FROM CRADLE TO SAVE: *REVOLUTIONARY ACQUISITION FORCE STRUCTURE ALTERNATIVES FOR THE 21ST CENTURY*

Lt Col Craig Olson, USAF

Military strategists depict a future characterized by the uncertainty of when and where conflicts will emerge—requiring that U.S. forces be prepared to engage worldwide, with leading-edge technologies. This challenge cannot be met without a revolutionary change in the present acquisition force structure. The services have the tools in hand to meet this challenge; will the Department of Defense be able to make the needed changes?

> *"There is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things."*
>
> **—Niccolo Machiavelli**

The date is October 22, 2015, just one day after the new commander-in-chief (CINC), U.S. Pacific Command (CINCPAC) assumed leadership. Intelligence sources indicate that China has been aggressively developing a family of all-weather precision guided munitions (PGMs), which they have just begun producing in significant numbers. This observation, combined with growing indications of China's desire for regional hegemony, has brought Taiwan to the forefront of the PACOM's (Pacific Command) security challenges.

Upon careful analysis of the situation, CINCPAC decides to seize this opportunity to engage the PACOM Operational Experimentation Force (PACOM OPEXFOR), a key component of an "acquisition renaissance" which has evolved over the past 15 years. Knowing that automatic target recognition (ATR) technology has progressed dramatically in recent years, CINCPAC immediately tasks the OPEXFOR commander, whose tightly coupled joint team of requirements, acquisition, and operational specialists will define a requirement and engage with

industry to identify suitable emerging technologies and integrate the appropriate hardware and software upgrades into existing sea, land, and airborne sensor platforms.

CINCPAC is aptly impressed as he observes the self-contained, multidisciplined OPEXFOR team orchestrate a series of full-blown acquisitions in just 18 months. The CINC will complete his tour, confident his successor has at his or her command the first truly robust, theater-wide, joint combat identification network, capable of detecting, locating, identifying, and destroying Chinese assets well before they enter Taiwanese airspace, effectively rendering China's PGM inventory obsolete.

Though a scenario like this is not feasible for a major new system such as the F–22, it is indeed a reasonable goal for the development, integration, and initial fielding of the various system and subsystem hardware and software acquisitions that compose the majority of combat capability improvements.[1] Moreover, to turn such a scenario into reality, it is absolutely essential that we reevaluate our present acquisition and operational force structures. We, in fact, must create an integrated acquisition and operational force structure if we hope to organize, train, and equip our future forces with the same technological edge they have become accustomed to, thus allowing them to maintain a decisive advantage over any adversary in a future characterized by uncertain threats and rapid technology change (Gansler, 1998, p. 1).[2]

This article lays out a path ahead toward an "acquisition renaissance." First, however, I'll discuss the present state of acquisition reform and the status of operational experimentation programs. Next, three alternative acquisition force structures will be presented that exhibit varying degrees of coupling between the acquisition and operational communities (Figure 1). The advantage and disadvantage of each alternative will be examined and a recommendation made as to the optimum acquisition force structure to pursue. The discussion will occur exclusively at the strategic level with the purpose being to challenge the reader to seriously think through the opportunity for revolutionary change in our defense acquisition system. The fine details of the
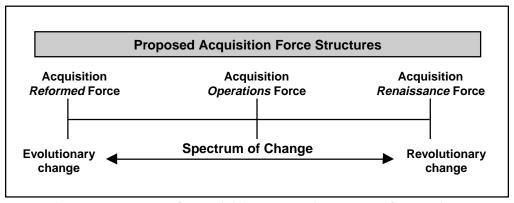

Figure 1. Proposed Acquisition Force Structure Alternatives

ensuing interagency, interservice, and cross-community changes and implications would be an interesting subject of a much more detailed study.

REFORM OR STREAMLINING? A BACKGROUND OF IMPROVEMENT

Modern acquisition reform began in the early 1970s following growing public perception of Pentagon mismanagement during the Vietnam War (National Security Decision Making Department, 1998, pp. 4–5).[3] While acquisition reform initiatives in the 1970s and 1980s took place in the context of a rather predictable threat environment, more recent initiatives, such as the Defense Reform Initiative (DRI) of 1997, have attempted to align the defense infrastructure with a much more dynamic environment (Defense Reform Initiative, 1997, p. 1).[4] Collectively, these types of initiatives have emphasized an appropriate balance between oversight and efficiency and have been successful in reducing the cycle time of several noteworthy programs ("Executive Summary," 1998).[5] Another significant step in acquisition reform came from the institution of the advanced concept technology demonstration (ACTD) program, which has provided a means of bringing together the development community with the operational community to address emerging technologies as potential solutions to critical military needs (Gansler, 1998, p. 8).[6]

Improvement initiatives have unquestionably streamlined acquisition. But has there been true transformation, or is the reformed process of today just a modified relic of the Cold War era?[7] Our national security strategy and Joint Vision 2010 depict an uncertain future and demand U.S. military forces engage worldwide, throughout the conflict spectrum, with leading-edge technologies. This provides a challenge which simply cannot be met short of a revolutionary change in the present acquisition force structure.

The need for a true acquisition revolution has been captured well by Jacques S. Gansler, Under Secretary of Defense for Acquisition and Technology: "We must modernize our current weapons systems; develop and deploy the major new systems and subsystems required for 21st century operations; and support those systems efficiently, effectively, and securely—and we must do all three of these at lower cost and with drastically reduced cycle times."(Gansler, 1998, p. 2) The traditional acquisition corps,

> **"Modern acquisition reform began in the early 1970s following growing public perception of Pentagon mismanagement during the Vietnam War...."**

which will be even smaller in the future, cannot do this alone.[8] It must draw upon the resources available in the operational community, where opportunities abound in a series of operational experimentation and demonstration programs now taking place.

OPERATIONAL EXPERIMENTATION PROGRAMS

Seeing is believing. More than 400 years ago, Machiavelli recognized this when he said, "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 …who do not truly believe in anything new until they have had actual experience of it" (Machiavelli, 1532/1952). Service operational experimentation programs initiated within the last few years have just begun to provide such an opportunity. Specifically, the Navy's Fleet Battle Experiments,[9] the Air Force's Expeditionary Force Experiments,[10] the Army's Advanced Warfighting Experiments,[11] the Marine Corps Warfighting Laboratory,[12] and finally, the interservice Joint Warfighting Experiments,[13] are taking those vital first steps toward institutionalizing a process of maturing emerging technologies in operational environments ("The New Naval War College," 1998; Cohen, 1997, p. 42; Lowrey, 1997; Krulak, 1996, Gansler, 1998, p. 5).

Each of the experimentation programs has a common goal—providing the capability to rapidly develop emerging technologies and new warfighting concepts and align them with new doctrine, tactics, techniques, and organizations (Cebrowski and Garstka, 1998; Krepenivich, 1994).[14] As experiments, failure is not only allowed, it is a key aspect of success in allowing the system to be refined in the same environment in which it will ultimately be used. In simple terms, evolutionary acquisition is occurring (Secretary of the Air Force, 1998, p. 2).[15] The experiments are always built

> **"The experiments are always built around emerging technologies and innovative warfighting concepts, and each is directly linked to Joint Vision 2010."**

around emerging technologies and innovative warfighting concepts, and each is directly linked to Joint Vision 2010. Thus, they represent the first legitimate attempts to bring together industry, acquisition, and operational communities in a single coordinated effort to advance the art of war.

With these powerful acquisition reform and operational exercise tools in the hands of each of the services, there would appear to be an almost unlimited potential to make sure the warfighter receives the right systems at the right time—like never before in the history of warfare. Will the Department of Defense (DoD) embrace this potential and begin to establish the appropriate force structure changes as we enter the 21st century? The discussion will now turn to alternative acquisition force structures that could capitalize on these unprecedented opportunities.

ALTERNATIVE ACQUISITION FORCE STRUCTURES

Not unlike the rest of our federal government, the defense acquisition system is organized to provide an elaborate and necessary means of checks and balances.[16] As such, it has been successful in producing the world's most effective and lethal weapon systems. Unfortunately, effectiveness is not synonymous with efficiency. Even with the reforms discussed earlier, most would agree that the present system is still too cumbersome to be compatible with the rate of technology change and the uncertain security environment of the future. What follows is a strategic-level discussion of three alternative acquisition force structures.

Each will be examined with respect to its organizational structure (see notional diagrams in the Appendix, Figure 3), as well as its associated strengths and weaknesses.

ALTERNATIVE I:
ACQUISITION REFORMED FORCE

The first alternative is termed the acquisition reformed force. As the title suggests, it is characterized by an evolutionary extension of the present trends in the acquisition and operational communities. In the acquisition reformed force, each community will continue to aggressively pursue improvements in the areas outlined previously, but they will maintain a separate and distinct chain of command, just as they do today.

For the purposes of this discussion, the acquisition community includes headquarters (Pentagon), program office, research, and industry arms.[17] Program managers continue to report to program executive officers (PEOs), while supporting requirements inputs from the operational commands. The tour length for the typical program manager is longer to ensure continuity through the acquisition cycle. It is assumed that defense reform initiatives have been successfully implemented, allowing business affairs within DoD to be nearly as streamlined as those in the civilian sector, resulting in significantly reduced overall contract award and execution timelines when compared to today.[18]

Due to a significantly reduced government research and development capacity, the Acquisition Reformed Force will rely heavily on the civilian sector for innovative technologies. Successful streamlining has increased the ease of doing business with the government, resulting in a preponderance of healthy competition from technology-rich vendors of all sizes. Furthermore, due to the shrinkage of the acquisition workforce, contractors have been empowered with the bulk of the engineering and program management responsibility. They are "monitored" rather than "managed" by the program offices. An evolutionary acquisition approach is used in many cases, but it is not common across the services. Personnel within the acquisition community will function basically as they do today—geographically and service separated, with little awareness of the intricacies of each other's

> **"Successful streamlining has increased the ease of doing business with the government, resulting in a preponderance of healthy competition from technology-rich vendors of all sizes."**

specialties and requirements.

Like the acquisition community, the operational community in the acquisition reformed force has also matured in its ability to identify new technologies and evaluate their suitability. Service OPEXFORs have been institutionalized and are under the control of service operational commands. Planning and performing the experiments is the primary responsibility of operational test and evaluation (OT&E) specialists, although they are heavily supported by the development test and evaluation (DT&E) community. They occur approximately once each year and consider technology applications across the whole spectrum of conflict. Many, but not all, new technologies are evaluated in the service experiments (OPEXs). Occasionally a joint operational experiment will

take place, but for the most part, technologies are identified and evaluated based on individual service needs.

As an acquisition force structure for the future, the primary advantage of the acquisition reformed force is its relatively low risk.[19] Since many of the characteristics of this force structure are just beginning to be apparent today, there will be few remaining bureaucratic or parochial hurdles to overcome for it to succeed in offering at least some improvement in efficiency.

The low risk is also its primary disadvantage, as there is little likelihood for a dramatic improvement in DoD's ability to procure systems faster, better, and cheaper.

> **"As an acquisition force structure for the future, the primary advantage of the acquisition reformed force is its relatively low risk."**

Furthermore, although to a lesser degree than in the past, a distinct possibility still exists for the procurement of a system that does not adequately meet user needs, is unnecessarily service-unique, or is not interoperable. Finally, future personnel drawdowns will leave a smaller acquisition and operator workforce available to support this structure, leaving the acquisition reformed force with little choice but to work harder with less, not unlike the frustrated forces of today.

ALTERNATIVE II:
ACQUISITION OPERATIONS FORCE

An institutionalized, interagency focus characterizes the acquisition operations force. Essentially, this force structure takes many of the positive aspects of the acquisition reformed force, and formalizes them across the services. It includes all the acquisition and OPEX initiatives of the acquisition reformed force, thus these efficiencies are also present in the acquisition operations force. Finally, it brings together most of the acquisition and operational specialists into a single organization, under a single commander.

In the acquisition operations force, the program office is still the focal point of the procurement process, but it is organized very differently from today's program offices. A senior military or civilian program manager will direct the program, and he or she will typically be an acquisition specialist. Though not common, a program manager will occasionally come from an operational background. In a significant departure from the acquisition reformed force, the program manager will report to an appropriate operational commander instead of the PEO (e.g., Air Combat Command for the F–22 program).

In light of the huge drawdown in acquisition personnel highlighted earlier, the acquisition operations force has embraced the need for radical restructuring at the program office and Pentagon level. Program offices will include a mix of operational specialists to complement a reduced staff of the typical program personnel. The operational specialists will perform the requirements definition function presently performed within the operational commands, and they will assist the acquisition specialists as they interface with the Pentagon (e.g., program objective memorandum development).

The Pentagon staff will rely heavily on increased program office support since they have taken most of the acquisition

personnel cuts. The PEO and program element monitor (PEM) staffs will be merged, and the functions of these staffs will be shared with the restructured program office.[20] Finally, there is no longer a need for separate DT&E and OT&E test specialists since all test functions will fall under the program manager.

An evolutionary approach is the standard practice in the acquisition operations force—across the services and in all new acquisition programs. Furthermore, it is well-understood and accepted by the defense industry. Consequently, ACTDs are no longer necessary as a separate means of quickly demonstrating and fielding new technologies. The evolutionary approach is fully complemented by an increased emphasis on operational experimentation in comparison to the acquisition reformed force.[21] Service OPEXs occur at a minimum of twice each year, and they have a more joint focus. Furthermore, joint warfighting experiments are the rule rather than the exception, and they take place at least once every two years. Finally, successful evaluation of all new system and subsystem programs in at least one of the OPEXs is a mandatory exit criteria for advancement in the acquisition process.

The primary advantage of the acquisition operations force is unity of command. A single operational commander overseeing the procurement process offers the distinct advantage of placing the ultimate responsibility for the suitability of a system where it belongs—on a single person who represents the user. Obviously, he or she must be supported by a balance of acquisition and operational specialists. For example, the operational commander might have two vice/deputy commanders—

one for operations and one for procurement. In any case, this approach should limit the finger-pointing that goes on today between the acquisition and operational communities. Moreover, "requirements creep" will no longer be a curse. It may even be embraced as an inherent aspect of an uncertain security environment and fully accommodated by the evolutionary acquisition approach and frequent OPEXs (Wall, 1998).[22] The

> **"The primary advantage of the acquisition operations force is unity of command."**

evolutionary approach, combined with fully merged DT&E and OT&E functions, also offers the potential of dramatically reducing the overall development time for a system or subsystem.[23]

The primary disadvantage of the acquisition operations force is the significant paradigm shift required for it to be implemented successfully. At present, there is a clear separation between the acquisition and operational communities. Operators typically have little appreciation for the complexities of acquisition and test, and this is exacerbated by the lack of operational experience among the majority of acquisition specialists.[24] Furthermore, there is often very little interest among operators in becoming involved in the acquisition community. Many would argue that this arrangement is as it should be, since it provides a necessary balance to the overall procurement process. This benefit does not have to be sacrificed, as a system of checks and balances will still occur within the acquisition operations force, but now in a compressed fashion.

A second disadvantage of the acquisition operations force is an inherently reduced opportunity for oversight, specifically the type presently provided by PEO/PEM staffs and operational command requirements staffs (Gansler, 1998, p. 8).[25] Consequently, although systems may be delivered faster, there is less of a guarantee they will also be consistently better or cheaper. Reduced oversight does not mean "no oversight," however, staff size and composition will have to be chosen

> **"Reduced oversight does not mean no oversight, however, simply that staff size and composition will have to be chosen very carefully."**

very carefully. Other factors to consider in choosing the optimum Pentagon and operational command staffs include:

- balancing the authority of operational commanders with senior Pentagon acquisition officials regarding requirements versus budget;

- determining how budget cuts are spread among programs; and

- deciding where responsibility should lie for answering congressional inquiries.

The solutions to these challenges merit further study, but they should not be considered insurmountable. Rather, they are the type of challenges one should expect with a large paradigm shift.

Finally, the acquisition operations force still maintains a distance between the acquisition process and the ultimate warfighter—the CINC and his forces. Consequently, there is still a finite possibility of a system being delivered that is not adequately "joint," interoperable, or optimized for the mission at hand.[26]

ALTERNATIVE III:
ACQUISITION RENAISSANCE FORCE

The final acquisition force structure alternative to be developed is termed the acquisition renaissance force. As the name implies, it represents a dramatic departure from the present paradigm of procuring systems. Like the other two alternatives, it includes the efficiencies of defense reform and operational experimentation programs as a standard framework. This force structure is unique, however, in that it shifts the focus of acquisition efforts to the ultimate warfighters, the CINCs of the Unified Commands, thus providing both an operational and a joint focus to procurement.

The simplest way to envision the key characteristic of the acquisition renaissance force is as a self-contained program office, analogous in structure to that of the acquisition operations force, but assigned to the CINC as part of his or her designated staff (e.g., J-xx). It would be headed by a flag officer who is supported by senior program management and requirements officers from each of the services. In contrast to the other two alternatives, these program managers and requirements officers are no longer considered specialists, but rather "renaissance" professionals with savvy in both arenas. How is such a broad range of expertise obtained? It occurs through an increased cross-flow between the communities throughout an officer's career. It is

assumed that the great majority of officers in this force structure begin their careers as operators, and then branch off into acquisition-related jobs at the mid-career point. These officers are then expected to move between acquisition and operational positions as they progress in rank. The experience gained from cross-flow will be augmented by specific training (e.g., a short program management or test and evaluation course taught at the Defense Systems Management College).

The size of the program office branch will be dependent on the scope of operations and the equipment apportioned to the CINC, but in all cases it would be larger than the typical program offices today, since it would likely be responsible for a wide variety of programs. The acquisition renaissance force assumes that the evolutionary acquisition approach is fully embraced, and a great majority of hardware and software acquisitions will have a relatively quick cycle time (i.e., less than three years), commensurate with a CINC's strategic horizon.[27] The services will maintain Title X responsibilities and budgets to organize, train, and equip their forces. In addition, a reduced Pentagon staff, analogous to that in the acquisition operations force, will also remain in place. This staff will coordinate with the Pentagon Joint Staff to determine the disposition of all acquisitions.

In addition to the program office branch, the acquisition renaissance force will also include an OPEXFOR as part of the CINC's designated staff, (e.g., J-xx+1). This branch will include all the test personnel (who, again, will have mixed acquisition and operational backgrounds), and it will be responsible for planning, executing, and evaluating the results of each OPEX. In contrast with the other two alternatives, OPEXs will no longer be service-unique but rather shared between the CINCs, as designated by the Pentagon Joint Staff.

The primary advantage of the acquisition renaissance force is that it provides an inherently joint focus while placing the responsibility for procurement in the hands of the ultimate user, the warfighting CINC. The CINC is also the individual most concerned with the security environment, and is therefore highly motivated to ensure the right system is delivered at the right time. By the same token, operators will be intimately involved in the acquisition process from the outset, significantly reducing the potential for a system requirements mismatch. Another advantage of the acquisition renaissance force is the higher potential of successfully accommodating the drawdown in acquisition specialists. This alternative fully embraces a dramatically reduced workforce, and grooms and trains personnel to best adjust to it. Furthermore, it provides a means of more tightly coupling the joint strategic planning system (JSPS) activities with the planning, programming, and budgeting system (PPBS) activities, thus enabling a closer match between CINC priorities, program objective memorandum development, and systems acquisition.

> **"The primary advantage of the acquisition renaissance force is that it provides an inherently joint focus while placing the responsibility for procurement in the hands of the ultimate user, the warfighting CINC."**

Clearly, the primary disadvantage of the acquisition renaissance force is risk. Indeed, it is the highest risk approach of the three alternatives presented. Although it offers a framework most likely to accommodate rapid concurrent development of new technologies and appropriate operational systems, it runs the risk of developing systems too quickly. Furthermore, since CINCs traditionally focus out from one to three years, this approach will tend to deemphasize long-range planning. The result could easily be suboptimum expenditure of funds on acquisitions that are short-term fixes applicable only to theater-specific scenarios. Allowing the services to maintain Title X responsibilities will provide a means of controlling this tendency; nevertheless, great care must be taken to ensure that checks and balances are put in place between the unified commands, operational commands, and the Pentagon staffs.

> **"Care must also be taken to ensure that personnel are adequately trained to maintain acquisition and operational expertise, and that enough of these new "renaissance specialists" are available for this option to succeed."**

This approach also requires a huge paradigm shift, even larger than the case of the acquisition operations force. Extra caution must also be exercised as the traditional program offices are totally restructured and reassembled underneath the CINC. Staffs must be sufficiently streamlined given the available personnel, but not made so small that program managers are overburdened with too many diverse programs. Care must also be taken to ensure that personnel are adequately trained to maintain acquisition and operational expertise, and that enough of these new "renaissance specialists" are available for this option to succeed.[28] Finally, the tight coupling with industry achieved by the other two alternatives will be complicated by this approach simply due to geographic separation. Therefore, a widespread and robust secure and unsecured voice, video, and data network will be essential. It will also require a willingness on the part of industry personnel to travel in theater to support their equipment in OPEXs.

THE TIME FOR AN ACQUISITION REVOLUTION IS NOW

Having identified the characteristics of three alternative acquisition force structures, what remains is a basis upon which to judge them and recommend a preferred path toward the future. Many other permutations of the alternatives presented are certainly possible. Moreover, the strengths and weaknesses discussed should not be considered sacrosanct or all-encompassing. They are relative characteristics with respect to each alternative and only apply within the context of the grand strategy and security environment presented. The three alternatives presented were chosen simply because they span a spectrum running from an acquisition, or business-focused structure, to an operationally focused structure. As the advantages and disadvantages of each approach are laid out, they also tend to occupy ends of a spectrum (see Figure 2). Therefore, the

spectrum can be analyzed with the goal of choosing an acquisition force structure most appropriate for the context presented.

The acquisition reformed force occupies one end of the spectrum as the most business-focused. It is the lowest risk approach, but it also has the slowest cycle time, is the least "joint," and requires the largest number of personnel. Finally, it places the acquisition process furthest from the warfighter. The acquisition renaissance force, on the other hand, is the most operationally focused. It involves the highest risk, but also has the potential for the fastest cycle time. Furthermore, it offers the maximum degree of jointness and should require the fewest total personnel. The acquisition operations force falls on the spectrum between these two, although not necessarily in the middle.

In the context of the security environment presented—one of significant U.S. engagement in a world of high uncertainty, a broad range of threats, and rapidly emerging technologies—the key attributes of an optimum acquisition force structure are operational focus, rapid cycle time, and flexibility. Based on this argument, the acquisition renaissance force would appear to be the best acquisition force structure for the future. However, risk must also be considered, given the typically risk-averse nature of the U.S. military. The skepticism likely to be encountered with this high-risk approach might make it difficult to embrace, at least initially. Therefore, the most appropriate force structure to pursue at this time is likely somewhat different from the one presented here, perhaps a combination of the acquisition operations force and the acquisition renaissance force.

As already stated, significant further study is required to work out the details of any such restructuring. The reader is again reminded that the purpose of the argument has not been to focus attention on the merits of such details, but rather to encourage a serious consideration of the
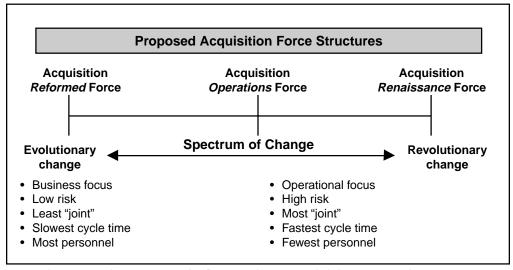

Figure 2. Spectrum of Alternative Acquisition Force Structures

opportunity for revolutionary change in our defense acquisition system. The time for holding on to old or slightly modified ways of doing business is past.

An uncertain but dynamic future awaits the 21st century military leader. It calls for an equally dynamic approach to system procurement.

"The only thing harder than getting a new idea into the military mind is getting an old one out."
—B. H. Liddell Hart

Lt Col Craig S. Olson, U.S. Air Force, is presently assigned to the Secretary of the Air Force for Acquisition, Special Programs Directorate, in Washington, D.C. He is a graduate of DSMC's APMC 99-3. His background includes operational flying tours as an F–4 weapon systems officer and electronic warfare officer, as well as a flight test tour in the F–15E. He has also served as a program manager in the Joint STARS Joint Program Office. He holds an M.S. degree in mechanical engineering from Boston University and a B.S. degree in engineering mechanics from the U.S. Air Force Academy. In addition, he is a graduate of the U.S. Air Force Test Pilot School, the Air Command & Staff College, and the Naval War College.

(E-mail address: craig.olson@pentagon.af.mil)

REFERENCES

Cebrowski, A. K., & Garstka, J. J. (1998, January). Network-centric warfare—its origin and future. *U.S. Naval Institute Proceedings,* 35.

Cohen, W. S. (1997, May). Secretary of Defense, *Report of the Quadrennial Defense Review. Washington*, DC: Office of the Secretary of Defense.

Department of Defense. (1977). *Defense Reform Initiative, the business strategy for defense in the 21st century.* Washington: Author.

Executive summary of arsenal ship report. (1998, March 2). *Inside the Navy,* p. 10.

Gansler, J. S. (1998, March 12). Testimony before Senate Subcommittee on Acquisition and Technology, Committee on Armed Services, by Under Secretary of Defense for Acquisition and Technology. 105th Cong., 2d Sess.

Krepenivich, A. (1994, Fall). Cavalry to computer: The pattern of military revolutions. *The National Interest.*

Krulak, C. C. (1996, Autumn). Operational maneuver from the sea: Building a Marine Corps for the 21st century. *National Security Studies Quarterly,* 19–29.

Vern Lowrey, (1997, November). Army division advanced warfighting experiment. *Engineer,* 27.

Machiavelli, N. (1952). Book 6. Of new dominions which have been acquired by one's own arms and ability. In *The Prince* (pp. 49-50). New York: New American Library. (Original work published 1532)

National Security Decision Making Department. (1998, August). *Resource allocation, the formal process* (2nd ed.). Newport, RI: U.S. Naval War College.

Secretary of the Air Force. (1998, April 30). *Evolutionary acquisition process for C2 systems* (Air Force instruction 63-XXX [Draft]). Washington: Author.

The New Naval War College, Focusing on Forward Thinking. (1998, September/October). *Surface Warfare,* 4 (Navy Warfare Development Command Maritime Battle Center).

Wall, R. (1998, August). Expeditionary nerve center. *Air Force Magazine,* 66.

ENDNOTES

1. The argument will focus on organizational, or force structure, changes that could institutionalize a dramatic reduction in the program definition and engineering and manufacturing development phases of the acquisition cycle for typical system and subsystem upgrades. The length of these phases for a traditional acquisition of this type usually ranges from two to five years, depending on the size and complexity of the system or subsystem. This study focuses on an organizational structure that will reduce the cycle by at least 50 percent. The study does not directly address other potential areas of change, such as funding availability and stability (i.e., program objective memorandum development) which, though considered important, are beyond its scope.

2. Although we obviously cannot be sure of the security environment we will face in the next 10 to 20 years, it is likely to be dramatically different and far more dynamic than that provided by the Cold War. One only has to look at a short list of the activities in which the U.S. military has been engaged since 1990 to confirm that this is already the case: conventional war in Desert Storm, humanitarian relief and urban warfare in Somalia, peacekeeping in Bosnia, the riots in Los Angeles, and the recent attack against terrorist facilities in Afghanistan and Sudan—nearly the entire spectrum of conflict is covered. Moreover, we

have had to face these challenges while undergoing a significant drawdown in force structure and a declining budget—two characteristics unlikely to change without the presence of a large peer competitor. Some of the specific characteristics and players of the early 21st century security environment will likely include: emerging democracies, potential competing major powers, rogue actors with weapons of mass destruction (WMD), large nonstate criminal organizations, and increasing economic and informational interdependence. Future adversaries probably will not attempt to directly combat the technologically superior U.S. military in a force-on-force sense, but will rather organize, train, and equip their forces to fight asymmetrically. Occurring simultaneously with these security environment changes is technology change at a rate never before witnessed in history. In sum, the future represents a set of constraints and opportunities that demand a fundamental change in our means of procuring systems.

3. The first DoD 5000-series documents were written in this time frame. These provided key guidance in several areas, including: increased oversight at distinct acquisition "phases," a requirement for Secretary of Defense approval at three decision milestones (program initiation, full-scale development, and production and deployment), the use of existing military or

commercial capabilities to satisfy mission needs whenever possible, and minimizing documentation. Many adjustments to the 5000-series documents have occurred since then, but the focus has continued to be increased efficiency and effectiveness through such principles as a streamlined or reduced number of management levels, centralized policy with decentralized execution, use of prototypes, and operational test and evaluation. In addition, the Packard Commission created, among other things, the defense acquisition boards (DAB) as a forum for increased oversight of programs at major decision milestones.

4. With respect to acquisition, DRI focuses on the need for DoD to adopt the "revolution in business affairs" which has allowed the American commercial sector to maintain a competitive edge in the rapidly changing global marketplace. Among these initiatives are more open government-contractor relationships as well as greater empowerment of the contractor, paperless contracting processes, electronic catalogs, discontinued printing of all DoD-wide regulations and instructions (to be made available exclusively through the Internet or CD-ROM), and reductions in military specifications.

5. Before cancellation, the Arsenal Ship program had demonstrated a 50 percent reduction in acquisition time for the design portion of the ship compared to traditional design approaches. This was primarily enabled by using industry-led acquisition operating under 110 *U.S. Code* Section 845 authority, which gives industry full trade space and responsibility for the design. In the Joint Direct Attack Munition (JDAM) program, streamlining initiatives saved $3 billion in program cost, decreased production delivery time by 48 months, and increased the warranty from 5 to 20 years.

6. ACTDs have provided an unprecedented opportunity to evaluate military utility prior to committing to formal acquisition (usually in a field demonstration or operational deployment), while developing appropriate concepts of operation and doctrine. Additionally, ACTDs often result in availability of an asset with a limited operational capability at the conclusion of the program while production models are developed. Since 1994, 46 ACTDs have been initiated, and the first nine were completed in an average time of about 20 months (concept to prototyping, assessment, and fielding of a limited capability). As would be expected, ACTDs have resulted in programs that transition to the formal acquisition process and programs that were terminated. Examples include the Kinetic Energy Boost Phase Intercept (BPI) program and the *Predator* unmanned aerial vehicle (UAV). The BPI ACTD, which evaluated the affordability, operational utility, and mission effectiveness of BPI engagements of tactical ballistic missiles, was terminated after determining that it was technically feasible but not operationally affordable. The

Predator, an unmanned aerial reconnaissance platform, was considered suitable and has actually entered the formal acquisition process while continuing to support peacekeeping operations in Bosnia.

7. The acquisition process in place during the Cold War produced highly effective technologies and systems (e.g., stealth, Joint STARS, PGMs), but it has not consistently demonstrated the ability to keep pace with rapid technology change.

8. Change is all the more critical in light of the upcoming reduction in personnel—124,000 fewer in the acquisition corps and 12,500 fewer in DoD Headquarters (as well as a 20 percent reduction in the government laboratory and test and evaluation infrastructure by 2005). The cuts in personnel and reductions in T&E infrastructure are to be implemented by the Defense Reform Act of 1997 and the Fiscal Year 1996 Defense Authorization Act, respectively.

9. The U.S. Navy is using a series of fleet battle experiments to turn their 21st century vision of network-centric warfare into reality. Specifically, they are using new information technologies to combine sensor, command and control, and engagement grids into a joint fires coordination network, or "ring of fire."

10. The U.S. Air Force has established an Expeditionary Force Experiment (EFX) program to complement the work ongoing at its six battle labs.

They recently completed their first annual experiment (EFX '98), which incorporated new technologies and concepts into combined live-fly/simulated Air Expeditionary Force (AEF) with the objective of evolving its core competencies on a foundation of global battlespace awareness and advanced command and control.

11. The U.S. Army has established a digitized heavy force called the Experimental Force (EXFOR) to carry out their Advanced Warfighting Experiments (AWE), where many of the Army's Force XXI information dominance and dominant maneuver initiatives are already being tested.

12. The Marine Corps considers its Warfighting Laboratory one of its most important initiatives. Through a series of Sea Dragon tests, they hope to combine new technology with innovative new organizations, doctrine, and training to create a force capable of dealing with changing operating environments. Among those to be looked at include power projection in the littoral battlespace, urban warfare, and crisis response focused on containing or obviating an incipient major theater war. Furthermore, it is forming a Special-Purpose Marine Air-Ground Task Force (Experimental) to begin integrating the ideas generated in the Warfighting Laboratory with the overall Marine Corps combat development process.

13. Though not as robust as the service experimentation programs, a joint warfighting program has also been

established specifically to help achieve the full spectrum dominance goal of Joint Vision 2010. A nominal amount will be invested in joint warfighting experiments ($23.7 million in fiscal year 1999) to provide field-demonstrated concepts and prototypes and to develop tasks, procedures, techniques, training, and doctrine that joint forces will need to realize Joint Vision 2010.

14. The service experimentation programs are neither operational exercises nor laboratory demonstrations. Rather, they are experiments conducted by actual operators in operationally relevant scenarios, often leaving behind a limited operational capability for the field. Vice Admiral Arthur K. Cebrowski, President of the Naval War College, emphasizes the importance of operational experimentation in facilitating concurrent development of technology, organization, and doctrine. He states, "In spite of a ponderous acquisition process, technology insertion is ahead of and disconnected from joint and service doctrine and organizational development… A process for the coevolution of technology, organization, and doctrine is required."

Andrew Krepenivich further argues that because we are in a unique period of technology change, we may be in the midst of a revolution in military affairs (RMA)—a time when technological change, systems development, operational innovation, and organizational adaptation combine to fundamentally alter the character and conduct of war. The details of an RMA and whether or not we are in one was purposefully not be debated here. Such revolutions throughout history have not been recognized until after they have occurred. What is emphasized here is the importance of timely adaptation of operational and organizational concepts with technology change to allow us to at least reap the rewards of an RMA, should it occur—"a dramatic increase—often an order of magnitude or greater—in the combat potential and military effectiveness of armed forces."

15. Though such an approach is not new (it has been common in the commercial sector since the 1970s), it has not gained widespread interest in DoD until recently. The Air Force is in the process of formalizing "evolutionary acquisition" as part of the buildup for the annual EFX. Also termed "spiral development," this process attempts to more tightly couple the acquisition and operational communities. It was initiated in 1996 at the Air Force Electronic Systems Center. It is an iterative strategy for command and control (C2) systems that facilitates rapid operational assessments of new technologies, refinement of user requirements, and fielding of sustainable prototypes with operational utility. It is distinguished from the ACTD process in that it accepts requirements and technology change as key components of systems evolution, and allows systems to mature via 18-month development increments, or "spirals," into fully fielded systems.

16. The defense acquisition system has traditionally comprised the planning, programming, and budgeting system (PPBS), which determines which systems will be procured and how many, and the acquisition management system (AMS), which determines how the systems will be developed and produced. The PPBS and AMS intersect at the requirements generation system (RGS), which determines what systems will be procured and why.

17. The typical program office consists of program management, engineering, contracts, and finance specialists, similar to today, and it is supported by development, test, and evaluation (DT&E) specialists, who may or may not be located at the same site.

18. This is a critical assumption to the argument. If defense reform does not lead to dramatic increases in efficiency analogous to the civilian "revolution in business affairs," the improvements presented here obviously will not be as significant. The merits of the Defense Reform Initiative and its probability of success are topics for another study.

19. For the purposes of the alternative force structures presented, risk is measured as a degree of departure from existing methods of acquisition and is only meaningful as a relative measure between the alternatives. The risk analysis is not meant to be robust, but rather just one of several elements of comparison between alternatives.

20. The Joint Requirements Oversight Council (JROC) and joint warfighting capabilities assessment (JWCA) structures will remain in place to harmonize requirements between programs and services.

21. The evolutionary approach will have to be thoroughly documented in a series of joint instructions and backed up by revisions to the *Federal Acquisition Regulations* (FARs).

22. It could also be argued the increased number of OPEXs in the acquisition operations force will be cost prohibitive. However, the potential payback must also be considered. At present it is too early to quantify, but the promise is encouraging. Regarding EFX, for example, Maj Gen John W. Hawley, commander of the newly formed Air Force Air and Space Command & Control Agency, has said: "If we learn something from this experiment that allows us to make just one better budget decision, we'll likely save the American taxpayers the cost of this experiment and much, much more."

23. Since evolutionary acquisition is based on actually fielding incremental capabilities, the production phase is effectively shifted to the left. Consequently, since time equates to money, there is also a significant potential for cost savings.

24. With the exception of test pilots and navigators, few people acquire true expertise in both arenas. Pilots and navigators from each service usually

remain in the acquisition corps after completing either the Air Force or Navy Test Pilot School. This is not as true for naval aviators, who usually return to the fleet. Test pilots and navigators, however, account for a very small portion of the total acquisition corps.

25. Time itself can often be a check and balance, as has been demonstrated by ACTDs that are not adequately scrutinized before being operationally deployed. The *Predator* UAV ACTD is an example of this. It was designed to demonstrate unmanned aerial reconnaissance and was actually deployed to support operations in Bosnia, but was arguably not operationally suitable. Although an ACTD version of the *Predator* was developed in minimum time, its sensor suite had very limited capability, and there were several maintenance and sustainment challenges. Operations in Bosnia demonstrated the need for several improvements, resulting in many changes to the production system and approximately double the cost over the ACTD version.

26. The "jointness" and interoperability of the types of system and sub-system improvements which are the focus of this study will be heavily reliant upon the successful implementation of ongoing defense information infrastructure/common operating environment (DII/COE) initiatives, which should provide common hardware and software architectures upon which to place incremental upgrades.

27. Obviously, the CINC program office branches will not oversee all acquisitions. There will still be a need for CONUS-based program offices to handle major systems and subsystem acquisitions (e.g., Joint Strike Fighter).

28. To some extent, the Navy already takes this approach to acquisition (Navy test aircrews routinely cycle between operational and acquisition assignments), so it should be possible for other services to do the same.

APPENDIX

**Acquisition Reformed Force
Organizational Structure**

Program Executive Officer

Industry · · · · · · Program Office · · · · · · Operational Commander

OPEXFOR

Program Management | Engineering | Contracts | Finance | Test & Evaluation

**Acquisition Operations Force
Organizational Structure**

Operational Commander · · · · · · HQ/Pentagon

OPEXFOR | Program Office · · · · · · Industry

Requirements | Program Management | Engineering | Contracts | Finance | Test & Evaluation

**Acquisition Renaissance Force
Organizational Structure**

Operational Commands · · · · · · CINC · · · · · · HQ/Pentagon

J-1 thru J-X | OPEXFOR | Program Office · · · · · · Industry
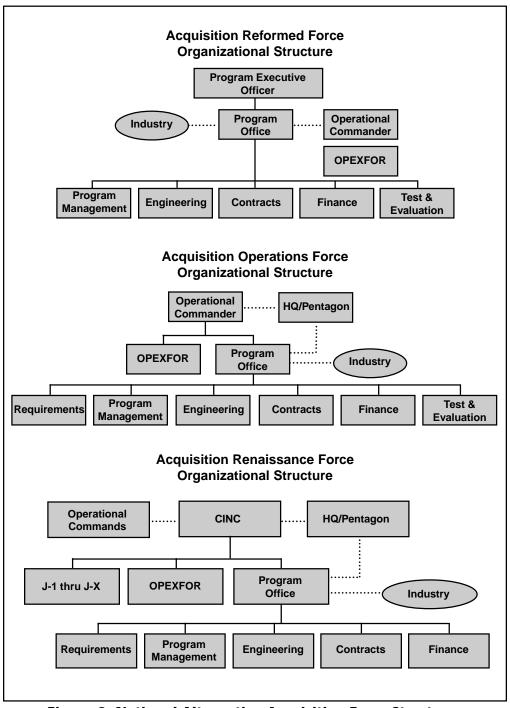
Requirements | Program Management | Engineering | Contracts | Finance

Figure 3. Notional Alternative Acquisition Force Structures