut down” during the life of the ship – somebody is always on watch – and the captain is ultimately responsible. Aviation leadership is certainly held accountable for their actions and material readiness. But the nature of the business means that they will not be in every cockpit, or on every mission, so they have to be able to trust each other. Commanders mentor and train, but then have to trust their junior airmen to take a multi-million dollar jet out on a mission, execute that missions, and return intact. Senior aviation leaders know what it’s like to fly as both a lead and wingman – so it was not that far a stretch for one three star to say to another “you’ve got the lead boss, I’m hear in support.”

## **Convergence**

### ***Creating an Enterprise – it started with pilot production***

An early part of this journey began ten years ago as a program to reduce the time to train new Navy and Marine Corps pilots. It had been taking nearly four years to get a pilot from “Street to Fleet” (i.e. from college graduation to their first fleet squadron). The challenge was a simple flow problem, but with many interdependent variables and involving several large systems, which were not always aligned. While the Bureau of Personnel considered pilot production from a macro sense, no one had ever totally laid out the entire system from fleet needs to what it would take for the system to meet that requirement.

Pilot training had in effect, three phases: basic, intermediate and advanced. Once a pilot completed basic training, they would be passed to a second system for intermediate training where they would again be “in-processed” and after completion, go through this all again for the advanced training system. So was born the “Naval Aviation Pilot Production Improvement Program” (NAPPI) to try to better bridge the stovepipes that made up naval aviation.

The primary responsibilities entrusted to a service chief, in this case the senior Navy leader, are to fill positions with appropriate skill sets, follow-on training and education, and equip the force with the tools it needs to succeed. And within naval aviation, the three large systems that had to better align to fix pilot production (Figure 2) were:

- The navy manpower system – which usually considers human resources from a macro standpoint, broken down (in the case of officers) by communities (aviation, surface, submarine etc,) and rank structure (ensign to Admiral) and proposed accession and retention policy to properly fill the fleet and stay below congressionally authorized numbers on the size of the officer force. They manage the overall force size and administer force shaping tools that either accelerate (early out incentives) or decelerate (bonuses) the movement in order to reach the desired end state.
- The training system, in this case for naval aviation, that includes pre-flight academics, basic flight, advanced flight and fleet readiness squadron (FRS)<sup>9</sup> training. All separate entities in their own right with their own squadron patches, histories and cultures.
- And the equipment which includes simulators, aircraft and aircraft parts, in addition to all the tools required at multiple levels to equip a high tech flying force.

## Navy Enterprise Stovepipes

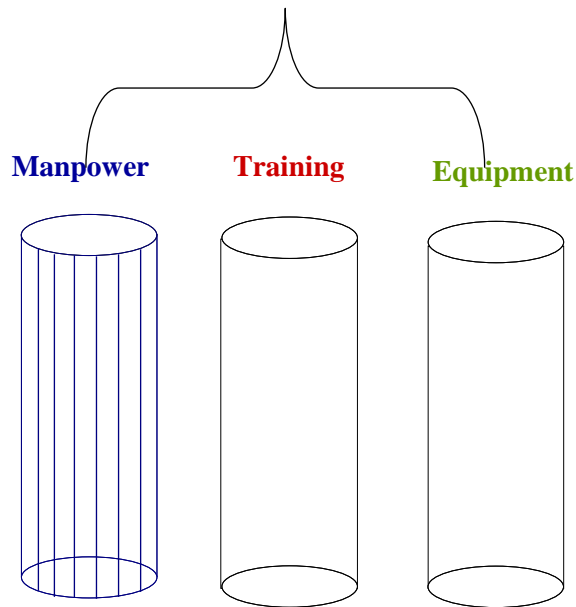


Figure 2: CNO Responsibilities

In many ways, these systems operate in a loose federation. But to succeed in a “mission” – in this case, reduce the time to train pilots – they were going to have to operate as an enterprise – many parts, one body.

To assist with the flow problem, Navy contracted with The Thomas Group<sup>10</sup>, a consulting firm that specializes in process improvement. After tightening up the real fleet requirement with the aviation type commander<sup>11</sup> and conferring with the Bureau of Personnel to gain a more holistic view of the officer accession process, the NAPPI team ventured to the United States Naval Academy in 1999 to talk to the source of nearly 300 naval pilots per year, about how prospective naval aviators would flow into the newly leaned out production system. It was much more efficient to have a pilot go through their entire training syllabus without starts and stops. Unplanned delays during flight training often require extra “warm up” flights to get the trainee ready again to undertake more aggressive training. Learning to fly requires dedicated and sustained focus, and delays are costly – in both time and money.

Once flow was leaned out, it was a matter of getting pilots to the start of the flow on time.<sup>12</sup> And if some had an appreciable delay to start this flow, the leadership capitalized on this “dead time” by sending new officers for a masters degree on their way to flight school, or some other billet that added down stream value to the enterprise, more efficiently using the time previously spent “stashed” away awaiting training. We were getting better visibility into the labor cost of naval aviation, and could now make enterprise level decisions as to the best use of that labor.

### ***But it was MORE than pilots ...***

It was not just about people. Flight training requires a lot of equipment that must be ready when needed; from aircraft and piece parts that make those aircraft run; to simulators, instructors, and course material. All systems must be responsive to the production flow, or production stops. So measuring how man aircraft were needed for any particular day became a key metric in both the training squadrons and the FRSs – aircraft ready for training. Which meant naval aviation leadership was going to have to go beyond their traditional comfort zone. They were going to have to leave the world of flowing scarves and big watches and try to bridge the gaps and speak the language of supply and maintenance.

While this may seem like a single homogenous system from the outside, like all large organizations, naval aviation is made up of several sub-cultures. One of the more colorful sub-cultures is the “maintainers” – the grand children of the old crew chief – who forged a close relationship with the pilot and an even closer relationship with the plane, and were famous for being able to piece a war weary aircraft back together “with beer cans and bubblegum.” But the grandchildren became more sophisticated and functionally broke down into all the different specialties that are needed to maintain a modern aircraft; electricians, avionic technicians, ordnance handlers, airframers, photo specialists, etc. Blending all those groups together is a challenge, but one that can be met by a good maintenance control team that knows how to properly groom aircraft through a deliberate periodic maintenance plan.

The other key constituent is the supply system. Often with their own metrics, supply officers ordered, tracked, and delivered a system that provided consumable and repairable parts. And while suppliers might be meeting 95% of their obligation on time, that last 5% might result in a

much higher percentage reduction in fleet readiness for a particular type model series aircraft. The three entities -- operations, maintenance, and supply -- had to come together as an enterprise.

For training pilots, the flow process improvements led to an increase in “the number of flight-ready aviators produced each year by 30percent, and reduced the time to train by 40%.”<sup>13</sup> And for the first time in many years, Naval Aviation had pilots showing up in the fleet as ensigns, rather than as lieutenants. This new enterprise approach delivered measurable results with pilot production. Next, Naval Aviation leadership wanted to determine if they could get similar results by applying an enterprise approach to overall fleet readiness. This would become the next phase of the journey.

### ***Bridging Stovepipes***

Creating an enterprise does not mean it will automatically act like one. Groups that traditionally worked in stovepipe organizations get comfortable in their processes, especially if they have been successful over time. These groups form cultural, sometimes tribal bonds around their complex understanding of their particular functional domain. The challenges lie in the seams and gaps between entities. Where the functional paths crossed the fledgling NAE would create cross functional teams (CFT) that would identify barriers to successful integration in addition to providing a dedicated process to break down those barriers:

- CFT 1 looked at the readiness requirements, and decided how much readiness was needed to meet the Fleet Response Plan.
- CFT-2 included most of the providers – the maintainers and suppliers who provided material support to meeting the Fleet Response Plan.
- CFT-3 was tied to the programmers and resource sponsors – and would elevate validated problems to the people who controlled the operations and maintenance funding.

### ***Boots on the Ground***

Creating an enterprise requires top down, executive level support and sponsorship. But in addition to policy and direction, an enterprise needs a dedicated process and the means for

execution. The NAE would only work if local leadership took ownership of their individual part of the process and drove the enterprise approach down to the shop floor. The type wing Commodores of the various model series aircraft would be in charge of the readiness “Triad” at each major naval air station. The triad would consist of the type wing Maintenance Officer, the Aviation Intermediate Maintenance Detachment Officer-in-Charge and Aviation Supply Division Officer. Prior to this, the wing commander had limited visibility into the intermediate level maintenance and supply as these fairly large commands fell under the Commanding Officer of the various Naval Air Stations. Air Stations commanders have a broader concern than just the flight line, so moving aircraft readiness under the type wing Commodores not only helped with functional alignment, but it forced the Commodores to take a more holistic view of their role in the enterprise. The “Triad” would meet weekly with the Commodore to help resolve barrier issues between elements that would come up from the lowest levels. If problems needed to be elevated for a material or process change, the Commodore could elevate the issue to NAE leadership for resolution. Senior flag level stakeholders were also engaged, and would systematically visit naval air stations, getting their “boots on the ground” to directly ask sailors about the process and hear from them the various barriers to mission success. They could then better champion their role in the process, helping with the resources and process changes needed to break through those barriers.

### **Success Story – the F-404 Engine**

The F-404 is the engine that drives the F-18 Hornet. It receives multiple levels of maintenance support; from the organizational level and squadron mechanics who can repair and tune an engine, to the intermediate level and specially trained artisans who completely rebuild the engine and handle more extensive repairs. The F-18 community was seriously short of engines, and had many aircraft parked awaiting a repaired engine to return from the shop. In the engine shop, crews were working around the clock, two 12 hour shifts that usually stretched to 14 hours with overlap – and they were always behind. Barriers were identified at the point of action and then one by one, they were removed. Some solutions were relatively easy, like changing the work hours at the consumable parts locker. They had been working two 8 hour shifts while the rest of the base was working around the clock – causing work to stop for want of a piece part in the middle of the night. Other barriers were harder to fix and required higher level intervention and

resources. One of the more fruitful decisions was to bring in commercial Lean / Six Sigma experts to identify and remove wasted time in the engine rebuild process.

In a short period of time, productivity expanded from 8 re-worked engines a month to 40. Crews were able to reduce their workload from two 12-hour, to three smaller, but more efficient 8-hour shifts as they systematically worked off their backload to meet requirements. This process was repeated at all other intermediate maintenance facilities that repaired the F-404 engine for the entire combined U.S. Navy and U.S. Marine Corps fighter community. After removing barriers and leaning out the other facilities, the enterprise determined that they could reduce capacity by 1/3, both saving physical overhead and manpower. Production increased, a more tightly validated requirement was filled, and resources could be returned back to the enterprise for other pressing needs.

It's often said, that the hardest thing to change is culture. But those F404 engine mechanics who were used to 14-hour shifts and being perennially behind had no problem adjusting to the new way of doing business. By having a metric that was tied to fleet readiness and given the tools they needed to stay ahead of production, their quality of life soared and no one wanted to go back to the old way of doing business. And this was not an isolated example – the NAE:

“... looked to cut consumption by realigning cost responsibility and making wing commanders, for instance, liable for a type/model/class of aircraft. The "tipping point" came in fiscal 2005 when the NAE faced a \$120 million cut in flying hours. Instead, the NAE ended the year with a \$163 million value ...'We essentially gave back to the Navy \$283 million out of the flying hour program.’”<sup>14</sup>

### ***Expanded in Scale / Scope***

The enterprise experiment in naval aviation showed so much promise that the Navy expanded the effort to take an enterprise view of the entire Navy. Now in addition to the Naval Aviation Enterprise, the Navy has (in various stages of maturity) a:

Surface Warfare Enterprise

Undersea Warfare Enterprise

Naval Netwar/FORCEnet Enterprise  
Navy Expeditionary Combat Enterprise

In addition, the Navy has established an overarching enterprise that provides top level guidance and to address seams between the functional enterprises.

On the current NAE website the fleet driven metric has been modified to: "Naval Aviation forces, efficiently provided and ready for tasking now and in the future."<sup>15</sup> The enterprise approach is alive and well. How well it scales and proceeds will be less determined by the new organizational construct, and more by how well the fledgling enterprises are able to focus, adapt and converge on a unified and measurable mission. The journey is far from over.

## **Conclusion**

When disparate groups are forced to work together, there is often a clash of cultures and values. This is because all of these large groups are in effect, complex adaptive systems that are forever evolving and growing, but also loath to change from patterns that had been successful in the past.

In order for groups to work better together there needs to be a fuller understanding of other stakeholder domains – so each can see how what they do fits into the larger system. They must possess the agility to adapt to evolving circumstances and have trust in each other to do the right thing.

The NAE successfully bridged stovepipe organizations and were able to increase overall system productivity at reduced cost. But how well will this scale to more complex challenges? With the limits of military power again made evident by recent insurgencies, states recognize that real solutions require a more comprehensive / whole-of-government approach. Hard power and soft power must work in harmony – and larger system stovepipes must also be bridged. Today, the talk is about how the non-military agencies of government need to become more expeditionary in nature – to harmonize with their military element to succeed in cooperative security type efforts. These will be difficult challenges. There will be much need for interagency training and rehearsal, as we build the capacities and capabilities to meet 21<sup>st</sup> Century challenges. But to



solve these more challenging problems, we're still going to have to get "boots on the ground," decide who owns the process, and determine a common objective by which all stakeholders can rally and measure their progress.

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<sup>1</sup> "So it's connected...now what? C2, Effects-Based Operations, and Whole of Government Action," ICCRTS June, 2007 Dr. Ed Smith and Mark Clemente, Newport, RI and "Cajole and Coordinate? C2 in Whole-of: -Government, - Nation, and -Coalition Action," ICCRST, June 2008 Ed Smith and Anne-Marie Grisogono and Mark Clemente, Seattle, WA; "NATO – Flirting with a More Comprehensive Approach to Alliance Security," ICCRTS June, 2008, Mark Clemente Seattle, WA.

<sup>2</sup> Charles C. Krulak (1999). "The Strategic Corporal: Leadership in the Three Block War". Marines Magazine, on Air University. Retrieved on 2009 – 01-19.

<sup>3</sup> See "Wicked Problems and Comprehensive Thinking in Irregular Warfare" ICCRTS June, 2009 Dr. Ed Smith and Mark Clemente, Washington, DC for a more thorough explanation of wicked problems. This paper posits a framework that combines complexity theory, living systems theory and decision making theory to offer a potential way ahead for dealing with wicked problems.

<sup>4</sup> Most of these observations are personal. The author was a functional wing commander and responsible for the readiness of the U.S. Navy's fighter squadrons at the creation of the NAE. Other observations came from personal interviews with the two chief NAE architects; Admiral John Nathman and Vice Admiral Wally Massenberg.

<sup>5</sup> David S. Alberts e-mail initiating Focus, Agility, and Convergence Team (FACT) dtd 13 Dec 2007.

<sup>6</sup> The Top Five Priorities were: Manpower, Current Readiness, Future Readiness, Quality of Service and Alignment. From [http://www.navy.mil/navydata/navy\\_legacy\\_hr.asp?id=216](http://www.navy.mil/navydata/navy_legacy_hr.asp?id=216) accessed 19 March 2009.

<sup>7</sup> Figure taken from Naval Postgraduate School thesis, "The Carrier Readiness Team – realizing the Vision of the Naval Aviation Enterprise," by Carroll F. LeFon, Jr, March 2009, page 12

<sup>8</sup> Admiral Rickover was the infamous father of nuclear power, whose personal zeal created the successful submarine enterprise. While he was head of the Navy Nuclear Propulsion Program, he personally interviewed and selected every officer who would enter the nuclear service, and created a zero-defect culture.

<sup>9</sup> FRS training is in the actual aircraft student pilot will fly in the fleet; i.e. F-18, E-2, H-60 etc.

<sup>10</sup> [www.thomasgroup.com](http://www.thomasgroup.com).

<sup>11</sup> This would be coordinated by Commander, Naval Air Forces Atlantic and Pacific Fleets -- the commanders who organize, train and equip our Carrier Strike Groups: Aircraft Carriers, and associated squadrons, including aircraft and personnel to meet Combatant Commander requirements.

<sup>12</sup> It should be noted that this "efficiency review" was not an indictment of the training system writ large and it was imperative that the quality of the end product was maintained.

<sup>13</sup> From "Thomas Group and U.S. Navy Reveal Latest Developments in Naval Aviation Flight Training At SMI Defence Conference" dtd 4 Aug 2000.

<http://www.thefreelibrary.com/Thomas+Group+and+U.S.+Navy+Reveal+Latest+Developments+in+Naval...-a063863225> accessed 19 March 2009

<sup>14</sup> From Aviation Week article:

[http://www.aviationweek.com/aw/generic/story\\_generic.jsp?channel=aerospacedaily&id=news/NAV10246.xml&headline=With%20Navair%20Chief%20Leaving,%20Cost-Savings%20Plan%20Up%20In%20Air](http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=aerospacedaily&id=news/NAV10246.xml&headline=With%20Navair%20Chief%20Leaving,%20Cost-Savings%20Plan%20Up%20In%20Air) <accessed 20 January 2009>

<sup>15</sup> The vision of the NAE is to "Efficiently deliver the right force, with the right readiness, at the right time – today, and in the future." This vision drives the NAE toward the construct of single process ownership, vital toward establishing a culture of cost-wise readiness and providing improved materiel management, more balanced logistics support and higher availability through faster turnaround times. Essential to achieving cost-wise readiness is understanding our total force cost structure, managing cost reductions, and making sound investments as a cohesive enterprise.

The mission of the NAE is to "Support Combatant Commanders and the Fleet by providing combat-ready Naval Aviation forces which are fully trained, properly manned, interoperable, well maintained and combat-sustainable."

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We will measure the efficiency and effectiveness of the NAE by the single Fleet-driven metric of "Naval Aviation forces, efficiently provided and ready for tasking now and in the future." This metric is the standard against which we measure our ability to deliver the things we value

From NAE website <<http://www.cnaf.navy.mil/nae/main.asp?ItemID=13>> accessed 20 January 2009