



NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

JOINT APPLIED PROJECT

**The Evolution of the Weapon System
Reform Act of 2009 (Public Law 111-23)**

**By: Dana G. Lymon
Michael McWhorter, and
Michael Violette
March 2011**

**Advisors: Michael Boudreau,
John Mull
Steve Cosgray**

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE March 2011	3. REPORT TYPE AND DATES COVERED Joint Applied Project	
4. TITLE AND SUBTITLE The Evolution of the Weapon System Reform Act of 2009 (Public Law 111-23)			5. FUNDING NUMBERS	
6. AUTHOR(S) Dana G. Lymon, Michael McWhorter, Michael Violette				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200 words) In evaluating the implications of the Weapon System Acquisition Reform Act of 2009 (WSARA), we compare the position of prior acquisition acts and DoD acquisition policies to this new act. We examine the advantages and disadvantages of WSARA as it relates to major defense acquisition programs and acquisition programs in general. The rationale for changes to the policy is examined, and conclusions are drawn regarding the impact of this new policy on DoD acquisition programs.				
14. SUBJECT TERMS Acquisition Reform, WSARA, Acquisition Strategy, Competitive Prototyping, Cost Growth, Conflict of Interest			15. NUMBER OF PAGES 63	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

**THE EVOLUTION OF THE WEAPON SYSTEM
REFORM ACT OF 2009 (PUBLIC LAW 111-23)**

Dana G. Lymon, Program Analyst, Program Executive Office, Aviation, Apache
Project Manager Office, Huntsville, Alabama
Michael McWhorter, Computer Engineer, U.S. Army Aviation & Missile RDEC,
Redstone Arsenal, Alabama
Michael Violette, Technical Project Manager, Naval Undersea Warfare Center
Division Newport, Rhode Island

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN PROGRAM MANAGEMENT

from the

**NAVAL POSTGRADUATE SCHOOL
March 2011**

Authors:

Dana G. Lymon

Michael McWhorter

Michael Violette

Approved by:

Michael Boudreau, Lead Advisor

John E. Mull, Support Advisor

Steve Cosgray, Support Advisor

William R. Gates, Dean
Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

THE EVOLUTION OF THE WEAPON SYSTEM REFORM ACT OF 2009 (PUBLIC LAW 111-23)

ABSTRACT

In evaluating the implications of the Weapon System Acquisition Reform Act of 2009 (WSARA), we compare the position of prior acquisition acts and DoD acquisition policies to this new act. We examine the advantages and disadvantages of WSARA as it relates to major defense acquisition programs and acquisition programs in general. The rationale for changes to the policy is examined, and conclusions are drawn regarding the impact of this new policy on DoD acquisition programs.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION AND BACKGROUND: WEAPON SYSTEM ACQUISITION BEFORE THE WEAPON SYSTEM ACQUISITION REFORM ACT OF 2009	1
A.	CONSIDERATION OF TRADE-OFFS AMONG COST, SCHEDULE, AND PERFORMANCE OBJECTIVES IN DOD ACQUISITION PROGRAMS.....	1
B.	ACQUISITION STRATEGIES TO ENSURE COMPETITION THROUGHOUT THE LIFE CYCLE OF MDAPS.....	2
C.	PROTOTYPING REQUIREMENTS FOR MDAPS.....	2
D.	ACTIONS TO IDENTIFY AND ADDRESS SYSTEMIC PROBLEMS IN MDAPS PRIOR TO MILESTONE B APPROVAL	2
E.	ADDITIONAL REQUIREMENTS FOR CERTAIN MDAPS	3
F.	CRITICAL COST GROWTH IN MDAPS.....	3
G.	ORGANIZATIONAL CONFLICTS OF INTEREST IN MDAPS	3
II.	CONSIDERATION OF TRADE-OFFS AMONG COST, SCHEDULE, AND PERFORMANCE OBJECTIVES IN DOD ACQUISITION PROGRAMS.....	5
III.	ACQUISITION STRATEGIES TO ENSURE COMPETITION THROUGHOUT THE LIFE CYCLE OF MAJOR DEFENSE ACQUISITION PROGRAMS.....	9
IV.	PROTOTYPING REQUIREMENTS FOR MDAPS.....	15
V.	ACTIONS TO IDENTIFY AND ADDRESS SYSTEMIC PROBLEMS IN MAJOR DEFENSE ACQUISITION PROGRAMS PRIOR TO MILESTONE B APPROVAL.....	19
VI.	ADDITIONAL REQUIREMENTS FOR CERTAIN MDAPS.....	23
VII.	CRITICAL COST GROWTH IN MDAPS.....	27
VIII.	ORGANIZATIONAL CONFLICTS OF INTEREST IN MDAPS	35
IX.	SUMMARY AND CONCLUSIONS	41
A.	CONSIDERATION OF TRADE-OFFS AMONG COST, SCHEDULE, AND PERFORMANCE OBJECTIVES IN DOD ACQUISITION PROGRAMS.....	41
B.	ACQUISITION STRATEGIES TO ENSURE COMPETITION THROUGHOUT THE LIFE CYCLE OF MDAPS.....	42
C.	PROTOTYPING REQUIREMENTS FOR MDAPS.....	42
D.	ACTIONS TO IDENTIFY AND ADDRESS SYSTEMIC PROBLEMS IN MDAPS PRIOR TO MILESTONE B APPROVAL	43
E.	ADDITIONAL REQUIREMENTS FOR CERTAIN MDAPS	44
F.	CRITICAL COST GROWTH IN MDAPS.....	44
G.	ORGANIZATIONAL CONFLICTS OF INTEREST IN MDAPS	45

LIST OF REFERENCES.....	47
INITIAL DISTRIBUTION LIST	49

LIST OF TABLES

Table 1.	Provisions to Address Systemic Problems Prior to Milestone B	21
Table 2.	Analysis of DoD Major Defense Acquisition Program Portfolios Fiscal Year 2009 Dollars	29
Table 3.	Effect of Lost Buying Power	30

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

AoA	Analysis of Alternatives
COI	Conflict of Interest
COTS	Commercial Off The Shelf
DCAPE	Director of Cost Assessment and Program Evaluation
DoD	Department of Defense
DoDI	Department of Defense Instruction
DTM	Directive-Type Memorandum
GAO	Government Accountability Office
JROC	Joint Requirements Oversight Council
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
MS	Milestone
NLT	No Later Than
O&S	Operation and Sustainment
ORD	Ordnance Requirements Document
SECDEF	Secretary of Defense
WSARA	Weapon System Acquisition Reform Act of 2009

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION AND BACKGROUND: WEAPON SYSTEM ACQUISITION BEFORE THE WEAPON SYSTEM ACQUISITION REFORM ACT OF 2009

The Weapon System Acquisition Reform Act of 2009 (WSARA) enacted seven specific areas of change to previous acquisition policy. These are identified in WSARA Sections 201–207. The seven areas of focus are presented below with a summary of how they were addressed in previous policy, and difficulties encountered by the Department of Defense (DoD) during Major Defense Acquisition Program (MDAP) execution. Chapters II–VIII then compare past policy to direction provided in WSARA, identify advantages and disadvantages, and summarize recommendations and conclusions regarding implementation of WSARA.

A. CONSIDERATION OF TRADE-OFFS AMONG COST, SCHEDULE, AND PERFORMANCE OBJECTIVES IN DOD ACQUISITION PROGRAMS

Prior to implementation of WSARA, tradeoff analyses to determine cost, schedule, or performance requirements were not explicitly required to be performed as early as an Analysis of Alternatives (AoA). Past guidance stated, “keep all reasonable options open and facilitate cost, schedule, and performance trades throughout the acquisition process,” (DoDI 5000.2, s. 4.7.2.1.1.1) and had a strong emphasis on trades performed throughout the technology development and engineering and manufacturing development phases. This allowed for system design and implementation to progress to a point whereby requirement adjustment could cause severe cost or schedule perturbations. Tradeoff analyses performed at the material solution analysis phase of the acquisition process can result in less substantial cost or schedule growth, as the overall program cost and schedule impact from requirements changes in later phases will be too great.

B. ACQUISITION STRATEGIES TO ENSURE COMPETITION THROUGHOUT THE LIFE CYCLE OF MDAPS

Past acquisition policy has required that DoD establish formal acquisition strategies for MDAPs, however, the requirement to include provisions for competition throughout the life cycle has not been explicitly stated or detailed. Specific measures to ensure competition were not defined in past policy, and continued competition through the Operation and Sustainment (O&S) phases was regularly overlooked. While competition at the subcontract level was encouraged, past policy did not require that the government evaluate proposals based, in part, on the degree to which subcontract competition was utilized. Combined with a shrinking industrial base, this acquisition strategy environment has led to a DoD culture with a strong precedent for contracting officers to waive competition requirements based on the need to retain the services of current contractors.

C. PROTOTYPING REQUIREMENTS FOR MDAPS

Prior to implementation of WSARA, competitive prototyping was part of the early development planning from conception to Milestone A and used during the research & development (R&D) phase for assuring the best design was selected. Competitive prototyping was not a requirement or codified law, so implementation was at the exclusive discretion of the acquisition office. Without a formal requirement to assess and implement competitive prototyping, acquisition offices lacked a formal competitive path to translate user needs and opportunities into demonstrable solutions before Milestone B approval, contributing to cost and schedule overruns.

D. ACTIONS TO IDENTIFY AND ADDRESS SYSTEMIC PROBLEMS IN MDAPS PRIOR TO MILESTONE B APPROVAL

Past acquisition policy demonstrated an inadequate amount of oversight and review to assure problems with various programs did not reach out-of-control

cost and schedule overruns. Systemic problems were rarely identified before Milestone B approval; allowing these faults to be manifested beyond the technology development phase where they could be most easily addressed. Nunn-McCurdy critical cost growth breach reporting requirements were stringent, but still allowed for MDAP execution without adequate program review.

E. ADDITIONAL REQUIREMENTS FOR CERTAIN MDAPS

Acquisition processes established prior to WSARA allowed MDAPs to start with unproven technologies, allowing programs to proceed down an acquisition path with high risk to system development. These processes allowed systems to be developed without having the requirements clearly defined. Subsequent re-baselining efforts did not solve the program's problem(s) root cause (immature technology); rather, the risk was moved to a later phase of the acquisition.

F. CRITICAL COST GROWTH IN MDAPS

Past acquisition policy and reforms perceived cost growth to be an indicator of a flaw in the design or development of the MDAP. Program Managers (PM) were able to re-baseline the program cost and schedule as long as there was technical progress being made, or the rationale for cost growth was reasonable. Minimal reporting was required and the thresholds for cost growth reporting were inadequately high, allowing substantial cost overrun to occur prior to alerting oversight activities.

G. ORGANIZATIONAL CONFLICTS OF INTEREST IN MDAPS

Existing acquisition law was not adequate to protect MDAPs from the Conflict of Interest (COI) issues that arise when companies are the source and the supplier of information to the MDAPs. The potential for COI was particularly threatening in acquisition programs where industry was heavily involved in the development of acquisition strategy or program requirements. The policies in

place prior to WSARA did not provide details regarding the implementation of blocking potential conflicts. Without adequate regulation, the perception of COI, if not actual improprieties, was likely to impact the acquisition decisions made by MDAPs.

II. CONSIDERATION OF TRADE-OFFS AMONG COST, SCHEDULE, AND PERFORMANCE OBJECTIVES IN DOD ACQUISITION PROGRAMS

The Weapon System Acquisition Reform Act of 2009 (WSARA) explicitly requires that “the Secretary of Defense shall ensure that mechanisms are developed and implemented to require consideration of trade-offs among cost, schedule, and performance objectives as part of the process for developing requirements for Department of Defense acquisition programs” (WSARA s. 201(a)). This direction is not a completely new requirement placed on DoD programs. Instead, the WSARA emphasizes an existing aspect of the acquisition process, and now uses this process as a prerequisite to the establishment of performance objectives. This shift to emphasizing tradeoffs earlier in the process is the latest in evolution of the trade-off requirement in acquisition policy. While the motivation for this change may be justified, obstacles remain to effective implementation of this requirement.

The focus on performing cost, schedule, and performance tradeoffs prior to establishment of performance objectives is driven by systemic cost and schedule overruns in DoD acquisition programs. As noted in a March 2009 Government Accountability Office (GAO) report, “this approach must begin with strong systems engineering analysis that balances a weapon system’s requirements with available resources” (GAO 09-326, p. 8). The report makes clear the perception that under previous acquisition paradigms, performance objectives were established without consideration for cost and schedule impact. This is closely tied to DoD’s inability to perform accurate cost estimation, another issue brought forth by the GAO’s statement that “of DoD’s 96 active major defense acquisition programs, 64 programs have reported increases in their projected cost since their initial cost estimate” (GAO 09-326, p. 2). The goal of the WSARA legislation and subsequent changes to DoD Instruction (DoDI) 5000.02 is to adequately balance cost, schedule, and performance risk during

the requirements definition phase of program acquisition. Armed with these tradeoff analyses from program inception, continued refinement of cost, schedule, and performance goals should have less severe impact as the program matures. DoD is instructed to establish mechanisms that allow programs to “develop estimates and raise cost and schedule matters before performance objectives are established for capabilities for which the Chairman of the Joint Requirements Oversight Council is the validation authority” (WSARA s. 201(a)(2)(A)), and “including the deferral of technologies that are not yet mature and capabilities that are likely to increase costs significantly or delay production until later increments” (WSARA s. 201(a)(2)(B)).

DoDI 5000.2, as updated in 2003, identified the need to establish trade space regarding performance and cost estimates. Regarding the definition of user requirements, that instruction directed that developers “address cost in the ORD, in terms of a threshold and objective” (DoDI 5000.2, s. 4.7.2.1.1.8). The difference between DoDI 5000.2 and a more recent policy found in WSARA and DoDI 5000.02 lies in the explicit direction that tradeoffs be performed during analysis of alternative efforts and the Material Solution Analysis phase. While past guidance stated, “keep all reasonable options open and facilitate cost, schedule, and performance trades throughout the acquisition process,” (DoDI 5000.2, s. 4.7.2.1.1.1) and had a strong emphasis on trades performed throughout the Technology Development and Engineering and Manufacturing Development Phases, WSARA forces this cost-schedule-performance tradeoff process into the Material Solution Analysis phase. Following the approval of WSARA in May 2009, DoD issued further execution guidance to DoDI 5000.02 through Directive-Type Memorandum (DTM) 09-027—Implementation of the Weapon Systems Acquisition Reform Act of 2009, dated December 4, 2009. This memorandum amended DoDI 5000.02 to direct “full consideration of possible trade-offs among cost, schedule, and performance objectives for each alternative considered” (DTM 09-027, 2009).

The successful establishment of the tradeoff mechanisms required by the WSARA, however, may prove to be a challenge. Beyond the WSARA language directing DoD to implement these tradeoffs, there is little to guide DoD in actual implementation. Vague wording in both the WSARA and DoDI 5000.02 amendments leave the definition of how this tradeoff process should be accomplished unclear. The WSARA establishes a Director of Cost Assessment and Program Evaluation (DCAPE). The DCAPE is to “lead in the development of study guidance for an analysis of alternatives for each joint military requirement for which the Chairman of the Joint Requirements Oversight Council is the validation authority,” and provide “full consideration of possible trade-offs among cost, schedule, and performance objectives for each alternative considered” (WSARA s. 201(d)). Observers have stated, “the new office creates a chain of command that operates in parallel to the undersecretary of defense for acquisition, so there is much confusion at the Pentagon as to how programs are supposed to be certified and approved” (Erwin, 2010).

Additionally, it is questionable if cost, schedule, and performance objectives tradeoffs are reliably quantifiable prior to and during the analysis of alternative phase. These tradeoffs are to be conducted prior to any internal technology development; tradeoffs regarding technical capability estimates may be inherently unreliable. These assessments would be based almost purely on market research and previous development efforts. While this type of tradeoff and associated analyses are routinely performed by user study groups, conducting formal tradeoffs as selection criteria for performance objectives may unfairly skew performance objectives to values that are less than desirable. The WSARA gives no criteria by which cost, schedule, and performance should be assessed. This provides DoD, and presumably each acquisition office, the flexibility to determine suitability of requirements based on program specifics. However, this also means that the tradeoff rationale can assume a wide range of interpretation. Negotiation of performance objectives with the user organizations

and resource sponsors must be based on sound cost and schedules and may be better conducted upon completion of an analysis of alternatives and establishment of technology development plans.

As demonstrated by GAO reports and the DoD's acknowledgement of routine cost and schedule overruns, Congress has expressed a justifiable demand for increased rigor in cost and schedule tradeoff analyses prior to establishing Major Defense Acquisition Program (MDAP) performance objectives. WSARA explicitly requires that DoD perform these tradeoffs, and the statute calls for compromises to performance requirements be put in place when appropriate to ensure achievable and cost effective systems. While not a new concept for DoD, WSARA shifts this tradeoff process to the earliest possible phase in system acquisition. This has the potential to reduce subsequent cost, schedule, and performance risk. However, by establishing the DCAPE role without further clarifying processes, WSARA and DoDI 5000.02 amendments regarding tradeoff analyses also have the potential to increase tradeoff completion time and delay completion of Material Solution Analysis phase. To maximize the benefit of this policy, DoD should seek to streamline and standardize the process of conducting these tradeoffs and the DCAPE role.

III. ACQUISITION STRATEGIES TO ENSURE COMPETITION THROUGHOUT THE LIFE CYCLE OF MAJOR DEFENSE ACQUISITION PROGRAMS

The Weapon System Acquisition Reform Act of 2009 (WSARA), by requiring DoD to implement acquisition strategies that ensure competition, takes a prescriptive approach to defining the justifications and requirements of acquisition strategy development. Acknowledging shifts in the government acquisition workforce's capabilities and the continued reduction in the industrial base, this legislation aims to provide direction regarding how competition should be considered in DoD acquisition. This direction is far more explicit than in previous policy, and requires DoD to establish selection criteria and authorities not previously explored or encouraged. The emphasis on continued competition through the life cycle is recognition of the common practice of establishing follow-on support directly with the prime vendor.

The GAO has observed, "increased globalization in the defense industry and consolidation of the defense supplier base into a few prime contractors has reduced competition" (GAO-09-05 p. 1). The perceived threat from increased globalization is that the use of foreign versus domestic suppliers could erode ability of U.S. industry to source critical technologies. This presents both a national security risk, as well as a negative economic impact to U.S. domestic industry. The reduction in overall industrial base is in part due to government-supported consolidation of private defense industry in the early 1990s. This reduced set of available sources has set the stage for routine establishment of sole-source contracts after conducting initial development competitions.

A GAO study conducted in 2004 revealed that "competition requirements were waived for nearly half (34 of 74) of the multiple-award contract and federal supply schedule orders GAO reviewed" (GAO-04-874). With a reduced set of industry firms to draw upon, program offices were able to make stronger rationalizations in waiving the requirements for competition for subsequent

production and support contracts. This has led to a DoD culture that has set a strong precedent for contracting officers to waive competition requirements based on the need to retain the services of current contractors. GAO found that “safeguards to ensure that waivers were granted only under appropriate circumstances were lacking. Specifically, guidance for granting waivers did not sufficiently describe the circumstances under which a waiver of competition could be used” (GAO-04-874). Further enabling this continued erosion of regular competition was the reduction in the government acquisition workforce. The rigorous effort required by regular competition has become an even more demanding effort with fewer skilled acquisition professionals. As a symptom of this culture, DoD has focused on making expeditious contract awards through a sole-source process late in the life cycle, however, “the focus on speed has come at the expense of sound contracting techniques” (GAO-06-838R, p. 2).

WSARA requires a more detailed discussion of competition in the program’s Acquisition Strategy than called for in past law and regulation. Unlike past regulation, a specific set of measures to be taken are identified, such as the following.

- Competitive prototyping
- Dual-sourcing
- Unbundling of contracts
- Funding of next-generation prototype systems or subsystems
- Use of modular, open architectures to enable competition for upgrades
- Use of build-to-print approaches to enable production through multiple sources
- Acquisition of complete technical data packages
- Periodic competitions for subsystem upgrades
- Licensing of additional suppliers
- Periodic system or program reviews to address long-term competitive effects of program decisions (WSARA s. 202(b))

Several of these techniques run contrary to practices or perceptions encouraged in previous acquisition law and policy. Identification of use of build-to-print approaches for multiple sources is a signal that continued competition using purely performance-based specifications may, in some cases, prove to be a hindrance to competition rather than promoting it. This measure will minimize the government's costs for non-recurring engineering should multiple sources be sought during the production cycle. Closely tied to this is the measure of "acquisition of complete technical data packages." While recognized by DoD acquisition organizations as a critical objective to achieve during competition, identification of this in the new acquisition law is a clear enabler to engaging multiple sources during production and sustainment.

Unlike past regulations, such as DoDI 5000.2, the WSARA prescribes the need for competition during Operation and Sustainment (O&S) phases of a program's life cycle. WSARA section 202(d), titled "Consideration of Competition Throughout Operation and Sustainment of Major Weapon Systems," calls for the Secretary of Defense to ensure that competition is provided for to the maximum extent, "whenever a decision regarding source of repair results in a plan to award a contract for performance of maintenance and sustainment of a major weapon system." This differs from past regulation which does not specifically identify O&S requirements, instead simply stating, "...throughout the life" of an acquisition program (DoDI 5000.2 s 4.7.1.5). The specificity of WSARA on this point can be interpreted as recognition of the frequent reliance by DoD on prime production sources to meet O&S requirements.

In another critical difference between WSARA and past acquisition policy, the new law requires that Acquisition Strategies make provisions for ensuring competition at both the prime and subcontract levels. This includes requiring that prime contractors' make or buy decisions give "full and fair consideration" to qualified sources other than themselves for major subsystems and components. This may run contrary to a contractor's business decision, but is now considered to be a requirement on the contractor. WSARA also requires DoD to provide for

government surveillance of how the prime selects subcontractors and use this as consideration in source selection decisions. Competition in subcontracting has been enforced in the past through the use of contractor purchasing system reviews; however, the explicit statement in WSARA that subcontract competition shall be a source selection criterion makes this a critical concept in a contractor's proposal and provides the government with a strong method of enforcement.

WSARA requires DoD to rigorously pursue competition in its acquisition strategies. The law prescribes specific measures to be included in acquisition strategies, and introduces new requirements as compared to previous acquisition policy. There is an increased emphasis on maintaining competition during the O&S phase of a program's life cycle. Given the measures now encouraged by the law, such as use of build-to-print to maintain multiple production sources, and competition of subsystem upgrades, it seems likely that the WSARA will achieve moderate increases in the number of competitions held throughout the DoD. Coupling the WSARA with previous acquisition policies that required an increase in DoD acquisition workforce size, it appears that DoD is poised to have both the explicit direction and workforce capability to follow through on Acquisition Strategies that improve the quantity of life cycle competitions.

An area of challenge to the DoD will be the act's direction to thrust the government further into subcontract management. Because the law requires that DoD adopt strategies maximizing contractor subcontract policy, program offices may find they are forced into a position of mandating or negotiating subcontract activity. While the Government was faced with some of these challenges in the past, such as mandating percentages allocated to small business, disadvantaged business, women owned, minority owned, or enterprise zone vendors, the active management of these activities was typically left to the prime contractor. Unless strict boundaries are defined and enforced, the new policy could lead to potential conflicts with the prime contractor whereby the government is forced to assume responsibility for subcontractor actions and performance. Business, technical development, manufacturing, and sustainment practices were all risk areas

previously assumed by the prime contractor, and the Government may not be well suited to actively engage in this arena. Additionally, the WSARA requires that DoD make provisions to continually monitor subcontract management processes, which could result in increased costs to the government to develop personnel and processes, as well as the subsequent increases in contractor deliverables, such as reports and monitoring systems. Application of the WSARA direction in this area should be executed in a rigorously formal manner with frequent guidance from DoD's contracting officers and legal counsel, as direct government intervention in the contractor-to-sub contractor process could increase risk to DoD.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. PROTOTYPING REQUIREMENTS FOR MDAPS

Section 203 of The Weapon Systems Acquisition Reform Act of 2009 (WSARA) requires,

(1) That the acquisition strategy for each major defense acquisition program provides for competitive prototypes before Milestone B approval (or Key Decision Point B approval in the case of a space program) unless the Milestone Decision Authority for such program waives the requirement pursuant to paragraph (2).

(2) That the Milestone Decision Authority may waive the requirement in paragraph (1) only—

(A) on the basis that the cost of producing competitive prototypes exceeds the expected life-cycle benefits (in constant dollars) of producing such prototypes, including the benefits of improved performance and increased technological and design maturity that may be achieved through competitive prototyping; or

(B) on the basis that, but for such waiver, the Department would be unable to meet critical national security objectives.

(3) That whenever a Milestone Decision Authority authorizes a waiver pursuant to paragraph (2), the Milestone Decision Authority—

(A) shall require that the program produce a prototype before Milestone B approval (or Key Decision Point B approval in the case of a space program) if the expected life-cycle benefits (in constant dollars) of producing such prototype exceed its cost and its production is consistent with achieving critical national security objectives; and

(B) shall notify the congressional defense committees in writing not later than 30 days after the waiver is authorized and include in such notification the rationale for the waiver and the plan, if any, for producing a prototype.

(4) That prototypes may be required under paragraph (1)

or (3) for the system to be acquired or, if prototyping of the system is not feasible, for critical subsystems of the system. (Weapons System Acquisition Reform Act of 2009 S. 454 p. 19)

In comparison to the old act, this act targets acquisition programs during the Materiel Solution Analysis and Technology Development phases, rather than when programs reach the Engineering & Manufacturing Development phase. This is not a completely new concept for DoD programs since the focus has for some time been geared to development planning from conception to Milestone A. However, with the development of competitive prototyping, this can help translate

user needs and opportunities into demonstrable solutions before Milestone B approval. WSARA reinforces the requirement for additional oversight and management of weapon systems to assure better control, minimizing cost overruns, and better meeting the schedule time frames.

Virtually every proponent of acquisition reform contends competition is an effective way of disciplining the price and performance of contractors. A recent report by the Defense Business Board stressed the value of having multiple sources for military systems (Thompson, 2010). However, the logic of competition in the commercial world does not necessarily operate in the defense marketplace, because there is only one customer—the government—and only two or three qualified suppliers for any particular product (Thompson, 2010). That means if the government wants two sources, it will have to pay for multiple designs, production lines, labor forces and spare-parts inventories (Werfel, 2010, p. 18). Also, to sustain two sources of any given item, the government will have to split demand between two suppliers in a way that undercuts economies of scale. The Bush administration concluded, "...buying an alternate engine for the F-35 fighter was a waste of money...." Bush's advisors did not believe the cost of sustaining two sources would ever be covered by savings from competition (DefenseNews, 2010, p. 29). Essentially, every program should incorporate an aggressive but sensible prototyping program to build and test non-production prototypes that can offer significantly enhanced capabilities to the warfighter (Business Executives for National Security, 2009). When defining the increased costs of multiple sources and competitive prototyping, acquisition offices should be prepared to also identify the potential long-term production and sustainment savings anticipated due to increased opportunities for competition during the system's life cycle.

DoD should increase its reliance on private industry for improved technology. High priority should be put on building and testing prototype systems to demonstrate new technology and provide a basis for realistic cost estimates prior to a full-scale development decision. This should be done with all weapon

systems, as the only consistently reliable way to get information regarding performance is by using prototypes that embody new technology. Research and development, including operational testing, should employ extensive competition with streamlined processes. The Defense Advanced Research Projects Agency (DARPA) should engage in prototyping and other work on joint programs and in areas not adequately emphasized by the Services. Section 203 of the WSARA is certainly designed to focus on fixing what is broken, not what works. The current acquisition does eventually deliver the most sophisticated weapons and comprehensive support services any military force has ever possessed, but it does so far too slowly and at vastly greater cost than necessary; we cannot afford to provide the warfighter with products inefficiently. This legal requirement for competitive prototyping prior to Milestone B should provide necessary and long overdue changes. If we fail to conform to the law, we will abet an increasingly sclerotic defense acquisition process that may one day no longer be able to supply American war fighters with the means to assure this nation's freedom and security. If we do not act now, with many advantages still in hand, we will have to act later in far less propitious circumstances (Business Executives for National Security, 2009). DoD should make greater use of components, systems, and services available "off the shelf" from private industry. New or custom-made items should only be developed when they are not readily available or are inadequate to meet military requirements. Program sponsors often lack the incentives to present objective risk assessments, report realistic cost estimates, or perform thorough tests of prototypes when such measures run the risk of exposing programs to disruption, deferral, or even cancellation. As a result, there is an unacceptable level of cost growth, performance problems, and schedule delays. In this sense, acquisition system problems are the collective responsibility of all the participants.

In conclusion, the WSARA's requirement for competitive prototyping prior to Milestone B approval represents an important example of how the defense acquisition system can effectively react to meet war fighter needs. An article

entitled "Acquisition Reform 'Logic,'" stated, "the Defense Department wastes billions every year on poorly managed programs and processes and many reformers raise doubts about whether the WSARA's latest campaign will turn out any better than previous failed efforts" (Thompson, 2010, p. 29). WSARA encourages oversight and management of weapon systems to assure better control and minimize cost over-runs and provide better ability of meeting the schedule time frame. Competitive prototyping will aid DoD in selection of the best design, whether product, part or system (McKenna, Long, & Aldridge, 2009). Competitive prototyping can help the government to understand the best design, best contractor, and most reasonable cost. Competitive prototyping encourages (use of COTS) as this will reduce the cost and be more competitive. Competitive prototyping may increase costs upfront, but is likely to clarify technical issues, and best values. Small upfront cost increase is expected to pay large dividends in terms of reduced Total Ownership Cost, R-TOC.

V. ACTIONS TO IDENTIFY AND ADDRESS SYSTEMIC PROBLEMS IN MAJOR DEFENSE ACQUISITION PROGRAMS PRIOR TO MILESTONE B APPROVAL

Section 204 of The Weapon Systems Acquisition Reform Act of 2009 (WSARA) requires that the Milestone Decision Authority (MDA) must submit a report within 30 days after receiving notification from a program manager that the Major Defense Acquisition Program (MDAP) is experiencing cost or schedule delays of 25 percent or more prior to Milestone B approval. Those programs that have not received a Milestone B approval and were also not previously subject to a review under section 2366a of Title 10 United States Code (USC), relating to the requirements for Milestone B are to be reviewed against criteria similar to that required for Milestone A certification. That report submitted by MDA will provide the defense and appropriations committees the information needed for identifying the root causes of the cost or schedule growth and appropriate metrics for assessing the program. The report will also certify that the program is essential to national security, there are no lower cost alternatives, new cost and schedule estimates are reasonable, and the program management structure is adequate. This act invokes a "Nunn-McCurdy" like review for pre-MS B and pre-MDAPs; therefore, MDA must review the program and consider termination. Certification, if not terminated, must be provided to Congress. The report to the defense and appropriations committees should identify: (1) the root causes of the cost or schedule growth and (2) appropriate acquisition performance measures for the remainder of the MDAP's development. The report should include either: (1) a certification of the necessity of the MDAP or (2) a plan for terminating MDAP development or withdrawing Milestone A or Key Decision Point A approval (Defense Acquisition University, 2009).

In comparison to the old act, this act further requires the identification and addressing of systemic problems before Milestone B approval, while programs are still in the technology development phase. In addition, the act further modifies

the requirements for review of MDAPs that experience critical cost growth breaches under Nunn-McCurdy. The new act requires the Secretary of Defense (SECDEF) to terminate an MDAP that meets or exceeds its critical cost growth threshold, unless deemed otherwise by the Secretary of Defense. The act requires the restructured program to return to the last milestone decision point for review. This in turn requires the Secretary to rescind the most recent milestone approval and suspend all contract actions relating to the program until completion of a new milestone review. It also requires unit cost reports to include all expenditures and all planned increments or spirals of the program in calculating its total procurement expenditure (Business Executive, 2009). The additions and changes to section 204 should help reduce the problems associated with cost and schedule deviation resulting in cost and schedule overruns. Providing additional government oversight to these programs and establishing the root cause will in turn end with a better product and/or system for the war fighter. Increased time or expenditures for early testing and development might be indicators that a program is troubled and needs to be terminated or restructured. However, the great investment in time and resources during the Technology Development phase results in better overall program performance and lower overall program costs.

Table 1 provides a detailed status for each provision, including the requirements of the provisions, any deadline, and the current known status of its implementation (Berteau, Hofbauer, & Sanok, 2010).

Table 1. Provisions to Address Systemic Problems Prior to Milestone B

Requirements	Deadline	Implementation
<ul style="list-style-type: none"> ➤ Revises Milestone A Certification. ➤ Requires MDA to determine “root cause” of cost or schedule growth as reported by PM and identify appropriate performance measures for remainder of development program, and report such to Congress. ➤ Each ongoing and not yet certified MDAP shall be certified in accordance with the requirements of 10 United States Code (USC) 2366a. 	<ul style="list-style-type: none"> ➤ NLT one year after enactment. 	<ul style="list-style-type: none"> ➤ Requirements for MDA program certification at Milestone A (10 USC 2366a) were amended. ➤ Ongoing MDAPs initiated prior to May 22, 2009 and will not have received a Milestone A certification or Milestone B certification prior to May 22, 2010, must receive a Milestone A certification NLT May 22, 2010.

Since the beginning of 2006, nearly half of DoD’s 95 Major Defense Acquisition Programs (MDAPs) have experienced critical cost growth, as defined in the Nunn-McCurdy provision, as amended. Overall, these 95 MDAPs have exceeded their research and development budgets by an average of 40 percent,

seen their acquisition costs grow by an average of 26 percent, and experienced an average schedule delay of almost two years. Such cost growth has become so pervasive that it may come to be viewed as an expected and acceptable occurrence in the life of a weapons program. The revised act contained in Section 204 would address this problem and enhance the use of Nunn-McCurdy as a management tool by requiring MDAPs that experience critical cost growth: (1) be terminated unless the Secretary certifies (with reasons and supporting documentation) that continuing the program is essential to national security and the program can be modified to proceed in a cost-effective manner, and (2) receive a new milestone approval (and associated certification) prior to the award of any new contract or contract modification extending the scope of the program. In accordance with section 104, a certification as to the reasonableness of costs would have to be supported by an independent cost estimate and a stated confidence level for that estimate (Levin & Carl, 2009). In passing the WSARA, Congress sought to minimize waste and inefficiency by codifying acquisition reforms that impose more transparency and oversight at an early point – before programs reach the development phase. Therefore, increased time or expenditures for early testing and development should only be taken as indicators that a program is troubled and needs to be terminated or restructured (“Title II—Acquisition”).

VI. ADDITIONAL REQUIREMENTS FOR CERTAIN MDAPS

The additional requirements levied by WSARA Section 205 are motivated by years of MDAP cost and schedule overruns and performance issues that often were not manifested until late in the acquisition process. It is not uncommon for programs to proceed past Milestone A, and sometimes beyond Milestone B, with unsettled Key Performance Parameters (KPP). (National Research Council) In this analysis, we highlight some of the changes made to past acquisition policy by WSARA to prevent these MDAP cost overruns in the future. This includes new requirements facing MDAPs and the advantages or disadvantages of these additional requirements. Finally, we provide conclusions and recommendations based on our analysis.

Previous acquisition processes allowed MDAPs to start with unproven technologies, allowing programs to proceed down an acquisition path with high risk to system development. This process allowed systems to be developed without having the requirements clearly defined. Subsequent re-baselining efforts did not solve the problem's root cause (immature technology); rather, the risk was moved to a later phase of the acquisition. With the new law, Congress has stepped up and provided a legal and binding means to establish control of issues related to cost, schedule, and performance. Congress has stated that any system that goes into Engineering and Manufacturing Development under a waiver of some of the statutory criteria after Milestone B must be reviewed annually.

Programs receiving MS B approval on the basis of a waiver of any of the statutory certification criteria must be reviewed by the MDA at least annually until they meet all of the criteria and must be flagged in any budget documentation for Congress. This amends the 2366b certification process to include a mandatory Preliminary Design Review before Milestone B (which will require a change to current acquisition policy). It requires semi-annual reviews of programs that are not terminated following a Nunn-McCurdy breach, until one year after the date

that such programs receive a new milestone approval. It applies the 2366b certification process to programs that received Milestone B approval prior to 2366b certification requirements, but have not yet received Milestone C approval (S.454-22 WSARA 2009 Section 205 para (b) (1)).

This additional requirement is an effort by Congress to get a handle on the cost and schedule issues earlier in the acquisition process. Those MDAPs experiencing APB breaches will be subjected to more stringent reporting requirements to Congress, now required twice per year instead of once per year as originally prescribed. This change to the Nunn-McCurdy Act forces the MDAP to get the system cost back in line with the APB, or the program is subject to termination. The new law includes measures to conduct a Preliminary Design Review (PDR), and a Post-PDR Assessment prior to Milestone B, keeping the Milestone Decision Authority (MDA) engaged in the development of the system. In accordance with the new law, MDAPs are required to inform the Congress of any problems with the program as follows:

DESIGNATION OF CERTIFICATION STATUS IN BUDGET DOCUMENTATION.—Any budget request, budget justification material, budget display, reprogramming request, Selected Acquisition Report, or other budget documentation or performance report submitted by the Secretary of Defense to the President regarding a major defense acquisition program receiving a waiver pursuant to subsection (d) shall prominently and clearly indicate that such program has not fully satisfied the certification requirements of this section until such time as the milestone decision authority makes the determination that such program has satisfied all such certification components. (S.-454 WSARA 2009 sec 205 para (b)(3))

This notification is achieved by providing relevant information to the Congress when submitting budget documents. WSARA forces the MDAPs to focus on the root cause of problems and bring these issues to resolution, instead of delaying resolution until the next major milestone. As an expected consequence, DoD will mitigate earlier, and at less expense, some of the problems that plague MDAPs as they move through the acquisition lifecycle process.

A major disadvantage of WSARA Section 205 requirements is the likelihood of delays in achieving Milestone B. Due to the efforts of Congress to be more engaged in MDAP acquisitions, systems may be delayed in progressing through acquisition milestones because of increased reporting requirements. WSARA forces the MDAP to resolve problems early in the process to reduce cost overruns typically encountered late in the acquisition process. One of the byproducts of resolving the problem(s) early is delaying Milestone B. This will stretch out the acquisition time schedule. Urgently needed MDAPs in the Technology Development Phase (a pre-acquisition phase) will feel severe pressure to obtain program approval and move into Engineering and Manufacturing Development.

The reason for these additional requirements is to validate maturity of the technology and design to minimize the cost, schedule, and performance impact to weapon systems before moving to Low Rate Initial Production (LRIP) or full rate production. A risk inherent with the associated delays while validating maturity is that the user community will introduce new requirements.

Pre or Post Milestone B PDR Assessment provides the MDA with the ability to determine which system best meets performance criteria and establishes the hardware, software, and human support systems to support the development of the MDAP. This level of confidence comes with a technical maturity level commensurate with the successful completion of PDR assessment. A successful PDR assessment gives the MDA the ability to recommend the requirement tradeoffs based upon an assessment of acceptable cost, schedule, and performance risk.

Successful PDR Assessment and demonstration of the maturity of relevant technologies at an appropriate TRL should provide the MDA with the necessary confidence to advance the program into Engineering and Manufacturing Development for completion of the detailed design of the warfighting system and testing of production-like prototype systems.

THIS PAGE INTENTIONALLY LEFT BLANK

VII. CRITICAL COST GROWTH IN MDAPS

As we look at the issue of Critical Cost Growth in WSARA Section 206, it is apparent, as with any reform effort that a certain amount of buy-in has to be obtained. Critical cost growth within Major Defense Acquisition Programs is a problem, and continues to be a problem for Program/Project Managers today. In dealing with the issue of cost growth we will look and some of the MDAPs programs that have experienced cost growth. We will see the effects on the programs financially. We will see what some of the causes of cost growth are, and how WSARA will address some of the issues of cost growth. We will see the impact of cost growth on other programs. We will explore some of the ways WSARA is attempting to deal with cost growth, and how MDAPs determine they are experiencing cost growth. We will also discuss some of the impacts on the MDAPs, and identify that technology maturity has a direct correlation to cost growth. As a byproduct of reform, we are trying to affect the process by getting better outcomes on requirements, funding and the acquisition of weapon systems by doing this balancing act. After all the evaluations, it is still boiling down to what systems are going to be eliminated or not because of the systemic issues that cannot be resolved or identified at the outset.

Under the Nunn McCurdy Act (amended), the PM shall notify the DoD component acquisition executive (CAE) immediately, whenever there is an actual cost breach. The PM must also report if there is a reasonable cause to believe that the current estimate of either the program acquisition unit cost (PAUC) or average procurement unit cost (APUC) of a MDAP or designated subprogram (in base-year dollars) has increased by 25 percent (or more) over the PAUC or APUC objective of the currently approved APB estimate, or 50 percent (or more) over the PAUC or APUC of the original APB estimate.

One of the major tenets of WSARA is the process of identifying the root cause via Root Cause Analysis—a process for identifying the basic or causal

factor(s) that underlie variation in performance, including the occurrence or possible occurrence. The Joint Requirements Oversight Council (JROC) reviews programs designated as “JROC interest” and supports the acquisition review process in accordance with law (10 U.S.C. 181). The JROC along with the Secretary of Defense and the newly established Director of Cost Assessment and Program Evaluation (DCAPE) determine the cost of completing the system that breaches the Nunn Mc Curdy thresholds. Additionally, the USD(AT&L), after consultation with the JROC regarding program requirements, shall determine the root cause or causes of the critical cost growth in accordance with applicable statutory requirements and DoD policies, procedures, and guidance based upon the root cause analysis conducted by the senior official for Program Assessment and Cost Analysis (PARCA); and in consultation with the DCAPE, they shall carry out an assessment of the following.

- The projected cost of completing the program if current requirements are not modified
- The projected cost of completing the program based on reasonable modification of such requirements
- The rough order of magnitude of the costs of any reasonable alternative system or capability
- The need to reduce funding for other programs due to the growth in cost of the program

Below are GAO charts on MDAP to show that these high visibility systems are susceptible to the same cost growth issues as smaller weapon systems. Also, because GAO is the investigative arm of the Congress, the latter is aware of the issue of cost growth. WSARA is an effort by the Congress to provide more rigor and teeth with which to combat cost growth on MDAPs. In Table 2, the data shows that growth is not just isolated in a particular military sector or Department; rather, it is an issue for all DoD components. Looking at weapons systems Selected Acquisition Reports (SARs), many systems were experiencing significant cost growth. The first GAO chart translates into weapons systems funding mismatches that resulted largely due to erroneous cost estimates or program cost growth. Slightly less than half of the weapons systems have

exceeded the Nunn McCurdy breach criteria and this also translated into increased schedule variances. After seeing the extent of the cost variances, one might ask, “what is an acceptable level of variance from the original Acquisition Program baseline before a system should be terminated?”

Table 2. Analysis of DoD Major Defense Acquisition Program Portfolios Fiscal Year 2009 Dollars

	Fiscal Year		
	2003	2007	2008
Portfolio size			
Number of programs	77	95	96
Total planned commitments	\$1.2 trillion	\$1.6 trillion	\$1.6 trillion
Commitments outstanding	\$724.2 billion	\$875.2 billion	\$786.3 billion
Portfolio indicators			
Change to total RDT&E costs from first estimate	37 percent	40 percent	42 percent
Change to total acquisition cost from first estimate	19 percent	26 percent	25 percent
Total acquisition cost growth	\$183 billion	\$301.3 billion ^a	\$296.4 billion
Share of programs with 25 percent increase in program acquisition unit cost growth	41 percent	44 percent	42 percent
Average schedule delay in delivering initial capabilities	18 months	21 months	22 months

Source: GAO analysis of DoD data.

Notes: Data was obtained from DoD’s Selected Acquisition Reports (SAR) (dated December 2002, 2006, and 2007). In a few cases, data were obtained directly from program offices. The number of programs reflects the programs with SARs; however, in our analysis we have broken a few SAR programs into smaller elements or programs. Not all programs had comparable cost and schedule data and these programs were excluded from the analysis where appropriate. Portfolio performance data do not include costs of developing Missile Defense Agency elements or the Defense Integrated Military Human Resources System (DIMHRS) program. The total acquisition cost growth for the 2007 portfolio was \$295 billion in 2008 constant dollars (GAO-09-663T, p. 0).

Table 3, below, illustrates overall performance in terms of buying power. As a point of interest, this portfolio is one indicator of how accurately DoD’s acquisition system meets its investment promises—from the perspective of the taxpayer and the warfighter.

Another is the effect cost increases have on DoD's buying power for individual systems, as demonstrated by changes in program acquisition unit costs. Some examples that illustrate the effect of lost buying power are shown in Table 3.

There is no single measure that perfectly explains every variable that influences cost growth and schedule slips in weapon systems acquisition. For example, the total cost of a weapon system can increase because more quantities are added, without necessarily being indicative of a problem. On the other hand, the total cost can stay the same while quantities are significantly reduced—a clear indication of a problem. While there can be legitimate debate over what set of measures best explain problem, as Table 2 shows, there can be no debate over the fact that the cost growth is significant and calls for action (GAO-09-663T, p. 2).

Table 3. Effect of Lost Buying Power

Program	Effect of Cost Increases on Buying Power Total cost(fiscal year 2009 dollars in billions)		Total quantity		Acquisition unit cost
	First full estimate	Current estimate	First full estimate	Current estimate	Percentage change
Joint Strike Fighter	206.4	244.8	2,866	2,456	38.4
Future Combat System	89.8	129.7	15	15	44.5
Space Based Infrared System High	4.4	12.2	5	4	244.7
Expeditionary Fighting Vehicle	8.8	13.7	1,025	593	167.5
V-22 Joint Services Advanced Vertical Lift Aircraft	38.7	55.5	913	458	185.9

²The program acquisition unit cost is the total cost for development and procurement of, and system-specific military construction for, the acquisition program divided by the number of fully configured end items to be produced. 10 USC § 2432 (a)(1). (GAO-09-663T, p. 2)

Cost growth in Major Defense Acquisition Programs (MDAP) has been a problem throughout the history of weapon systems. The above tables and explanations provide actual recent data to support the fact that cost growth is still affecting MDAPs. Cost growth is an issue that impacts all MDAP stakeholders. Due to the complex nature of weapon system development, the risk of cost growth has a high likelihood. Some level of cost growth may be deemed to be acceptable, assuming the Program Manager (PM) can account for this or mitigate the cost impacts through adjustments to other aspects of the program. However, it should be recognized that because a system is showing progress in meeting the milestone goals, this does not mean technology maturity issues and other program risks have been mitigated or are being addressed. The notion that capabilities should be fielded regardless of the cost borne by the government is falling on deaf ears as DoD budgets are getting tighter. This mentality has caught up with the federal government, because there is no bottomless pot of money.

WSARA approaches cost growth as an indicator of something seriously wrong in the design or development of the MDAP. In the past, PMs were able to re-baseline the program as long as there was technical progress being made, or the rationale for cost growth was reasonable. Cost growth under WSARA has negative consequences and demands the PM control cost related to the design or technology issues facing the program, or risk program cancellation and an intense level of scrutiny, accompanied by corrective action reporting. WSARA reflects Congress' recognition of cost growth in DoD, the unhappiness of the Congress with lack of cost discipline in DoD, and the intent of the Congress to see that cost indiscipline be fixed. Congress has clearly bought into GAO logic that technological immaturity is a major cost driver that may require draconian response; even to the extent of program cancellations. WSARA requires that a PM experiencing critical cost growth conduct an extensive root cause analysis to flush out the reason for the problem(s) in the program. Also, the ability to re-baseline will not be as easy as it has been in the past. There has been more reporting rigor put into Nunn-McCurdy breach requirements; unit cost reports are

required, and restructuring of programs may be required before gaining MDA approval to proceed, and also, the current approval may be rescinded. These consequences put more pressure on the PM to address critical MDAP problems earlier in the acquisition life cycle versus delaying problem resolution to later in the program when the cost of change is more expensive and difficult to do. If from the outset the program has established an evolutionary acquisition approach then the issues should not be if the capability can be field but more along the lines of how can we improve the capability.

An advantage of the new law is the focus on problem root cause analysis. The law forces the MDAP to make design or technology risk decisions early in the acquisition process. Early risk mitigation planning is anticipated to save cost on redesign and schedule issues later in the acquisition process. Establishment of the different levels of criticality for Nunn-McCurdy breaches provides for appropriate levels of reporting and response consequences. Reporting requirements are based on the severity of the breach of the Acquisition Program Baseline (APB). Additionally, the new law does not allow the MDAP to re-baseline without restructuring to circumvent the cost issue. These force the MDAP to come up with acceptable restructure plans that gain the MDA's approval to move forward.

A disadvantage of early issue resolution due to implementation of WSARA is the potential delay in moving through early milestones. WSARA implementations and tightening up of the criteria related to Nunn-McCurdy breaches do not mean fewer breaches and fewer consequences; rather, these Congressional actions mean more breaches with more thorough associated review and the presumption of program termination. This cannot be looked at as an unintended consequence of the law; on the contrary, this must be recognized as a direct response to the lack of DoD cost discipline, shown to be habitual over many years.

WSARA's provisions to address critical cost growth result in the warfighter receiving capability from a restructured weapon system program with fewer

deficiencies. It is more likely that programs must be more careful in their selection of mature technology and the need to avoid use of technology that has not been proven. This may likely force programs into evolutionary acquisition, rather than reaching for the objective solution that is more risky. Also, with budgets getting smaller, the earlier DoD can get a handle on technical risk, the more funding will be available to fund other development programs. Reporting and oversight due to APB breaches have been increased, forcing the MDAP to report as often as semi-annually based on the severity of the breach. This keeps Congress and DoD engaged in the development of the weapon system and inevitably causes increase in workload and reporting. Unfortunately, this burdens the PM and steals valuable time that otherwise might have been expended in resolving the issue. This level of oversight comes with a price, requiring investment and development of personnel that can carry the torch of success within increasingly complex MDAPs. As WSARA implementation takes shape, DoD will have to take into consideration the potential increases in workforce necessary to support WSARA requirements. Moreover, facts show that you must also recognize that the intention is to discourage gambling with taxpayer funds on technology that has not demonstrated the requisite level of maturity. There is a big penalty for gambling and losing—it is probably not worth the risk for either the PM or the PEO.

Recommendations related to this issue of critical cost growth include maintaining the Congressional involvement and oversight to the level the law requires. The PM/PEO's establishment of policies for root cause analysis of failure, and development of PEO/agency-wide reporting process to streamline reporting for Nunn-McCurdy requirements would be great initiatives to assist in the decrease of cost growth as a whole. Furthermore, there should be emphasis that immature technology is a trap and should be watched for and avoided. The minor recommendation is the possible need for increased PMO personnel and the expectation that programs schedule estimates are going to be lengthened.

THIS PAGE INTENTIONALLY LEFT BLANK

VIII. ORGANIZATIONAL CONFLICTS OF INTEREST IN MDAPS

Section 207 of the WSARA has various tenants, listed below, that are intended to protect MDAPs from conflict of interest (COI) issues that arise when companies are the source and the supplier of information to the MDAPs. WSARA is put into place to minimize those conflicts when possible. There are certain exceptions, such as the case of diminishing sources. These exceptions can influence the effectiveness of the law; nonetheless, that does not reduce the requirement for these provisions. The law identifies provisions regarding COI as follows:

Elements- The revised regulations required by subsection (a) shall, at a minimum--

(1) Address organizational conflicts of interest that could arise as a result of--

(A) Lead system integrator contracts on major defense acquisition programs and contracts that follow lead system integrator contracts on such programs, particularly contracts for production;

(B) the ownership of business units performing systems engineering and technical assistance functions, professional services, or management support services in relation to major defense acquisition programs by contractors who simultaneously own business units competing to perform as either the prime contractor or the supplier of a major subsystem or component for such programs;

(C) the award of major subsystem contracts by a prime contractor for a major defense acquisition program to business units or other affiliates of the same parent corporate entity, and particularly the award of subcontracts for software integration or the development of a proprietary software system architecture; or

(D) The performance by, or assistance of, contractors in technical evaluations on major defense acquisition programs;

(2) ensure that the Department of Defense receives advice on systems architecture and systems engineering matters with respect to major defense acquisition programs from federally funded research and development centers or other sources independent of the prime contractor;

(3) require that a contract for the performance of systems engineering and technical assistance functions for a major defense acquisition program contains a provision prohibiting the contractor or any affiliate of the contractor from participating as a prime contractor or a major subcontractor in the development or construction of a weapon system under the program; and

(4) Establish such limited exceptions to the requirement in paragraphs (2) and (3) as may be necessary to ensure that the Department of Defense has continued access to advice on systems architecture and systems engineering matters from highly qualified contractors with domain experience and expertise, while ensuring that such advice comes from sources that are objective and unbiased. (Weapons System Acquisition Reform Act of 2009 S. 454, p. 25)

MDAPs have always faced the issue of potential COI when soliciting advice from contractors. This is because of the sheer magnitude of MDAP complexity. MDAPs are forced into situations where a prime contractor may have an affiliation with a sub-contractor providing support to the MDAP as a technical or acquisition advisor. This vested interest in the technical advice and planning being provided to the government causes the appearance of COI. Government acquisition offices must establish responsibilities that are inherently governmental, and ensure government employees are performing these activities without undue influence from private industry, while maintaining the ability to get work done in the most efficient and effective manner possible. In recent years, MDAP's were giving the contractor substantial decision-making power over the direction of the program due to the government's insufficient acquisition workforce and its dependence on contractor support. This put the government in a vulnerable position, as the contractor was advising the government on

inherently governmental issues, such as statements of work, engineering requirements, and various other aspects of acquisition management related to competition.

WSARA's primary challenge in ensuring acquisition integrity is enabling the government to execute acquisition programs without major schedule delays and cost overruns while avoiding COI. Meeting that challenge has been the goal of acquisition reform improvements for decades. With the implementation of WSARA, Congress is stating that the time is right for renewed efforts to improve the performance of the defense acquisition system. WSARA establishes guidance to facilitate an improved ability to make programmatic decisions, and maintain and train the human capital necessary to support the sustainment of weapon systems. Congressional intent is to reduce the need to retain contractor services for management and advisory services to the MDAP execution, and help prevent the leak of sensitive information that could cause the government to lose its ability to negotiate in good faith.

A major issue in the development of weapon systems is the separation of ownership within the contractor's arena providing services to the government. WSARA will help maintain a level of separation that supports a healthy industrial base of competing companies over the long term.

WSARA establishes the Panel on Contracting Integrity, charged with reviewing the progress made by DoD in eliminating areas of vulnerability to defense contracting systems. The panel targets vulnerabilities allowing fraud, waste, and abuse to occur, and recommends associated changes in law, regulations, and policy. The panel prepares annual reports containing a summary of the findings and recommendations, and submits this to Secretary of Defense.

An advantage of the implementation of WSARA is the assurance that a government entity is providing leadership in contracting integrity via the Panel on Contracting Integrity. The law provides a surveillance arm, the Panel on Contracting Integrity, that makes sure the contractors are doing what they signed

up to do by evaluating the organizational structures of the companies. WSARA provides for the establishment of a Panel on Contracting Integrity, whose purpose is to look into contractor organizational structures to be sure that those portions providing services to government offices are firewalled to ensure that government contract-related information is protected from dissemination. The Panel evaluates the criteria that protect confidentiality of advisory services to the MDAPs from the participating services companies and their separation from the prime acquisition entity. The Panel's surveillance and fraud detection are part of the law that benefits all MDAPs or non-major programs dealing with contractors. WSARA's modifications to the Defense Supplement to the Federal Acquisition Regulation do not provide any specific definition of these conflicts of interest and of personal services contracts which have been so prevalent in acquisition offices, and provide some needed clarity as to the appropriate application of these services.

A potential disadvantage of WSARA includes the question of whether the Panel on Contracting Integrity will be equipped to enforce the law. The Secretary of Defense may deem that the existence of the panel is not required, if MDAP offices do not receive adequate support or the conflict of interest issues are mitigated to an acceptable level. The law says as follows.

(e) Termination-

'(1) IN GENERAL- Subject to paragraph (2), the panel shall continue to serve until the date that is 18 months after the date on which the Secretary of Defense notifies the congressional defense committees of an intention to terminate the panel based on a determination that the activities of the panel no longer justify its continuation and that concerns about contracting integrity have been mitigated.

'(2) MINIMUM CONTINUING SERVICE- The panel shall continue to serve at least until December 31, 2011. (Weapon System Acquisition Reform Act of 2009 S. 454, p. 25)

It is unknown what impact the implementation and investigative arm of the law will have on the cost and schedule of MDAPs with an upfront limited life or charter that is dependent upon the effectiveness of the panel's mitigation of contracting integrity issues. With that being said, the more effective the panel is the more likely its services will be terminated, because within the law the Secretary of Defense may deem the panel has done its job effectively. The pitfall with any new guidance is having time to evaluate the benefits of that guidance.

A conclusion that can be derived from the implementation of this section of the law is that the government acquisition offices will have an improved level of confidence that information they are receiving from the contractors is the best information that industry can offer. You might conclude that this is the intent of the law. The effects of implementation remain to be seen. It also may be concluded that the Congress intended that a governmental arm be established specifically to police contractor integrity in circumstances where said contractors are providing services in sensitive areas and where those contractors might use their position to take advantage of or trade in information that is government-sensitive. The implementation of this law will require time to evaluate the success of the guidance. A recommendation is to continue to conduct the necessary surveillance and monitoring of contractor proposals and services to guarantee better pricing and prevent COI. To maximize efficiency and objectivity, this process should be standardized across acquisition agencies or PEOs. That within itself will be a great benefit to the taxpayer and the soldier.

THIS PAGE INTENTIONALLY LEFT BLANK

IX. SUMMARY AND CONCLUSIONS

The Weapon System Acquisition Reform Act of 2009 (WSARA) enacted seven specific areas of change from existing policy. The seven focus areas, identified below, led to considerable inefficiency or posed challenges to the DoD that WSARA is intended to correct or enhance. Implementation of the changes prescribed by WSARA will take significant strides in improving DoD's acquisition performance, though some changes may introduce new challenges.

A. CONSIDERATION OF TRADE-OFFS AMONG COST, SCHEDULE, AND PERFORMANCE OBJECTIVES IN DOD ACQUISITION PROGRAMS

The goal of the WSARA legislation and subsequent changes to DoDI 5000.02 is to adequately balance cost, schedule, and performance risk during the requirements definition phase of program acquisition. However, it is questionable if cost, schedule, and performance objectives tradeoffs are reliably quantifiable prior to and during the analysis of alternative phase. Tradeoffs conducted prior to internal technology development may be inherently unreliable. It is recommended that negotiations regarding performance objectives be conducted upon completion of an analysis of alternatives and establishment of technology development plans.

WSARA explicitly requires compromises to performance requirements be put in place when appropriate to ensure achievable and cost effective systems. Shifting this tradeoff process to the earliest possible phase in system acquisition has the potential to reduce subsequent cost, schedule, and performance risk. However, by establishing the DCAPE role without further clarifying processes, WSARA and DoDI 5000.02 amendments regarding tradeoff analyses also have the potential to increase tradeoff completion time and delay completion of Material Solution Analysis phase. To maximize the benefit of this policy, DoD should seek to better define the DCAPE role and streamline and standardize the process of conducting these tradeoffs.

B. ACQUISITION STRATEGIES TO ENSURE COMPETITION THROUGHOUT THE LIFE CYCLE OF MDAPS

WSARA requires that DoD rigorously pursue competition in its acquisition strategies and prescribes specific measures to be included. There is an increased emphasis on maintaining competition during the O&S phase of a program's life cycle. Given the measures now encouraged by the law, such as use of build-to-print to maintain multiple production sources, and competition of subsystem upgrades, it seems likely that the WSARA will achieve increases in the number of competitions held throughout the DoD. Coupling the WSARA with previous acquisition policies that required an increase in DoD acquisition workforce size, it appears that DoD is poised to have both the explicit direction and workforce capability to follow through on Acquisition Strategies that improve the quantity of life cycle competitions.

WSARA also requires that DoD make provisions to continually monitor subcontract management processes, which could result in increased costs to the government to develop personnel and processes, as well as the subsequent increases in contractor deliverables, such as reports and monitoring systems. Application of the WSARA direction in this area should be executed in a rigorously formal manner with frequent guidance from DoD's contracting officers and legal counsel, as increased government intervention in the prime contractor-to-sub contractor process could increase risk to DoD.

C. PROTOTYPING REQUIREMENTS FOR MDAPS

WSARA's requirement for competitive prototyping prior to Milestone B approval provides a mechanism to improve upon how the defense acquisition system reacts to meet war fighter needs. Competitive prototyping will aid DoD in procurement and evaluation of the best designs and technologies. However, the requirement to establish early competition comes at a cost; competitive prototyping will increase early RDT&E funding requirements. These up-front cost increases are expected to pay large dividends in terms of reduced Total

Ownership Cost. When defining the increased costs of competitive prototyping, acquisition offices should be prepared to also identify the potential long term production and sustainment savings anticipated due to increased opportunities for competition during the system's life-cycle.

D. ACTIONS TO IDENTIFY AND ADDRESS SYSTEMIC PROBLEMS IN MDAPS PRIOR TO MILESTONE B APPROVAL

Past acquisition policy demonstrated an inadequate amount of oversight and review to assure problems with various programs didn't reach out-of-control cost and schedule overruns. Systemic problems were rarely identified before Milestone B approval; allowing these faults to be manifested beyond the technology development phase where they could be most easily addressed. Nunn-McCurdy critical cost growth breach reporting requirements were stringent, but still allowed for MDAP execution without adequate program review.

The additions and changes in WSARA section 204 should help reduce the problems associated with cost and schedule deviation resulting from immature technology or the wrong choice of technology. Providing additional government oversight to these programs and establishing the overrun root cause will result in a better match of capabilities, mature technologies, and resources. The requirement to establish root cause should be expected to identify system "culprits," as well as systemic patterns that result in developmental cost increases and delays; technical or resource issues identified during Technology Development will help to shape realistic technology and cost expectations. Increased time or expenditures for early testing and development might be indicators that a program is troubled by immature technology and the need for termination or restructure of technology development that is not ready for "prime time." Enforcement of WSARA's increased oversight and reporting requirements during the Technology Development phase will likely result in better overall program performance and lower overall program costs.

E. ADDITIONAL REQUIREMENTS FOR CERTAIN MDAPS

Acquisition processes established prior to WSARA allowed MDAPs to start with unproven technologies, allowing programs to proceed down an acquisition path with high risk to system development. These processes allowed systems to be developed without having the requirements clearly defined. Subsequent re-baselining efforts did not solve the programs' problem(s) root cause (that is, immature or poorly chosen technology); rather, the risk was moved to a later phase of the acquisition.

Additional requirements introduced in WSARA assist in validation of technology maturity to minimize the risk of cost, schedule, and performance impact to weapon systems before moving to LRIP or full rate production. A major enabler to this validation is the requirement for Pre-Milestone B PDR Assessment. This requirement provides the MDA (prior to a Milestone B decision) with the ability to determine if the system meets performance criteria and establishes the hardware and software systems to support continued development and production of the MDAP. This level of confidence comes with a technical maturity level commensurate with the successful completion of PDR assessment. It should be recognized, however, that this requirement may result in delayed progression through Milestone B, as successful implementation of the PDR may delay the entire acquisition effort. Regardless, implementation of this requirement should be rigorously pursued, as a successful PDR gives the MDA the ability to recommend requirement tradeoffs based upon an assessment of acceptable cost, schedule, and performance risk.

F. CRITICAL COST GROWTH IN MDAPS

Past acquisition policy that allowed for minimal reporting and inadequate cost growth thresholds resulted in substantial overruns prior to alerting oversight activities. Cost growth under WSARA has negative consequences and demands

the PM control cost related to the design or technology issues facing the program, or risk program cancellation and an intense level of scrutiny, accompanied by corrective action reporting.

Recommendations related to this issue of critical cost growth include maintaining Congressional involvement and oversight as prescribed by WSARA. PM/PEOs must establish policies for root cause analysis of failure, and development of PEO/agency-wide reporting process to streamline reporting for Nunn-McCurdy requirements would alleviate increased costs associated with the new law. Additionally, PEOs should be cognizant of the possible need for increased personnel and schedule impacts due to increased scrutiny and reporting.

G. ORGANIZATIONAL CONFLICTS OF INTEREST IN MDAPS

Policies in place prior to WSARA did not provide details regarding the implementation of blocking potential conflicts of interest (COI). Without adequate regulation, the perception of COI, if not actual improprieties, was likely to impact the acquisition decisions made by MDAPs.

WSARA increases government acquisition office confidence that information received from the contractors is the best information that industry can offer. It may be concluded that the Congress intended for the establishment of a governmental organization to police contractor integrity in circumstances where contractors are providing acquisition-sensitive services, and where those contractors might use their position to take advantage of their unique access to the Government's acquisition strategies. The implementation of this law will require time to evaluate the success and suitability of the guidance. It is recommended that PEOs and acquisition offices establish formal policy regarding the surveillance and monitoring of contractor proposals and services rendered, with the specific purpose of preventing actual or perceived conflict of interest.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

- Appropriate Role of Contractors Supporting Government. Report of the Acquisition Advisory Panel. Retrieved December 10, 2010, from www.acquisition.gov/comp/aap/documents/chapter_6.pdf
- Berteau, D. J., Hofbauer, J., & Sanok, S. (2010). Implementation of the Weapon Systems Acquisition Reform Act of 2009. *Center for Strategic & International Studies (CSIS)*.
- Business Executives for National Security. (2009, July). *Reforming the defense acquisition enterprise*. Retrieved November 17, 2009, from http://www.bens.org/mis_support/Reforming%20the%20Defense.pdf
- Congressional Research Service. Retrieved August 17, 2010, from <http://opencrs.com/document/RS22947>
- Contract Management: DoD vulnerabilities to contracting fraud, waste, and abuse. (2006, July 7). GAO-06-838R. Washington, D.C.
- Contract Management: Guidance Needed to Promote Competition for Defense Task Orders. (2004, July 30). GAO-04-874. Washington, D.C.:
- Defense Acquisition University. (2009, May 29). *Weapon Systems Acquisition Reform Act of 2009 (Public Law 111-23, 22 May 2009)*. PowerPoint briefing.
- Defense Acquisitions: Assessments of Selected Weapon Programs. (2009, March 30). GAO-09-326SP. Washington, D.C.
- Defense Acquisitions: Charting a Course for Lasting Reform. (2009, April 30). GAO-09-663T, Washington, D.C., pp. 0, 2.
- Defense Procurement Acquisition Policy. Retrieved August 31, 2010, from www.acq.osd.mil/dpap/cpic/cp/panel_on_Contracting_Integrity.html
- Department of Defense Instruction 5000.2. (2003, May 12). "Operation of the Defense Acquisition System."
- Department of Defense Instruction 5000.02. (2008, December 2). "Operation of the Defense Acquisition System."
- Department of Defense: A departmentwide framework to identify and report gaps in the defense supplier base is needed. (2008, October 7). GAO-09-05. Washington, D.C.

- Directive-Type Memorandum (DTM) 09-027—Implementation of the Weapon Systems Acquisition Reform Act of 2009. (2009, December 4). Undersecretary of Defense for Acquisition, Technology and Logistics.
- Erwin, S. I. (2010, January). Acquisition Reform Act: The backlash has begun. *National Defense Magazine*.
- Government Contracts Advisory. (2008, January 3). *Congress passes new Weapon Systems Acquisition Reform Act of 2009*. Retrieved February 3, 2009, from <http://www.mckennalong.com/news-advisories-2148.html>
- Levin, C. (2009, February 24). Summary of the Weapons Systems Acquisition Reform Act of 2009. Retrieved February 24, 2009, from <http://levin.senate.gov/newsroom/release.cfm?id=308525>
- The National Academies Press. (2008). Retrieved November 1, 2010, from www.nap.edu/openbook.php?record_id=12065&_id=12065&_id=84.
- Thompson, L. (2010, March 1). Acquisition reform 'logic' commercial defense world plays by own rules. *DefenseNews*. Retrieved April 26, 2010, from <http://www.defensenews.com/story.php?i=4518221>
- Title II—Acquisition Policy. (n.d.). WIFCON.com. Retrieved October 22, 2010, from http://www.wifcon.com/dodwsara/wsara_204.htm
- U.S. Government Accountability Office (GAO). Retrieved September 10, 2010, from www.gao.gov/htext/d09431t.html
- Weapon Systems Acquisition Reform Act of 2009. (2009). Pub. L. No. 111-23, 123 Stat. 1704.
- Werfel, M. (2010, March 22). Real acquisition reform flows from truth. *DefenseNews*.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California