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A comparative analysis of risk management plans within the Defense Contract Management Agency

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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

A COMPARATIVE ANALYSIS OF RISK MANAGEMENT PLANS WITHIN THE DEFENSE CONTRACT MANAGEMENT AGENCY

by

Teddie L. Dyson

June 2001

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This thesis performs a comparative analysis of a sampling of risk management plans for strategic and critical suppliers administered by the Defense Contract Management District West (DCMDW) in order to identify the areas of highest risk and the most common tools used to mitigate risk in key processes and systems for these suppliers.

The Defense Contract Management Agency (DCMA) uses a comprehensive, inclusive, and iterative approach to risk management. It follows the Government and DoD risk management premise of using a five-step approach to risk management and the basic idea of identifying and assessing key processes/systems whose risk, either through probability or potential impact, offers the most cause for concern from a performance, schedule, or cost perspective. It employs current information technology, Risk Assessment and Management Program (RAMP) to provide consistency, commonality, access, and comparability to its risk management process.

Performance and schedule, product support and supplier quality assurance for product quality, and delivery were the areas of highest risk for DCMA. The most commonly applied risk handling tools indicated in the RAMP database were areas associated with analysis, monitoring, and surveillance activities before final inspection: "Data Analysis", "Product Audits", "System Evaluation", and "Corrective Action".

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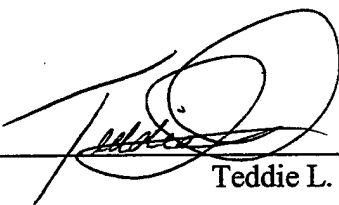
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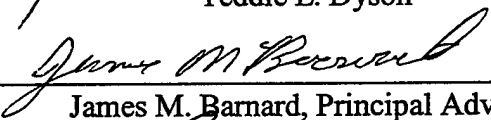
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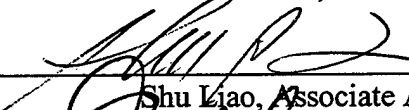## NAVAL POSTGRADUATE SCHOOL
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I.   INTRODUCTION

A.   PURPOSE

Risk is the probability of an undesirable event and the significance of its consequence, or more succinctly, "an event and its probability and impact" (RM, 1999). Within the development of major projects, there are five common facets of risk: technical, programmatic, supportability, cost, and schedule and they can be found in all phases of the Federal Acquisition Process from procurement planning and requirements analysis to the award and post-award phases. The Defense Systems Management College (DSMC) defines the risk management structure for Department of Defense (DoD) acquisition as a continuous, iterative activity between key processes, described as risk planning, risk assessment, risk analysis, and risk handling. The Defense Contract Management Agency (DCMA) is intricately involved in the transition of major acquisition programs from award to performance, and specifically in the post-award contract administration phase of risk management. To handle these responsibilities, DCMA utilizes risk management plans designed to incorporate all aspects of a successful risk management program.

The purpose of this thesis is to perform a comparative analysis of a sampling of risk management plans for strategic and critical suppliers administered by the Defense Contract Management District West (DCMDW) in order to identify the areas of highest risk and the most common tools used to mitigate risk in key processes and systems for these suppliers. Through a comprehensive literature review, a sampling of actual risk management plans, and information gathered through interviews with DCMA personnel

within varying DCMA resident and regional offices in DCMDW, a study of common high risk areas and risk mitigation techniques is developed to aid DCMA personnel in developing future risk management plans and techniques.

B.   BACKGROUND

All acquisition programs are subject to risks. The DCMA One Book defines risk as a measure of the inability to achieve overall program objectives as defined by cost, schedule and technical goals. In this context risk is generally described by its probability of occurrence and its impact. To guard against risk, DCMA has established risk management as an operating principle and an integral part of its processes.

Risk management is a systematic approach to problem solving. It includes risk planning, assessing risk areas, developing risk handling options, monitoring risks to determine how they have changed, and documenting the overall risk management program. Risk management plans are plans of action to reduce or eliminate risks affecting cost, schedule or performance. By identifying, analyzing and managing risks through an iterative, continuous program assessment via risk management plans, DCMA can have significant positive impacts on the cost, schedule, and performance of its assigned programs.

Risk management plans identify and track key risk drivers, define risk abatement plans and provide for continuous risk assessment. Through the use of risk management plans specific to each of its suppliers, DCMA seeks to identify and control critical risk functions and bring them within acceptable levels. The Risk Assessment and Management Program (RAMP) is an information technology tool that readily allows DCMA to define and document risk management plans and to share the information

contained in these plans throughout the organization, and ultimately to its external customers.

In RAMP, DCMA categorizes its suppliers as "strategic", "critical", or "routine". Strategic and critical suppliers represent those contractors or contract actions of highest significance (from a cost or safety standpoint) and therefore highest risk—with respect to potential impact:

- **Strategic suppliers** are ACAT I prime contractors.

- **Critical suppliers** are those not designated as "strategic" and who produce products/services classified as: ACAT I sub-contractor (delegation), safety of flight, flight critical, life support, explosives, munitions, hazardous, specialized safety, level 1 sub-safe, nondestructive test, demilitarization, engaged in First Article Testing at the time of risk assessment (when RAMP capable), space/satellite (when RAMP capable), or nuclear (when RAMP capable).

- **Routine suppliers** are all those not designated as "strategic" or "critical". (Shields, 2001)

By analyzing the plans for strategic and critical suppliers, we can readily assess how consistently DCMA is applying its own philosophies, identify the more significant or high risk areas of commonality among suppliers, and recognize the more prevalent risk handling tools used to mitigate against risk in the post-award contract administration phase of acquisition.

C.   RESEARCH OBJECTIVE

The objective of this thesis is to identify and examine risk in the post-award contract administration phase of the Federal Acquisition Process. The goal of this study is to identify commonalities in the various risk management plans of strategic and critical suppliers, determine the areas of highest risk and define common tools used to mitigate risk in key processes and systems for these suppliers.

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This research serves as a case study of the risk management process in DCMDW. The research will benefit DCMA offices in their continued implementation of the RAMP program and its integration into their current risk management programs and processes. The ability to see beyond the immediate supplier and recognize the commonalities that exist in managing risk in the post-award contract administration phase of Government acquisition enhances the ability of DCMA personnel to make sound business assessments and implement reasoned risk management approaches that have a proven track record, a higher probability of success, and are consistent with Government and DoD risk handling guidance.

D. RESEARCH QUESTIONS

1. Primary Research Question

How does the Defense Contract Management Agency (DCMA) address risk management in the acquisition process?

2. Subsidiary Research Questions

- What is the Defense Contract Management Agency (DCMA) philosophy with regard to risk management in the post-award contract administration phase?

- Are risk management plans for specific activities consistently developed and applied within DCMA?

- What are the areas of highest risk for strategic and critical suppliers in the contract administration phase?

- What are the most common tools used to mitigate risk in key processes and systems?

- What is risk management in the context of the Federal Acquisition Process?

E. SCOPE

This thesis will be a case study. The effort will be directed to analyzing risk management plans as documented in the RAMP database available to DCMDW. Interviews and opinions of key Government representatives involved in RAMP

implementation and the risk management program will augment the study. This research will not provide an exact template for risk management plans rather it will provide an analysis of various risk management plans for strategic and critical suppliers assigned to the DCMDW and seek to identify commonalities that exist between them to draw conclusions regarding areas of high risk and risk handling tools in the post-award contract administration phase of federal acquisition.

Specifically, this thesis will (1) review risk in Federal acquisition and specifically in the post-award contract administration phase; (2) present the current DCMA Risk Management program, processes, and systems; (3) analyze a representative sampling of DCMA risk management plans for various strategic and critical suppliers in DCMDW; (4) identify commonalities in the development and application of Risk Management Plans; (5) discuss areas of highest risk in the contract administration phase; and (6) identify common tools used to mitigate risk in key processes and systems.

F.   METHODOLOGY

This thesis is a study of risk management plans for strategic and critical suppliers assigned to DCMDW. It includes identification of commonalities in risk management plans, an assessment of high risk areas common to strategic and critical suppliers, and a presentation of common tools used to mitigate risk in key processes and systems. A comprehensive literature review of books, magazine articles, CD-ROM systems, Internet based materials, Government reports, corporate materials and other information sources is conducted to describe risk in the acquisition environment and the risk management background within which the DCMA offices operate. The Defense Systems Management College (DSMC) *Risk Management Guide for DoD Acquisition* and the DCMA *Supplier Risk One Book Chapter* are used as guides for identifying risk areas and risk handling

treatments. A sampling of various risk management plans for strategic and critical suppliers is obtained using the RAMP database through the DCMDW office. These plans are analyzed to identify commonalities in their development and application and specifically, to look for high-risk areas and common risk handling tools used to mitigate risk for strategic and critical suppliers.

G. ORGANIZATION OF STUDY

Following this introductory chapter, Chapter II provides background information on risk management in the Federal Acquisition Process. It also provides an overview of the DCMA Risk Management Program including its philosophy and various aspects of the overall program to include Process Oriented Contracting Administration Services (PROCAS), Integrated Product Teams (IPTs), and Management Councils. Chapter III examines risk management plans in the DCMA environment. The Risk Assessment and Management Program (RAMP) is reviewed including the development and application of risk management plans throughout the agency. Chapter IV presents data obtained from a sampling of risk management plans for strategic and critical suppliers in DCMDW and analyzes the commonalities found within their plans, areas of high risk, and risk handling tools. Chapter V includes the conclusions and recommendation of the thesis. It answers the research questions and addresses topics for additional research.

II.   RISK AND RISK MANAGEMENT BACKGROUND

A.   RISK AND RISK MANAGEMENT DEFINED

Webster's defines risk as the "possibility of loss or injury". (MW, 2001) Other generic definitions include "chance of something going wrong" (Encarta, 2001) or, when used as a verb, "accept the danger of doing it". (Cambridge, 2001) This seems simple enough, but when asked "what is risk?" the term becomes hard to grapple with and, as with a lot of things, the best answer may be "it depends". Risk is a dependent concept and typically one that is thought of in negative terminology. One needs to know the context with which it is being used relative to time and space to properly define it so that it actually means something.

In acquisition related terms, DoD defines risk as

> ... a measure of the potential inability to achieve overall program objectives within defined cost, schedule, and technical constraints ... [it] has two components: (1) the *probability* (or likelihood) of failing to achieve a particular outcome, and (2) the *consequences* (or impact) of failing to achieve that outcome. (RM, 1999)

1.   Risk Characteristics

Risk can be characterized in certain emotive and descriptive words. Basic characteristics of risk include volatility, variance, uncertainty, ignorance, incomplete knowledge and ambiguity. Each of these terms defines various aspects or dimensions of risk dependent upon the perspective from which it is viewed. (Shapira, 1995) Over time and in common use, risk has evolved from an unintended or unexpected outcome to an outcome and a chance of its occurrence that is decidedly unfavorable. (Ansell, 1992) Risk, therefore, is commonly thought of in a negative context.

Yet other methods for describing risk seem much more scientific—unemotive in nature. The George Washington University's Educational Services Institute (ESI) course on risk management characterizes risk as situational, time based, interdependent, magnitude dependent, and value based (ESI, 1998). These variations objectively describe and distinguish the nature and identity of risk in the subjective context of its environment.

In the context of decision-making, risk choices seem to embrace three dominate aspects: risk definition, risk attitude, and risk management. How is risk defined in the situation at hand? What are the decision-makers' attitudes—risk adverse, risk neutral or risk seeking? How will the risk be dealt with? (Shapira, 1995)

a.   *The Definition of Risk*

Risk can be thought of or described in terms of its dimensions and its relation to uncertainty. Outcomes, both positive and negative can be considered. Parameters can be established to consider how much risk is used and whether combinations of risk will be regarded as descriptive of the whole. (Shapira, 1995)

b.   *Attitude Toward Risk*

The relationship between risk and return will mold the approach towards seeking or avoiding risk in varied situations dependent upon people, resources, situations, etc.. The degree of risk and its level of consequence will likewise impact the prevailing responses. (Shapira, 1995)

c.   *Dealing with Risk*

The methods used to handle or treat risk will be dependent upon whether risks are to be avoided, delayed, or reduced. Decisions include whether to attempt to control risk, gather more information, or merely change the parameters or estimates. (Shapira, 1995)

2. Risk Management Characteristics

Risk management is "the act or practice of dealing with risk. It includes planning for risk, assessing (identifying and analyzing) risk areas, developing risk handling options, monitoring risks to determine how risks have changed, and documenting the overall risk management program." (RM, 1999)

The risks at issue may be actual, but they are also definitely what is perceived. Decisions are made based on perceptions of risk consequences. Perceptions are estimates of probabilities or likelihood and evaluations of magnitude of outcomes that are often subjective; they are psychologically derived. Further, there is a political dimension whereby decision makers are influenced by those affected by the outcomes. So despite the classical decision theory premise of objective calculations, risk management involves many subjective and judgmental contributions. (Ansell, 1992)

Given this, successful risk management requires (1) flexible and general models, (2) a family of related methods which link models to circumstances, (3) a wide range of skill and expertise, and (4) experience and leadership. (Ansell, 1992) Risky choice is succinctly conflict resolution. Managers are expected to manage, not just assess and accept risk; they are expected to "make things happen" and "take (good) risks". (Shapira, 1995)

Taking a less esoteric look and once again seeking to more scientifically describe risk management, the ESI course identifies four major components of risk management: risk identification, risk quantification, risk response development, and risk response control. (ESI, 1998) These concepts are developed further below.

a. *Risk Identification*

Risks should be identified early, often, regularly, and at all levels—a comprehensive approach. The process should be thorough and fully documented. Tasks should be assigned to specific team members. Inputs can include such items as requirements document, work breakdown structure, cost and time estimates, etc. Tools for idea generation include expert interviews and brainstorming, etc. (ESI, 1998)

b. *Risk Quantification*

Quantifying risk includes analysis and prioritization. Analysis includes worst, best, and most probable scenarios. Assess probabilities and determine impacts such as schedule risk, cost risk, profitability, etc. (Quantifiable measures are preferred, but qualitative can be used.) Rank analyzed risks, highest to lowest and filter out unimportant risks. (ESI, 1998)

c. *Risk Response Development*

Plan and implement basic risk response strategies based on risk type. Evaluate and select a primary option based on a strategy of acceptance (of the consequences), avoidance (eliminate the cause), or mitigation (minimize probability, minimize impact or transfer the risk). (ESI, 1998)

d. *Risk Response Control*

Risk response control involves implementing risk strategy, evaluating and documenting the results. As risks become actual events, strategies are carried out. Clearly define the lines of responsibility, communicate status, and document actions. Evaluate the results to reassess risk probability, impact and events as well as risk strategies. Assess risk as to cost, schedule and performance. Continually document risk results: current, accurate, complete, and simple. (ESI, 1998)

B. RISK MANAGEMENT IN THE FEDERAL ACQUISITION PROCESS

Acquisition reform has changed the field of play where the Department of Defense must buy its wares. Technical, business and management approaches have evolved. Today, it's all about commercial products, streamlined processes, and best value. This dynamic arena is juxtaposed against a backdrop of trimmed defense budgets and reduced Government oversight that makes for a risky playing field.

Risks can be thought of in terms of future events and the uncertainty associated with their occurrence and potential impact. They are inherently interdependent, time-based and obviously situational. In acquisition related terms, this means risks exist throughout the life of a program and at all phases of the acquisition cycle. A risk occurrence in one area or phase will absolutely effect risk elsewhere, e.g., a slip in schedule early on in the process will have domino effects downstream and potentially impact other risk areas such as cost.

The Federal Acquisition Process (FAP) segregates acquisition into three distinct phases: pre-solicitation, solicitation-award, and post-award administration. Risk is alive and well in each of these areas. The pre-solicitation phase includes risk associated with such functions as needs determination, market research, requirements analysis and sourcing. The award phase problems include issues such as solicitation method, selection of contract type, bid or proposal evaluation, and award selection. Transitioning from award to contract administration involves risk associated with contract administration plans, early DCMA involvement (early PROCAS), post-award orientation conferences (the handoff) and flow-down clauses for subcontractors. (Ross, 1999)

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Risk management activities span across all phases and functions of the acquisition cycle. Area emphasis, scope and detail will vary according to phase and depend upon the specific risk event. Though there is no one standard prescribed for use, there are some general requirements and basic processes that are common throughout the DoD acquisition arena.

1.   The Risk Management Process

The Department of Defense mandates the use of risk management in its major defense acquisition programs:

> The acquisition strategy shall address risk management. The PM [Program Manager] shall identify the risk areas of the program and integrate risk management within overall program management." Further, DoD encourages the use of risk management throughout the entire program life cycle and advocates "life cycle risk management versus risk avoidance. (DoDD 5000.2-R, 2001)

Given that risks are to be managed vice avoided, DoD describes the overarching risk management process:

> The establishment of a risk management process (including planning, assessment (identification and analysis), handling, and monitoring) to be integrated and continuously applied throughout the program, including, but not limited to, the design process. The risk management effort shall address risk planning, the identification and analysis of potential sources of risks including but not limited to cost, performance, and schedule risks based on the technology being used and its related design, manufacturing capabilities, potential industry sources, and test and support processes; risk handling strategies; and risk monitoring approaches.... (DoDD 5000.2-R, 2001)

The Defense Systems Management College (DSMC) reiterates this basic risk management process and details its structure and make-up. This then forms the basic process model DoD prescribes to deal with acquisition related risk.
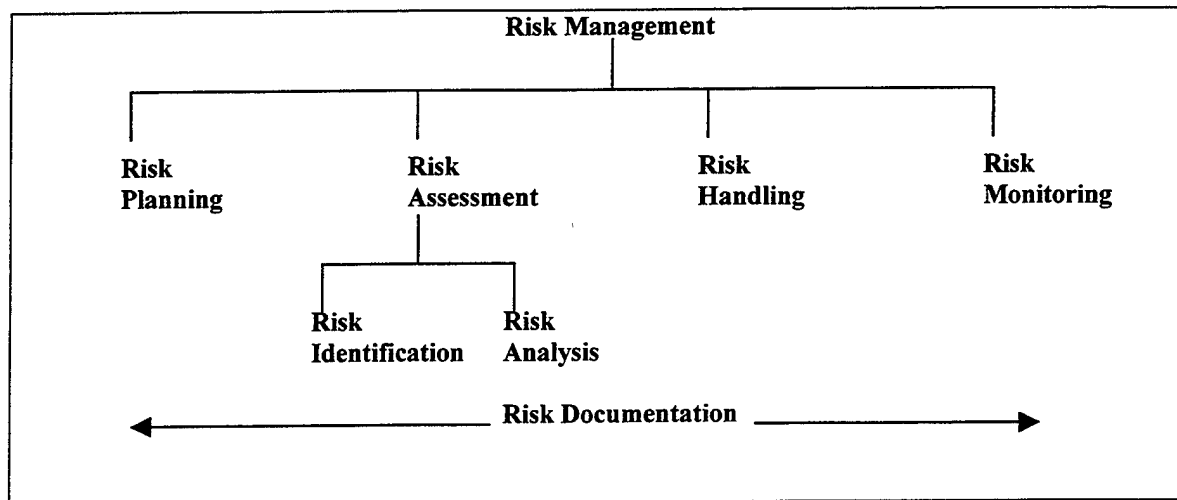
Figure 2.1.   DSMC Risk Management Structure (From RM, 1999).

a.   *Risk Planning*

Risk planning is the process to develop a risk management strategy; determine the methods used to identify, analyze, handle, monitor, and document risk; and plan for adequate resources to implement the program. The result is a Risk Management Plan (RMP) that is iterative and descriptive of the schedules, activities, and processes. The plan is in essence, a road map. (RM, 1999)

b.   *Risk Assessment*

Risk assessment is the identification and analysis of risk. The process begins with the compilation of risk events and the subsequent evaluation at a level of detail to understand causality i.e. risk drivers and impact. This problem identification is the stage that quantifies the probability and consequences of various risks.

Risk assessments typically include a performance/technical assessment, a schedule assessment, and a cost estimate. Risk analysis activity begins with a detailed study of the critical risks to judge the probability and impact on cost, schedule, and performance. Risk ratings are assigned and are often expressed as high, moderate, and

low based on consideration of the likelihood of the risk event's occurrence and its consequences. (RM, 1999)

However, it is worth noting here that there is no one mandated method for assessing or classifying risk within DoD. For example, there is no requirement to classify risk as "high", "moderate", and "low" and no specific method for prioritizing the risks following the initial assessment. Given this predicament, it becomes difficult to compare risk or how risk is handled between various programs and activities or between the services themselves.

c. Risk Handling

Risk Handling is the specific methods and techniques used to deal with the identified risk. The chosen options are a direct result of the risk assessment rating and prioritization. It includes scheduling, the assignment of responsibility, and provides cost estimates. The objective is to manage risks to acceptable levels. Risk handling options can include risk avoidance, control, transfer and assumption. (RM, 1999)

(1)   Risk control seeks to mitigate risks to reduce the likelihood and/or consequence of their occurrence. It includes such activities as trade studies, early prototyping, incremental development, modeling/simulation, reviews/inspections, and manufacturing screening. (RM, 1999)

(2)   Risk avoidance seeks to eliminate high or medium risk sources and replace them with a lower risk solution. This process may involve such efforts as changes in the requirements or specifications. An up-front requirements analysis and cost-as-an-independent variable (CAIV) trades are sample risk handling options here. (RM, 1999)

(3)   Risk assumption acknowledges a risk situation and consciously accepts the associated risk level without especially seeking to exert any control over it. The basic premise here is that not all risks are worth worrying about. To handle risk in this manner resources (time, money, people, administration) must be identified to overcome the risk should it occur. (RM, 1999)

(4)   Risk Transfer reallocates risk to another part of the system during the design phase or re-distributes risk between the Government and prime contractor or between Government agencies or contracting team members. It is a form of risk sharing and can influence cost objectives depending on where the burden is placed. (RM, 1999)

d.   *Risk Monitoring*

Risk monitoring systematically tracks and evaluates the risk handling activities against established metrics. It is a reiterative process which can likely result in changing and identifying new risks and risk handling methods. The key measures here are cost, schedule and performance effects. This is basically a feedback technique. Test and Evaluation (T&E), demonstration events, program metrics, and process proofing are sample risk monitoring techniques. (RM, 1999)

e.   *Risk Documentation*

Formal documentation of the risk management process offers several benefits. It serves as a basis for assessments and updates, ensures a more comprehensive assessment, provides a method for monitoring and verifying results, provides background material, is useful as a management tool, and produces rationale for program decisions. (RM, 1999)

2. Post-award Administration Phase

The Post-award Administration Phase of Federal acquisition (also known as Contract Administration) includes among other functions; start-up, quality assurance, payment and accounting, contract modification, claims, termination and closeout. These can be further delineated as described in Figure 1.2. The first four functions are required for every acquisition, while the last three are dependent upon the administrative requirements specific to the contract in question. Within this myriad of functions are many risks and many associated methods of handling them.

The Government and contractor plan and initiate performance in the post-award phase. Large dollar contracts or contracts for complex, technical requirements require a contract administration plan to delineate Government surveillance and monitoring activities and provide for proper Government and contractor performance.

Various means and methodologies are used to perform these administrative functions. Agencies may assign a Contracting Officer's Representative (COR) or Contracting Officer's Technical Representative (COTR) to liaison between the Government and contractor to provide technical assistance to the contractor and current contract information to the Contracting Officer (CO). The Defense Contract Management Agency (DCMA), the principal organization for handling contract administration within DoD acquisition, assigns Administrative Contracting Officers (ACOs) to perform specifically delineated contract administration functions. (Ross, 1999)

POST-AWARD ADMINISTRATION PHASE

FUNCTIONS	SUB-FUNCTIONS	TASKS
Start-Up	Planning	Contract Administration Planning
	Ordering	Post-Award Orientations
	Subcontracting	Order Against Contracts
		Consent to Subcontract
Quality Assurance	Monitoring and Problem Solving	Monitor, Inspect, and Accept
		Delays
		Stop Work
		Remedies
	Property	Property Administration
	Reporting Performance Problems	Report Performance Problems
Payment and Accounting	Payment	Limitation of Costs
		Payment
		Unallowable Costs
		Assignment of Claims
		Collecting Contractor Debts
		Progress Payments
		Price and Fee Adjustments
	Accounting	Accounting and Cost Estimating Systems
		Cost Accounting Standards
		Defective Pricing
Closeout	Closeout	Closeout
Contract Modification	Contract Modification	Contract Modification
Termination	Termination	Termination
		Bonds
Claims	Claims	Claims

Figure 2.2.   FAP Post-Award Administration Phase (After Ross, 1999).

Post-award contract risk management naturally follows all that has gone before; it builds on what is already in place. The process starts with an Integrated Baseline Review (IBR) following contract award to ensure plans and performance baselines are adequate and consistent with the contract schedule, scope, and resources. Although specific steps to initiate the risk management plan will vary, the following identifies some of the more basic ideas:

- Conduct initial meeting with contractor to describe the objectives and approach to risk management.

- Train Government contract administrators and contractors' organization on risk management basics.

- Review pre-contract award risk plan and revise as necessary.

- Conduct in-depth review of risk assessments and expand as necessary.

- Review and revise risk handling plans to match adjustments made in the assessment.

- Review documentation requirements with the contractor and Government administration staff.

- Establish a formal risk management organization consistent with contract terms.

- Refine risk monitoring plans with the contractor.

- Establish program reporting requirements with the contractor.

- Identify other risk management activities in conjunction with the contractor.

- Manage the program risk in accordance with the risk management plan.

- Work with contractor to refine risk monitoring plans and procedures; develop performance measures and metrics to track medium and high risk items. (RM, 1999)

C. DCMA RISK MANAGEMENT PROGRAM

DCMA is DoD's contract manager responsible for ensuring programs, supplies, and services are delivered on time, within cost, and meet performance requirements. As of January 26, 2001, the DCMA homepage reported DCMA manages 325,000 prime contracts valued at $852 billion and employs over 12,000 civilian and military professionals. Their employees interact with customers on a daily basis to ensure customer needs are met:

- Before Award – assist in designing solicitations, identify potential performance risks, select capable contactors, and write contracts promoting easy contract administration

- After Award – ensures contractor product, cost, and schedules are in compliance with the terms and conditions of the contract to include on-site

surveillance and program-specific processes that cannot be performed by off-site buying activities (DCMA web site, 2001)

DCMA's mission includes providing risk assessment services. DCMA manages risk using integrated supplier surveillance planning. They preposition workforce at contractor sites and use integrated management teams to bring a multifunctional perspective to assess supplier systems and processes for cost, schedule, and product/service performance. (DCMA web site, 2001)

1. Philosophy

The DCMA One Book (OB) establishes risk management as a central operating principle and integral part of DCMA processes. DCMA follows the standard risk management philosophy prescribed in the DoD Risk Management Guide (RM) and the Defense Acquisition Deskbook (DAD). (OB 0.1, 2001)

DCMA's risk management methodology complies with statutory and regulatory requirements and is specific to the conduct of contract administration processes. Agency risk management is comprised of five steps: risk planning, risk assessment, risk handling, risk monitoring, and risk documentation. (OB 0.1, 2001) Five mechanisms are used to carry out the risk management process: Integrated Product Teams (IPTs); contractor documentation, product/processes, metrics and data; Process Oriented Contract Administration Services (PROCAS); inspection/audit results and data analysis; and process mechanisms for individual assessment tools. (OB 0.1, 2001)

2. Process Oriented Contracting Administration Services (PROCAS)

PROCAS promotes mutual trust and understanding between the Government and contractors by using common objective data to improve performance and encourage successful contract completion. PROCAS adds value by increasing customer satisfaction through improved contract performance from improved processes and increased on-time

delivery. It is a continuous process improvement approach that systematically provides a method for selecting, analyzing, and modifying processes so that once a problematic process has been identified and corrected, the IPT then moves on to the next process. (OB 0.3, 2001)

All DCMA employees must use PROCAS methods to the maximum extent possible. Process improvement efforts must be conducted using Integrated Product Teams (IPTs) and must be prioritized according to highest returns to the Government. DCMA offices must maintain a history of PROCAS efforts including identification of key processes, process analysis, risk classifications, resource adjustments and associated cost savings or cost avoidance. (OB 0.3, 2001)

DCMA Contract Management Offices (CMOs) must determine the degree of involvement based on cost, schedule, and technical risks in the selected processes affecting delivery or service. They must develop surveillance plans to form the basis for risk assessment and process identification and prioritization. (OB 0.3, 2001) However, contractors are responsible for the processes employed to fulfill Government contracts and it is their choice whether to choose to team with the Government to improve processes of mutual interest. DCMA members can never mandate process improvements. (OB 0.3, 2001)

3.   Integrated Product Teams (IPTs)

IPTs are characterized as multi-functional and multi-organizational teams designed to take advantage of the disparate skills of their members. IPTs add value by bringing various functional disciplines together to jointly build programs. Customers and Management Councils select areas of potential benefit from IPT involvement to resolve

problems, improve performance, facilitate reform initiatives, and develop surveillance plans. IPTs must use PROCAS techniques and risk assessment tools to improve overall contract performance. (OB 0.3, 2001)

IPTs are designed to promote cooperation and full and open discussions. Team members should be qualified (in their functional disciplines) and empowered to speak for their superiors or "principals" in the decision-making process. In fact, they are encouraged to frequently communicate with their leadership to ensure they are espousing sound advice to the sponsoring party (Management Councils, customers, etc.) and should make other team members aware of any of their limitations to speak for their parent organization. Agreements are considered "final" and therefore this continuous "up-the-line" communication is essential. (OB, 0.3, 2001)

4. Management Councils

Management Councils are senior representatives from customer buying activities, program management offices, the Defense Contract Audit Agency (DCAA), DCMA and contractors. They are forums to communicate ideas, implement change and speed up improvements in acquisition. Here, all the stakeholders are brought together to coordinate and resolve issue and thereby add value to the acquisition process. (OB 0.3, 2001)

CMOs must establish and support councils at all contractor sites that have major acquisition programs (ACAT I and II), hold greater than 80% of their unliquidated obligations, or on an as needed basis. Councils cannot alter, amend or deviate from contract terms and FAR/DFARS requirements. (OB 0.3, 2001)

Contractor members must have the authority to represent their corporation across at least two business areas, contractual entities or profit centers. All members must be senior enough to commit resources and make decisions for their organizations. Central to this is the decision and the power to establish IPTs and target specific processes for increased risk management. The CMO Commander, the DCAA Resident Auditor and all Program Managers and Item Managers must be council members. (OB 0.3, 2001)

D. CHAPTER SUMMARY

This chapter defines risk, provides some distinguishing characters and then describes it in the context of decision-making. Risk management is then introduced conceptually as a way to deal with risk. It is characterized by some basic over-arching functions that run a common thread through federal acquisition and DoD risk management. Finally, the DCMA risk management program is discussed and some of its more salient components presented.

In decision-making, risk choices can be characterized in three dimensions: the definition of risk, the attitude toward risk, and dealing with risk. Risk management is the process used to deal with risk and includes the four broad steps of identification, quantification, response development, and response control.

The Federal Acquisition Process divides procurement into three phases: pre-solicitation, solicitation-award, and post-award administration. Varying risks and risk treatments exist throughout the cycle, but the basic DoD risk management process remains consistent and is mandated for use in major defense acquisition programs: risk planning, risk assessment, risk handling, risk monitoring, and risk documentation. It is an

iterative process and is carried through, continued, and expanded upon in the post-award contract administration phase of the acquisition process.

DCMA is the principal contract administrator for DoD. Risk assessment services are central to their mission of taking care of customer needs. DCMA follows the standard DoD risk management process and uses several mechanisms to carry out this function. IPTs, PROCAS, and the use of Management Councils are central to the risk management philosophy employed to ensure the contractor provides customer service and product delivery.

The next chapter will look at risk management plans and how they are used and incorporated into DCMA's new risk management database, the Risk Assessment and Management Program (RAMP). RAMP is designed to incorporate all aspects of the risk management process and provide a common tool whereby information can be easily and quickly shared with geographically dispersed administrative offices and customers.

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III. RISK MANAGEMENT PLANS

A. INTRODUCTION

DCMA has adopted a comprehensive risk management methodology that is to be applied consistently to all its suppliers. Their Supplier Risk Management Program integrates the assessment and monitoring processes and is consistent with the stated DoD five-step process of risk planning, assessment, handling, monitoring, and documentation. DCMA has recently employed a new tool, the Risk Assessment & Management Program (RAMP), a computer software application, to assist them in accomplishing their risk management mission.

RAMP facilitates an integrative and iterative approach to the risk management process. It provides DCMA with several valuable functions in carrying out its contract administration and subsequent risk management mission:

- Provides one standard automated tool to assess cost, schedule, and performance risk.
- Facilitates collection and documentation of supplier risk information.
- Requires supplier involvement prior to input.
- Shares information with buying activities (customers) in the form of an integrated risk management plan.

In keeping with its efforts to promote teaming and cooperation with contractors as encouraged with the PROCAS, IPT, and Management Council initiatives, DCMA principles dictate that suppliers should be informed and involved with risk management actions and results. DCMA further stipulates that the generated output of the RAMP system is not to be used by buying activities as past performance data and its use as source selection information is also limited. (OB, 3.1, 2001)

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B.   SUPPLIER RISK MANAGEMENT

The DCMA "One Book" chapter on Supplier Risk Management establishes the risk management policy and methodology DCMA CMOs use to document risk statements and the required monitoring levels and techniques they use in response to specific contractor facility risk. All personnel use the planning, assessment, handling, monitoring and documentation approach to perform these efforts at supplier facilities. Through risk management, DCMA determines the priority, degree, and intensity of risk handling and monitoring as well as required resources needed at specific CMO locations. (OB, 3.1, 2001) A detail of the DCMA risk management process and responsibilities follows.

Table 3.1. presents an overview of the various sub-processes within the risk management process as a whole.

1.   Risk Planning

DCMA Manages risk in the post-award contract administration phase through the use of CMOs assigned to all of its suppliers. All suppliers and/or contractual agreements must have associated risk management plans. Functionally integrated CMO teams review the contract and customer requirements to gain a clear understanding of the customer needs and expectations. Through this procedure CMOs identify key processes and technical and business systems that will require surveillance. Key processes are identified by their "consequence of failure" on contract performance, schedule, or cost. (OB, 3.1)

SUPPLIER RISK MANAGEMENT PROCESS OVERVIEW

Process Inputs:	Sub processes:
Contract, Purchase Order & Modifications	Risk Planning
Memorandum of Agreement (MOA), Quality Assurance Letter of Instruction (QALI), Letter of Delegation (LOD)	Risk Assessment Risk Handling Risk Monitoring
FAR & DFARS	Risk Documentation
Performance Based Assessment Model (PBAM) Users Guide	**Process Mechanisms:**
Performance Based Business Environment (PBBE) Guides	Functional personnel & IPTs Contractor documentation, products/
Supplier policies, procedures, standards, and data	processes, metrics, and data PROCAS
Work Breakdown Structure (WBS)	Inspection/audit results & data analysis
Supplier and program office risk Management plans	**Process Controls:**
Formal/informal reviews	Contractual terms & conditions
Customer feedback	Customer requirements
Pre-award surveys	CMO management review
DLA-GC Notifications of Suspect Product	Unit Self-Assessment (USA) Internal Operations Assessment (IOA) Management Control Reviews (MCRs)
DLAD 5000.4 Processes:	
Configuration Mgt including Technical Data	Performance Based Payments
Contractor Estimating System Reviews	Progress Payments Based on Cost
Contractor Purchasing System Reviews	Property Control System Analysis
Contract Safety	Public Vouchers
Earned Value Management System (EVMS)	Schedule and Delivery Management
	Software Contract Admin Services
Integrated Logistics Support	(SWCAS)
Material Mgt & Accounting Systems	Supplier Quality Assurance (QA)
Packaging Management Program	System Planning, RD&E
Parts Control Program	Test and Evaluation Management

Table 3.1.   Supplier Risk Management Process (After OB, 3.1, 2001).

2.   Risk Assessment

DCMA must perform a risk assessment for all its suppliers.   Performance, schedule, and cost are the principal areas of consideration. The CMO team or functional specialist will assign a risk rating to each system or key process based on a combination

of high, moderate, and low ratings for likelihood of failure and impact. The key indicators of risk are a contractor's experience, performance, and capability. The rater must be able to support the assigned risk ratings with actual data representative of these key indicators: proofing, audits, evaluations, etc; both contractor and Government supplied information can be used for this purpose. For assistance, the rater can research each applicable One Book process and its associated Risk Matrix to ascertain specific performance requirements that relate to the contractor in question. (OB, 3.1, 2001)

Figure 3.1 depicts the risk assignment process using a matrix table to produce risk ratings.

The following risk ratings are appropriate under the listed conditions. Key definitional differences are denoted by the italicized words.

a. High Risk

- Failure or nonconformance *likely to result* in unsafe conditions for personnel.

- Failure of nonconformance *likely to result* in mission failure or prevent proper tactical function of a major end item (aircraft, weapon, or space system)

- Process is *out of control.*

- Performance data indicates *significant doubt* of system or process capability *to meet* requirements.

- A major disruption is *highly probable* and the contractor is *unlikely to meet* performance, schedule or cost objectives.

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DCMA
Defense Contract Management Agency

Risk Analysis Process

RISK RATING

MODERATE

Level	Process Variance/ Probability of Occurrence
1	Minimal/Remote
2	Small/Unlikely
3	Acceptable/Likely
4	Large/Highly Likely
5	Significant/Near Certainty

LIKELIHOOD

5 M M
4 M M
3 M M
2 M
1 M

1 2 3 4 5

CONSEQUENCE

Level	Performance	Schedule	Cost
1	Minimal or No Impact	Minimal or No Impact	Minimal or No Impact
2	Acceptable with some reduction in margin	Additional resources required; able to meet need dates	<5%
3	Acceptable with significant reduction in margin	Minor slip in key milestone; not able to meet need dates	5-7%
4	Acceptable, no remaining margin	Major slip in key milestone or critical path impacted	>7-10%
5	Unacceptable	Can't achieve key team or major program milestone	>10%

Figure 3.1.   Risk Analysis Process (From SRM Brief, 2001).

b.   Moderate Risk

- Failures *could result* in unsafe conditions.

- Failures *could adversely affect* mission performance.

- Proper performance of end items, subassemblies, or key processes is *doubtful*.

- There is a *moderate process variance* and the trend is adverse.

- Performance data indicates *doubt* of system or process capability *to consistently meet* requirements.

- *Probable* that the contractor will encounter delays and if concerns are not addressed the process *may progress* to "high" risk.

c.   Low Risk

- Failures are *unlikely* to present serious problems.

- Performance data provides *confidence* in system or process capability to meet requirements.

- *Minimal or no impact* in meeting performance, schedule, or cost objectives. (OB, 3.1, 2001)

3. Risk Handling

DCMA teams or specialists must use risk handling plans as the operational risk management tool. The plans must specify the methods used to mitigate risk associated with a contractor's systems or key process. CMOs may use either Government action or Contractor Self-Oversight as the surveillance method.

IPTs or functional specialists develop and execute risk handling plans as required according to applicable DLAD 5000.4 One Book policy chapters or as indicated by other technical and business systems presenting risk. The risk handling plan indicates the intensity, schedule and frequency of the designated risk handling method. CMO personnel can apply PROCAS methods (process proofing, product audits, data analysis, etc.) to any of the risk areas to improve systems, processes, or products. (OB, 3.1, 2001) Some examples of risk handling methodologies, given risk specific situations follow.

a. *High Risk*

- Immediate and intensive surveillance.
- Establish intensive system evaluations, product audits, process proofing, data analysis, root cause analysis, corrective action, and statistical sampling.
- Execute until risk is mitigated to a lower level.

b. *Moderate Risk*

- Intensity and frequency of surveillance includes establishment of *scheduled* system evaluations, product audits, process proofing, data analysis, root cause analysis, corrective action, and statistical sampling.
- Execute until risk of impact is *reduced*.

c. *Low Risk*

- Intensity and frequency of surveillance includes using *periodic* Government and contractor data reviews (EVMS, delivery performance history, process control data, cost control data, extensive audit data, etc.)
- Ensure process variance does not increase and process capability *remains stable*. (OB, 3.1, 2001)

CMOs must have a specific risk handling plan for all suppliers at all given locations regardless of complexity, risk level, or dollar value of contract(s). The plans must be tailored to the program, contract, or supplier facility. The depth and length of the plans vary and depend upon business volume, product criticality, or acquisition complexity. The plans may be contract specific (when the requirement is not applicable to all contracts within a facility) or facility specific (when the process or system is common to all contracts within the facility). (OB, 3.1, 2001)

4. Risk Monitoring

The DCMA team or specialist must track and evaluate performance relating to systems and key processes identified in the risk handling plan. Monitoring involves constant and consistent follow-up of all that has gone before through the regular use of surveillance methods that will truly measure contract performance. Assigned personnel will compare results with objectives for the various risk handling methods and adjust the methods, intensity, and frequency accordingly. This is basically trend analysis, an important indicator of future success. Adverse results may require the IPT or specialist to take corrective measures and increase surveillance. They will modify risk assessments and the risk handling plans as needed to account for the results of the ongoing risk management program. (OB, 3.1, 2001)

5. Risk Documentation

The team or specialist must record and maintain current documentation of the entire risk management program and any updates as required. (OB, 3.1, 2001)

Figure 3.2 displays the Supplier Risk Management Process as a flow chart, clearly indicating the iterative nature of the risk management process.

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┌─────────────────────────────────────────────────────────────────────────┐
│  ┌──────────────────────┐                                                 │
│  │ INPUT:               │              ╭─────────╮                        │
│  │ CONTRACT, POS, MODS, │─────────────▶│  START  │                        │
│  │ MOA, QALI, LOD, FAR, │              ╰─────────╯                        │
│  │ DFARS, PBAM, DLAD    │                                                 │
│  │ 5000.4, CONTRACTOR   │                                                 │
│  │ INFORMATION          │                                                 │
│  └──────────────────────┘                                                 │
│            │                                          YES                  │
│            ▼                                         ╱╲                    │
│  ┌──────────────────────┐                          ╱    ╲                 │
│  │ REVIEW CONTRACT/     │                         ╱ ADJUST ╲              │
│  │ CUSTOMER             │                         ╲SURVEILL-╱             │
│  │ REQUIREMENTS         │                          ╲ANCE?  ╱              │
│  └──────────────────────┘                           ╲    ╱                │
│            │                                          ╲╱                   │
│            ▼                                          │ NO                 │
│  ┌──────────────────────┐                            ▼                    │
│  │ IDENTIFY SYSTEMS,    │              ┌──────────────────────┐           │
│  │ KEY PROCESSES, AND   │              │ DOCUMENT ALL         │           │
│  │ KEY PRODUCT          │              │ APPLICABLE FACETS    │           │
│  │ CHARACTERISTICS      │              │ OF RISK PLANNING,    │           │
│  └──────────────────────┘              │ ASSESSMENT, HANDLING │           │
│            │                           │ & MONITORING         │           │
│            ▼                           └──────────────────────┘           │
│  ┌──────────────────────┐                            │                    │
│  │ ASSIGN RISK RATINGS: │                            ▼                    │
│  │ HIGH, MOD, LOW       │              ╭──────────────────────╮          │
│  └──────────────────────┘              │ BUSINESS FUNCTION    │          │
│            │                           │ COMPLETE             │          │
│            ▼                           ╰──────────────────────╯          │
│  ┌──────────────────────┐                                                 │
│  │ SELECT HANDLING      │                                                 │
│  │ METHODS: PROOFING,   │                                                 │
│  │ AUDITS, EVALUATIONS  │                                                 │
│  │ DATA ANALYSIS        │                                                 │
│  │ INCLUDE: INTENSITY,  │                                                 │
│  │ FREQUENCY & SCHEDULE │                                                 │
│  └──────────────────────┘                                                 │
└─────────────────────────────────────────────────────────────────────────┘
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Figure 3.2.   Supplier Risk Management (After OB, 3.1, 2001)

C.   RISK ASSESSMENT AND MANAGEMENT PROGRAM (RAMP)

1.   Transition

RAMP software is the mandated tool for risk assessment and handling activities throughout DCMA. It integrates and automates these processes and eases collection and documentation of supplier risk information. RAMP is consistent with DCMA

Information Technology policy for mission applications and replaces all local automated risk assessment tools that were previously in use. RAMP is a module in the web-based Supplier Information Service (SIS) and is open to DCMA customers, basically supplying the same information previously shared through other channels: IPTs, Management Councils, etc. (IM 00-223, 2000)

By implementing RAMP, DCMA CMO personnel have transformed from conducting periodic risk assessments using a Performance Based Assessment Model (PBAM) that required only tri-annual full-up evaluations, with annual desk audits dispersed in between, to real-time supplier surveillance. The new process integrates the PBAM risk assessment and surveillance planning processes to institute a consistent risk management methodology throughout DCMA. (TM 99-79, 1999) When implementing RAMP, CMO personnel are able to initially populate the RAMP database with previously used PBAM information due to the fact that the tenets of the program remain consistent with the new policies. (IM 00-223, 2000)

A new Supplier Risk Management One Book Chapter was added to be the "overarching" policy for the new risk management program. Additionally, 20 One Book Chapters "link to" and supplement the guidance. Process Owners were required to update policy, guidebooks and training strategy to accommodate these changes. The Risk Assessment and Management Program (RAMP) is the automated tool associated with the supplier risk management program. (IM 99-273, 1999)

The RAMP database will remain closed to DCMA suppliers due to the fact that it is intended solely to be a DCMA internal management tool designed to automate policy. However, DCMA operating principles encourage a teaming approach with its suppliers,

as evidenced through other acquisition reform initiatives: PROCAS, IPTs, Management Councils, etc. With this in mind, supplier information is to be shared and discussed with the cognizant contractors prior to use within the RAMP system

2. Organization

A RAMP risk management plan is organized to assign risk ratings at four different levels: Overall, Service Set, One Book chapter, and key process/system. Five service sets support the overall rating and 20 One Book Chapters and their associated key processes/systems define the service set. CMO personnel will assign three separate ratings for performance, schedule, and cost to identified risks at each of these levels. If no risk is identified, then the area will remain un-rated. However, an "overall" rating must be assigned to the supplier or contract as a whole. (IM 00-293, 2000)

The following table displays the five service sets employed in the RAMP database and the associated 20 One Book Chapters used to evaluate contractor risk:

ONE BOOK POLICY STRUCTURE SERVICE SET ALIGNMENT	
Major Program Earned Value Management System (EVMS) Acquisition Logistics Support	**Delivery** Schedule and Delivery Management Contract Safety
Business and Financial Systems Contract Property Management Contractor Estimating System Reviews Contractor Purchasing System Reviews Material Management & Accounting Systems	**Product Support** System Planning RD&E – Design Eng SPRD&E – Systems Eng Test & Evaluation Management Supplier QA – Quality System Configuration & Technical Data Mgt Packaging Management Program
Payment & Financial Mgt Progress Payments Based on Cost Performance Based Payments Public Vouchers	Parts Control Program Software CAS Supplier QA – Product Quality

Table 3.2.   Service Set Alignment (After SRM Brief, 2000).

3. Responsibilities

Functional specialists populate the initial database and enter data into RAMP. They rate their processes and systems and overall One Book Chapters in performance, schedule, and cost. This rating is a professional judgment call that should take into account supporting and verifiable information. This is justified by a written narrative that describes the information used to support the ratings. (IM 00-293, 2000)

Service Set ratings are system generated from their supporting One Book ratings and cannot be altered. CMO designated Supervisor/Team Leaders will review the ratings at this level and provide a written narrative that summarizes the assessment and prescribed risk handling activities. (IM 00-293, 2000)

The CMO designated Operations Group Leader or Team Leader(s) will review all RAMP information and assign an overall rating to performance, schedule, and cost and write a supporting narrative. These ratings are system generated, but can be changed at the discretion of CMO management. (IM 00-293, 2000)

4. Risk Rating Assignments

A risk rating of "high", "moderate", or "low" is assigned to performance, schedule, and cost for the supplier or contract overall and for the identified risk areas at each of the other four levels. Some service sets or One Book chapters may receive no rating at all: "NA" or "not applicable".

If there are no historical contractor data, second party data, or working records for a new contractor, the key processes or systems identified for risk assessment should be considered "in process" for performance, schedule and cost until data can be reviewed. This is a temporary rating until a functional specialist can review first output. There

should however, be rationale (narrative) for this area since it was chosen as a priority for risk assessment in the first place. (IM 00-293, 2000)

In and of themselves, areas that buyers require DCMA to monitor are not automatically considered "high" risk. The risk rating assigned by the CMO is a combination of likelihood/probability and impact should the risk event occur. Customer specified "important" characteristics are a contributing factor when specialists rate the impact or consequence side of the risk matrix. (IM 00-293, 2000)

All delegated subcontract work shall be entered into RAMP to provide customer visibility of this level. If the contractor's delegation only specifies product characteristics, DCMA personnel should identify the actual subcontractor process(es) that produce these specified product characteristics. (IM 00-293, 2000)

5.   Supplier Risk Handling

DCMA risk assessments and the resulting risk ratings are designed to be based on verifiable and producible data that contractors can review. Government judgment calls alone are usually not enough to convince a contractor to take additional measures to guard against potential error. The data used to support the risk rating may be Government or contractor collected, so long as they produce clear evidence. (IM 01-020, 2001) Although the Government may plan and assess risk, it is the supplier who must actually handle it to change the way a process works.

As part of its assignment in facilitating DoD's risk management program, DCMA has a role to influence the risk handling the contractor may voluntarily perform. This is where the "narrative" aspect of RAMP assessment often proves to be helpful by providing a clear cause-and-effect trail for the contractor to consider. A "cooperative"

approach similar to a PROCAS agreement is the preferred course of action within DCMA. Failing this, a Corrective Action Request (CAR) is an alternative tool that may need to be utilized by the CMO. (IM 01-020, 2001)

Once risk is identified, suppliers may choose one of four risk handling options to deal with a risky process or system:

- **Avoid** risk by changing the situation so that risk is no longer present i.e. restructuring.

- **Accept** risk by acknowledging its likelihood and consequences and (hopefully) plan for its contingency if it occurs.

- **Transfer** risk to another system or location where the impact is minimized.

- **Control** risk by reducing the likelihood (prevention) or the impact (reduction). (IM 01-020, 2001)

6. Government Monitoring

This is actually risk handling performed by the Government. Since the Government cannot actually alter the process or system—having no such ownership over these areas—DCMA must conduct continuous data review to "pulse" identified key processes/systems considered risky to the contractor's overall performance. This basically involves gauging the movement of measured outputs (or trend analysis) from the risk handling tools chosen to mitigate the risk.

Intensity, frequency and schedule are used to describe the risk handling tools for each key process/system identified as requiring risk management. "Intensity" measures the degree to which the specific tool is to be applied, e.g., 100%, sample size, specific elements. (IM 00-293, 2000) "Frequency" describes the periodicity of the risk handling action and "schedule" provides a more specific time reference.

This area of the risk management process also includes any "mandatory inspections" customers require. From the DCMA perspective, an inspection is only as good as its output's relevancy to managing risk: "... risk is not reduced unless a process is changed and inspection does not change a process." (IM 01-020, 2001) Inspection is the monitoring of performance and assists in determining whether the risk handling methodology needs to be changed to improve performance.

7. Risk Management

RAMP produces what is more accurately considered to be Risk *Management* Plans because they encompass all five aspects of the risk management process (planning, assessment, handling, monitoring, and documentation) and not just the "risk handling" requirements called for under DCMA's supplier risk management policy. (IM 01-020, 2000)

In maintaining its status as a real-time risk management tool, RAMP will be updated as needed to report current conditions at supplier locations. As prescribed by DCMA policy, the maximum frequency between updates is one year. Personnel responsible for updating the database (the functional specialists) are tasked with keeping abreast of changing conditions at contractor sites that could result in changing risk ratings and priorities, e.g., reorganizations, strikes, renovations. (IM 00-293, 2000)

RAMP is intended to facilitate the collection of supplier information for the purpose of contract management. It provides the framework for a systemic approach to assigning risk ratings that are used by DCMA personnel to identify and prioritize process improvements as well as resource allocation. However, despite this substantial gathering of performance information on specific contractors, DCMA has established policy that

expressly prohibits the use of RAMP data for pre-award source selection past performance information. "RAMP is intended to be used as a post-award system, not as a past performance tool because it does not have the appropriate checks and balances necessary for that purpose." (IM 01-115, 2001)

D.   CHAPTER SUMMARY

This chapter begins with a discussion of DCMA's supplier risk management process including the risk analysis matrix used for assigning risk ratings and the associated risk handling methodologies applied to the various rating levels. It proceeds with DCMA's incorporation of current risk management information into the new automated risk management program, RAMP. Finally, various aspects of the RAMP database are reviewed and pertinent program application issues detailed.

DCMA has adopted a comprehensive risk management methodology to consistently apply to all its suppliers. DCMA created a new One Book Chapter to describe its risk management process and assign responsibilities to its CMOs. It employs a risk matrix structure to define risk in terms of probability and consequence and assign risk ratings for performance, schedule, and cost. Risk handling methodologies vary in intensity as appropriate to mitigate the associated level of risk.

The RAMP program is designed to be an all encompassing risk management plan incorporating all five functions of the risk management process in one automated tool allowing users from geographically dispersed sites to share data. The RAMP database will be initially populated with existing risk management plans. Its information will be made available to customers although it is expressly not to be used for past performance data or source selection criteria. RAMP will remain closed to suppliers; however, in

keeping with the tenets of PROCAS, IPTs, and Management Councils, the information will be shared and discussed with contractors prior to use.

RAMP is the mandated tool for risk assessment and handling throughout DCMA. DCMA functional specialists or IPTs will identify risk priorities and assign risk ratings at the key process/system and One Book Chapter level; management/supervisory oversight will review automatically generated ratings at the Service Set and Overall rating levels and write narrative cause-and-effect descriptions to support the assigned risk. However, the role of risk handling belongs to the contractor; it is the supplier's process that must be adjusted and only the contractor can do this. Hence, the ongoing teaming aspects of DCMA's risk management program.

The next chapter will present risk management data from a sampling of risk management plans representative of the Defense Contract Management District West (DCMDW) region. A comparative analysis of these plans, obtained from the RAMP database, will be conducted to identify commonalities, high risk areas, and risk handling tools consistent across the region.

IV. RAMP DATA PRESENTATION AND ANALYSIS

A. INTRODUCTION

The purpose of this chapter is to present and analyze risk management data obtained from a sampling of risk management plans from the RAMP program initiated in DCMDW. Forty-two (42) RAMP plans from strategic and critical suppliers are reviewed. The analysis focuses on commonalities between the plans themselves and the requirements as set forth by DCMA and DoD. It studies areas of highest risk in performance, schedule, and cost for the suppliers overall and at the service set and One Book chapter levels of review. Further, it researches common risk handlings tools selected to deal with the various risks identified at the key process/system level of planning.

DCMDW manages more that 125,000 contracts totaling over $500 billion. The district consists of 15 field offices on-site at contractor facilities, 13 geographic offices handling multiple suppliers for specified areas within the region, and a headquarters office in Carson, CA. (DCMDW web site, 2001) As of April 30, 2001 DCMDW's RAMP database population includes 117 strategic assessments and 857 critical plans from 5,375 total assessments for the entire region. The strategic and critical assessments come from only 27 strategic and 718 critical suppliers respectively. (Shields, 2001) Many suppliers have more than one plan due to multiple contracts.

The sample analyzed here includes 42 plans from eight different geographic and in-plant offices in DCMDW. The plans represent 30 different contractor organizations and a cross section of facility-wide and contract(s) specific risk management plans. The

plans are all from critical and strategic suppliers. Appendix A provides a listing of the 42 sampled RAMP risk management plans and their associated offices, locations, and suppliers.

B. OVERALL RISK RATINGS & SERVICE SET SUMMARY

Appendix B presents an overview of the Overall, Service Set, and One Book Chapter risk ratings—high (H), moderate (M or Mod), low (L)—in performance (P), schedule (S), and cost (C) for each of the 42 RAMP plans. Plans without final ratings are indicated as in process (IP).

Table 4.1 provides an overview of the overall risk ratings for performance, schedule, and cost for the 42 sampled plans from critical and strategic suppliers. One plan listed overall risk ratings as "in process" and is consequently not included in the tabulation.

OVERALL RISK RATINGS	*High*	*Mod*	*Low*
Performance	7	17	17
Schedule	6	17	18
Cost	5	8	28

Table 4.1. Overall Risk Ratings.
(Source: Developed by Researcher.)

Overall risk ratings are system generated, but can be changed at the discretion of the rater; however, the method employed on each individual plan is not readily discernable by the reader. Often the risk ratings appear to be average assessments based upon ratings achieved at the Service Set level, which are in turn driven by One Book Chapter risk ratings. However, there are instances where a high risk rating overrides what would otherwise be a lower rating due to the significance or severity of a specific risk at the One Book Chapter level and its relative importance to the contract, facility, or

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program overall. The amount of rationale or detail for the assigned risk rating provided at this level is often limited and simplistic. Some merely provide scope descriptions even when Overall risk ratings are high. Others can be quite thorough and provide sound and meaningful summaries for the supporting information that follows, even when no significant risk is present. The length of the plans varies as well and there is no clear pattern as to this cause.

1. Performance

While there was no absolute majority for risk ratings, a significant and equal proportion of the plans rated *performance* both as a moderate and low risk area—40.5%. *Performance* can be viewed as the riskiest area overall, with more high risk ratings than schedule and cost, although not significantly so, 16.7% v. 14.3% and 11.9% respectively.

2. Schedule

Schedule closely resembles *performance* risk ratings: 40.5% moderate risk and 42.9% low. As is often seen through the study, *performance* and *schedule* more often mirror each other due to their close relationship and ultimate control by the contractor. Poor or faulty performance will usually result in schedule delays due to additional time requirements arising from rework or malfeasance. In the reverse, missed milestones (whatever the cause) reflect poorly on contractor performance and can often drive the risk rating from this vantage.

3. Cost

Cost risk was clearly the area of least risk for the plans overall: 66.7% rated *cost* as a low risk area with 11.9% and 19.1% respectively rating cost as high or moderate. *Cost* can remain isolated from performance and schedule difficulties through Government risk mitigation via selection of contract type and payment terms. The Government, being

the buyer, has more direct ownership over this area or process than performance or schedule and more ability to dictate the final outcome ... at least from a risk management perspective. The Government doesn't perform the service or manufacture the product, but it does pay the bills.

The following sub-chapters delineate risk ratings for each of the One Book Chapters under their cognizant service sets. Contract/contractor program/facility specific high risk areas are addressed in detail and chosen key processes/systems and their associated risk handling tools are discussed.

C.   MAJOR PROGRAM RISK RATING

The Major Program service set employed in the RAMP database corresponds to Chapter 2 of the One Book, Major Program Services. Two of the six subchapters, Earned Value Management and Acquisition Logistics, are available for assigning risk ratings in RAMP. Eleven (11) of the 42 sampled RAMP plans rated risk areas for one or more of the One Book Chapters under this service set. The following risk management plans—numbered as per Appendix A—assigned risk ratings in this area: 6, 10, 23, 24, 30, 33, 34, 38, 39, 41, and 42.

The individual ratings for *performance, schedule,* and *cost* are automatically generated for each RAMP plan based on the input data for all the associated One Book Chapter risk ratings for each of these areas. Table 4.2 provides an overview of the Major Program service set risk ratings for *performance, schedule,* and *cost* of the 42 sampled plans from critical and strategic suppliers. Eleven (11) of the sampled plans addressed risk management under the Major Program risk area. Thirty-one (31) plans rated this risk as not applicable and are not depicted in the table.

MAJOR PROGRAM RISK	*High*	*Mod*	*Low*	
Performance		0	3	8
Schedule		1	5	5
Cost		2	1	8

Table 4.2.   Major Program Service Set Risk Ratings.
(Source: Developed by Researcher.)

Major Program is the least applied service set among the sampled plans. Only

26.2% of the plans rank risk in this area and most of the risk was rated low: of the plans

rating Major Program risk, 72.7% rated *performance* and *cost* risk as low, while 45.5%

rated *schedule* risk as moderate or low. There were no high risk ratings for *performance*.

Of the two assigned One Book Chapters for risk management, Earned Value

Management was applied twice as often as Acquisition Logistics Support: 23.8% v.

11.9% due to statement of work (SOW) requirements and Memorandum of Agreement

(MOAs) between the buyer (program office) and the local DCMA office.

Only two plans (#34 and #42) rated high risk at the Major Program service set

level and both were driven by high risk ratings under Earned Value Management (EVM).

The sole high risk rating for Acquisition Logistics Support (#41) was mitigated at the

Major Program level by a low EVM value in the same area. When applied, EVM seemed

to take a more prominent role in the risk assignment for the service set as a whole.

1.   Earned Value Management

The supplier uses an Earned Value Management System (EVMS) to provide

management information on technical performance, schedule, and cost. They must

ensure compliance with industry guidelines and contract requirements. As part of its risk

management efforts, DCMA must provide EVMS system surveillance and program

analysis to its customers. Table 4.3 provides an overview of the key processes/systems

chosen for risk management efforts under the Earned Value Management One Book Chapter 2.2.

EARNED VALUE MANAGEMENT KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLAN NO.s									
	6	10	23	24	30	33	34	38	41	42
Accounting					X			X	X	
Analysis									X	
Baselining Changes		X							X	
Budgeting								X		
Change Incorporation					X					
Cost Performance Report				X						
Cost Variance						X				
Cost/Schedule Variance							X			
Estimate at Completion (EAC)		X								
Earned Value (EV)										X
Forecasting									X	
Indirect Management					X					
Material Management					X					
Management Analysis		X	X	X	X			X		
Management Reserve						X				
Organizing					X			X	X	
Schedule Variance						X				
Scheduling	X				X				X	
Subcontract Management			X	X						
Training									X	
Undistributed Budgeting						X				
Use of EV Data									X	
Work/Budget Authorization	X				X					

Table 4.3.   Key Processes/Systems for Earned Value Management.
(Source: Developed by Researcher.)

Ten (10) of 42 RAMP plans (or 23.8% of the plans sampled) addressed risk for EVMS. The plans focused on 23 different key processes/systems and used ten (10) different combinations of processes and systems within EVMS to assess risk for the

contractor, facility, or contract in question. As no two plans are alike in the specific processes or systems they survey, it is easy to conclude that risk management for EVMS is very specific to the contract in question. The most prevalent system chosen for review was "Management Analysis", which was chosen 50% of the time RAMP plans addressed EVMS.

Three plans rated EVMS risk as high in one or more areas. The following details the high risk areas specific to the plans indicated and their associated risk handling tools chosen to mitigate the risk:

- #23: The Army Tactical Missile System (ATACMS) Block II LRIP (low rate initial production) contract rated under this plan for Lockheed Martin Missiles and Fire Control is substantially behind schedule and has caused the EVMS *schedule* area to be rated as high risk. Of the two key systems analyzed for EVMS risk, "Subcontract Management" was rated as the high *schedule* risk. Just as contract clauses flow down to subcontractors, so does risk management. The major subcontractor has a substantial negative schedule variance causing the high *schedule* risk rating and additionally driving a moderate risk rating in the *cost* area due to the potential future impact on cost. "Data Analysis" is the selected risk handling tool for "Subcontract Management": Cost/Schedule Status Report (C/SSR) data from both the prime and subcontractor is reviewed and analyzed monthly to mitigate risk. No further risk handling detail was provided.

- #34: Honeywell's cumulative cost variance for ten (10) out of (34) WBS Item Accounts is greater than 10% with a wide range from +128% to -16%. Program costs are considered likely to increase due to poor control over cost variance and threaten to drain the program budget and lead to the elimination of required qualification tests. For these reasons, *cost* is rated as a high risk area for EVMS and "Cost/Schedule Variance" is the key system reviewed for risk management. Program funding depletion also directly affects *schedule* and *performance* and drives their moderate risk ratings in the EVMS area. "Data Analysis" is the chosen risk handling tool for "Cost/Schedule Variance". Specifically, a remaining qualification test will be evaluated weekly until completion. Past program test deficiency causes will be reviewed to determine possible preventative measures for corrective action.

- #42: The Raytheon Tucson Evolved Sea Sparrow Missile (ESSM) plan rates *schedule* and *cost* as high risk areas for Earned Value Management

leading to the same risk rating at the Major Program service set level for this plan as well. "Earned Value" for two contracts is the key process identified for risk management review. One contract rates *schedule* and *cost* risk high due to a nine-month negative schedule variance (not meeting delivery requirements) and a four month negative cost variance ($50M+ Over Target Baseline). The second contract rates *schedule* risk high due to major slips in key milestones or critical path and high *cost* risk due to unobtainable planned cost targets and regularly unforeseen cost events ($50M Over Target Baseline). "Data Analysis" is the chosen risk handling tool by and requires bi-weekly reviews of Raytheon Tucson's Cost Performance Report (CPR) along with the Government's Technical Representative weekly report.

For each of the plans rating high risk for EVMS, different key processes/systems were chosen for risk management focus. The three high risk plans used either a sole parameter (#34 and #42) or only two areas to manage risk (#23) while the two plans with the greatest number of chosen key processes/systems (#30 and #41) ranked risk low in all three areas. "Data Analysis" was the common tool used to mitigate high risk in all instances, but different data sources were identified for each of the three high risk plans to mitigate risk and seemed appropriate given the differences in the contractor and contractual arrangements specific to each plan. The lack of detailed rationale for risk handling under "Data Analysis" for "Subcontract Management" (#23) is understandable given the indirect relationship of the Government to the subcontractor. The high risk areas in #34 and #42 drive a high risk rating at the Major Program service set level.

2. Acquisition Logistics Support

DCMA's policy is to assess the contractor's ability to meet technical performance, schedule, and cost goals for logistics support by reviewing progress on their logistics activities and the supplier's plans, procedures, and reports representative of the their logistics management systems/processes. DCMA will identify problem areas and recommend Continuous Improvement Opportunities (CIOs) or issue Corrective Action

Requests (CARs) to affect process improvements to reduce total ownership cost (life cycle cost). Table 4.4 provides an overview of the key processes/systems chosen for risk management efforts under the Acquisition Logistics One Book Chapter 2.3.

ACQUISITION LOGISTICS SUPPORT KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLAN NO.s				
	6	23	30	39	41
Cost As An Independent Variable (CAIV)	X				
Computer Resources Support				X	
Depot Level Maintenance Requirements	X				
Facilities				X	
Logistics Management Plan		X	X	X	
Logistics Demonstration	X				
Maintainability Demonstration	X				
Maintenance Planning	X			X	
Manpower & Personnel				X	
Packaging & Handling				X	
Supply Support				X	
Support Equipment		X		X	
Supportability Planning		X			
Technical Data	X	X		X	
Training and Support	X			X	

Table 4.4.   Key Processes/Systems for Acquisition Logistics Support.
(Source: Developed by Researcher.)

Five of 42 RAMP plans (11.9%) addressed risk for logistics support. The five plans used 15 different key processes/systems in four different combinations to assess this risk. Given the low identification rate, logistics support does not appear to be recognized as a particularly risky area and once identified there were few similarities in the systems or processes identified for risk management efforts. The use of the "Logistics Management Plan" and "Technical Data" were the two most commonly identified key processes/systems for risk management of contractor logistics support, used in three of five instances.

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Only one RAMP plan of the 42 sampled plans rated high risk in this area:

- #41: Raytheon Tucson Systems plan rated *schedule* risk high and *performance* and *cost* risk as moderate. The high risk rating is supported by the "Supply Support" and "Support Equipment" key processes/system which indicate contractor schedule slippages are due to lack of master scheduling. This, in addition to adverse performance trends, drive anticipated delays in meeting *performance*, *schedule*, and *cost* objectives. 100% monthly and quarterly "Data Analysis" is the chosen risk handling tool and includes a review of the following data sources: schedule analysis, delivery trend analysis program review, root cause data, and cost performance data.

This one high risk plan uses ten different key processes/systems to manage contractor risk but most of these areas are not yet actually rated and remain "in process". The chosen key processes are consistent with the Acquisition Logistics Support chapter and the risk assignments are adequately supported by rationale and clearly linked with each other. The risk handling tool, "Data Analysis' is consistent with the trend in the Major Program risk area and is appropriately detailed in the RAMP plan as to the specifics of the data review. The high risk here is mitigated at the Major Program level by a lower risk under EVM.

D. PRODUCT SUPPORT RISK RATING

The Product Support service set employed in the RAMP database corresponds to Chapter 4 of the One Book, Product Performance Services – Right Item. Eight of the ten subchapters are available for assigning risk ratings in RAMP: Systems Planning, Research, Development and Engineering (SPRD&E), Test and Evaluation Management, Configuration Management, Parts Management Program, Software Contract Administration Services, Supplier Quality Assurance, and Packaging Management Program. Two of these subchapters are further broken down: SPRD&E – Design Engineering and SPRD&E – Systems Engineering; Supplier Quality Assurance – Quality

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System and Supplier Quality Assurance – Product Quality. Thirty-six (36) of the 42 sampled RAMP plans rated risk areas for one or more of the One Book Chapters under this service set. The following risk management plans—numbered as per Appendix A— assigned risk ratings: 1 – 9, 11 – 26, 29 – 31, 33 – 39, 41, and 42.

The individual ratings for performance, schedule, and cost are automatically generated for each RAMP plan based on the input data for all the associated One Book Chapter risk ratings for each of these areas. Table 4.5 provides an overview of the service set risk ratings in performance, schedule, and cost of the 42 sampled plans from critical and strategic suppliers. Thirty-five (35) of the sampled plans addressed risk management under the Product Support risk area. Two plans are "in process" of assigning risk ratings and five plans rated this risk as not applicable; these seven plans are not depicted in the table.

PRODUCT SUPPORT RISK	High	Mod	Low
Performance	3	14	18
Schedule	5	9	21
Cost	2	11	22

Table 4.5.   Overview of the Service Set Risk Ratings for Product Support.
(Source: Developed by Researcher.)

Product Support is the most applied service set among the sampled plans. A strong absolute majority of 83.3% of the plans rank risk in this area. It is the largest area with the largest scope from the standpoint of using seven different One Book Chapters and nine different risk management areas (two of the chapters being split into two areas). Despite the size and potential for risk, given the subject area of the service set, risk remained low: 62.9% and 60% of the plans respectively ranked *cost* and *schedule* risk as

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low, while still a clear majority of 51.4% ranked *performance* risk low and 40% ranked *performance* risk as moderate.

Of the nine One Book Chapter applications, Supplier Quality Assurance – Product Quality was used two to five times as often as any other One Book Chapter level area. It was the most commonly used ranking area of any in the RAMP program: 73.8% of the RAMP plans addressed risk in this area. Even when only one or two areas are ranked under Product Support, Supplier Quality Assurance – Product Quality remains the key chosen factor. Given the area's broad scope and clear application in the post-award contract phase of acquisition, this is not surprising. Due to its frequency of use both when few and many One Book Chapters are selected for risk management, it is the key driving factor in the overall risk ratings at the Product Support service set level; although when include with others, it's ratings do not seem to out weigh the other applications.

Only three plans (#17, #20, and #37) rated high risk at the Product Support service set level and all three were strongly driven by high risk rankings for Product Quality.

1. SPRD&E – Design Engineering

SPRD&E surveillance is a risk assessment of the suppliers to conduct systems planning, research, development and engineering including engineering systems, processes, policies, procedures, practices, activities, and products. The DCMA focus here is on design engineering to ensure compliance with contract requirements as affecting technical performance, schedule, and life cycle cost. Table 4.6 provides an overview of the key processes/systems chosen for risk management efforts under the

System Planning, Research, Development and Engineering (SPRD&E) One Book Chapter 4.1.

SPRD&E - DESIGN ENGINEERING	RISK MANAGEMENT PLAN NO.s						
KEY PROCESSES/SYSTEMS	1	6	22	26	30	38	42
Cost Proposal Analysis	X						
Design Analysis					X	X	
Design Review				X			
Deviations/Waivers/Engineering Change Proposal (ECP) Evaluations	X						
Engineering Planning							X
Engineering Management	X	X	X			X	X
Producibility							X
Software							X
Systems Design					X		

Table 4.6.   Key Processes/Systems for SPRD&E-Design Engineering.
(Source: Developed by Researcher.)

Seven of 42 RAMP plans surveyed (16.7%) contractor design engineering efforts as part of their product support efforts. The seven plans used nine different key processes/systems in seven different combinations to assess this risk. While there was clearly a lot of variation in the key processes/systems used by the plans, Engineering Management was clearly the most prevalent process identified for risk management, used 71.4% of the time.

There were two instances of high risk ratings for design engineering efforts. The following details the specifics for the applicable plans and discusses their chosen risk handling methods:

- #30:   Aerojet was assigned a high risk rating for design engineering in all three areas of *performance*, *schedule*, and *cost*.   "Design Analysis/Synthesis" was the chosen key process/system for Government

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surveillance. Improper design requirements could lead to incorrect design solutions and/or environmentally hazardous conditions impacting *cost, schedule,* and *performance*. Although the probability of occurrence was only rated moderate, the consequence of occurrence was rated high in that failure could likely result in mission failure. The chosen risk handling methods were "Surveillance" and "Data Analysis". Specifically, requirements analysis, functional analysis/allocation, and synthesis processes were monitored; various activities and metrics were surveyed; and policies and procedures were reviewed. The surveillance revealed no systemic problems and overall contractor performance was considered good, but the current risk ratings and handling methods will remain in place due to the high risk of consequence should failure occur.

- #42: Raytheon Tucson ESSM program rated *schedule* and *cost* as high risk areas under design engineering. One contract for an Engineering Manufacturing Development (EMD) program identified "Engineering Management" and "Engineering Planning" as key processes/systems to use for risk management. Failure to properly control either area has the potential to impact cost and schedule and future transitioning into production. A major slip in key milestones and critical path has led to a schedule extension. *Cost* is rated high due to unobtainable cost targets and regularly unforeseen cost events; the contract is $50M+ over contract value. A second contract for Low Rate Initial Production (LRIP) program identified "Producibility" and "Software" as key processes/system to use for risk management. A nine month negative schedule variance and difficulty in meeting delivery requirements drives a high risk rating for *schedule*. *Cost* is rated high to the contractor's failure to contain costs; the contract is $50M+ Over Target Baseline (OTB) and has a four month negative cost variance. Ratings for "Software" are in process. "Data Analysis" was the chosen risk handling tools for the three rated processes: The contractors Cost Performance Report (CPR), Cost Schedule/Status Report (CSSR), and the Government's Technical Representative weekly report will be reviewed monthly.

For both of the plans rating high risk for Design Engineering, completely different key processes/systems were chosen for risk management focus. Plan # 30 focused on only one key parameter—"Design Analysis", while plan #42 used a mixture of four different plans to manage risk. These differences are consistent with the contractual efforts and well explained and documented in the rationale. Plan #30 is focused on the potential impact of the risk vice its low probability of occurrence (the contractor has demonstrated good performance); plan #42 rated risk under two different contracts in

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different acquisition phases: the engineering based processes were chosen for risk management during EMD and production based processes were used during LRIP (the contractor is already experiencing some difficulty in fulfilling contractual requirements and requires a different focus). "Data Analysis" is once again chosen as a risk mitigation tool for both plans, specific to the data for the processes chosen. "Surveillance" is additionally used in plan #30 and is used to assess the metrics and processes for systemic difficulties. Finding none and given the contractor's performance, it appears to be a worthy task to eliminate probability concerns and focus instead on mitigation of impact of failure. The high risk for both plans in the Design Engineering area is not driving high risk ratings for the Product Support service set level; each plan uses five other various One Book Chapter areas for risk management under Product Support and successfully mitigates the service set level risk rating.

2. SPRD&E – Systems Engineering

SPRD&E surveillance is a risk assessment of the suppliers to conduct systems planning, research, development and engineering including engineering systems, processes, policies, procedures, practices, activities, and products. The DCMA focus here is on engineering management systems to ensure compliance with contract requirements as affecting technical performance, schedule, and life cycle cost. Table 4.7 provides an overview of the key processes/systems chosen for risk management efforts under the Systems Planning, Research, Development and Engineering (SPRD&E) One Book Chapter 4.1.

SPRD&E - SYSTEMS ENGINEERING KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLAN NO.s										
	22	23	24	26	30	33	35	38	39	41	42
Design Engineering		X									
Detail Design						X					
Earned Value Management										X	
Engineering Management	X		X								
Functional Analysis							X				
Logistics Engineering								X			
Interface Management						X					
Modeling and Simulation		X		X							
Open Systems			X								
Producibility		X						X		X	
Reliability/Maintainability		X			X				X		
Requirements Analysis						X					
Resource Management										X	
Software		X									
Subcontractor Engineering Design		X									
Systems Analysis				X							
Systems Design				X							
Systems Engineering			X		X			X	X		
Systems Integration				X		X	X				
Systems Planning				X							
Systems Requirements		X		X			X				X
Systems Safety		X	X		X			·X			
Technical Cost Drivers	X										
Technical Data					X						
Technical Performance										X	

Table 4.7.   Key Processes/Systems for (SPRD&E)-Systems Engineering.
(Source: Developed by Researcher.)

Eleven (11) of 42 RAMP plans (26.2%) surveyed contractor systems engineering efforts as part of their product support efforts. The 11 plans used 25 different key processes/systems in 11 different combinations to assess this risk. There is clearly a lot of variation in the choice of key systems/processes to use for risk management. The most

often used were Systems Engineering, Systems Requirements, and Systems Safety, each used in 36.4% of the plans.

There was one instance of high risk rating for systems engineering. The following details the specifics of the applicable plan and discusses its chosen risk handling method:

- #42: Raytheon Tucson ESSM program rated *schedule* and *cost* as high risk areas for systems engineering. "Systems Requirements" was chosen as the key process for risk management under the EMD program contract. A major slip in key milestones and critical path has led to a schedule extension and the high *schedule* risk rating. *Cost* is rated high due to unobtainable cost targets and regularly unforeseen cost events; the contract is $50M+ over contract value. "Data Analysis" is the chosen risk handling tool: a bi-weekly review of CPR along with the Government Technical Representative weekly report.

This one high risk plan in this area uses only one key system, "Systems Requirements" to manage contractor risk while the other ten less risky plans used an average of four key parameters each to mitigate risk in the Systems Engineering area. The rationale seems supportive of the assigned rating and consistent with the EMD design and integration activities that have experienced technical difficulties. The chosen risk handling tool is "Data Analysis" of performance reports applicable to the contractor's requirements.

3. Test and Evaluation

The focus here is on the manufacturer's test engineering/design process and test management systems that verify compliance with contract performance requirements. DCMA seeks to identify potential test problems and notify customers of suppler test decisions. Test data can be an indicator of supplier problems in design, development, production, or system deployment. Table 4.8 provides an overview of the key

processes/systems chosen for risk management efforts under the Test and Evaluation Management One Book Chapter 4.1.1.

TEST & EVALUATION KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLAN NO.s													
	1	6	22	23	24	26	30	33	34	35	38	39	41	42
Acceptance Tests	X		X		X			X						X
Development Tests		X			X						X			
Earned Value Management (EVM)													X	
Integration Tests						X								
Modeling and Simulation				X										
Producibility													X	
Prototype Tests				X										
Quantitative/Acceptance Testing												X		
Reliability/Maintainability				X	X						X			X
Resource Management													X	
Systems Requirements														
Technical Performance													X	
Test Analysis			X					X						
Test Facility								X						
Test Management Planning & Organization								X						
Test Performance								X						
Test Planning				X		X	X			X				
Test/Evaluation Master Plan		X												X

Table 4.8.   Key Processes/Systems for Test and Evaluation.
(Source: Developed by Researcher.)

Fourteen (14) of 42 RAMP plans (33.3%) assessed supplier test and evaluation performance. Eighteen (18) key processes/systems in 13 different combinations are used to assess contractor risk in the 14 plans. There is a great deal of variability in the chosen key systems/processes for risk management efforts. However, "Acceptance Tests" were used in 35.7% of the plans rating the test and evaluation efforts. No risk areas were rated

high. Seven plans ranked risk as low, six ranked risk as medium, and one plan remained "in process".

4. Configuration and Technical Data Management

The contractor conducts Configuration and Technical Data Management to maintain product design and integrity; control form, fit, and function; determine engineering and cost tradeoff decisions of technical performance, producibility, operability, and supportability; and maintain historic data files. DCMA's role is to verify the contractor's process has controls for establishing the proper baseline and perform necessary reviews and product audits to ensure the contractor's compliance. Table 4.9 provides an overview of the key processes/systems chosen for risk management efforts under the Configuration Management One Book Chapter 4.2.

Sixteen (16) of the 42 RAMP plans (38.1%) evaluated this area for risk. Thirteen (13) key processes/systems in nine different combinations are used to assess contractor risk in the 16 plans. While there is a lot of variability between the plans as a whole, "Configuration Control" was used in 56.3% of the plans rating configuration and technical data management. There were no high risk areas and risk throughout was predominantly low: 68.8% ranked *performance* and *schedule* risk as low; 75% ranked *cost* risk low.

CONFIGURATION & TECHNICAL DATA MANAGEMENT KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLAN NO.s															
	1	2	3	5	6	22	23	24	26	33	34	35	38	39	41	42
Baselining										X						
Classification of Changes										X		X				
Change Management										X						
Configuration Management														X	X	
Configuration Status Accounting									X							
Configuration Verification and Audit								X	X							
Configuration Control	X				X	X	X	X			X	X	X			X
Configuration Identification		X	X	X					X							X
Data Management						X										
Delivery of Technical Data										X						
ECPs/Value ECPs/ Waivers/ Deviations												X				
Nonconforming Material/Material Review Board (MRB)							X									
Value Engineering Incentives															X	

Table 4.9.   Key Processes/Systems for Configuration and Technical Data Management.
(Source: Developed by Researcher.)

5.   **Parts Management Program**

The Parts Management Program is intended to standardize parts to reduce inventory and costs for drawings and testing and improve systems commonality, interoperability, reliability, standardization, maintainability, and interchangeability. DCMA must assess the contractor's program in this area to account for risk associated with noncompliance and possible impact to performance, schedule, and cost. Table 4.10 provides an overview of the key processes/systems chosen for risk management efforts under the Parts Management Program One Book Chapter 4.2.1.

Six of 42 RAMP plans (14.3%) address this risk area. Fourteen (14) key processes/systems are used in six different combinations to assess contractor risk in the

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six plans. "Parts Evaluation/Authorization Process" is the only key process identified as a risk management area in two separate RAMP plans. There is absolutely no commonality here between frequency of chosen processes/systems for risk management or overall configuration of the risk management plan.

PARTS MANAGEMENT PROGRAM KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLANS NO.s					
	22	23	24	33	34	41
Assess Parts Suppliers		X				
Design and Requirements Process			X			
GIDEP Alerts				X		
GIDEP/DMSMD/MPCASS		X				
Handling						
Marking						
Nonstandard Parts				X		
Packaging						
Parts Evaluation/Authorization Process			X			X
Parts List Tracking				X		
Parts Management Plan					X	
Safety of Flight Parts	X					
Subcontractors				X		
Supplier Policies, Procedures, Practices						X

Table 4.10.   Key Processes/Systems for Parts Management Program.
(Source: Developed by Researcher.)

There was one instance of high risk in Parts Management Program. The following details the specifics for the applicable plan and discusses its chosen risk handling methods:

- #22: McDonnell Douglas Helicopter Systems' Parts Management Program was rated as a high *performance, schedule,* and *cost* risk. High *performance* risk is due to high consequence of failure, outstanding corrective action issues from a previous audit, and past performance

instances of similar corrective action difficulties. High *schedule* risk is based on the consequences of process failure and previous contractor mitigation factors. High *cost* risk is present due to consequences despite the fact the contractor has adequate processes in place. "Safety of Flight Parts" is the key process/system identified for risk management based on the safety and mission elements it controls. Monthly "Data Analysis" of metrics and 100% inspections of all flight safety part installations are the chosen risk handling methods and are conducted dually by DCMA and Boeing.

Parts Management is the least used of the nine areas under Product Support but its risk factors for the plans overall do not indicate any nuances different from the other areas. The one high risk plan manages contractor risk through the use of one key process, "Safety of Flight Parts" which is a proper focal point for mitigating impact of failure, which is loss of life in this case. "Data Analysis" of metrics and 100% inspections seems appropriate given the nature of the risk and chosen key parameter for risk management. There is no significant correlation between risk ratings under this area and those derived at the service set level other than contributing factors to the average rating.

6.   Software CAS

Software Configuration Management Services include software; the supplies, processes, procedures, and activities attributable to software development; software documentation; software embedded in test equipment; and non-deliverable software products. DCMA assess the contractor's software development efforts and possible performance, schedule, and cost impacts. Table 4.11 provides an overview of the key processes/systems chosen for risk management efforts under the Software Contract Administration Services (CAS) One Book Chapter 4.3.

Eleven of 42 RAMP plans (26.2%) provide for contractor surveillance in this area. Seventeen (17) key processes/systems are identified and ten combinations used for the eleven plans. "Software Configuration Management" is the most frequently used key

process/system, applied 81.8% of the time. "Software Quality Assurance" likewise is used to a significant degree, 63.6% of the time. There is clearly a lot of commonality and congruence between the various plans under Software CAS.

SOFTWARE (SW) CAS KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLANS NO.s										
	1	4	6	20	23	24	30	35	39	41	42
CDRL Release	X										
Integrated SW Management				X						X	X
Intergroup Coordination				X						X	X
Organization Process Definition										X	X
Organization Process Focus										X	X
Peer Review	X				X	X		X		X	X
Quantitative Process Management						X				X	X
Requirements Management					X	X				X	X
SW Configuration Management	X	X	X		X	X	X		X	X	X
SW Development Plan		X				X					
SW Product Engineering					X	X			X	X	X
SW Project Planning			X	X	X	X				X	X
SW Project Tracking/Oversight					X	X				X	X
SW Quality Assurance		X	X		X	X			X	X	X
SW Quality Management						X				X	X
SW Subcontractor Management					X	X				X	X
Training Program						X				X	X

Table 4.11.   Key Processes/Systems for Software CAS.
(Source: Developed by Researcher.)

There is only one incidence of high risk in Software CAS. The following details the specifics for the applicable plan and discusses its chosen risk handling methods:

- #20:   Motorola SSG received a high risk rating for *schedule* in Software CAS. This is because Motorola is going to deliver six to eight months late. Despite this the *cost* risk remains low, as this is a fixed price contract. "Software Project Planning" is the key process identified for risk management; this monitors the contractor's compliance to the applicable software development plan and Statement of Work (SOW) which remains

at risk due to inadequately defined interfaces slowing the software development and affecting schedule. "CMM Based Insight" (contractor monitoring) is the identified risk handling method; this includes a review of the contractor's software development plan (SDP) and the statement of work (SOW).

Most of the risk under Software CAS is low: 70.0% each for performance and schedule and 90% for cost. The one plan rating high risk for software (#20) uses only one key process for risk management: "Software Project Planning" which is not used solely elsewhere, but only in conjunction with other processes/systems to manage software risk in totality. It was chosen in this case because it is a Letter of Delegation (LOD) task and it appears to be consistent with a subcontracted effort. The high *schedule* risk under Software CAS for plan #20 is a contributing factor to the high risk rating assigned to *schedule* at the Product Support service set level for plan #20, but as with the other plans, it does not seem to be an overriding factor. Monitoring contractor meetings ("CMM Based Insight") as the chosen risk handling tool seems appropriate as well to a subcontract effort.

Current information indicates Program Managers consistently have problems with software acquisition in the form of cost overruns, slippage in schedule, and nonperformance in terms of meeting specification standards, mission requirements, and functionality. (Nissen) In fact, it is often regarded as the highest risk element in weapon system development: management is inconsistent or reactive, predictable risks are ignored, and quality standards are often traded for schedule, performance, or cost. (GSAM 6.4.1.1, 2000) Given this, it is surprising DCMA rates risk in this area so low; they may be underestimating the probability or magnitude of the problem should software development go awry.

7. Supplier Quality Assurance – Quality System

DCMA performs oversight functions to assess contractor compliance with technical, manufacturing, and quality assurance requirements. Due to the breadth of this program, multi-functional teams often perform the surveillance to maximize the scope of the evaluation and share information within the DCMA Contract Management Office (CMO). Quality Assurance activities are performed whenever inspection and/or acceptance at origin is assigned to DCMA unless specifically not required by the customer or governed by other policies. For RAMP purposes, Supplier Quality Assurance is divided into two areas for risk handling: Quality System and Product Quality.

Quality System audits are performed when directed by the customer, existing data is inadequate or unavailable to properly assess the contractor quality assurance system, or the contractor's process has been substantially changed, requiring a new baseline review. DCMA measures performance against the DCMA Audit Checklist and International Organization for Standardization (ISO) 9000 series quality systems models. The contractor is invited to participate in these audits. Table 4.12 provides an overview of the key processes/systems chosen for quality system risk management efforts under the Supplier Quality Assurance (QA) One Book Chapter 4.4.

Fourteen (14) of 42 RAMP plans (33.3%) addressed quality systems as a risk management area. The plans focused on 26 different key processes/system and used 13 different combinations of processes and systems within quality systems to assess risk for the contractor, facility, or contract in question. The most prevalent systems chosen for review were "ISO 9002", "Design Control", and "Internal Quality Audits"; each used

21.4% of time. As is visibly apparent in the table there is no real commonality or congruence between the plans with most key processes/systems only being used once. Additionally, one plan, Raytheon Tucson Systems (#41) clearly addresses risk management to a degree not even approached in the other 13 plans.

One RAMP plan rated quality system risk as high. The following details the high risk rating in all three areas of performance, schedule, and cost and the associated risk handling tool chosen to mitigate the risk:

- #20: DCMA rates *performance, schedule,* and *cost* as high risk areas for the Motorola SSG plan citing a near certainty of complete failure for sub-system of the F-22 program. Significant instances where there are product quality issues for form, fit, and function and resource deficiencies in the form of new employees/engineers drive the poor *performance* rating. The *schedule* for estimated time of delivery has already been extended five months beyond purchase order delivery date. The *cost* is likewise rated high, even though this is a fixed-price subcontract due to the high probability of unknowns becoming out-of-scope work issues. "Design Control" is the key process chosen for risk management and "System Evaluation" is the risk handling tool: DCMA QA Representative is to attend the bi-weekly meeting with the Quality Assurance Team for problem status and schedule impact.

The one high risk plan uses only one key process/system out of 26 different options used throughout the sample for risk management in the Quality System area: "Design Control". All three risk areas of *performance, schedule,* and *cost* here drive higher risk ratings at the Product Support service set level for plan #20 and high risk for the plan overall. This high risk plan is not inconsistent with the other plans applying Quality System risk management efforts; 64.3% of the plans use only one key process/system for risk mitigation efforts. However, risk in this area generally remains low: 68.8% rate *schedule* and *cost* risk as low; 56.3% rate *performance* risk low. The risk under plan #20 however, runs consistent throughout the entire RAMP plan and draws a common thread through the other two One Book Chapter areas under which it addresses risk

management. The chosen risk handling tool is "System Evaluation" and this seems

consistent with the need for frequent contractor/Government interface.

SUPPLIER QA - QUALITY SYSTEM KEY PROCESSES/SYSTEMS	7	11	12	15	20	22	30	31	33	34	35	36	38	41
Contract Review														X
Control Customer Supply Product														X
Control of Quality Receipt														X
Correct/Prevent Action										X				X
Control of Inspect/Measure/Test Equipment					X									X
Control of Nonconforming Material			X											X
Design Control			X	X										X
Document and Data Control														X
Handling/Storage/Packaging/ Preservation/Delivery														X
Inspection and Test Status														X
Inspection and Testing														X
Internal Quality Audits			X								X			X
Into-Plane Operations				X										
ISO 9001										X			X	
ISO 9002								X		X		X		
Material Review Board (MRB)												X		
Management Responsibility														X
Prime Control of Sub-Vendors										X				
Process Control														X
Product Identification/Traceability														X
Purchasing														X
Quality System							X							X
Refinery Operations	X	X												
Servicing														X
Statistical Techniques														X
Training														X

Table 4.12. Key Processes/Systems for Supplier QA-Quality System Risk
Management Efforts.
(Source: Developed by Researcher.)

8.   Supplier Quality Assurance – Product Quality

Each lot of output from a high risk processes must be sampled using a statistically valid sampling plan. CMO personnel have discretion in forming lots for these samples. Table 4.13 provides an overview of the key processes/systems chosen for product quality risk management efforts under the Supplier Quality Assurance One Book Chapter 4.4.

Thirty-one (31) of 42 RAMP plans (73.8%) addressed product quality as a risk management area. The plans used 140 different key processes/system and 29 different combinations of processes and systems within product quality to assess risk for the contractor, facility, or contract in question. The most prevalent systems chosen for review was "Final Inspection", used in 23.8% of the plans. While this high percentage might seem to indicate DCMA is waiting until the product is finished before making sure it is acceptable, the large number of "in process" reviews (i.e. the other 139 key processes/systems used to evaluate product quality risk) and the numerous quality assurance evaluations of the contractors' Quality System cited earlier in this chapter indicates DCMA's proactive approach to monitoring quality.

Five RAMP plans rated product quality risk as high. The following details the high risk rating for the identified areas of performance, schedule, and cost and the associated risk handling tools chosen to mitigate the risk.

PRODUCT QUALITY

RISK MANAGEMENT PLANS

KEY PROCESSES/ SYSTEMS	2	3	4	5	6	7	8	9	11	13	14	15	18	19	20	21	22	23	24	25	29	30	31	33	34	35	36	37	38	39	42
Acceptance Tests	x	x		x														x													
Assembly																		x	x				x		x					x	x
Avionics Assembly																		x								x					
Battery																													x		
Blading																													x		
Blending and Compounding								x																							
Bonding																													x		
Brazing																									x						
Calibration							x	x																			x		x		
Canniblization							x																								
Case, Rocket Motor																		x													
Cleaning																				x											
COA																											x				
Conformal Coating																			x												
Continuity Short Test																			x												
Contract Review																							x					x			
Configuration Management																													x		
Cooler Acceptance Test																			x												
Cooler Back Flush																			x												
Cooler Burn-In																			x												
Cooler Compressor Weld																			x												
Cooler Integration																			x												
Cooler Leak Check																			x												
Cooler Mechanism Assembly																			x												
Craftman Program																															
Cross Talk Test																			x												
De-paint						x																									
Dimensional Inspection																		x											x		
Documentation and Records					x						x	x													x						
Drilling																													x		
Dye Penetrant																													x		
Electrical Test																						x									
Electron Beam																															
Environmental Stress Screening Burn-in Test																			x												
Evacuation Pump																			x												
Evaluation/Repair/Modification																													x		
Fabrication																													x		
Facilities and Equipment					x							x																			
Final Acceptance Test																			x												
Final Visual																													x		
Final Fabrication																									x						
Final Inspection	x	x	x	x	x				x									x	x				x				x				
Final Test Witness														x																	
Form and Tin																								x							
Functional Test		x																					x							x	
Fusion Weld																							x								
Fuze																		x													
Gas Generator Bag Assembly																		x													
Getter Fire																			x												
GPS Antenna Assembly																		x													
Handling/Storage/Deliver																													x		
Hardness																			x												
Harnesses																															
Heat Load Test																			x												
Hydraulic/Fuel/Pneu-matic Tube Installation																													x		
Hydrotest																															
Hot Fire Test																						x									
Igniter Casting																									x						
Igniter Chamber Assem-bly/Preparation Line																									x						
Igniter Final Assembly																									x						
Igniter Propellant Mixing																									x						
In-process Inspection														x																	
Inspection																			x									x			
Installation of Outer Cover																			x												
IR Alignment																								x							
Integration and Test				x																											
Joint Aircraft Inspection																x															
Key Assembly HTI																			x												
Label Packaging																			x												
Laser Weld																			x												
Leak Check HTI Unit																			x												
Leak Test																													x		
Linear Inspection																						x									
Liquid Penetrant																						x			x						
Loading of Defaults and Optimization																			x												
Loading and Shipping								x																							
Machining						x						x						x	x						x				x		
Magnetic Part																									x				x		

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PRODUCT QUALITY KEY PROCESSES/ SYSTEMS	2	3	4	5	6	7	8	9	11	13	14	15	18	19	20	21	22	23	24	25	29	30	31	33	34	35	36	37	38	39	42
Maintenance																	X														
Management of Perform-ance Based Payment Request, Preparation & Submittal														X																	
Mandatories														X																	
Mapping																													X		
Marking																													X		
Material Inspectin & Receiving Report (MIRRs)																			X												
Missile Guidance Set																		X													
Motor Case Assembly																									X						
Motor Case Fabrication																									X						
Motor Case Winding																									X						
Motor Casing																									X						
Motor Final Assembly																									X						
Motor Packaging and Shipment																									X						
Motor Propellant Mixing																									X						
Mount Cold Shield																				X											
Mount Focal Plane Array																				X											
MRB	X	X	X																			X									
Non-Destructive Evaluation (NDE)																								X							
Non-Destructive Testing (NDT) "PT"																										X					
Operational Factors						X					X																				
Over and Above QAS							X																								
Painting							X																						X		
Packaging																					X		X					X	X		
Payload Fairing																															
Personnel Requirements						X					X																				
Pick and Place																							X								
Plotting EMA																							X								
Post Test																													X		
PPP & M																						X									
Pretest																													X		
Product Evaluation						X					X																				
Proof Load Test																													X		
Propellant Cast & Cure																						X									
Pull Test																													X		
Purchasing										X												X						X	X		
Radiography																						X							X		
Repair & Overhaul																								X							
Receiving/Inspection										X													X			X			X		
Run Test																													X		
Safety						X					X																				
Sampling							X	X																							
Separation Systems																															
Sensor Test																							X								
Servicing							X																								
Shipping																						X									
Soldering																								X							
Static Testing																									X						
Stencil Printer																							X								
Stores																									X						
Storage and Handling							X																								
Subcontract Management													X																		X
Tensile Test																												X			
Testing							X																								
Test Start Up																												X			
Tube Extrusion																								X							
Ultrasonic						X																X			X						
Vendor																									X						
Warhead																	X														
Weight & Balance						X																									
Welding												X												X		X		X			
Wire Bonding																			X												
X-ray						X																			X						

Table 4.13.   Key Processes/Systems for Supplier QA-Product Quality.

(Source: Developed by Researcher.)

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- #2:   Raytheon Electronic Systems was rated with a high *performance, schedule,* and *cost* risk. Raytheon is currently unable to meet contracted delivery schedules due to inadequate manufacturing capability. There was no integrated master schedule between three facilities involved in the F/A 18 program, low yields on some subassembly circuits, a shortage of test equipment, and a need for additional employees to increase production capacity. Risk mitigation plans were cited as being in place. However, the key processes/system identified for risk management do not support the most recent rating assignments. "Acceptance Testing", "Final Inspection", and "Material Review Board" (MRB) all contained the initial low risk in all three areas of *performance, schedule,* and *cost* and clearly had not been updated to support the more current chapter rating. "Corrective Action" (as required), "Data Analysis" (collected quarterly) and selected "Product Audits" were risk handling methods chosen for the "Acceptance Testing" and "Final Inspection" processes. "Product Audits" are conducted for "use as is" and "repair" items under the MRB process.

- #14:   Westinghouse Electric facility plan was rated as a high *performance, schedule,* and *cost* risk. Two key processes, "Documentation" and "Receiving Inspection" support this risk ratings because failures in these processes has resulted in nonconforming material delivered to the customer. Additionally, there are numerous contractor reorganizations involving up to 50% personnel lay-offs creating serious losses in the corporate knowledge base. "Corrective Action" using Corrective Action Reports (CARs) issued for contract deviations, "Record Review" involving a 100% review of shipment records at final inspection, and 100% "Product Audits" of all items presented to the Government for acceptance are the selected risk handling tools.

- #17:   Stewart and Stevenson were assigned high risk ratings for *performance, schedule,* and *cost* under Supply Quality Assurance— Product Quality. "Shipping" is the chosen system for risk management review. The contractor has failed to achieve ISO 9000 certification and was previously issued a Level III Corrective Action Request for deficiencies in their quality management system. On-time delivery was 75% as result of product quality deficiencies. DCM surveillance and audits were suspended until the contractor can obtain a repeatable and positive Government release quality. "Inspection" is the chosen risk handling tool. There were inconsistencies in the rating narrative: "Cost" was described as low risk due to fixed-priced contracts, however the overall, service set, and chapter rating assigned a high rating risk to this area.

- #20:   Motorola SSG is assigned a high risk rating for *performance* under product quality. It is highly likely there will be a major impact on hardware performance due to subcontractor interface specification requirements for continued development. "Subcontractor Oversight" is the key process identified to manage this risk and no risk handling tools

were cited due to the delegated nature of the risk management area. *Schedule* received only moderate risk ratings because the situation is not expected to impact current build, but rather those in the future. *Cost* was rated moderate as well, even though this is a fixed-price effort, due to the potential for out-of-scope work requirements. No specific risk handling tools were annotated, although it was noted that the product quality assurance area was constantly monitored by DCMA and any changes would be promptly noted and reflected in the risk ratings.

- #22: McDonnell Douglas Helicopter Systems effort for the Longbow Apache program was assigned a high risk rating in all three areas of *performance, schedule,* and *cost* for product quality. Joint Aircraft Inspection was the first identified key performance parameter and was rated as high risk in all three areas: *Performance* rating indicated that a single failure could result in loss of life or total mission failure and product technical performance requirements continually fail acceptance criteria. *Schedule* rating was high because failure to repair in a timely manner would likely affect the remanufacturing effort. *Cost* increase was considered likely. "Product Audits": 100% inspection of aircraft when ready for inspection, daily was the identified risk handling tool. "Maintenance" was the second performance area chosen for risk management efforts and was rated as moderate risk in all three areas: *Performance* rating was moderate due to two Corrective Action Reports (CARs) being issued in the last year, not all mechanics are fully trained, repetitive errors, and aircraft discrepancies noted during customer inspection. *Schedule* risk is moderate because failure to detect deficiencies during this process that incorporates delivery preparation of aircraft, would impact meeting delivery schedule. High *cost* risk due to failure to detect deficiencies would transfer costs of correction to the customer. "Product Audits" of meeting inspection criteria in accordance with aircraft maintenance publication is the chosen risk handling tool and are conducted on all aircraft: 100% intensity.

- #37: Telechem International Inc. received high risk ratings in all three areas of *performance, schedule,* and *cost* for the product quality area. Five key processes/systems were identified for risk management activity: 1. "COA" was rated as high risk in all areas; it is required to be reviewed and inspected due to critical application. "Data Analysis" is the chosen risk handling tool and will be accomplished with meetings with the contractor regarding each contract. 2. "Contract Review" was rated as high *performance* and *cost* risk and moderate *schedule* risk. Rationale indicated it's critical application to identify requirements and no further detail. The risk handling tool is a "Contract Award Meeting" for each contract. 3. "Inspection/Test" shall be performed due to product problems. 100% "Product Audits" are the identified risk handling tool using Defense Energy Supply Center (DESC) guidance. 4. "Packaging and Shipment" received high risk ratings in all three areas due to high

failure rate upon receipt at DESC. "Product Audits" as per DESC guidelines are the identified risk handling tool. 5. "Purchasing" was assigned a high *performance* risk rating and moderate ratings for *schedule* and *cost*. These ratings were assigned due to questionable documents that were hard to verify. The identified risk handling tool for this area was "Process Proofing/Product Audit".

The degree of possible variation for key processes/systems is so great for this area it is difficult to make any sort of meaningful comparisons. Although, it is clear that the plans are not carbon copies of each other and specifically address product quality issues for the contractual effort in question and that is entirely appropriate. Product Quality for the sampled plans addresses risk management through 140 different key parameters, over four times as many as any other areas in the RAMP database. With such a strong presence in the risk management data, Product Quality is a key driver in Product Support service set level risk ratings and RAMP plan ratings Overall. *Performance* risk was rated moderate 50% of the time, with *schedule* and *cost* each ranked as low 53.3% of the time. High risk ratings were assigned to these areas only 16.7% and 13.3% of the time, respectively.

Some commonalities can be found in the risk handling tools used to mitigate Product Quality risk: "Product Audits" and some version of "Test and Inspection" are common risk mitigation technique applied to the high risk Product Quality key processes/systems, indicating a natural Government propensity to ensure its getting what it paid for prior to acceptance.

9. Packaging Management Program

DCMA provides packaging assistance and support to its customers to ensure adequate packaging performance in accordance with the contractual arrangement and the item's physical characteristics, destination, and use. DCMA support includes

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surveillance of the contractor's performance and capability including availability of packaging specification information, adequate handling processes, equipment, and packaging costs. The goal is desired protection at the least practical cost to prevent deterioration or damage until customer delivery. Table 4.14 provides an overview of the key processes/systems chosen for the packaging management program under the Packaging Management Program One Book Chapter 4.4.4.

PACKAGING MANAGEMENT PROGRAM									
KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLANS NO.s 12 13 14 16 17 18 34								
Handling		X	X	X	X	X	X	X	
Marking		X	X	X	X	X	X	X	
Packaging		X	X	X	X	X	X	X	
Storage								X	
Transportation								X	

Table 4.14. Key Processes/Systems for Packaging Management Program.
(Source: Developed by Researcher.)

Seven of 42 RAMP plans (16.7%) addresses the packaging management program as a risk management area. The seven plans used five different key processes/systems in two different combinations. Clearly, when this area is a chosen area for review, there is a great deal of continuity between the plans. This is likely due to DCMA's policy to maintain a Packaging Management Program and provide Packaging Specialists to perform functions and assist in the packaging process. Such specific guidelines easily lend themselves to consistent application throughout DCMA. Three key processes/system were used in all plans: "Handling", "Marking", and "Packaging". There were no high risk areas identified under the packaging management program. Five

plans rank all three risk areas as low, one plan ranks risk as moderate, and one remained "in process".

E. DELIVERY RISK RATING

The Delivery service set employed in the RAMP database corresponds to Chapter 5 of the One Book, Delivery Services – Right Time. Two of the four subchapters are available for assigning risk ratings in RAMP: Schedule and Delivery Management and Contract Safety Requirements. Thirty-two (32) of the 42 sampled RAMP plans rated risk areas for one or more of the One Book Chapters under this service set. The following risk management plans—numbered as per Appendix A—assigned risk ratings: 1, 4 – 9, 13 – 19, 22 – 25, and 29 – 42.

The individual ratings for performance, schedule, and cost are automatically generated for each RAMP plan based on the input data for all the associated One Book Chapter risk ratings for each of these areas. Table 4.15 provides an overview of the service set risk ratings in performance, schedule, and cost of the 42 sampled plans from critical and strategic suppliers. Thirty-two (32) of the sampled plan addressed risk management under the Delivery risk area. Ten (10) plans rated this risk as not applicable and are not depicted in the table.

DELIVERY RISK	High	Mod	Low
Performance	7	13	12
Schedule	6	11	15
Cost	5	9	18

Table 4.15.   Overview of the Service Set Risk Ratings for Delivery Risk.
(Source: Developed by Researcher.)

Delivery is the second most applied service set among the sampled plans. Thirty-two plans or 76.2% of the RAMP plans ranked risk in this area. While the majority of the

risk assignments in this area were like elsewhere, low and moderate, this service set had the most plans rated as high risk: eight plans or 25% of the plans addressing Delivery ranked one or more areas of *performance, schedule,* and *cost* as high risk.

Of the two assigned One Book Chapters for risk management, Schedule and Delivery Management was applied four times as often as Contract Safety Requirements: 69.0% v. 16.7% of the time.

Eight plans rated high risk at the Delivery service set level and all were driven by high risk ratings under Schedule and Delivery Management. The sole high risk rating for Contract Safety Requirements was mitigated at the Delivery level by a low Schedule and Delivery Management value in the same area. When applied, Schedule and Delivery Management seemed to take a more prominent role in the risk assignment for this service set as a whole.

1. Schedule and Delivery Management

DCMA's policy is to improve on-time deliveries by reducing delinquency causes in the acquisition process, pre-notify customers of potential delays, and respond to customer inquiries. These activities assist the customer to meet readiness requirements, identify alternative logistic support mechanisms, and select proven performers. Table 4.16 provides an overview of the key processes/system chosen for schedule and delivery risk management under the Schedule and Delivery Management One Book Chapter 5.1.

SCHEDULE & DELIVERY MANAGEMENT													RISK MANAGEMENT PLANS																
KEY PROCESSES/SYSTEMS	1	4	5	6	8	13	14	16	17	18	19	22	23	24	25	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Alert Data Analysis																				x									
Contract Review													x																
Delivery Schedules																								x	x				
Forecasting												x																	
Manufacturing and Assembly																				x									
Manufacturing Management													x																
Manufacturing Process Control																	x												
Material Process Control										x																			
On-time Delivery													x	x			x				x								
Over & Above Negotiations				x																									
Product Development			x										x						x										x
Production Planning and Control	x		x			x	x	x	x	x	x	x		x	x	x			x		x				x	x	x	x	
Production Schedule				x																									
Progress Payment Review																			x										
Purchasing																				x									
Receive and Inspect										x										x									
Schedule & Delivery Management	x																											x	
Services Management Control Process																													x
Vendor Selection Process										x																			

Table 4.16.   Key Processes/System for Schedule and Delivery Management.
(Source: Developed by Researcher.)

Twenty-nine (29) of 42 RAMP plans (69.1%) addressed schedule and delivery as a risk management area. The 29 plans used 19 different key processes/systems in 15 different combinations to assess risk for the contractor, facility, or contractor in question. "Production Planning and Control" was clearly the most commonly used process, used 62.1% of the time RAMP plans assessed the contractors schedule and delivery system.

Eight RAMP plans rated schedule and delivery quality risk as high. The following details the high risk rating for the identified areas of performance, schedule, and cost and the associated risk handling tools chosen to mitigate the risk:

- #5:   Raytheon Electronic Systems F18 Spare/Support program rated Schedule and Delivery Management a high risk in *performance* and *schedule* and low risk in *cost*. "Production Planning and Control" was the key process/system chosen for risk management efforts. The high risk rating for *performance* is due to the contractor's full manufacturing capacity that is unable to meet delivery schedules required by the contract. The contractor initially lacked an Integrated Master Schedule (IMS) between three disparate facilities. Now, an IMS is in place and updated weekly. Additionally, subcontractors have been added to assist in the production effort. *Schedule* risk is high due to missed delivery milestones

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because of low yields on components and a shortage of Special Test Equipment for the increased delivery schedules. Additionally, employees are required to increase production. *Cost* risk remains low due to the firm fixed price contracts in place for the program. "Corrective Action" as needed and monthly "Data Analysis" and "Product Audits" are the tools identified for risk handling measures.

- **#13:** Graco Industries is given a high risk rating in all three areas of *performance, schedule,* and *cost* for schedule and delivery management. "Production Planning and Control" is the key process/system chosen for risk management. The high risk performance rating is due to the contractor's lack of a well managed IMS for in-house Government contracts, a high turnover of personnel, and constant lack of capacity. *Schedule* is rated as a high risk because the contractor is on-time less than 20% of the time. Even though this is a fixed price contract, DCMA justifies its high *cost* risk rating because the supplier is a sole source provider and there are "intangible costs" associated with failing to deliver on time; the Government lacks other options should they fail to provide the items when needed. However, Overall, the contractor is assigned a low cost rating, due to the fixed price nature of the contract. Five risk handling tools are applied to this problem: 1. "Alerts" – issued each time the contractor will miss the final delivery date. 2. "Contract Abstract" – complete review each time a new contract or change order. 3. "Corrective Action" – issue Corrective Action Request (CARs) as necessary. 4. "CPSS Requests" – schedule as needed when received from the customer. 5. "Production Person Workload (PPW) Report" – review the PPW for past due orders and upcoming orders on a daily basis

- **#14:** Westinghouse Electric Corporation facility plan rated high risk in *performance* and *schedule* and moderate *cost* risk for schedule and delivery. "Production Planning and Control" is the area chosen for risk management. The high *performance* rating is due to numerous quality problems associated with incomplete data packages and parts not within established tolerances. This is likely caused by expedite actions leading to circumvention of normal lead times. *Schedule* risk is rated high: the contractor has delivered on-time once in the last two years even after receiving many contract modifications for delivery extensions. Two CARs have been issued for poor schedule trend performance. *Cost* risk is moderate because all contracts are firm fixed price with no progress payment; however, schedule slippages and product reworks lead to increased cost risk. "Corrective Action"—issuing CARs and monthly "Schedule Reviews"—100% delivery schedules for all contracts.

- **#17:** Steward & Stevenson's facility plan was rated high risk in all three areas of *performance, schedule,* and *cost* for schedule and delivery. "Production Planning and Control" is the area chosen for risk management because it is the top level system that controls the contractor's ability to satisfy the delivery schedule. *Performance* risk is rated high because the

contractor does not seem to have a well managed IMS for Government contracts. Many expedite actions are required and vendor control is lacking. The contractor's less than 50% rate for on-time delivery drives the high *schedule* risk rating. Lack of production planning results in numerous delayed shipments. *Cost* risk is high due to expediting efforts. Five risk handling tools are used for this area: 1. "Contract Abstract" – complete review each time a new contract or change order. 2. "Corrective Action" – issue Corrective Action Request (CARs) as necessary. 3. "CPSS Requests" – schedule as needed when received from the customer. 4. "Product Audits" – per shipment each time the contractor will miss the final delivery date. 5. "Production Person Workload (PPW) Report" – review the PPW for past due orders and upcoming orders on a daily basis.

- #19: Davies Rail & Mechanical assigned high risk ratings in all three areas of *performance, schedule,* and *cost* for schedule and delivery management. "Production Planning and Control" was the chosen key process/system for risk management. The contractor did not have a well managed IMS, the on-time delivery rate is less than 50%, and expediting efforts negatively impact the cost. Five risk handling tools were chosen to mitigate the risk: 1. "Alerts" – each time contractor will miss the final delivery date. 2. "Contract Abstract" – complete review each time a new contract or change order. 3. "Corrective Action" – issue Corrective Action Request (CARs) as necessary. 4. "CPSS Requests" – schedule as needed when received from the customer. 5. "Production Person Workload (PPW) Report" – review the PPW for past due orders and upcoming orders on a daily basis.

- #22: McDonnell Douglas Helicopter Systems' Longbow Apache program received a high risk rating in the area of *performance.* "Forecasting" and "Production Planning and Control" are the identified key process/systems for risk management. "Forecasting" *performance, schedule,* and *cost* were all rated as moderate risks. *Performance* under "Production Planning and Control" was rated high: High turnover of subcontractors supplying critical and flight safety parts have caused numerous tooling and drawing changes and increasing probability that *performance, schedule,* and *cost* objectives will not be met. "Data Analysis" is the risk handling tool chosen for this area.

- #41: Raytheon Tucson ESSM program received a high risk ratings for *performance* and *schedule* and a low risk for *cost* under Schedule and Delivery Management. "Production Planning and Control" and "Schedule and Delivery Management" are the two key processes/systems chosen for risk management. *Performance* risk for these areas stems from the contractor's rescheduling of major programs 26 times in the last 12 months. The operational Master Performance Schedule (MPS) schedule metric fluctuates between 70-80%; internal goals have never been met. The *schedule* rating is driven by the additional factor of only a 66% on-

time delivery rate. Moderate *cost* rating stems from the contractor's use of the MRP system as a material ordering system and managing by workarounds or expediting which negatively impacts cost. Monthly "Data Analysis" and "MMAS Meetings with Contractor" were the selected risk handling tools for "Production Planning and Control": analyze processes with the contractor to identify root causes and request contractor take corrective action on this system. Risk handling tools for "Schedule and Delivery Management" are monthly "Data Analysis" and "Root Cause Analysis": review the on-time delivery report and outstanding delinquency report to identify root causes.

- #42: Raytheon Tucson Evolved Sea Sparrow Missile (ESSM) program rated high *cost* risk for schedule and delivery with moderate *performance* and *schedule* risk assignments. Two key processes/systems were chosen for risk review: 1. "Product Development" assigned *cost* a high risk rating due to cost overruns on one contract and obsolete material issues on another under the program. 2. "Services Management Control Process" assigned a high risk rating to *cost* due to new requirements potentially causing a delayed or missed milestone which may result in costly rebaselining activities. The chosen risk handling tools for CESR are 100% "Contract/Modification Review", monthly "Data Analysis", weekly "Meetings", and monthly "Root Cause Analysis".

Seven of the eight plans rating high risk for Schedule and Delivery Management identified "Production Planning and Control" as a key process to manage risk; it was the sole process for six of the plans. Plan #42 is the exception because the difficulties do not seem to stem from the manufacturing process itself. This is consistent with the risk management efforts in this area across the board that often chose this process as a key performance parameter for risk management. A common theme running through these plans is the contractor's lack of an integrated master scheduling plan between facilities or within the plant to distinguish Government contract efforts (#5, #13, #17, #19, and #41). Other plans focus on various subcontractor difficulties (#22), quality difficulties (#14), or obsolescence and new requirements issues (#42). In all cases, the high risk ratings in this area drive the risk rating at the Delivery service set level. The chosen risk handling tools for these areas seemed common within the specific DCMA office responsible for contract

administration: The DCM San Antonio office tended to use "Alerts", "Contract Abstracts", "CARs", "CPSS Requests", and "PPW Report" to handle risk. Raytheon offices tended more towards "Data Analysis", "Root Cause Analysis", and "Meetings".

2. Contract Safety Requirements

When contract requirements dictate specific safety requirements involving Ammunition and Explosives (A&E), Flight Ground Operations, Industrial Operations, Into-Plane Refueling Operations, or Maritime Operations, DCMA will evaluate contractor high risk operations in accordance with the DCMA Contract Safety Program. Table 4.17 provides an overview of the key processes/systems chosen for contract safety requirements under Contract Safety Requirements One Book Chapter 5.3.

CONTRACT SAFETY REQUIREMENTS KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLANS NO.s						
	7	9	15	30	31	35	38
Compliance/Performance History					X		
Documentation					X		
Facilities							
Mishap History					X		
Procedures					X		
Safety Program		X	X	X	X	X	X

Table 4.17. Key Processes/Systems for Contract Safety Requirements.
(Source: Developed by Researcher.)

Seven of 42 RAMP plans (16.7%) addressed contract safety requirements as a risk management area. The six plans used six different key processes/systems in two configurations to assess risk for the contractor. "Safety Program" was the system used in all instances and clearly drives the high degree of consistency in this area.

Only one RAMP plan rated safety risk as high. The following details the high

risk rating and the associated risk handling methodology to mitigate the risk:

- #30: Aerojet General Corporation rates *performance* as a high risk area under contract safety requirements. "Safety Program" is the chosen key process/system to manage risk. *Performance* received a high rating due to the inherent risk of explosives handling operations. Any failure to follow safety requirements would significantly increase the severity of mishaps. Although no specific risk handling tool was listed, risk handling detail indicated a Contract Safety Specialist would review the contractor's safety program along with the contractor's safety representative including operational sites, production areas, and subcontractor compliance.

The one plan with a high risk rating used the same key system to manage risk as

the other plans under Contract Safety Requirements: "Safety Program", selected because

it is the overarching key process under this area. The rating rationale is sound, based on

the potential impact vice the probability of the risk event. For this reason, it is reasonable

that a low risk rating for Schedule and Delivery Management mitigates the high risk

rating here for the service set. While not specifically spelled out, risk handling will be

accomplished by reviewing the contractor's safety program.

F.   BUSINESS AND FINANCIAL SYSTEMS RISK RATING

The Business and Financial Systems service set employed in the RAMP database

corresponds to Chapter 7 of the One Book, Business & Financial Systems Services. Four

of the six subchapters are available for assigning risk ratings in RAMP: Contract

Property Management, Contractor Estimating System Reviews, Material Management

and Accounting Systems, and Cost Accounting Standards (CAS) Administration.

Nineteen (19) of the 42 sampled RAMP plans rated risk areas for one or more of the One

Book Chapters under this service set. The following risk management plans—numbered

as per Appendix A—assigned risk ratings: 1, 8, 10, 18, 22, 25, 27, 28, 30, 31, 33 – 36, and 38 – 42.

The individual ratings for performance, schedule, and cost are automatically generated for each RAMP plan based on the input data for all the associated One Book Chapter risk ratings for each of these areas. Table 4.18 provides an overview of the service set risk ratings in performance, schedule, and cost of the 42 sampled plans from critical and strategic suppliers. Nineteen (19) of the sampled plan addressed risk management under the Business and financial Systems risk area. Twenty-four (24) plans rated this risk as not applicable and are not depicted in the table.

Business and Financial Systems are used for risk management efforts in 45.2% of the sampled plans. The majority of the risk was rated low: 63.2% of plans rated *schedule* and *cost* risk as low, while 47.4% (still the largest proportion) rated *performance* risk as low. High risk ratings were rare: twice for performance and cost and one for schedule. This is undoubtedly indicative of the fixed price contract types used commonly throughout the plans.

BUSINESS & FINANCIAL SYSTEMS RISK	*High*	*Mod*	*Low*
Performance	2	8	9
Schedule	1	6	12
Cost	2	5	12

Table 4.18. Overview of the Service Set Risk Ratings for Business and Financial Systems Risk.
(Source: Developed by Researcher.)

Risk ratings were fairly well dispersed among the four One Book Chapters used for the Business and Financial Systems service set with over half the plans using this

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service set assigning risk ratings for Contractor Estimating System Reviews (CESRs) and Material Management and Accounting Systems (MMAS) (63.2%), Contract Property Management (73.7%), and Contractor Purchasing System Reviews (73.7%).

Only three plans (#25, #41, and #42) rated high risk at the Business and Financial service set level and all three were driven by high risk ratings for Contract Property Management which seems to be the most risky area and a key driver in this service set. CESRs provided the other sole high risk rating and contributed to high risk service set rating (#41).

1. Contractor Estimating System Reviews

Contractor Estimating System Reviews (CESRs) review the contractor's processes of collecting and building cost estimates. The Government must ensure this is done according to standards with the right information source and the right system to produce reliable and consistent cost information representative of actual costs. Table 4.19 provides an overview of the key processes/systems chosen for CESR risk management under the Contractor Estimating System Reviews One Book Chapter 7.3.

Twelve (12) of 42 RAMP (28.6%) plans address CESRs as a risk management area. The 12 plans use nine different key processes/systems in eight different combinations to assess risk for the contractor, facility, or contract in question. "Forward Pricing" was the most often used process, identified as key area 66.7% of the time, with "Cost Accounting System (CAS)" and "Proposal Development" following closely, in use 58.3% of the time. Combined, these clearly lend some continuity to the risk management process.

CONTRACTOR ESTIMATING SYSTEM REVIEW	RISK MANAGEMENT PLANS NO.s											
EY PROCESSES/SYSTEMS	1	10	22	28	30	31	33	34	35	38	39	41
ccounting			X									
ost Accounting System (CAS)	X	X		X	X				X	X		X
stimating System				X								
orward Pricing	X	X	X	X	X				X	X		X
MAS			X		X				X			
egotiate Final Overhead Rates					X							
roposal Development	X	X	X			X			X		X	X
urchasing System	X				X							
ystem Audit							X	X				

Table 4.19. Key Processes/Systems for Contractor Estimating Systems Review. (Source: Developed by Researcher.)

Only one RAMP plan rated CESRs as a high risk area:

- #41: Raytheon Tucson Systems plan was rated as a high risk in the area of *cost* for CESRs with *performance* and *schedule* being assigned moderate ratings. Three key processes/systems were chosen for risk management: "Cost Accounting System", "Forward Pricing", and "Proposal Development". All three areas were individually rated as moderate and do not support the high cost risk rating at the One Book Chapter level. The chapter narrative indicates a corrective action in place for inadequate and late subcontract cost/price analysis.

The lack of supporting ratings at the key process/system level is inconsistent with the scheme of risk management in the RAMP system which is designed to build up from the lowest levels of key processes/systems through to an Overall rating supported and documented by the ratings at the lower echelons. Additionally, the lack of supporting information at these levels means there is no direct correlation between the three chosen processes/systems (and their associated risk handling tools) and problem at hand. However, high risk under Contract Property Management lends additional credibility to

the resulting high risk at the Business and Financial Systems service set level. The three chosen systems for risk management are the three most commonly used areas for risk assessment under CESR.

2. Material Management and Accounting Systems

The concept of Material Management and Accounting Systems (MMAS) is to ensure that material used to manufacture a product is charged or costed, in the right amount, to the contract for that product and no other. Suppliers may have numerous contractors, both Government and commercial and properly assigning material costs to a contract can be a complex and confusing enterprise. DCMA must apply risk management to ensure confidence in allowable and allocable material costs assignable to a contract. Table 4.20 provides an overview of the key processes/systems chosen for MMAS risk management under the Material Management and Accounting Systems One Book Chapter 7.5.

Twelve (12) of 42 RAMP plans (28.6%) addressed MMAS as a risk management area. The 12 plans used 15 different key processes/systems in 10 different configurations to assess risk for the contractor. "Accounting System Reviews" was the system used most commonly, 66.7% of the time. No RAMP plans rated risk as high in this area and the predominant risk ratings were low for *performance, schedule,* and *cost*: 75%, 91.6%, and 83.3% of the plans addressing MMAS.

MATERIAL MANAGEMENT & ACCOUNTING SYSTEM (MMAS)	RISK MANAGEMENT PLANS NO.s										
KEY PROCESSES/SYSTEMS	1	22	28	30	31	33	34	35	36	38	40	41
Accounting System Reviews	X	X	X	X				X	X		X	X
Contract Closeout				X								
Cost Monitoring				X			X					
Cost Vouchers				X								
Earned Value Management							X					
Estimating System	X			X			X	X				
Inventory Management												X
MMAS System			X		X							
Material Requirements Planning (MRP)										X	X	
Progress Payments		X	X	X			X					
Property Management			X				X					
Proposal Analysis							X					
Purchasing System							X					
Schedule/Delivery Management							X					
Scheduling System												X

Table 4.20.   Key Processes/Systems for Material Management and Accounting System (MMAS).
(Source: Developed by Researcher.)

3.   Contract Property Management

Contractors must have an adequate system to manage Government property in their possession. Their property control system must serve to control, protect, preserve, maintain, and establish accountability over Government property. DCMA oversight includes activities to assess the contractor's system to determine priority, degree, and level of surveillance required; validate a contractor's self oversight program; perform property administration functions; and investigate loss, damage, or destruction (LDD) of Government property. Table 4.21 provides an overview of the key processes/systems chosen for risk management under the Contract Property Management One Book Chapter 7.1.

Fourteen (14) of 42 RAMP plans (33.3%) addressed contract property management as a risk management area. The 14 plans used 16 different key processes/systems in five configurations to assess contractor risk. Eight of the plans (57.1%) used the same configuration and 12 plans used Property Management as a key processes (85.7%), providing a significant amount of continuity between the plans. Even among five different combinations there is significant congruence/overlap between the chosen processes/systems.

Five RAMP plans rated property management as a high risk area. The following details the high risk rating for the identified area of performance, schedule, and cost and the associated risk handling tools chosen to mitigate the risk:

CONTRACT PROPERTY MANAGEMENT														
RISK MANAGEMENT PLANS NO.s													
KEY PROCESSES/SYSTEMS 10	18	25	27	30	31	33	34	35	38	39	40	41	42
Acquisition X	X		X	X	X		X	X	X	X		X	
Consumption X	X		X	X	X		X	X	X	X		X	
Contractor Property Close-out X	X		X	X	X		X	X	X	X		X	
Disposition X	X		X	X	X		X	X	X	X		X	
Identification X	X		X	X	X		X	X	X	X		X	
Maintenance X	X		X	X	X		X	X	X	X		X	
Movement X	X		X	X	X		X	X	X	X		X	
Physical Inventories X	X		X	X	X		X	X	X	X		X	
Property Management X	X	X	X	X	X		X	X	X		X	X	X
Receiving X	X		X	X	X		X	X	X			X	
Records X	X		X	X	X		X	X	X			X	
Reports X	X			X	X		X	X	X			X	
Storage X	X			X	X		X	X	X			X	
Subcontractor Control X	X			X	X		X	X	X			X	
Summary of Elements						X							
Utilization X	X			X	X		X	X	X			X	

Table 4.21.   Key Processes/Systems Chosen for Contract Property Management.
(Source: Developed by Researcher.)

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- #10: Brown & Root Services Corporation facility is rated as high risk in all three areas of *performance*, *schedule*, and *cost*. Fifteen different key processes/systems are used to manage risk, seven of these areas are rated as high risk: "Acquisition", "Contractor Property Close-out", "Disposition", "Property Management", "Records", "Reports", and "Subcontractor Control". *Performance* risk is high due to the variety and geographic dispersion of Government property under the contractor's cognizance: over 95,690 line items scattered throughout the Balkans (Bosnia, Croatia, Hungary, Macedonia, and Kosovo) and valued at over $293,046,299. *Schedule* risk is high due to potential impact of systemic deficiencies on the contractor's ability to order materials and issue subcontracts to meet the numerous and varied requirements. *Cost* risk is high due to the cost reimbursable contracts and performance in multiple locations. System Evaluation is the chosen risk handling tool to mitigate risk for this contractor: an annual property control system audit.

- #25: DRS Infrared Technologies LP M1A2 Abrams Upgrade program is assigned a high risk rating in the area of *performance* with low risk ratings for *schedule* and *cost*. The contractor's *performance* criteria are divided into three sub-elements: inherent, property control system, and property control system changes. Property control system and property control system changes are assigned a high rating because the contractor is new and acceptable property control procedures have not been submitted and potential changes are unknown. There are no known deficiencies now that could impact *cost* or *schedule*. "Property Management" is the chosen key system for risk management. "System Evaluation" using annual sampling is the chosen risk handling tool.

- #40: Raytheon Tucson AMRAAM program is assigned a high risk rating for *performance*, *schedule*, and *cost* for contractor property management. This risk rating is not broken down into the specific elements but cites excessive Lost, Damaged, and Destroyed (LDD) property on the program as rationale for the "Property Management" key process. "System Evaluation" using an annual sample is the chosen risk handling tool.

- #41: Raytheon Tucson Systems is assigned high risk ratings for *performance*, *schedule*, and *cost*. Fifteen different key processes/systems are used to manage risk, six of these areas are rated as high risk: "Acquisition", "Movement", "Property Management", "Records", "Subcontractor Control", and "Utilization". The contractor's property system is rated as "unsatisfactory" but "approved" and the contractor is pursuing an approved corrective action plan (CAP) and joint audits with DCMA personnel to improve their "internal" ratings from "RED" to "YELLOW". "Annual Statistical Sampling" is the chosen risk handling tool in all instances.

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- #42: Raytheon Tucson Evolved Sea Sparrow Missile (ESSM) was assigned high risk ratings in all three areas of *performance*, *schedule*, and *cost* for property management. "Property Management" is the chosen key system for risk management: *Performance* is rated high due to the contractor's unsatisfactory performance during a property control system audit. Process integrity is compromised due to improper management and control of Government property and may impact *schedule*. Problems with the system cause overall *cost* increases. An annual systems analysis using 100% "Judgement Sampling" is the chosen risk handling tool.

The five plans rating high risk for Contract Property Management all had a common key process/system in common: "Property Management". Two of the plans (#10 and #41) used 15 different key processes/systems to assess risk for the contractor; three of the plans (#25, #40, and #42) used only one key parameter for this purpose. Four of the plans (#10, #40, #41, and #42) rated all three areas of risk, *performance*, *schedule*, and *cost* as high risk, while one plan (#25) rated only *performance* as a high risk, *schedule* and *cost* risk remain low. However, despite the preponderance of high risk ratings in this area, these factors, when encompassed with the ratings for the other three One Book Chapter level ratings, contributed to moderate risk ratings and only led to three plans with high risk ratings at the service set level. "System Evaluation" was the chosen risk management tool in three instances (#10, #25, and #40), with "sampling" tools used in the remaining two plans (#41 and #42). However, "System Evaluation" is conducted using annual sampling, which blurs the distinction between the two tools.

4. Contractor Purchasing System Reviews

Contractor Purchasing System Reviews (CPSRs) involve the Administrative Contracting Officer's (ACO's) consent for the prime to place subcontracts and approval of the contractor's purchasing system. When the prime contractor awards subcontracts non-competitively or the contract allows all subcontract costs to flow up to the Government, the Government is placed at risk. Purchasing system approval allows

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contracting officers to waive subcontract advance notifications and/or consent to subcontract actions and provide early CAS information to base source selection decisions and negotiation positions for profit/fee. Table 4.22 provides an overview of the key processes/system chosen for risk management under Consent to Subcontract/Contractor Purchasing Review One Book Chapter 7.4.

Nine of 42 RAMP plans addressed contractor purchasing systems as a risk management. The nine plans used 11 different key processes/systems in eight different configurations to assess risk for the contractor. "Best Value" and "Internal Purchasing System Audit" were the two most commonly used systems/processes for risk management: 55.6%. No RAMP plans rated high risk in this area. The majority of the risk ratings were low: 66.7% for schedule and 55.5% each for performance and cost.

CONTRACTOR PURCHASING SYSTEM REVIEW KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLANS NO.s								
	1	8	10	30	31	33	34	38	41
ACO Concerns							X		
Best Value			X	X	X		X	X	
Forward Pricing				X					
Internal Purchasing System Audit	X				X		X	X	X
Make/Buy			X	X			X	X	
Price Negotiation					X		X		
Public Law					X		X		
Purchasing/Contract		X							
Summary of Processes						X			
System Approval				X				X	
Vendor Rating				X	X		X	X	

Table 4.22. Key Processes/System for Contractor Purchasing System Review.
(Source: Developed by Researcher.)

G. PAYMENT AND FINANCIAL MANAGEMENT RISK RATING

The Payment and Financial Management service set employed in the RAMP database corresponds to Chapter 9 of the One Book, Payment and Financial Management Services. Three of the six subchapters are available for assigning risk ratings in RAMP: Progress Payments, Performance Based Payments, and Public Vouchers. Twenty-one (21) of the 42 sampled RAMP plans rated risk areas for one or more of the One Book Chapters under this service set. The following risk management plans—numbered as per Appendix A—assigned risk ratings: 1, 4 – 6, 19, 22 – 25, 28, 30 – 35, and 38 – 42.

The individual ratings for performance, schedule, and cost are automatically generated for each RAMP plan based on the input data for all the associated One Book Chapter risk ratings for each of these areas. Table 4.23 provides an overview of the service set risk ratings in performance, schedule, and cost of the 42 sampled plans from critical and strategic suppliers. Twenty-one (21) of the sampled plans addressed risk management under the Payment and Financial Management risk area. Twenty-one (21) plans rated this risk as not applicable and are not depicted in the table.

Payment and Financial Management was applied by half of the sampled RAMP plans. An absolute majority of the risk at the service set level was rated low: 76.2% for *performance* and *schedule* and 71.4% for *cost*. Only one plan (#23) ranked high risk at the service set level.

PAYMENT & FINANCIAL MANAGEMENT RISK	High	Mod	Low
Performance	1	4	16
Schedule	1	4	16
Cost	1	5	15

Table 4.23.   Overview of the Service Set Risk Ratings for Payment and Financial Management Risk.
(Source: Developed by Researcher.)

Of the three assigned One Book Chapters for risk management, Progress Payments Based on Costs and Public Voucher were applied most often (61.9% and 76.2% respectively), while Performance Based Payments was used less than half the time risk was rated, 42.9%.

Only two plans used any high risk ratings and these were in the Performance Based Payments area (#23) which ultimately drove high risk ratings at the service set level and in the Public Vouchers area (#42) which was mitigated to moderate risk ratings at the service set level by low and moderate ratings in the other two One Book Chapters.

1.   Progress Payments Based on Cost

Progress payments recognize a contractor's need for working capital due to long lead times and work in process costs and thus provide interim financing for contracts other than cost-reimbursement arrangements. DCMA's role regarding the management of progress payments is three-fold: ensure that Government funds are protected, that the contractor is paid in a timely fashion commensurate with the actual work performed as per contractual requirements, and that overpayments are avoided. To do this the contractor's management systems, financial condition, and contract performance must be

monitored. Table 4.24 provides an overview of the key processes/systems chosen for risk management under the Progress Payments One Book Chapter 9.2.

Thirteen (13) of 42 RAMP plans (31.0%) addressed progress payments as a risk management area. The 13 plans used five different processes/systems in seven different configurations to assess risk for the contractor. "Management of Company Financial Condition" was the most frequently used process, 84.6% of the time. Clearly there is a lot of continuity between the various plans, with a majority of the plans using the exact same configuration. No one plan used a key process or system not used elsewhere. No RAMP plans rated high risk in this area. An absolute majority of risk ratings were low: 84.6% for *performance*, 92.3% for *schedule*, and 76.9% for *cost*.

PROGRESS PAYMENTS RISK MANAGEMENT PLANS NO.s KEY PROCESSES/SYSTEMS	1	4	5	22	25	28	30	31	32	33	38	41	42
Management of Company Financial Condition	x	x	x	x	x		x	x	x	x		x	x
Management of Costs	x	x	x	x			x	x	x	x		x	x
Management of Business Systems	x	x	x	x				x	x	x	x		x
Management of Production & Quality Assurance (QA)	x	x	x	x					x	x			x
Management of Progress Payment Requests, Preparation, & Submittal	x	x	x	x		x	x	x	x	x			x

Table 4.24.   Key Processes/Systems for Progress Payments.
(Source: Developed by Researcher.)

2.   Public Vouchers

Contractors submit interim and final public vouchers for costs and fees under cost-reimbursement, time-and-materials (T&M), and labor-hour (LH) contracts. DCMA

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contract auditors are authorized representatives of the Administrative Contracting Officer (ACO) for receiving vouchers, approving interim vouchers, authorizing contractor direct submission to the disbursing office for those suppliers with approved billing systems, and forwarding final payment vouchers to the ACO for approval. The auditor may be the Defense Contract Audit Agency (DCAA). Table 4.25 provides an overview of the key processes/systems chosen for risk management under the Public Vouchers One Book Chapter 9.4.

Seventeen (17) of 42 RAMP plans (40.5%) addressed public vouchers as a risk management area. The 17 plans used six different key processes/systems in ten different combinations to assess risk for the contractor. "Management of Voucher Preparation and Submittal" was the most commonly chosen area for risk management, used 82.4% of the time. One again there is visibly a great deal of continuity between the plans and their chosen methodologies. A good deal of overlap exists even when there is variation.

PUBLIC VOUCHERS KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLANS NO.s																
	1	4	6	22	23	24	25	28	30	32	33	34	35	39	40	41	42
Accounting System													x				
Contractor Procedures		x										x	x				
Management of Financial Condition	x	x	x	x					x	x	x	x	x	x	x		
Management of Business Systems	x	x	x	x				x		x	x		x	x	x		x
Management of Costs	x	x	x	x				x	x	x	x			x	x	x	x
Management of Voucher Preparation/Submittal	x	x	x	x	x	x	x		x	x	x		x	x		x	x

Table 4.25.   Key Processes/Systems for Public Vouchers.
(Source: Developed by Researcher.)

Only one RAMP plan rated risk as high in this area:

- #42: Raytheon Tucson ESSM program was rated as high risk in the areas of *schedule* and *cost*; *performance* risk was rated moderate. Four key processes/systems are chosen to manage risk, as indicated above. Only the "Management of Costs" process received high risk ratings: This area was chosen because only allocable, reasonable costs are allowable. Rating rationale indicated that the contractor had notified the Government that additional funds are needed; past performance indicates previous cost control problems; and Limitation of Cost/Limitation of Funds notifications were not being provided to the Government until requested and then, late. Performance progress consistently lags funding. The chosen risk handling tool for this area is 100% monthly "Audit Voucher for Fee".

The key processes/systems chosen for risk management were consistent and used extensively by other plans addressing risk management under the Payment and Financial Management service set. But only one of the three rated risk as high: "Management of Costs". The rationale for this clearly justified the risk rating and its importance. The high risk rating here however, did not produce a high risk rating at the service set level due to the mitigation effect of other One Book Chapter risk ratings for the plan. The chosen risk handling plan, "Audit Voucher for Fee" seems consistent with the need to verify costs.

3. Performance Based Payments

Performance based payments provide contractor financing vice payment for accepted items. It is applicable when objective and quantifiable performance measurements exist or when completion of definable events is appropriate. DCMA is responsible for administrating payments under this program which is preferred due to the clearly, definable links between performance and dollars and allowance for the establishment of clear goals. Performance Based Payments are used for fixed price type contracts when no other financing is provided for. Table 4.26 provides an overview of

the key processes/systems chosen for risk management under the Performance Based Payments One Book Chapter 9.3.

Nine of 42 RAMP plans (21.4%) addressed Performance Based Payments as a risk management area. The nine plans used seven different key processes/systems in seven different configurations to assess risk for the contractor. "Management of Performance Based Requirements, Preparation, and Submittal" was by far the most commonly used process, occurring 77.8% of the time. RAMP plan #34 was "in process" of rating risk for this area and provided no key process/system information.

PERFORMANCE BASED PAYMENTS KEY PROCESSES/SYSTEMS	RISK MANAGEMENT PLANS NO.s								
	5	19	22	23	34	39	40	41	42
Accomplishment of Performance Certification	X								
Completion of Contract Milestones						X	X		X
Management of Business Systems	X	X							
Management of Company Financial Condition	X	X				X	X	X	
Management of Costs	X	X				X			X
Management of Production/QA & Physical Percent of Completion	X	X							
Management of Performance Based Requirements, Preparation, & Submittal	X	X	X	X		X	X		X

Table 4.26. Key Processes/Systems for Performance Based Payments. (Source: Developed by Researcher.)

Only one RAMP plan rated risk as high for performance based payments:

- #23: Lockheed Martin Missiles and Fire Control was rated as high risk in all three areas of *performance, schedule,* and *cost.* "Management of Performance Based Payment Requirements, Preparation, and Submittal" is the chosen risk management area. Physical verification reviews indicated delinquent subcontractors. Production lines are co-mingled with other contract efforts. Contractor is financially stable, however a potential merger may affect this. A moderate number of changes is anticipated to

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require renegotiation of events and anticipated major changes may expose the contract to greater risk than previously known. The chosen risk handling tools for this process are 100% monthly "Data Analysis", 100% annual "DCAA Audit" of incurred costs to verify performance payments are not advance payments, initially "Established Surveillance Plan", 100% "Product Audits" as submitted for approval, and monthly 100% "Review of Paid Vouchers".

The high risk plan uses only one key parameter to manage risk for the contractor under Payment and Financial Management: "Management of Performance Based Requirements, Preparation, & Submittal." This system is commonly used in the other plans under this service set, but usually in conjunction with other key parameters. The high risk ratings here drive the high risk ratings at the service set level. The rationale noted several problem areas to defend the high risk rating. Five different risk handling tools are listed and would seem to encompass the problem through their combined umbrella effect regarding nearly every aspect of this area.

H.   VARIABILITY IN THE SAMPLED PLANS

The following sections address a few summary observations regarding variability in the RAMP plans as a whole:

1.   Missing Risk Ratings

The risk rating process for the RAMP plans start with risk planning. Planning involves the identification of key processes/systems that can have a significant adverse affect on performance, schedule, or cost if not properly controlled. The "significant adverse affect" is defined based on probability of occurrence and impact. Those processes or systems meeting this requirement as determined by DCMA personnel are rated in the RAMP plan. Contract requirements, memorandums of agreement (MOAs) with the customer, or other delegations such as subcontract work provide additional

reasons to rate specific processes or systems not otherwise identified as a ratable item by DCMA.

The RAMP plans typically indicate why a process or system is chosen to be worthy of inclusion but usually make no statement regarding the exclusion of a particular Service Set or One Book Chapter or process/system. One Book Chapter ratings are built from the rated key processes/systems. So, if no key processes/systems are identified under a particular One Book Chapter, then that chapter is not included in the RAMP plan. The same is true for Service Set risk assignments, whose ratings follow those given to appropriate One Book Chapters. If no chapters under a given Service Set are rated, then that Service Set is rated as "NA" or "not applicable".

So, while every RAMP plan contains an Overall rating for the contractor, contract, program, or facility in question, the plans do not contain ratings for every identified Service Set and One Book Chapter formatted into the RAMP database. Absent the knowledge of the decisions made during the risk planning phase, consumers of RAMP data may not have a full understanding of why individual areas were not evaluated.

2. Key Process/System Choice

Functional specialists or process owners identify key processes/systems from which the risk ratings will be assigned. There is no one reference or master laundry list from which these processes may be selected. Specialists refer to a number of guides, publications, directives, and other information sources specific to their One Book Chapter area to determine possible process or system areas conducive to risk management surveillance.

A good starting place identifying key processes/systems is the DLAD 5000.4 One Book. Each One Book Chapter provides some direction regarding the risk planning process, but details and data references vary greatly from listing recommended (and sometimes required) processes or systems for surveillance to referencing FAR/DFAR requirements or DoD Directives. Often data links are provided to specific guides and publications e.g. EVMS Guidebook, DSMC Acquisition Logistics Guide, DSMC Test and Evaluation Guide, Software Engineering Institute's Software Capability Maturity Model, and the Contractor Purchasing System Review (CPSR) Guidebook. The Supplier Risk Management One Book Chapter 3.0 is often referred to as well.

All One Book Chapters refer the specialist to the applicable contract, appropriate modifications, MOAs, and Letters of Delegation/Instruction (LODs/LOIs) for their specific RAMP plans. Given the contract/contractor specific requirements as well as the previously mentioned data sources for key process/system identification, the degree of variability of RAMP plans for key process/system identification is great. This makes any sort of comparative analysis between the plans difficult. While a more systemic "cut and paste" risk management plan process would be easier to comparatively evaluate, it would hold no true meaning for risk managers. The plans are specific to the contractor and effort at hand and rightfully so.

3. Risk Handling Tools

Key process owners use a pull-down menu within the RAMP database to select fro a listing of risk handling tools to indicate their methods of risk mitigation. If their tool is not listed they may add their own. This type of selection accounts for the common terms used in most of the RAMP plans to indicate risk handling efforts for specific key processes/systems. Although many of these terms are not very descriptive in and of

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themselves (i.e. data analysis, corrective action, product audits, etc.), their commonality provides some ability to comparatively analyze the chosen tools.

"Data Analysis" was the most often applied risk handling tool (used in1084 instances), followed by "Product Audits" (860 uses), "System Evaluation" (692 uses), and "Corrective Action" (468 uses). "In process" risk handling tool assignments were the fifth most common (329 uses) and often associated with "in process" risk rating assignments, but not exclusively. "Data Analysis" was a popular application across various Service Sets, ranking as the most popular tool in half of the One Book Chapters, and in the top three risk handling tools for each of the chapters 80% of the time.

Information regarding intensity, frequency, and schedule is a data entry requirement for he tools and is there to provide specifics. Some plans provide verbose, descriptive narratives supporting their risk handling selection and application, others provide little at all. Similarly, some plans detail their risk handling efforts beyond the basic risk handling tool identification within the narrative (i.e. identify exactly what data items undergo "data analysis") to add value to the risk handling selection, while others do not.

So, while the system is designed to provide focal points (and create areas of commonality and comparability) it simultaneously provides flexibility to match the risk handling tool to the specific problem or key process/system identified for risk management efforts.

I.   CHAPTER SUMMARY

This chapter begins with an introduction of DCMDW and the sampled RAMP plans from this DCMA region. It provides an overview of the Overall, Service Set, and

One Book Chapter risk ratings for each of the 42 sampled plans. The Overall risk ratings and Service Set summary is presented and a brief discussion of *performance, schedule,* and *cost* follows. Then each of the Service Sets is presented with a summary and analysis of the high, moderate, and low risk ratings for each of the three areas. Immediately following each of the Service Sets are the applicable One Book Chapters and the chosen key processes/systems for rating risk for each of RAMP plans rating risk in this area. A summary analysis and discussion of the high risk areas follows for each of the One Book Chapters. Finally, variations between the sampled plans regarding non-risk ratings, key process/system choice, and risk handling tool methodology are noted.

The next chapter will draw conclusions regarding how DCMA addresses risk management in the acquisition process based on the analysis of 42 sampled RAMP plans within the DCMDW region. Recommendations and further areas of recommended study will be provided.

V. CONCLUSIONS AND RECOMMENDATIONS

A. OVERVIEW

The focus of this research was to examine how DCMA addresses risk management in the acquisition process. To do this, the concepts of risk, risk in acquisition, and risk management in the context of the Federal Acquisition Process were presented. The role of DCMA in the post-award contract administration phase and their philosophy regarding risk management was discussed. DCMA's new information technology tool for managing risk, RAMP was presented and a sample of 42 RAMP risk management plans for strategic and critical suppliers from the DCMDW region were studied. Performance, schedule, and cost risk ratings were examined at the Overall, Service Set, One Book Chapter, and key processes/system levels to determine commonalities and consistencies between the plans. High risk ratings and their associated risk handling tools chosen to mitigate risk were discussed in detail. Finally, systemic variabilities and some conclusions as to their causes were presented.

B. CONCLUSIONS

This research will present conclusions by answering the primary and subsidiary research questions proposed in Chapter 1:

1. Subsidiary Research Question 1: What is Risk Management in the Context of the Federal Acquisition Process?

The Federal Acquisition Process assesses and manages risk through all three phases of pre-solicitation, solicitation-award, and post-award administration. While risk and risk treatments may vary from phase to phase, the five-step DoD risk management process remains consistent throughout: risk planning, risk assessment, risk handling, risk monitoring, and risk documentation.

Central to this is risk identification and risk analysis as part of the risk assessment phase. Key processes and systems are chosen for risk handling based on a measure of their likelihood of occurrence and their impact should the risk be realized. So probability and consequence are the drivers of risk assessment. Risk handling can be treated in one of four ways: risk avoidance, control, transfer, and assumption.

Basic risk management in the Federal Acquisition Process is consistent with methods prescribed elsewhere. While there is no one formally directed way or system to manage risk within Government acquisition, the basic philosophies of the five-step risk management process and the associated risk assessment treatment and risk handling options remain consistent throughout. The core foundation is the same, but the specifics and therefore the ability to compare risk between the various systems, agencies, and services is difficult at best. This is appropriate if complexity and variation of Government and DoD acquisition is considered, at least from the standpoint of deriving meaningful conclusions and not looking at wrote, summated descriptions that offer little scientific analysis and even less real solutions to problem solving and actual risk management.

2. **Subsidiary Research Question 2: What is the Defense Contract Management Agency (DCMA) Philosophy with regard to Risk Management in the Post-award Contract Administration Phase?**

DCMA is the principal contract administrator for DoD and follows the standard prescribed risk management process. IPTs, PROCAS, and Management Councils (all recognized acquisition reform initiatives) are central to DCMA's risk management efforts of using a comprehensive risk management methodology inclusive of all stakeholders and applicable to all its suppliers. All are fully incorporated into their system for developing and maintaining risk management plans.

The nexus for risk management within DCMA is the DLAD 5000.4 One Book, in general, and specifically, Chapter 3.0 describing the risk management process and assigning responsibilities to all the CMOs. Central to this is the risk matrix structure that defines risk in terms of probability and consequence and assigns risk ratings in the three areas of performance, schedule, and cost for each of the applicable One Book Chapter areas and they're associated key processes/systems. The new tool for managing this risk process within DCMA is RAMP, an information technology database of risk management plans.

The RAMP program is a comprehensive risk management tool. It incorporates all five phases of the risk management process and allows for ready reference, quick update, and widespread information sharing within DCMA of risk management plans for various suppliers, programs, and contracts. Its information will be made available to customers (i.e. Program Managers) but it is expressly not to be used as past performance information. While RAMP will remain closed to suppliers, information contained within will be shared and discussed through other mechanisms (e.g. IPTs and Management Councils) to continue to promote a teaming and responsive atmosphere.

So, the risk management philosophy within DCMA is one of comprehensive and inclusive management using information technology to enhance its performance and customer service. It's philosophy and techniques are consistence with the Federal Acquisition Process and prescribed DoD methodologies. It is important to note, that DCMA sees this as "risk management" and not just "risk handling" or "risk monitoring" because its key tool, RAMP incorporates all five phases of the risk management process and it is iterative and timely.

In actuality, it is the suppliers' job to handle the risk for their contractual efforts. DCMA's role is really one of assessment, monitoring, and documentation of the contractor's systems, processes, and actual risk handling techniques. But from an internal standpoint of managing suppliers, DCMA is handling risk by assessing and monitoring problematic supplier areas (key processes/systems) and supplier methods to manage risk. This assessment and monitoring allows the Government (either at the administration level or the customer level) to take lawful and meaningful contractual actions to seek correction, consideration, or resolution that is fair and reasonable within the terms of Government procurement and the contract.

3.   **Subsidiary Research Question 3: Are Risk Management Plans for Specific Activities Consistently Developed and Applied within DCMA?**

The DLAD 5000.4 One Book Chapters for the various areas addressed in the RAMP format for risk management plans and indeed, the RAMP program itself clearly promotes consistent development and application of risk management plans for the various geographically dispersed suppliers, contracts, and programs administratively managed by DCMA. While the plans are not carbon copies of each other and there are significant variations in narration style (descriptive and fluid v. formal and brief), depth of justification for assigned risk ratings (100 pages v. 10), and span of risk rating areas (16 One Book Chapters rated v. 1) the plans are all formatted identically and use the same option areas for rating risk down to the One Book Chapter level. Key processes and system level risk ratings present much more variability given the large number of choices available to functional specialists/process owners from generic sources and the individual contracts. While the individual plans overall may tend to use a different key process/system combination to address risk for an applicable One Book Chapter, there is

a great deal of overlap between plans of the key process/system choices leading to the conclusion that there is really a great deal of commonality in the choices made, especially for the area that lend themselves for being a bit more systemic and process oriented (i.e. public vouchers) vice being more contractually specific (i.e. product quality).

Risk rating methodologies, as far as they are described, appear to be consistent. Performance, schedule, and cost are rated and justified according to their probability and impact for the specific key process or system. The process/system ratings consistently flow upward to justify the One Book Chapter ratings, Service Set ratings, and risk ratings Overall. In some senses, this is a "no brainer" because the RAMP plan promotes systemic pyramiding of risk ratings. But the initial key processes and systems must be chosen and the initial risk ratings assigned and justified. Narratives, at all levels, are subjectively written and generally support those rating assignments that flow upward from the process/system assessments.

4. Subsidiary Research Question 4: What are the Areas of Highest Risk for Strategic and Critical Suppliers in the Contract Administration Phase?

Performance was generally ranked as an area of higher risk than schedule and cost, although schedule closely followed due to their intrinsically close relationship and the lowered degree of control or affect the Government can have over these areas as opposed to cost. From the Government's perspective of influence, performance and schedule can be influenced by the amount of money the Government is willing to pay. But influence is not control. From the Government's perspective of function ownership, performance and schedule are strictly controlled by the contractor (i.e., the Government isn't the physical builder of the weapon systems it purchases) and while cost is incurred

based upon the contractor's purchasing and resource use, it doesn't necessarily correlate to price paid by the Government.

The Government can protect itself from cost overruns through fixed-price type contracts. That means the cost area, at least from the perspective of cost to the Government, is controllable by the Government to a higher degree than performance and schedule which ultimately lies in the hands of the contractor. Of course this assumes the contractor will eventually delivery the purchased performance and no additional costs will be incurred by the Government due to delay or failure. Whether this risk is appropriately accounted for under the cost area for a specific contractor, contract, or program in question is debatable. Obviously risk in one area will drive risk in the other areas. But if this is carried too far, then dividing risk into the three categories of performance, schedule, and cost makes no sense and one risk rating will suffice. From this view, it is reasonable to conclude some isolation of these three areas is appropriate otherwise they are meaningless. Generally, risk associated with failure to perform or schedule was addressed under the performance and schedule area and cost was treated separately.

Product Support was the area of highest risk among the Service Sets. It was the most applied Service Set, over 83% of the 42 plans rated risk in this area. This is due in part to the numerous One Book Chapters associated with this area, more than twice as many as any other area. Supply QA – Product Quality was the riskiest One Book Chapter in the RAMP system for the sample; over 76% of the plans assessed risk in this area. Product Quality is a One Book Chapter within the Product Support Service Set and further supports the "most risky" designation. Just as Product Support contains the

majority of One Book Chapter risk areas to support increase its likelihood of risk management efforts, Product Quality included far more identified key processes/systems than any other One Book Chapter; 140 different processes/systems were identified from the 42 sampled plans.

Apart from the sheer numbers aspects of available options to rationalize the high risk associated with Product Support in general and Product Quality specifically, this area intrinsically lends itself to being the most risky. Of all the areas rated, it seems to be the most exactly tied to the specifics of contract performance over more generic and systemic risk areas. They are in congruence with the high risk conclusions regarding the areas of performance and schedule previously mentioned. Delivery is the second most frequently applied Service Set (over 76%) and Schedule and Delivery Management the second most frequently applied One Book Chapter risk (over 69%).

5. **Subsidiary Research Question 5: What are the Most Common Tools used to Mitigate Risk in Key Processes and Systems?**

"Data Analysis", "Product Audits", "System Evaluation", and "Corrective Action" were the most commonly applied risk handling tools in the sampled RAMP plans. While these tools are common enough for a comparative analysis across individual RAMP plans, Service Sets, One Book Chapters, and processes/systems they are too broad for great detail or depth of analysis. When the assigned tools are supported by accurate intensity, frequency, and schedule information as well as narratives describing the selection of tools and their applicability, they become both meaningful and comparable. The quality of the narratives, their descriptiveness and ability to provide rationale to support the tool selection are paramount to RAMP's usefulness. Without it,

they remain comparable at a macro level, but without depth and substance required for detailed use and applicability.

The common risk handling tools highlight DCMA's role to analyze, monitor, and survey and prompt the contractor when necessary. These techniques allow the Government to assess problems and work with the contractor to fix them using risk handling techniques the contractor must ultimately employ. They focus on actions before the final inspection, on procedural and systemic problems to achieve real change in fixing the root cause of production difficulty. This allows DCMA to prioritize process improvement opportunities and allocate resources from a risk-based perspective.

6. Primary Research Question: How Does the Defense Contract Management Agency (DCMA) Address Risk Management in the Acquisition Process?

DCMA uses a comprehensive, inclusive, and iterative approach to risk management. It follows the Government and DoD risk management premise of using a five-step approach to risk management and the basic idea of identifying and assessing key processes/systems whose risk, either through probability or potential impact, offers the most cause for concern from a performance, schedule, or cost perspective. It employs current information technology, RAMP to provide consistency, commonality, access and comparability to its risk management process.

DCMA and the RAMP process for risk management naturally focus on and explore high risk areas given the nature of identifying and establishing key processes/systems and the requirement for written narratives at every level of assessment. The high risk areas tend to be related to performance and schedule, product support and product quality, and delivery. But risk management in the post-award phase requires

DCMA's risk management to be more akin to risk assessment and monitoring than actually handling the risk, because it's really the supplier who has the direct ability to make change and handle risk associated with his processes and systems. However, risk handling does occur from indirect means provided through risk assessment, risk monitoring, and contractually corrective actions consistent with procurement laws and the terms of the contract. The contractor's non-responsiveness is determined by risk management which is a focus on those things that are important vice checking everything. From a cost-benefit approach, this makes economic sense.

C. RECOMMENDATIONS

1. DoD Should Mandate a Common Risk Management Process throughout all DoD Organizations and Applicable to Each of the Services, Agencies, and Acquisition Offices

In times of tightening defense budgets and fewer manpower resources, DoD must find more cost efficient ways to ensure quality is delivered by its contractors. It can no longer depend on 100% final inspection as its primary means of surveillance. By evaluating high risk areas, based on probability and impact, DoD acquisition organizations can focus their attention on the areas where they are likely to reap the most results from a perspective of cost, time, and manpower input—basically a form of cost-benefit analysis.

The risk management process as defined in the DSMC Risk Management Guide is good starting point. However, there are numerous differing and specific plans employed by each of the services, agencies, and individual commands. Achieving a common approach is best achieved by mandating a common information technology tool. This would forward the ideas of interoperability between the services and the application of consistent Government acquisition practices. Having a common methodology that is

directly comparable amongst all DoD organizations improves the Government's ability to learn from itself, make better acquisition decisions, and present one face to contractors. Commonality would open individual acquisitions to more competitors who are able to better understand the common DoD approach and therefore better able to compete.

As it is currently written, RAMP would not address necessary risk management areas prevalent in other phases of the acquisition cycle and it references DCMA specific directives that are not applicable elsewhere. So, RAMP is not suitable for these purposes. Certainly, any information technology solution would have to be greatly expanded and very flexible to accommodate the differing needs and requirements of the various acquisition activities and services. But if a common acquisition system across DoD is an acquisition reform goal then moving in that direction makes formulating such a program much more feasible and cost effective because the variances will be fewer. Of course, from the direct opposite position, by formulating a DoD-wide risk management plan and data system the acquisition arena would move closer to having a common system. Designing the process and mandating the specifics is the first step. The information technology tool should follow.

2. Revise the RAMP Plan Format to Make them Even More Directly Comparable to Each Other and Incorporate a Summated Spreadsheet Linked to the Risk Ratings for Each Area

Currently all Service Sets are presented even when not rated: "not applicable" however, only those One Book Chapters and key processes/systems actually rated are presented in the final risk management plan. Expand the formatting to include all One Book Chapters for all rated Service Sets in the final RAMP plan whether or not they are rated to allow for a more direct comparison of Service Sets between plans. Additionally, for each of the One Book Chapters that are rated prescribe some basic key

processes/system to be commonly listed on all RAMP plans whether they are rated or not. Any additions to these more common areas could be added beneath to provide for needed detail and individuality of contractual efforts. These additions along with written narratives justifying risk ratings provide the necessary flexibility to include meaningful data for specific risk management plans into a common and generic system that is flexible enough to allow for deviations.

Incorporate a summated spreadsheet, similar to that presented in Appendix B, linked to the actual risk ratings for each of the plans at least to the One Book Chapter level. This would allow for quick and easy direct comparison between plans and provide an accurate means to perform statistical analysis and draw summary conclusions about how risk is managed within a given office or geographic region.

3. Use RAMP Data for Past Performance Information

The information currently populating the RAMP database does not fit the DoD definition of Past Performance Information (PPI). This seems like an incredible waste of time and talent and information. The data within RAMP are factual and current. It studies the contractor's processes and systems in terms of performance, schedule, and cost, all relevant PPI issues. Either these data and the way they are collected and presented should be modified to conform to DoD requirements for PPI or the DoD requirements regarding the collection and use of PPI should be changed to accommodate the wealth of information gathered in RAMP.

High risk ratings for suppliers may be a touchy issue from their perspective. But it is important to remember that this rating reflects risk and not necessarily performance. Because the focus of RAMP data is to handle risky areas, it may not and probably does

not address solid performance areas for contractors. Therefore, RAMP, if used as PPI should only be one of several PPI sources because its information is, by definition, limited to problem areas and not performance as a whole. But if used as one piece of the past performance map for a contractor, it will provide good detail regarding how responsive a contractor is once risk is identified, how able a contractor is in identifying and handling their risk, and their propensity to work with the Government to resolve problem issues. Contractors would need to be granted access to RAMP data if used for PPI which is not a far step from the Government's desire to share data with the contractor prior to data upload.

D.   SUGGESTED AREAS FOR FURTHER RESEARCH

Suggested topics for further research include:

1.   Identify and Compare Various Risk Management Models and IT Systems in Use in DoD

What are the areas of convergence and divergence between the models? How can risk management systems be modified to provide a "fit" for all the Services, agencies, and acquisition offices in DoD either in one IT system or in multiple, highly interoperable systems?

2.   Study the RAMP Program from an IT and Process Oriented Perspective

Does RAMP improve or enhance the risk management process at DCMA? Is the RAMP program "user friendly"? Are DCMA personnel adequately trained to use RAMP? Does the automated RAMP process provide meaningful data to users? Is the RAMP process itself a faster and more efficient means of creating, updating, and using risk management plans? How can the RAMP processes for data input, modification, retrieval, and dissemination be improved?

3. Research Whether RAMP and Other Risk Management Activities at DCMA Actually Reduce Acquisition Risk

Overtime, do the risk ratings improve? This can be studied from the standpoint of individual RAMP plans overtime actually documenting risk reduction, reduced risk from the perspective of all RAMP plans written by specific geographic or in-plant offices, or risk reductions documented for the regions or DCMA activities as a whole. Risk reductions can be viewed from the standpoint of fewer area being included and monitored within RAMP and from the standpoint of high risk ratings reduced to moderate or low ratings.

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APPENDIX A. RAMP INVENTORY

INDEX OF SAMPLED RAMP PLANS

PLAN #	DCMDW OFFICE/CONTRACTOR	PROGRAM/CONTRACT
	DCM RAYTHEON, LOS ANGELES	
1	RAYTHEON CO C3S	EPLRS (PRIME)
2	RAYTHEON ELEC SYS (SAT)	F/A 18 E/R HORNET (SUPPORT)
3	RAYTHEON ELEC SYS (SAT)	F 15 (SUPPORT)
4	RAYTHEON ELEC SYS (SAT)	F 15 (PRIME)
5	RAYTHEON ELEC SYS (SAT)	F 18 SPARE/SUPPORT (PRIME)
6	RAYTHEON ELEC SYS (SAT)	TPQ-47 FIREFINDER (PRIME)
	DCM SAN ANTONIO	
7	HUNTSVILLE AVIATION	FACILITY
8	BOEING AEROSPACE SUPT CTR	KC-10 CLS (PRIME)
9	RAYTHEON AIR	FACILITY
10	BROWN & ROOT SVCS CORPS	FACILITY
11	EXXON/MOBIL	SPO600 ... (PRIME)
12	LOCKHEED MARTIN HARLINGEN	EELV (SUPPORT), TITAN IV (FACILITY)
13	GRACO IND	C & T (PRIME)
14	WESTINGHOUSE ELEC CORP	FACILITY
15	SOUTHWEST AIRPORT SVCS	FACILITY
16	DYNA-MARQ	FACILITY
17	STEWART & STEVENSON	FACILITY
18	D&D MACHINERY & SALES INC	FACILITY
19	DAVIES RAIL & MECHANICAL	FACILITY
	DCM PHOENIX	
20	MOTOROLA SSG	F-22 (SUPPORT), F-22 (FACILITY)
21	MOTOROLA SSG	MAVSTAR GPS (SUPPORT)
22	MCDONNEL DOUGLAS HELICOPTER SYS	LONGBOW APACHE (PRIME)
	DCM DALLAS	
23	LOCKHEED MARTIN MISSILES & FC	ATACMS-BAT (PRIME) (FACILITY)
24	LOCKHEED MARTIN MISSILES & FC	HIMARS (PRIME)
25	DRS INFRARED TECHNOLOGIES LP	M1A2 ABRAMS UPGRADE (PRIME) (FACILITY)
26	DRS INFRARED TECHNOLOGIES LPD	JAVELIN DDC SUBCONTRACT (SUPPORT)
27	AMORPHOUS MATERIALS	AV-8B REMANUFACTURE (PRIME)
	DCM VAN NUYS	
28	LITTON SYSTEM INC, G&C SYS DIV	FACILITY
29	SAMS AIRPACK PLUS INC	FACILITY
30	AEROJET GENERAL CORP	TITAN IV (FACILITY)
	DCM SANTA ANA	
31	PARKER HANNIFIN CUSTOMER	FACILITY
32	APPLIED MATERIAL TECH	FACILITY
33	AEROJET	SADARM (PRIME) (FACILITY)
34	HONEYWELL ENGINES & SYSTEMS	DOD (SUPPORT), F-22 (FACILITY)
	DCM LOCKHEED MARTIN, SUNNYVALE	
35	UNITED TECH CORP	MINUTEMAN III PRP (FACILITY)
36	ASSOC AEROSPACE ACT	FACILITY
37	TELECHEM INTL INC	FACILITY
38	NORTHROP GRUMMAN	TRIDENT II MISSILE (PRIME) (FACILITY)
	DCM RAYTHEON, TUCSON	
39	RAYTHEON TUCSON	TOMDEP (PRIME) TOMAHAWK (FACILITY)
40	RAYTHEON TUCSON	AMRAAM (PRIME)
41	RAYTHEON TUCSON	SYSTEMS (PRIME)
42	RAYTHEON TUCSON	ESSM (PRIME)

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SERVICE SETS / ONE BOOK CHAPTERS (Sets 1–6)

ONE BOOK CHAPTERS	1 IP	1 P	1 S	1 C	2 IP	2 P	2 S	2 C	3 IP	3 P	3 S	3 C	4 IP	4 P	4 S	4 C	5 IP	5 P	5 S	5 C	6 IP	6 P	6 S	6 C
OVERALL		L	L	L		H	H	L		M	M	L		M	M	L		M	M	L		L	L	L
1. MAJOR PROGRAM RISK RATING																						L	L	L
Earned Value Management																						L	L	L
Acquisition Logistics Support																						L	L	L
2. PRODUCT SUPPORT RISK RATING		L	L	L		M	M	L		L	L	L		L	L	L		L	L	L		L	L	L
SPRD&E - Design Engineering		L	L	L																				
SPRD&E - Systems Engineering																								
Test and Evaluation		L	L	L																		L	L	L
Configuration and Technical Data Management		L	L	L		L	L	L		L	L	L										L	L	L
Parts Management Program																								
Software CAS		L	L	L										L	L	L						L	L	L
Supplier Quality Assurance - Quality System																								
Supplier Quality Assurance - Product Quality						H	H	H		M	L	L		M	L	L		M	M	M		M	L	L
Packaging Management Program																								
3. DELIVERY RISK RATING		L	L	L										M	M	L		H	H	L		L	L	L
Schedule and Delivery Management		L	L	L										M	M	M		H	H	L		L	L	L
Contract Safety Requirements																								
4. BUSINESS AND FINANCIAL SYSTEMS RISK RATING		L	L	L																				
Contractor Estimating System Reviews		L	L	L																				
Material Management and Accounting Systems		L	L	L																				
Contract Property Management																								
Contractor Purchasing System Reviews		L	L	L																				
5. PAYMENT AND FINANCIAL MANAGEMENT RISK RATING		L	L	L										L	L	L		L	L	L		L	L	L
Progress Payments Based on Costs		L	L	L										L	L	L		L	L	L				
Public Vouchers		L	L	L										L	L	L						L	L	L
Performance Based Payments																		M	L	L				

SERVICE SETS / ONE BOOK CHAPTERS (Sets 7–12)

ONE BOOK CHAPTERS	7 IP	7 P	7 S	7 C	8 IP	8 P	8 S	8 C	9 IP	9 P	9 S	9 C	10 IP	10 P	10 S	10 C	11 IP	11 P	11 S	11 C	12 IP	12 P	12 S	12 C
OVERALL		M	L	L		M	M	M		L	L	L		H	H	H		M	L	L		L	L	L
1. MAJOR PROGRAM RISK RATING														M	M	M								
Earned Value Management														M	M	M								
Acquisition Logistics Support																								
2. PRODUCT SUPPORT RISK RATING		M	L	L		M	M	M		L	L	L						M	L	L	IP			
SPRD&E - Design Engineering																								
SPRD&E - Systems Engineering																								
Test and Evaluation																								
Configuration and Technical Data Management																								
Parts Management Program																								
Software CAS																								
Supplier Quality Assurance - Quality System		M	L	L														M	L	L		L	L	L
Supplier Quality Assurance - Product Quality		M	L	L		M	M	M		L	L	L						M	L	L				
Packaging Management Program																					IP			
3. DELIVERY RISK RATING		M	L	L		M	M	M		M	L	L												
Schedule and Delivery Management						M	M	M																
Contract Safety Requirements		M	L	L						M	L	L												
4. BUSINESS AND FINANCIAL SYSTEMS RISK RATING						M	M	M						M	M	M								
Contractor Estimating System Reviews														M	M	M								
Material Management and Accounting Systems																								
Contract Property Management														H	H	H								
Contractor Purchasing System Reviews						M	M	M						L	L	L								
5. PAYMENT AND FINANCIAL MANAGEMENT RISK RATING																								
Progress Payments Based on Costs																								
Public Vouchers																								
Performance Based Payments																								

SERVICE SETS

ONE BOOK CHAPTERS	13				14				15				16				17				18			
	IP	P	S	C	IP	P	S	C	IP	P	S	C	IP	P	S	C	IP	P	S	C	IP	P	S	C
OVERALL		M	M	L		H	H	H		M	L	L		L	L	L		H	H	H		L	M	H
1. MAJOR PROGRAM RISK RATING																								
Earned Value Management																								
Acquisition Logistics Support																								
2. PRODUCT SUPPORT RISK RATING		L	L	L		M	M	M		M	L	L		L	L	L		H	H	H		L	L	L
SPRD&E - Design Engineering																								
SPRD&E - Systems Engineering																								
Test and Evaluation																								
Configuration and Technical Data Management																								
Parts Management Program																								
Software CAS																								
Supplier Quality Assurance - Quality System										M	L	L												
Supplier Quality Assurance - Product Quality		L	L	L		H	H	H		M	L	L						H	H	H		L	L	L
Packaging Management Program		L	L	L		L	L	L						L	L	L		M	M	M		L	L	L
3. DELIVERY RISK RATING		H	H	H		H	H	M		M	L	L		L	L	L		H	H	H		L	M	L
Schedule and Delivery Management		H	H	H		H	H	M						L	L	L		H	H	H		L	M	L
Contract Safety Requirements										M	L	L												
4. BUSINESS AND FINANCIAL SYSTEMS RISK RATING																						L	L	L
Contractor Estimating System Reviews																								
Material Management and Accounting Systems																								
Contract Property Management																						L	L	L
Contractor Purchasing System Reviews																								
5. PAYMENT AND FINANCIAL MANAGEMENT RISK RATING																								
Progress Payments Based on Costs																								
Public Vouchers																								
Performance Based Payments																								

SERVICE SETS

ONE BOOK CHAPTERS	19				20				21				22				23				24			
	IP	P	S	C	IP	P	S	C	IP	P	S	C	IP	P	S	C	IP	P	S	C	IP	P	S	C
OVERALL		M	M	M		H	H	M		L	L	L		H	M	L		M	M	M		L	M	L
1. MAJOR PROGRAM RISK RATING																		L	M	L		L	M	L
Earned Value Management																		L	H	M		L	M	L
Acquisition Logistics Support																		L	L	L				
2. PRODUCT SUPPORT RISK RATING		M	M	M		H	H	M		L	L	L		M	M	M		L	M	L		L	L	L
SPRD&E - Design Engineering														M	L	L								
SPRD&E - Systems Engineering														M	L	L		L	M	M		L	L	L
Test and Evaluation														M	M	M		L	L	L		M	M	M
Configuration and Technical Data Management														L	L	L		M	M	L		M	M	M
Parts Management Program														H	H	H		M	M	M		M	M	M
Software CAS						M	H	L										L	M	L		L	L	L
Supplier Quality Assurance - Quality System						H	H	H						L	L	L								
Supplier Quality Assurance - Product Quality		M	M	M		H	M	M		L	L	L		H	H	H		M	M	M		M	M	M
Packaging Management Program																								
3. DELIVERY RISK RATING		H	H	H										H	M	M		M	M	M		M	M	M
Schedule and Delivery Management		H	H	H										H	M	M		M	M	M		M	M	M
Contract Safety Requirements																								
4. BUSINESS AND FINANCIAL SYSTEMS RISK RATING														M	M	L								
Contractor Estimating System Reviews														M	M	L								
Material Management and Accounting Systems														M	L	L								
Contract Property Management																								
Contractor Purchasing System Reviews																								
5. PAYMENT AND FINANCIAL MANAGEMENT RISK RATING		L	L	L										L	L	L		H	H	H		M	M	M
Progress Payments Based on Costs														L	L	L								
Public Vouchers														L	L	L		M	M	M		M	M	M
Performance Based Payments		L	L	L										L	L	L		H	H	H				

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SERVICE SETS

ONE BOOK CHAPTERS	25 IP	P	S	C	26 IP	P	S	C	27 IP	P	S	C	28 IP	P	S	C	29 IP	P	S	C	30 IP	P	S	C
OVERALL		L	L	L		M	M	M		L	L	L		M	M	M		L	L	L		L	L	L
1. MAJOR PROGRAM RISK RATING																						L	L	L
Earned Value Management																						L	L	L
Acquisition Logistics Support																						M	M	M
2. PRODUCT SUPPORT RISK RATING		L	L	L		M	M	M										L	L	L		M	M	M
SPRD&E - Design Engineering						M	M	M														H	H	H
SPRD&E - Systems Engineering						M	M	M														M	M	M
Test and Evaluation						M	M	M														M	M	M
Configuration and Technical Data Management						M	M	M																
Parts Management Program																								
Software CAS																						M	M	M
Supplier Quality Assurance - Quality System																						L	L	L
Supplier Quality Assurance - Product Quality		L	L	L														L	L	L		M	M	M
Packaging Management Program																								
3. DELIVERY RISK RATING		L	L	L														L	L	L		M	L	L
Schedule and Delivery Management		L	L	L														L	L	L		L	L	L
Contract Safety Requirements																						H	M	L
4. BUSINESS AND FINANCIAL SYSTEMS RISK RATING		H	L	L						L	L	L		L	L	L						L	L	L
Contractor Estimating System Reviews														L	L	L						L	L	L
Material Management and Accounting Systems														L	L	L						L	L	L
Contract Property Management		H	L	L						L	L	L										M	L	L
Contractor Purchasing System Reviews																						L	L	L
5. PAYMENT AND FINANCIAL MANAGEMENT RISK RATING		L	L	L										L	L	L						L	L	L
Progress Payments Based on Costs		L	L	L										L	L	L						L	L	L
Public Vouchers		L	L	L										L	L	L						L	L	L
Performance Based Payments																								

SERVICE SETS

ONE BOOK CHAPTERS	31 IP	P	S	C	32 IP	P	S	C	33 IP	P	S	C	34 IP	P	S	C	35 IP	P	S	C	36 IP	P	S	C
OVERALL		M	L	L		L	L	L		L	L	L		M	M	M		L	M	L		L	L	L
1. MAJOR PROGRAM RISK RATING										L	L	L		M	M	H								
Earned Value Management										L	L	L		M	M	H								
Acquisition Logistics Support																								
2. PRODUCT SUPPORT RISK RATING		M	L	L						L	L	L		M	M	M		L	L	L		L	L	L
SPRD&E - Design Engineering																								
SPRD&E - Systems Engineering										L	L	L						M	M	M				
Test and Evaluation										L	L	L		L	L	L		M	M	M				
Configuration and Technical Data Management										L	L	L		L	L	L		M	M	M				
Parts Management Program										L	L	L		L	L	L								
Software CAS																		M	L	L				
Supplier Quality Assurance - Quality System		M	M	M						L	L	L		M	M	M		L	L	L		L	L	L
Supplier Quality Assurance - Product Quality		M	L	L						M	M	M		M	M	M		L	L	L		L	L	L
Packaging Management Program														L	L	L								
3. DELIVERY RISK RATING		L	L	L		L	L	L		L	L	L		L	L	L		M	L	L		L	L	L
Schedule and Delivery Management		M	M	M		L	L	L		L	L	L		L	L	L		L	L	L		L	L	L
Contract Safety Requirements		L	L	L														L	M	L				
4. BUSINESS AND FINANCIAL SYSTEMS RISK RATING		M	L	L						L	L	L		L	L	L		L	L	L		M	L	M
Contractor Estimating System Reviews		L	L	L						L	L	L		L	L	L		L	L	L				
Material Management and Accounting Systems		M	L	L						L	L	L		L	L	L		L	L	L		M	L	M
Contract Property Management		L	L	L						M	L	L		M	L	L		M	M	M				
Contractor Purchasing System Reviews		L	L	L						M	M	M		M	L	L								
5. PAYMENT AND FINANCIAL MANAGEMENT RISK RATING		M	L	M		L	L	L		L	L	L		L	L	L		L	L	L				
Progress Payments Based on Costs		M	L	M		L	L	L		L	L	M												
Public Vouchers						L	L	L		L	L	L		L	L	L		L	L	L				
Performance Based Payments													IP											

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SERVICE SETS / ONE BOOK CHAPTERS	37 IP	P	S	C	38 IP	P	S	C	39 IP	P	S	C	40 IP	P	S	C	41 IP	P	S	C	42 IP	P	S	C
OVERALL		H	H	L		L	L	L		M	M	L		L	L	L	IP					M	M	H
1. MAJOR PROGRAM RISK RATING						L	L	L		L	L	L						L	M	L		M	H	H
Earned Value Management						L	L	L										L	L	L		M	H	H
Acquisition Logistics Support										L	L	L						M	H	M				
2. PRODUCT SUPPORT RISK RATING		H	H	H		L	L	L		L	L	L					IP					M	M	M
SPRD&E - Design Engineering						L	L	L														M	H	H
SPRD&E - Systems Engineering						L	L	L		L	L	L					IP					M	H	H
Test and Evaluation						L	L	L		L	L	L					IP					M	M	M
Configuration and Technical Data Management						L	L	L		M	L	L					IP					L	M	M
Parts Management Program																	IP							
Software CAS										L	L	L					IP					M	L	L
Supplier Quality Assurance - Quality System						L	L	L										L	L	L				
Supplier Quality Assurance - Product Quality		H	H	H		L	L	L		L	L	L										M	M	M
Packaging Management Program																								
3. DELIVERY RISK RATING		M	M	M		L	L	L		M	M	M		M	M	L		H	H	M		M	M	H
Schedule and Delivery Management		M	M	M		L	M	L		M	M	L		M	M	M		H	H	M		M	M	H
Contract Safety Requirements						M	L	L																
4. BUSINESS AND FINANCIAL SYSTEMS RISK RATING						L	L	L		M	M	M		M	M	M		M	M	H		H	H	H
Contractor Estimating System Reviews						L	M	M		M	M	M						M	M	H				
Material Management and Accounting Systems						L	L	L						L	L	L		L	M	M				
Contract Property Management						L	L	L		M	M	M		H	H	H		H	H	H		H	H	H
Contractor Purchasing System Reviews						M	M	M										L	L	M				
5. PAYMENT AND FINANCIAL MANAGEMENT RISK RATING						L	L	L		M	M	M		L	L	L		M	M	M		L	M	M
Progress Payments Based on Costs						L	L	L										M	M	M		L	L	L
Public Vouchers										M	M	M		L	L	L		M	M	M		M	H	H
Performance Based Payments										M	M	M		L	L	L		M	M	M		L	M	M

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