

# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



### THESIS

**AN ANALYSIS OF VERTICAL INTEGRATION IN THE  
DEFENSE INDUSTRY AND ITS EFFECTS ON DoD  
ACQUISITION PROGRAMS**

by

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March 1999

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The Defense Department established a Defense Science Board Task Force on Vertical Integration and Supplier Decisions to determine whether vertical integration had increased in the defense industry, its potential effects on defense products, and whether DoD's acquisition reforms may mitigate any harmful effects. The Task Force final report established the findings that major defense firms had increased their vertical capabilities and very little evidence was presented that vertical integration had created systematic problems for DoD products today. Although an insignificant amount of evidence was available to conclude that vertical integration of the defense industry was detrimental to the national defense of our nation, DoD managers do believe that vertical integration posed potential future concerns to DoD. The evidence of a more concentrated industry and a dwindling defense budget are two factors which contributed to this research into the effects of vertical integration on DoD's acquisition programs. Anticompetitive practices, such as stifling innovation, shutting out other subcontractors, and establishing a monopoly in several areas which limits competition in the defense industry, are reasons for DoD concerns. Although no systematic problems exist for DoD acquisition program managers, certain issues warrant being oversimplified.

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PROGRAMS**

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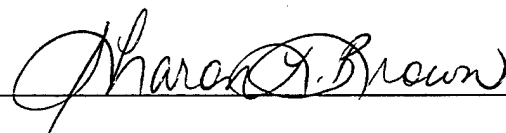
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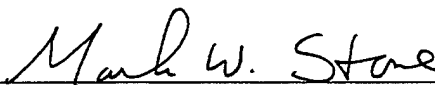
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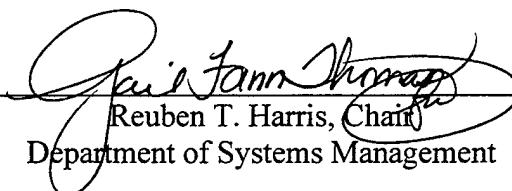
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## **ABSTRACT**

In 1997, Dr. Kaminski, the USD (A&T), requested an investigation into the defense industry and its growing practice of vertical integration. The Defense Department established a Defense Science Board Task Force on Vertical Integration and Supplier Decisions to determine whether vertical integration had increased in the defense industry, its potential effects on defense products, and whether DoD's acquisition reforms may mitigate any harmful effects. The Task Force final report established the findings that major defense firms had increased their vertical capabilities and very little evidence was presented that vertical integration had created systematic problems for DoD products today. Although an insignificant amount of evidence was available to conclude that vertical integration of the defense industry was detrimental to the national defense of our nation, DoD managers do believe that vertical integration posed potential future concerns to DoD. The evidence of a more concentrated industry and a dwindling defense budget are two factors which contributed to this research into the effects of vertical integration on DoD's acquisition programs. Anticompetitive practices, such as stifling innovation, shutting out other subcontractors, and establishing a monopoly in several areas which limits competition in the defense industry, are reasons for DoD concerns. Although no systematic problems exist for DoD acquisition program managers, certain issues warrant being oversimplified.



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## LIST OF SYMBOLS, ACRONYMS, AND/OR ABBREVIATIONS

ACAT – Acquisition Category

AEW – Airborne Early Warning

ASW – Antisubmarine Warfare

AWACS – Airborne Warning Air Control System

BRAC – Base Realignment and Closure

CAIV – Cost As An Independent Variable

CICA – Competition In Contracting Act

CMI – Civil Military Integration

COGP – Commission on Government Procurement

COTS – Commercial-Off-The-Shelf

CSIS – Center for Strategic and International Studies

DoD – Department of Defense

DoDD – Department of Defense Directive

DoJ – Department of Justice

DRI – Defense Reform Initiative

EO – Electro-optical

FAR – Federal Acquisition Regulation

FLIR – Forward Looking Infrared Radar

FOTD – Fiber-optic towed decoys

FTC – Federal Trade Commission

GPS – Global Positioning System

ISDS – Information Space and Defense Systems Group

IRCM – Infrared Countermeasures

JASSM – Joint Air-to-Surface Standoff Missile

JDAM – Joint Direct Attack Munition

JSTARS- Joint Surveillance Target Attack Radar System

MAIS – Major Automated Information System

MDA – Milestone Decision Authority

MDAP – Major Defense Acquisition Program

NASA – National Aeronautics and Space Administration

PM – Program Manager

QDR – Quadrennial Defense Review

R&D – Research and Development

RSC – Raytheon Systems Company

RFCM – Radio Frequency Countermeasures

SBA – Small Business Administration

SBIR – Small Business Innovative Research

SBIRS – Space Based Infrared System

SLAM – Standoff Land Attack Missile

THAAD – Theater High-Altitude Area Defense

TI – Texas Instruments

TWI – Training With Industry

USA – United Space Alliance

USC – United States Code

## I. INTRODUCTION

### A. INTRODUCTION

This research focuses on the practice of vertical integration in the defense industry and addresses certain concerns of the Department of Defense (DoD) which have been raised due to the increased vertical capabilities of some firms. Vertical integration seems to limit competition and innovation. Due to the government's support of vertical integration, the government may have assumed another liability. Initially, vertical integration was a concept widely-accepted by DoD. Now, the practice of vertical integration in the defense industry brings unique concerns to DoD managers.

The 1997 Quadrennial Defense Review (QDR) report called for a defense strategy that balanced continued American engagement today with a focused modernization effort to meet tomorrow's challenges. To promote and protect U.S. interests, the QDR strategy had three main elements: "first, the ability to shape the international environment by promoting regional stability, preventing or reducing conflicts and threats, and deterring aggression and coercion on a day-to-day basis in key regions of the world; second, the need to respond quickly to the full spectrum of crises, from conducting concurrent smaller-scale contingency operations to fighting and winning two major theater wars; and, third, the mandate to prepare now to meet the security challenges of an unpredictable future and discourage prospective rivals from embarking on a military competition with the U.S." [Ref. 20:p. 2] "*Shape-respond-prepare*" became the watchwords of DoD officials who borne the planning responsibility for our national security defense plan.

"This strategy was the conceptual foundation of the review and the QDR programmatic decisions. Implementing the strategy will require 'quality people, ready

forces and superior organization, doctrine and technology,' according to the review. The QDR recommended modest cuts in personnel strength and weapons programs. These prudent reductions, along with systemic improvements in the infrastructure, would allow the U.S. military to meet the near- term requirements of shaping and responding, and long-term modernization to prepare for the future. The QDR assumed that defense spending would remain relatively constant in the future. ” [Ref. 20:p. 2] Although the QDR presented this “*beautiful*” picture of the United States being a superior power and easily having the capability to modernize its armed forces, the current defense spending trend depicts another picture of the color of money.

“The end of the Cold War ushered in an era of declining budgets and sharply reduced expenditures for military procurement, which forced deep cuts in the number and size of weapons programs. In fact, the overall U.S. defense budget decreased from a peak of \$390 billion in 1985 (in constant fiscal year 1997 dollars) to \$252 billion in 1997 -- a reduction of about 35%. More important from the defense contractors’ perspective, however, the procurement budget incurred the brunt of these cuts, sinking from about \$125 billion (fiscal year 1997 dollars) in 1985 to about \$44 billion in 1997, a 65% reduction.” [Ref. 25:p.1] (See Figure 1.1) Pressure to reduce discretionary spending, intensified by the Gramm-Rudman-Hollings deficit reduction act, led to steady reductions in the defense budget through the remainder of the Reagan administration. As mentioned earlier, the procurement budget suffered the greatest with a whopping 65% drop. Moreover, the procurement trend was toward smaller numbers of higher unit cost systems that incorporate advanced technologies such as stealth technology and advanced sensor and fire-control features.

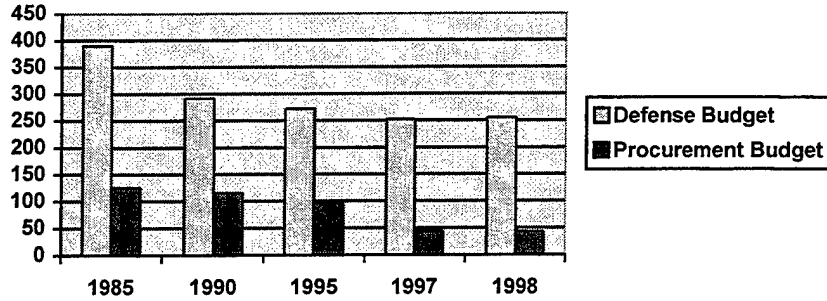


Figure 1.1-Outlook of Defense Budget and Procurement Budget from 1985-1998 (fiscal year 1997 dollars)

A decline in demand of this magnitude, which occurred in an industry that invested heavily in plants and infrastructure in the early 1980's based on expectations on continued growth in the demand for weapons and military systems, led quickly to over-capacity among defense contractors. This over-capacity, in turn, contributed to excess overhead and higher costs for U.S. military programs. The defense industry responded by reducing capacity through consolidation, which resulted in a significant decline in the number of defense contractors. Initially, consolidation and mergers of the defense industry received much support from DoD. Their support was visibly evident and resulted in a highly concentrated defense industrial base.

Soon after President Clinton took office, then Secretary of Defense Les Aspin told contractors that there was an urgent need to shrink their businesses. The goal was to preserve an effective, affordable industrial base that could still produce critical defense systems -- but with smaller budgets. The unacceptable alternative would be to keep unneeded factories and excess employees, driving up the cost that the government paid. William Perry, who succeeded Aspin, was even more direct, saying, " We expect companies to go out of business, and we will stand by and let that happen." [Ref. 23:p. 1]

Defense contractors got the message: merge, consolidate, restructure, reengineer, and unfortunately eliminate jobs. The defense contractors performed a series of mergers and consolidations in order to remain competitive in this smaller defense market. The term, vertical integration or vertical mergers was used to describe the actions occurring in the defense industry. Large contractors began to buy-out sub-tier contractors and in some instances gained the capability to solely produce a much needed defense product. The practice of vertical integration held back sub-tier suppliers from gaining business in the defense industry market and made the defense industry base a smaller operating environment. Although the larger defense contractor organizations could have employed business practices that exclude other firms, there was little evidence of any such practices. Vertical integration began to concern Department of Defense leaders and managers, because it could possibly lead to adverse consequences to acquisition reform initiatives in the form of higher costs, poor quality, and low performance products.

In 1997, the Under Secretary of Defense for Acquisition and Technology, Paul G. Kaminski, announced a series of DoD initiatives to counter the impacts of vertical integration in the defense industry. Consolidation and mergers of the defense industry that began in the early '90s had raised concerns that vertical integration in the defense industry may degrade competition and innovation among sub-tier contractors. A Defense Science Board Task Force was formed and asked to determine whether vertical integration had increased in the defense industry, its potential effects on defense products, and whether DoD's acquisition reforms may mitigate any harmful effects. Dr. Kaminski endorsed the Defense Science Board Task Force's Report on Vertical Integration and Supplier Decisions and mandated their recommendations be implemented. The

Department's actions were undertaken to improve its ability to recognize and address potential problems that may arise from vertical integration in the future.

The primary research question framed in this thesis is how the defense industry's practice of vertical integration has influenced DoD's ability to effectively manage their acquisition programs, if it had any effects at all. The defense industrial base is approximately four percent of the national industrial base and its main reason for existence is to support the defense business of the United States. In the early 1990's, the Defense Department executive officers encouraged consolidation within the industry as an inevitable consequence of shrinking procurement budgets. "In 1993, then Deputy Defense Secretary William Perry urged defense industry executives to combine into a few, large companies to eliminate costly over-capacity. In addition, in 1994, then Deputy Secretary of Defense John Deutch stated in testimony before the House Armed Services Committee that the Defense Department saw consolidation as 'inevitable and necessary.' Also, Deputy Under Secretary of Defense John Goodman reiterated the Defense Department's support for the consolidation process." [Ref. 23:p. 2] So what changed to make DoD managers rethink the merger policies?

Defense contractors saw the writing on the wall and got the intended message from the executive officers. The message simply was that we are spending too much money in the defense budget; companies decide upon your strategy to enable to stay in business with the government and incur a steady profit. Based on simple economic principles, the defense contractors realized that the only way to remain competitive was to merge or consolidate their assets with other defense contractors. With the government being the only buyer of their products, defense contractors devised their company

strategies to become more efficient providers of defense products. So, the practice of vertical integration in the defense industry zoomed. Mergers and consolidations occurred simultaneously. Lower-tier contractors soon complained their business was not receiving much DoD work due to the new, highly-evolving, concentrated defense industrial base. DoD placed into action acquisition reform initiatives and defense reform initiatives in an attempt to reduce defense spending and cut costs to the government. Also, the Base Realignment and Closure (BRAC) policy was enacted to save defense dollars. Little improvements in the form of costs saving to the government were realized, and the mergers of the defense industry provided little evidence of the same. The restructuring of the defense industrial base became an issue of concern to DoD. Therefore, DoD decided to further investigate mergers and consolidations.

This research study explores the following objectives: (1) to analyze the defense industry's practice of vertical integration, (2) to identify the potential effects on defense products, (3) to address the concerns of the Department of Defense as identified in the Defense Science Board Task Force report on vertical integration and supplier decisions, and (4) to provide recommendations for dealing with future potential mergers.

The defense industry's practice of vertical integration has created unique problems for DoD acquisition managers. As a result of consolidation, several major defense firms have increased vertical capabilities thus limiting competition in the marketplace and stifling innovation. A consequence of vertical integration of the defense industry is a more concentrated market and fewer new program opportunities. The recent industry mergers and acquisitions do not provide much evidence to support the practice

of vertical integration as being harmful, but over time, the merging of defense industries could pose some serious concerns for DoD managers.

One of DoD's acquisition priorities is to provide the armed forces service member with a quality product that operates at maximum performance. The practice of vertical integration threatens the quality and performance characteristics of future defense products. Therefore, DoD's primary concerns with the practice of vertical integration are: 1) preferring internal over external suppliers, 2) increasing barriers to market entry, 3) compromising proprietary information, and 4) refusing to use suppliers owned by competitors.

This thesis addresses DoD's concerns of both maintaining competition and preventing barriers to entry and provide recommendations for dealing with future potential mergers in order to alleviate problems for acquisition managers.

## **B. RESEARCH QUESTIONS**

In conducting this research, the primary research question and subsidiary research questions were chosen in order to fully-develop and understand the topic. There are two central topic areas, the vertical integration of the defense industry and DoD's method of conducting acquisitions.

### **◆ Primary Research Question**

How has defense industry's practice of vertical integration affected the Department of Defense Acquisition Programs?

### **◆ Subsidiary Research Questions**

#### **Defense Industry and Vertical Integration:**

- ◆ What are the reasons firms choose to merge and consolidate their businesses?

- ◆ What is vertical integration?
- ◆ What is the present make-up of the defense industrial base?

**DoD - Acquisition Process and Methods of Conducting Business:**

- ◆ What DoD acquisition strategies help support competition and innovation?
- ◆ What problems could a Program Manager face as a result of a firm's consolidation?
- ◆ How are acquisition policies and vertical integration interrelated?
- ◆ To what regulations must Program Managers adhere?

**C. SCOPE, LIMITATIONS, AND ASSUMPTIONS**

**1. Scope**

This thesis analyzes the defense industry's practice of vertical integration and the potential effects it may have upon DoD acquisition programs. The main thrust of this thesis includes: (1) a review of the changes which have occurred in the defense industrial base over the past decade, (2) the potential consequences of vertical integration through limiting competition and suppressing innovation, and (3) the unique challenges faced by acquisition managers in attempting to manage a successful program. The focus of this thesis is on changes in DoD acquisition programs caused by defense industrial mergers. In particular, this research looks at defense industry changes over time, the issues of full and open competition and barriers to entry in the marketplace, and the actual cost savings realized through mergers. This thesis does not focus on global expansion of the defense industry and the potential effects in the United States industrial base. The role of foreign governments and their intervention into the United States industrial market are beyond

the scope of this thesis. Other DoD's initiatives, such as Partnering with Industry, Globalization of Business and Industry, and Civil-Military Integration, are future research topics which may be of interest to acquisition managers.

## **2. Limitations**

Changing regulations impact the research studies. With the recent implementation of the Acquisition Reform Initiatives and Defense Reform Initiatives, little data is available for a thorough analysis of how such initiatives have impacted the defense industrial base. This research paper is also limited by a lack of quantifiable data on cost savings to the government. The cost savings DoD reported in the General Accounting Office Report, GA 1.13:NSIAD-98-156 estimated savings from mergers up to December 1998 amounted to just under \$2 billion. However, "the savings DoD reported were generally not developed from a detailed analysis of the effect of restructuring on individual contract process, but rather were estimated using the same or similar methodologies employed to estimate savings during the certification process." [Ref. 27:p. 2] Proposed contractual changes will affect the overall contract price and contracting methods of doing business with DoD.

## **3. Assumptions**

It is assumed that the reader of this research paper has read "The Defense Science Board Task Force Final Report on Vertical Integration and Supplier Decisions" by the Office of the Secretary of Defense prior to reading this thesis. Although the results of this study are discussed in chapter three of this thesis, it would be beneficial to the reader to have read the entire study.

#### **D. RESEARCH METHODOLOGY**

A comprehensive review of the industrial base, public policy on mergers, contract law, and acquisition reform initiatives was performed to aid in fully understanding this thesis subject. The researcher obtained background information from the Naval Postgraduate Library, the Internet, the Office of the Director of Procurement, and the Center for Strategic and International Studies (CSIS). The researcher examined several documents promulgating the defense industrial base policies and procedures, and past inspector general reports. Several House and Senate reports were reviewed. Based upon this research, correspondence between DoD executive officers dealing directly with procurement policies or industrial base issues were completed.

The primary research objective is to identify factors that affect DoD acquisition manager's ability to effectively manage their acquisition programs. Furthermore, the objectives were to be accomplished through examining the changes in the industrial base over the past ten years, assessing the vertical integration of the defense industry, and determining to what extent vertical integration has affected acquisition programs. Once identified, these factors are analyzed to determine their potential impact on acquisition programs.

#### **E. BENEFITS OF THE THESIS**

The purpose of this study is to determine the effects of vertical integration on acquisition programs. It is the intent of the author to show that the practice of vertical integration does effect acquisition programs. If the author's hypothesis holds true, then DoD managers will have another alternative to consider as they make programmatic decisions where vertical integration appears to be a factor. This study enhances DoD's

ability to effectively deal with industrial mergers and consolidations through identifying alternative measures and policies to consider. If the defense industry's practice of vertical integration does not present any unique issues to DoD, then the study provides less essential information for today but is good food for thought.

## **F. ORGANIZATION OF THE THESIS**

The remainder of this thesis is organized into the following chapters:

- ◆ Chapter II, "Background and Literature Review," presents the reader with background information on the history of the Defense industrial base, the concept of vertical integration, reasons why corporations chose to merge, and DoD concerns about mergers and the practice of vertical integration.
- ◆ Chapter III, "DoD Acquisition Programs," discusses DoD's new method of doing business. It takes into account Acquisition Reform Initiatives and Defense Reform Initiatives.
- ◆ Chapter IV, "Analysis of Vertical Integration and DoD Acquisition Programs," depicts the researcher's analysis of vertical integration and its effects on acquisition programs.
- ◆ Chapter V, "Conclusions and Recommendations," provides the researcher's results of the analysis, concluding statements, and recommendations. Recommendations for future research are listed here.



## II. BACKGROUND AND LITERATURE REVIEW

### A. INTRODUCTION

The defense industrial base is defined as “the combination of people, institutions, technology, and production capacity used to develop and manufacture the weapons and supporting defense equipment needed to achieve our national security objectives.” [Ref. 8:p. 1] It is comprised of three components: maintenance, production, and technology and the health of each component is essential to the ability of the DoD to respond to immediate contingencies and to deter a revived global threat. The defense industrial base is approximately four percent of the national industrial base and consists of private industries, government laboratories, private and public manufacturing facilities, as well as private and government research and development facilities. The defense industrial base is important to the national security of the United States. “The continued integrity of the industrial base is paramount to execute specific defense missions in support of broader national security objectives. However, as defense spending sharply declines and defense industries dwindle, that integrity falters.” [Ref. 8:p. 5]

Since the Cold War peak, the defense industry responded to the approximate 40 percent reduction in the defense budget by consolidating firms, eliminating jobs in the defense sector, and reducing the number of companies in the defense industry. From March 1994 to February 1998, the size of the defense industry changed dramatically. (See Table 1.1) The following table does not represent all proposed and consummated defense acquisitions and mergers, but it identifies thirty-five influential acquisitions and mergers that relate to government antitrust policies. As seen in the table, seven notable

merger and acquisition cases occurred in 1994; twelve followed in 1995; thirteen developed in 1996; and five materialized in 1997. Over \$100 billion of mergers and acquisitions took place in the defense industry. When Lockheed-Martin Corporation decided to purchase Northrop Grumman Corporation, the Pentagon supported the Department of Justice's (DOJ) decision to block the \$11 billion merger. This was the first major intervention from the government in industry acquisitions and mergers. Attorney General Janet Reno pointed out that "this proposed merger would substantially reduce competition in many areas of vital importance to America's national defense. It would cost taxpayers more and take the competitive wind out of the sails of innovation in the production of many critical systems that protect our fighting men and women around the world." [Ref. 27:p. 1] Defense Secretary William Cohen voiced the same apprehensions that the Pentagon was worried concerning about vertical integration in the defense industry.

Vertical integration is a term that describes a firm, that owns the capability to internally supply some of the subsystems or components it needs for its products. A fully vertically integrated firm would produce the entire system – all the subsystems, components and the like – whereas a firm with a lesser amount of vertical capabilities would buy subsystems and components from other firms. In the defense industry in which initially included over 100 companies, has been reduced to three major prime contractors the: Lockheed-Martin, Boeing, and Raytheon Corporations. Over the course of the past five years, mergers greatly expanded, and in 1994, alone, 22 mergers occurred. Defense Secretary Cohen believed that if the proposed Lockheed – Northrop Grumman merger had occurred, combining Lockheed Martin's strength in platforms and

systems with Northrop Grumman's capabilities in electronics and platforms, it would have created a significant risk to competition at the supplier level. The practice of vertical integration posed unique issues to DoD managers.

**Table 2.1-Notable Merger and Acquisitions from March 1994 – February 1998**

<b>Acquiror</b>	<b>Acquiree</b>	<b>Value</b>	<b>Date</b>
Loral	IBM Federal Systems	\$1.575B	3/1/94
Northrop	Grumman	\$2.100B	4/4/94
Martin Marietta	General Dynamics Space Systems	\$209M	5/2/94
Westinghouse Elec Sys	Norden Systems	<\$100M	6/1/94
Northrop Grumman	Vought	\$130M	7/31/94
Allied Signal	Textron Lycoming	~\$375M	10/28/94
Litton	Teledyne Electronic Systems	Not avail.	12/40/94
Hughes	CAE Link	\$170M	2/27/95
Alliant Techsystems	Hercules Aerospace	\$466M	3/15/95
Lockheed	Martin Marietta	>\$9B	3/15/95
Rolls Royce	Allison Gas Turbine	\$5252M	3/30/95
Tracor	Lundy Tech Center	\$7M	3/31/95
Loral	Unisys Defense Operations	\$862M	5/5/95
Litton	Imo	Not avail.	6/5/95
E-Systems	Raytheon	\$2.3B	6/15/95
General Dynamics	Bath Iron Works	\$300M	9/17/95
GM Hughes	Magnavox Electronic Systems	\$370M	12/14/95
Litton	Hughes-Delco Inertial Systems	~\$70M	12/31/95
Allied Signal	Northrop Grumman Precision	~\$50M	12/31/95
Logicon	Geodynamics	\$32M	1/19/96
Litton	Sperry Marine	\$160M	2/9/96
GM Hughes	Littion-Itek	\$26M	2/16/96
Litton	PRC	\$425M	2/20/96
Northrop Grumman	Westinghouse Electric Systems	\$3.6B	3/2/96
General Dynamics	Teledyne Vehicle Systems	\$55M	3/29/96
Lockheed Martin	Loral	\$9.5B	4/22/96
Raytheon	Chrysler Technologies	\$455M	6/14/96
Southwest Marine	Continental Maritime	Not avail.	6/14/96
GEC-Marconi	Hazeltine	\$110M	7/10/96
Tracor	Cordant	\$65-80M	9/26/96
Boeing	Rockwell Aerospace & Defense	\$3.025B	12/6/96
Litton	SAIT Division of SAIC	Not avail.	12/31/96
General Dynamics	Lockheed Martin Armament & Defense Systems	\$450M	1/1/97
GM Hughes	Alliant Techsystems Marine Systems Group	\$141M	2/28/97
Boeing	McDonnell Douglas	\$13.3B	8/1/97
Raytheon	Texas Instruments Defense Business	\$2.95B	7/11/97
GM Hughes Defense Business	Raytheon	\$9.5B	12/17/97
Lockheed Martin Corp	Northrop Grumman Corp	\$9.0B	Blocked 3/98

DoD's primary concerns with the practice of vertical integration are: 1) preferring internal over external suppliers, 2) increasing barriers to market entry, 3) compromising proprietary information, and 4) refusing to use suppliers owned by competitors.

[Ref. 3:p. 3] A vertically integrated firm can employ business practices that exclude or harm other firms. Such business practices can lead to defense products that are lower in performance, more costly, and of poorer quality. Although a firm may consolidate or merge with another company for different reasons, changes in the economic incentives, new company leaders, and future business operations, all may affect the actions a firm takes to remain competitive in the defense industry. Proponents of vertical integration in the defense industry believe that the creation of the huge contractors eases the tough management burden of the Pentagon. It allows prime contractors to integrate all the complex components that go into modern weapons, and to integrate different weapon systems so that they work properly together. Vertical integration advocates feel that such innovation on behalf of the government contractors allows them to do what they do best -- build the weapon systems and the Pentagon to do what it does best -- fight wars.

[Ref. 9:p. 1] These proponents of vertical integration fail to realize the potential harm that could arise to defense products or competition if the practice of vertical integration is not adequately monitored and regulated.

The concentrated defense industry combined with few new DoD program opportunities creates a potentially static business environment. These altered conditions in the industry could change the incentives for firms to employ vertical integration to their advantage. In so doing, firms might disadvantage other firms; this would potentially affect defense products cost, quality, and performance. Some market pressures --

including active competition at the prime contractor level, changes in missions and technologies, and internal corporate dynamics -- create incentives that mitigate against firms using internal capabilities preferentially, and over time, might motivate firms to shed vertical business units. [Ref. 1:p. 3] Therefore, it is the job of all DoD managers to execute their duties in the most efficient and effective manner possible, to be good stewards of the taxpayer's dollars, and to become smart, effective, well-informed buyers. DoD antitrust policies and procedures must effectively address any concerns with vertical integration to stay ahead of potential problems. DoD must pay close attention to the defense industry and its business practices.

## **B. THE ANTITRUST APPROACH TO VERTICAL INTEGRATION IN THE DEFENSE INDUSTRY**

There are two antitrust agencies -- the Federal Trade Commission (FTC) and the Department of Justice (DOJ) -- that strive to improve DoD's involvement in the antitrust process. FTC and DOJ antitrust agencies design antitrust rules to protect competition, to eliminate barriers market to entry, and ultimately, protect consumers from the improper exercise of market power. Congress decided over hundred of years ago that a competitive economy would provide maximum benefits for consumers in the form of lower prices, optimal quality and quantity of goods and services, and greater innovation. This served to supervise an economy based on government control or the accumulation of market power by private interests. The 1968 Merger Guidelines of the Department of Justice embodied four main economic principles:

- (1) the number and size distribution of firms selling in a market are important determinants of competitiveness and, indeed, that rather small increases in market share may substantially reduce competition;

- (2) that vertical integration may reduce competition by raising entry barriers;
- (3) that conglomerate acquisitions can reduce competition by eliminating potential entrants, providing opportunities for reciprocity, or entrenching dominant positions; and
- (4) that efficiency can be enhanced just as well by internal growth as by mergers and acquisitions.

The Department of Justice published a vertical merger enforcement policy citing at least three general categories of vertical merger theories -- foreclosure/raising rivals' costs, increased anti-competitive coordination, and regulatory evasion. [Ref. 13:p. 5] The first theory, foreclosure and raising rivals' costs, posits that a vertical merger may allow an integrated firm to deny or to raise the cost of inputs to its rivals -- input foreclosure -- or to deny or to limit access by rivals to downstream customers -- customer foreclosure.

“The theory's focus on market power as a necessary condition is appropriate because a vertical merger is likely to harm competition unless it gives the integrated firm the ability and the incentive to induce new market equilibria upstream and downstream. With market power, an integrated firm may be able to raise its rivals' costs or foreclosure access to inputs. It may be able to raise costs directly by inducing a price increase. It may also raise its rivals' cost by impairing their ability to operate above minimum efficient scale. In any event, the integrated firm must also have the incentive to do so, that is, a post merger upstream price increase must increase the integrated firm's total profit upstream and downstream.” [Ref. 13:p. 5]

Vertical mergers can also increase anti-competitive coordination when important price and non-price information, particularly technology, must be shared between the supplier and the customer. [Ref. 13:p. 5] If a vertical merger allows an integrated firm to evade that regulation and exercise market power in either the regulated market or an

adjacent market, it is possible that welfare will be reduced. This is most common when artificial transfer prices allow rate regulation avoidance. These four main economic principles are still very relevant today, for if a proposed merger is suspected to anti-competitive, then it will be highly reviewed by the FTC and DOJ.

### **1. The Federal Trade Commission**

What is the role of the FTC concerning vertical integration in the defense industry? The Commission's proper role is to establish antitrust regulations and enforce the antitrust laws in the ongoing consolidations among companies that supply goods and services to the Defense Department. The Commission identifies, investigates, and analyzes mergers in order to make a determination whether it has reason to believe a particular merger will harm competition, with particular emphasis on the analysis articulated in the Merger Guidelines jointly issued by the Commission and the Department of Justice. "In analyzing a proposed merger, the Commission focuses on one overriding issue: the likelihood that the transaction will harm customers in any relevant market through increased prices; lower product quantity, quality or service levels; or reduced technological innovation. If the Commission has reason to believe that a merger will create or enhance market power or facilitate its exercise, and there are no countervailing considerations, it has two primary options:

- 1) to seek an injunction in federal court to block the merger, or
- 2) to fashion a remedy that will eliminate the competitive problem.

If anti-competitive effects are not likely, the Commission will not challenge the transaction." [Ref. 25:p. 2]

The Commission uses an analytical framework, which is set out in the joint Department of Justice and Federal Trade Commission Merger Guidelines, to analyze mergers. The guidelines are a flexible tool designed for use in all kinds of industries. They anticipate a particular industry's structural and behavioral characteristics that distinguish them from other industries, and provide an analytical framework that takes these characteristics into account. The analysis of mergers in the defense industry is challenging because of the special characteristics of the industry. The Defense Department is often the only buyer for the products and services of the merging firms, and its procurement processes are different from those in most industries. The products (e.g., weapon systems) being procured are often complex and heterogeneous systems that are frequently purchased on a winner-take-all basis, making cartel behavior less likely. National security may be implicated in a defense industry merger and that point requires further emphasis by FTC. The Commission is sensitive to considerations of national security and in particular that a merger will enable the Defense Department to achieve its national security objectives in a more effective manner. The Commission strongly believes, however, that competition produces the best goods at the lowest prices and is also most conducive to innovation. Therefore, there is generally no conflict between antitrust enforcement and national security. Vigorous enforcement of the antitrust laws is entirely consistent with the goal of preserving a strong national defense. [Ref. 25:p. 2]

## **2. The Department of Justice**

The DOJ's role in enforcing the antitrust laws is significant as well. If companies perceive that they can disregard the laws and conduct business in the manner most beneficial to them, then the effects of vertical integration becomes a larger concern for

DoD and enforcement of the antitrust laws must be actively pursued. One such merger blocked by DOJ is the Lockheed Martin agreement with Northrop Grumman. If this merger had been successful, then a monopoly in the aerospace defense industry would have occurred. It is important to understand the enforcement of antitrust laws in this case.

*a. The Case of United States vs. Lockheed Martin Corporation and Northrop Grumman Corporation*

In the case of the United States of America versus Lockheed Martin Corporation and Northrop Grumman Corporation, the United States District Court ruled that this merger would not be allowed. The United States of America filed a complaint for a civil action to obtain equitable relief against the defendants and sought to prevent the proposed acquisition of the defendants pursuant to an Agreement and Plan of Merger entered into by the defendants on July 2, 1997. This action was filed by the United States under Section 15 of the Clayton Act, as amended, 15 U.S.C. &167 25, to prevent and restrain the defendants from violating Section 7 of the Clayton Act, as amended, 15 U.S.C. &167 18.

Northrop and Lockheed are two of the leading competitors and major providers of electronics systems and military aircraft to the U.S. military. Lockheed and Northrop develop and produce high-performance fixed-wing military aircraft and integrated electronics systems for sale to the DoD. Lockheed also develops and produces space-based platforms for sale to the DoD. Lockheed and Northrop also develop and produce critical defense systems and subsystems including but not limited to airborne early warning (AEW) radar, airborne fire

control radar, and electro-optical (EO) missile warning systems for sale to the DoD or to military prime contractors in the United States for use in U.S. military programs. The proposed acquisition of Northrop by Lockheed would have resulted in unprecedented vertical and horizontal integration in the defense industry which would have substantially lessened, and in several cases eliminated, competition in major product markets critical to the national defense.

“Lockheed and Northrop are the only two suppliers of AEW radar, directed infrared countermeasures (‘IRCM’) systems, and the SQQ-89 antisubmarine warfare (‘ASW’) combat system to the U.S. military. They are also the only effective competitors for U.S. military EO missile warning systems, and the two leading suppliers of remote mine hunting systems and stealth technology. Lockheed, Raytheon Company, and Northrop team (with Northrop as the supplier of the critical electronics technology), are the only companies developing fiber-optic towed decoys (‘FOTDs’). Lockheed and Northrop are two of only three viable suppliers of on-board radio frequency countermeasures (‘RFCM’) systems and high performance fixed-wing military aircraft for the U.S. military.” [Ref. 29:p. 2]

“If Lockheed acquires Northrop, it will obtain a monopoly in AEW radar, EO missile warning systems, directed IRCM systems, FOTDs, and the SQQ-89 ASW combat system. This monopoly position likely will lead to higher costs, higher prices, and less innovation for systems required by the U.S. military. Lockheed's acquisition of Northrop will also substantially reduce competition in on-board RFCM systems, high performance fixed-wing military aircraft, stealth

technology, and remote mine hunting systems. The acquisition, if consummated, would result in only Lockheed and The Boeing Company ('Boeing') remaining as suppliers of U.S. military high performance fixed-wing military aircraft, with the two companies teamed on virtually every military aircraft currently in production. The increased interdependence between Lockheed and Boeing may lead to reduced competition among aircraft platforms, less price competition, and reduced innovation in the high performance fixed-wing military aircraft market."

[Ref. 29:p. 2]

"The acquisition would have given Lockheed strong economic incentives:

- (1) to favor its in-house capability to the detriment or foreclosure of other system and subsystem competitors, and
- (2) to refuse to sell, to sell inferior quality, or to sell at disadvantageous terms, its in-house capability to its platform and integrated electronic system competitors.

The acquisition will likely result in less innovation by Lockheed and other platform, system, and subsystem competitors, possible exit by competitors, fewer opportunities for and increased barriers to competitive entry, and lower quality subsystem, system, and platform products at higher costs and higher prices to the U.S. military. The proposed acquisition of Northrop by Lockheed will substantially lessen competition in all identified product markets. For these reasons, DoD found that the proposed merger presents 'an unprecedented combination of horizontal and vertical problems' which raise 'significant competitive problems for the DoD,' which led DoD to conclude that 'the Department's interests would be best served if Lockheed Martin and Northrop Grumman do not merge.'" [Ref. 29:p. 4]

The antitrust agencies seek to protect the Defense Department. Any proposed merger which may impact cost, product performance, and quality are highly scrutinized by FTC and DOJ officials. In the early 1990's, when the practice of vertical integration was growing rapidly, the agencies merely took notice of the occurrences and began to question where was this process going.

### **C. THE PRACTICE OF VERTICAL INTEGRATION IN THE DEFENSE INDUSTRY**

Vertical integration is a subject that has been studied for over four decades, and little progress has been made in the area. In this era of downsizing, in both the private and public sectors, much emphasis has been placed on efficiency, cost-cutting, and global expansion. Prior to 1992, the government prohibited most large combinations of weapon makers because it wanted to force them to compete with one another. There was little regard given to the costly duplicative research and development efforts and the excess overhead of the contractors. After the fall of the Soviet Union and the decline of the defense budget, antitrust guidelines were relaxed, and defense contractors were encouraged to merge or consolidate their businesses.

#### **1. Reasons Why Firms Merge**

Today's mergers and acquisitions are financial transactions, naturally, but the real payoff comes from integrating the strengths of two or more companies once the deal is approved. The integration allows the combined organization to take advantage of economies of scale, efficiencies gained by adopting each other's best practices, and streamlined organizations. They can also achieve market power--the increased ability to demand lower rates from suppliers and better terms from downstream customers or

retailers. But these benefits depend on their depth of consolidation--how deep and quickly they can integrate to get the synergies that are possible but not automatic.

If one were to ask a representative of a firm to discuss its reasons for merging, he or she would, undoubtedly, receive a plethora of answers ranging from profit, diversification of business and product, global expansion, advanced technology, etc. Of course, mergers occur for different reasons, but two major reasons for the defense industry's mergers are defense spending cutbacks and diminishing profits. If a firm can eliminate the other competitor(s), then that firm will receive a larger market share and higher profits. A general economic theory states that a positive relationship exists between profit rates and the concentration of an industry. A positive profit-concentration relationship supports the inference that increasing concentration leads to increased collusive activity or market power where the larger, more concentrated firms are gaining control of the market and the smaller firms are losing out. (See Figure 2.1)

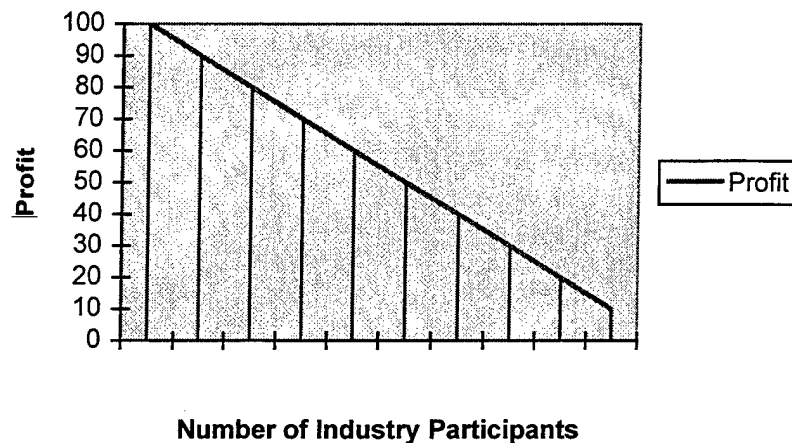


Figure 2.1. Profits in a Concentrated Industry

Figure 2.1 is the researcher's interpretation of how profits in a concentrated industry work. It illustrates that as the number of industry participant's increase, the

industry becomes more concentrated and profits of those industries that remain in the market decrease. Simply put, the more concentrated the market, the higher the profits of the participants. An economic theorem, the Coase Theorem, supports the theory that transaction costs partly explains why firms tend to vertically integrate. The Coase Theorem identified two fundamental systems for directing the allocation of resources in a competitive market. "Outside the firm, price movements direct production, which is coordinated thorough a series of exchange transactions on the market. Within a firm, these market transactions are eliminated and in place of the complicated market structure with exchange transactions is substituted the entrepreneur coordinator, who directs production." [Ref. 1:p. 11] Because the entrepreneur can direct the production, he controls the price and is capable of making it more advantageous to his firm. Thus the transaction costs, the expenditures of resources associated with the use of the market in transferring a good service from one party to another, would make it profitable to vertically integrate. Some of these transaction costs are passed on to the government, or the government chooses to subsidize the restructuring of the defense industry base.

The concern over the future of the U.S. defense industry base increased dramatically as the defense budget began to decline. Defense firms began to consider other options, such as conversion, diversification, civil/military integration, and dual-use technologies, in order to continue their business and remain a healthy market entity. The defense firm's interest grew in the commercial industry for many reasons such as:

- (1) Commercial electronics technology evolved more rapidly than the military environment.
- (2) Military equipment has become more dependent upon advanced electronics.

- (3) Flexible production manufacturing technologies were identified as being more efficient.
- (4) The cost of some military equipment became so expensive that very few firms could produce them. [Ref. 13:p. vii]

These four changes in the market supported the reasons the defense firms consolidated and the government supported them financially. "If the government had to subsidize a totally unique and isolated industrial structure, all of its procurement dollars would go to subsidizing the defense industry, with no money left for purchasing military equipment." [Ref. 13:p. vii]

Supposedly, vertical integration of the defense industry saves the government money. These anticipated cost savings support DoD's encouragement of consolidations. Through various efforts, the defense industrial base reduced to a smaller, more concentrated industry. There is evidence of a reduced number of prime and sub-tier suppliers; the top six firms owning two-thirds of defense sales, and capacity reductions still being underway. The current defense industrial base is smaller and more diverse.

## **2. Current Defense Industrial Base**

The current industrial base consists of research and development, production, and maintenance technologies. The defense industrial base is a small part of the national industry base. The largest defense firms are more vertically integrated. Figure 2.2 graphically depicts the supply channels of the industry. Each level of product adds value to the platform. When a prime contractor is able to build his own major systems, subsystems, and components, he, virtually, eliminates the sub-tier suppliers. Eventually, the sub-tier suppliers go out of business.

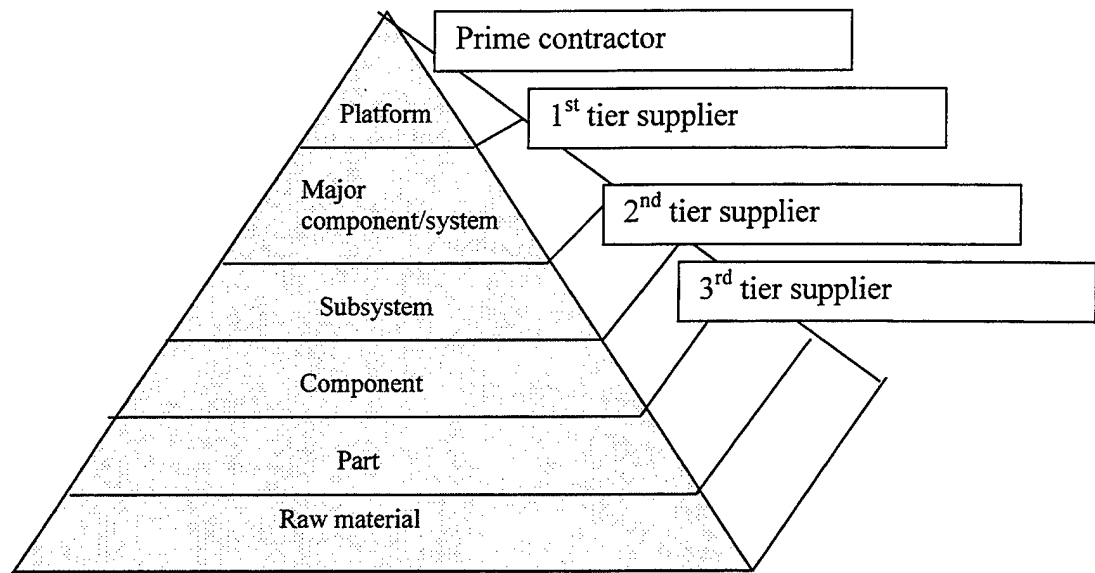


Figure 2.2. Graphic Depiction of each product level  
(Source: Reference 15)

The defense drawdown will not put the largest 25 DoD prime contractors at financial risk, but those lower-tier producers who cannot sustain in the commercial markets. [Ref. 20:p. 4] Suppliers at the lower tiers that have done only defense work may find it economically feasible to convert work toward the commercial sector. If suppliers convert successfully, they may be unwilling to return to defense business when needed. If they are unsuccessful, they may be out of business totally. Therefore, capabilities and skills critical to future DoD requirements must be identified and preserved. DoD relies predominantly on free market forces to shape the industrial base, with intervention anticipated only in those areas that are dominated by defense production and are essential for national security. Now, the merger process of the top four prime contractors will be reviewed to understand their efforts taken to achieve vertical integration. The 1997 and 1998 editions of The Government Executive, a magazine which provides an annual

special report to the public, ranked the top 100 defense contractors by dollar volume of their awards from agencies. The discussions below summarize the top four defense contractor's worth and looks at how each organization's profit has been impacted.

*a. Lockheed Martin Corporation*

Lockheed Martin Corporation was formed in March 1995 with the merger of two of the world's premier technology companies, Lockheed Corporation and Martin Marietta Corporation. In 1996, Lockheed Martin completed its strategic combination with the defense electronics and systems integration businesses of Loral. On July 16, 1998, the Justice Department blocked the merger agreement between Lockheed and Northrop, sending the message to defense contractors that size does matter. The proposed merger would have enabled Lockheed Martin to form a monopoly in several combat systems, airborne early warning radar, electro-optical missile warning systems, directed infrared countermeasures systems, fiber-optic towed decoys, and the SQQ-89 antisubmarine warfare. In spite of this unsuccessful venture, Lockheed Martin continues to gobble up defense contracts and was ranked number one in federal and defense contracts for fiscal years 1997 and 1998.

Lockheed Martin Corporation is comprised of all or portions of 17 heritage companies. Lockheed Martin bought Martin Marietta, who previously purchased General Dynamics Space Systems, and the acquisition process runs on and on. It appears that Lockheed Martin was attempting form an extremely, tight and secure future as shown through the mergers undertaken. They diversified their company and continued to go after other ventures which would incur profit

for them. See Table 2.1: Notable Mergers and Acquisitions from March 1994 - February 1998 for greater detail of the mergers on page 15. Lockheed business areas are: Aeronautics, Electronics, Energy and Environment, Global Telecommunications Information and Services, and Space and Strategic Missiles. In 1998, Lockheed Martin ranked number one in defense contractors earning \$12,395,041,000 in awards and \$14,009,181,000 in 1997.

The past performances of the Lockheed Martin Corporation are outstanding, but to understand where they are going in 1999 and beyond is even more astounding. Lockheed attempted to acquire the U.S. Enrichment Corporation, the federally-owned company that enriches uranium, but the government rejected their attempt. The F-22 program, Theater High-Altitude Area Defense (THAAD) anti-missile program, the Joint Air-to-Surface-Standoff Missiles (JASSM) cruise missile program, and Foreign Military Sales for other aircraft enriches their vision.

***b. Boeing Corporation***

The Boeing Company, based in Seattle, Washington, is the largest aerospace company in the world, as measured by total sales, and the nation's leading exporter. Boeing is the world's largest manufacturer of commercial jetliners and military aircraft, and the nation's largest National Aeronautics and Space Administration (NASA) contractor. The company's capabilities in aerospace also include helicopters, electronic and defense systems, missiles, rocket engines, launch vehicles, and advanced information and communication systems. The company has an extensive global reach with customers in 145

countries and operations in 27 U.S. states. Worldwide, Boeing and its subsidiaries employ more than 238,000 people.

As a result of the Boeing and McDonnell Douglas Merger in 1997, and the acquisition in 1996 of the defense and space units of Rockwell International, Boeing became the largest aerospace company in the world. Boeing is organized into four major business segments: Boeing Commercial Airplane Group; Space and Communications Group; Military Aircraft and Missile Systems Group; and the Shared Services Group. The company has been the world leader in commercial flight for more than 30 years. The company is responsible for a substantial number of military-aircraft and defense-system products and programs. Several years ago, Boeing set out to build a position of leadership in information, space, and defense markets comparable to the one long held in commercial aircraft. That objective was pursued through both substantial internal investment and strategic acquisition and merger. Based on 1997 results, it is clear that the new combined company has, indeed, achieved a position of enormous breadth and strength in the targeted areas.

During 1997, the Information, Space & Defense Systems Group (ISDS) accounted for 40 percent of total company sales. Revenues for 1997 included a full year of the aerospace and defense operations acquired from Rockwell International in December 1996. The information, space, and defense systems business is broadly-diversified, and no program accounted for more than 15 percent of total 1995 to 1997 segment revenues. Further, the Group was strongly profitable, with a pre-tax operating return on sales of 7.3 percent in 1997. Boeing

experienced a net loss of \$178 million in 1997-its first annual loss in 50 years. Initially, Boeing had trouble delivering on the promises of the mega-merger corporation: boosting its profits while dramatically lowering costs. The Boeing fighter/attack aircraft products and programs consist of the F/A-18E/F Super Hornet, F/A-18 Hornet, F-15 Eagle, F-22 Raptor, the AV-8B Harrier, and the Joint Strike Fighter. Other military airplanes include the C-17, T-45 Goshawk, 767 Airborne Warning Air Control System (AWACS), and the Airborne Laser. Military rotorcraft products consist of the RAH-Comanche, CH-47 Chinook, AH-64D Apache Longbow, and the V-22 Osprey. Defense systems include the Harpoon anti-ship missile, the Standoff Land Attack Missile (SLAM), and the Joint Direct Attack Munition (JDAM).

Boeing is experiencing success in the 777 program, and the joint venture with Lockheed Martin--United Space Alliance (USA), which operates the space shuttle program for NASA. They are re-hiring workers who were released due to a slowdown in scheduled space shuttle flights to work on the project. Boeing ranked number two in defense contracts in 1998, and number seven in 1997. Boeing had not internalized the growing pains of merging in 1997.

*c. Raytheon Company*

The steep decline in defense procurement induced Raytheon to respond to the smaller defense industrial base with a fundamental challenge--become larger and more capable or risk losing the competitive edge required to compete and to survive at the highest levels of the industry. In 1995, Raytheon acquired

E-Systems. In 1996, Raytheon acquired two Chrysler Technologies' defense businesses. In early 1997, Raytheon won the competitions to acquire Texas Instruments' (TI) defense operation and to merge with Hughes defense. On July 11, 1997, Raytheon completed the acquisition of TI defense. On December 17, 1997, Raytheon completed the merger with Hughes defense. On December 18, 1997, Raytheon announced the formation of Raytheon Systems Company (RSC) as the focal point for all defense and government electronics businesses, with its headquarters in the Washington, D.C. area, and RSC will operate as part of Raytheon Company. Out of the consolidation and reorganization of the former Raytheon Company, the five new business segments emerged: Defense Systems; Sensors and Electronic Systems; Command, Control and Communication Systems; Intelligence, Information and Aircraft Integration Systems; and Training and Services. On January 23, 1998, Raytheon announced the make-up of the Raytheon Systems Company organization and plans for site consolidation. It is a known merger principle that if a merger is to be successful, it must be quick and decisive. This is exactly the manner in which Raytheon changed its business. As a result, RSC was able to move forward boldly, as one of the largest, strongest, most capable, and most integrated defense and government electronics businesses in the world.

Raytheon's 1997 results included only a partial year related to the July acquisition of the TI defense operation and less than two weeks' results related to the December merger with Hughes defense. The actual sales were \$13.7 billion for 1997: Raytheon's revenues would have been in excess of \$20 billion on a pro-

forma 1997 basis--that is, including a full year's revenues in 1997 for mergers and acquisitions minus divestitures. The company ended the year with debt, net of cash and marketable securities, of \$9.8 billion, compared with \$3.6 billion a year ago. This increase was principally due to the financing requirements of the merger with Hughes defense and the TI defense acquisition, partially offset by the sale of some appliance and other non-core operations. Free cash flow for the year 1997 was approximately \$300 million, an improvement of more than \$600 million over 1996. The restructuring charges included the costs of facility and office closures, employee severance costs, one-time costs from the merger with Hughes defense and the acquisition of TI defense, non-recurring charges related principally to contract valuations, and the write-down of non-current assets to fair market value.

The Raytheon team believes they are doing what they need to do. They are determined to continue to sharpen their competitive edge. Competitive strength is the key to winning contracts and creating value for their stockholders, and it is the key to creating career opportunities for their employees.

*d. Northrop Grumman*

Northrop Grumman Corporation, headquartered in Los Angeles, California, is a leading designer, systems integrator and manufacturer of military surveillance and combat aircraft, defense electronics and systems, airspace management systems, information systems, marine systems, precision weapons, space systems, and commercial and military aerostructures. Northrop Grumman was formed in 1994 when Northrop Corporation acquired Grumman Corporation. Also in 1994, the company completed the acquisition of Vought Aircraft, a major

producer of military and commercial aerostructures. In 1996, Northrop Grumman acquired the defense and electronics systems business of Westinghouse Electric Corporation, and in 1997 completed a merger with Logicon Inc., a leading, defense information technology company. Northrop Grumman employs about 49,000 people. Northrop Grumman reported sales of \$9.2 billion in 1997, up 6 percent from \$8.6 billion in 1996.

The company is organized into three major business units: the Integrated Systems and Aerostructures Sector, based in Dallas, Texas; the Electronic Sensors and Systems Sector, headquartered in Baltimore, Maryland, and Logicon Inc., a wholly-owned subsidiary based in Herndon, Virginia. Northrop Grumman plays a major role in many of the world's most advanced weapons systems and technologies. Northrop Grumman is so attractive to other companies because of its electronics business. Electronics are becoming increasingly key to Pentagon programs. Northrop's electronics programs include flight-control systems, radar, fire-control systems, avionics, space-borne sensing, submarine propulsion, and power generation. More than half of their sales are from military electronics, and over the next five years the company expects electronics to grow to two-thirds of its business. Northrop is the producer of the Joint Surveillance Target Attack Radar System (JSTARS) aircraft and the B-2 stealth bomber. They are the subcontractor to Boeing on the Navy's F/A-18 Hornet strike fighter and the C-17 airlifter. Northrop Grumman Corporation reported record sales and net income for 1997, a year in which operating profit topped \$1 billion for the first time in the company's history.

Northrop remains confident in the strategic rationale underlying business transformation. Their electronics, systems integration, and information technology business areas are healthy today and serve as engines for growth tomorrow. Global financial conditions will continue to constrain sales in 1999 and 2000, but with the anticipated economic improvement and increases in the defense procurement budget, Northrop expects to see strong growth in revenues as well as earnings in the future.

#### **D. CHAPTER SUMMARY**

This chapter has provided the reader with background information pertaining to vertical integration of the defense industry. It defined the defense industrial base and the concept of vertical integration. An extensive review was given to the practice of vertical integration in the big four defense prime contractors, Lockheed Martin Corporation, Raytheon Systems Company, Boeing Company, and Northrop Grumman Corporation, and firms' reasons for deciding to merge in business. Although firms offered several reasons why they have chosen to combine forces in the industry, higher profits were the most evident result of their union which leads to another reason why DoD is concerned about this practice of vertical integration in the defense industry.



### III. DoD ACQUISITION PROGRAMS

#### A. INTRODUCTION

In the past three years, DoD managers have become increasingly concerned with the practice of vertical integration in the defense industry. Vertical integration is believed, by some, to limit competition and lead to higher costs, poorer quality, and lower performance products. They surmise that vertical integration also tends to work against the principles of acquisition reform. Acquisition reform initiatives were implemented to reduce major acquisition program costs and to help fund weapons modernization, however, most major acquisition program costs have continued to increase despite such initiatives and vertical integration. [Ref. 28:p. 5] Acquisition reform initiatives were intended to ensure that small and small disadvantaged businesses were not excluded from what had traditionally been a "big guys' game" in DoD and Federal Government contracting. Congressional actions to promote subcontracting opportunities were mandated in order to keep small businesses, which represent 90 percent of the businesses in this country, from being undercut and forced out of the defense industry altogether. [Ref. 29:p. 2] However, vertical integration confines competition by decreasing the number of sub-tier suppliers in the defense industry market which leads to a smaller defense industrial base.

On the other hand, some believe vertical integration warrants positive recognition in the defense industry due to the potential cost savings that are to be realized by the government. Defense planners and corporate officers face the increasingly difficult tasks of providing for both the current needs and future modernization requirements of the nation's armed forces, while operating within increasingly tight budgetary constraints.

This is the reason that DoD and the administration have been supportive of the efforts by industry to consolidate defense work. Improving efficiency and reducing unnecessary expenditures have become central defense reform themes. Therefore, it is the hope of DoD to reform its acquisition system and further the transformation of the traditional defense industrial base into a continuing source of innovation in meeting the nation's defense needs. [Ref. 23:p. 34] Program managers must make educated, informed, and smarter decisions in acquiring government products. The balance of this chapter focuses on the regulations that govern program managers' activities, the acquisition strategies that support competition and innovation, and discusses potential problems for PMs to be aware of when dealing with such a vertically integrated defense industrial base.

## **B. DoD ACQUISITION REGULATIONS**

The Defense Department publishes considerable guidance for acquisition program managers. DoD Directive (DoDD) 5000.1 establishes guiding principles for all defense acquisitions. DoD Regulation 5000.2-R specifies mandatory policies and procedures for Major Defense Acquisitions Programs (MDAPs) and Major Automated Information Systems (MAISs) Acquisition Programs. The Defense Acquisition Deskbook describes the discretionary information which Program Managers (PMs) and other participants in the defense acquisition process can consult for assistance in implementing guiding principles and mandatory procedures. PMs must exercise sound judgment when structuring and executing defense acquisition programs. The separation of mandatory policies and procedures from discretionary practices, aids PMs by providing flexibility in execution their responsibilities. [Ref. 18:p. 1] Procurement and contracting rules are extremely comprehensive. But, nonetheless, PMs working within the acquisition

environment must make DoD the smartest, most responsive buyer of the best goods and services that meet the warfighters' needs, at the best dollar value over the life of the product.

### **1. The Development of The Acquisition Strategy**

With changes in military missions and sharp reductions in defense spending, the Defense Department must rely on the broader commercial world. Acquisition program costs have once again gained the central attention of some Congress members. All this attention has forced the Pentagon to undergo a revolution in its business affairs to complement its revolution in military affairs. DoD can no longer rely solely upon defense-unique industries and capabilities to equip its forces for it is too costly.

[Ref. 23:p. 34] The cost of acquisition programs leads to the issue of defense industry restructuring. Through the restructuring of the defense industrial base, program acquisition costs are to be reduced and to provide benefit to the government. But defense contractors generally remain profitable, in part by restructuring and consolidating. Industrial restructuring often includes reducing the size of factories, closing some factories that are no longer needed, merging divisions and operations, and cutting corporate workforces. [Ref. 23:p. 34] DoD PMs must take steps to become more efficient business managers, which is one reason why they develop acquisition strategies to guide their programs.

#### **a. DoD 5000 Series**

DoDD 5000.1 mandates certain principles to guide all defense acquisition programs. Those principles are divided into three broad categories and illustrated in Figure 3.1. The three principles that guide all acquisition programs are:

- (1) translating operational needs into stable, affordable programs,
- (2) acquiring quality products, and
- (3) organizing for efficiency and effectiveness.

This thesis addresses in detail the second principle with emphasis placed upon three of its elements: event-oriented management, competition, and innovative practices. These three elements are a major part of the guiding principles of acquisition strategies. The acquisition strategy, required by DoD 5000.2-R, Section 3.3, is a top-level description sufficient for decision-makers who report to the Milestone Decision Authority (MDA) to assess whether it makes good business sense, effectively implements laws and policies, and reflects top management's priorities. [Ref. 18:p. 50] Therefore, the acquisition strategy is the first step taken by the PM to ensure that the program will be a success.

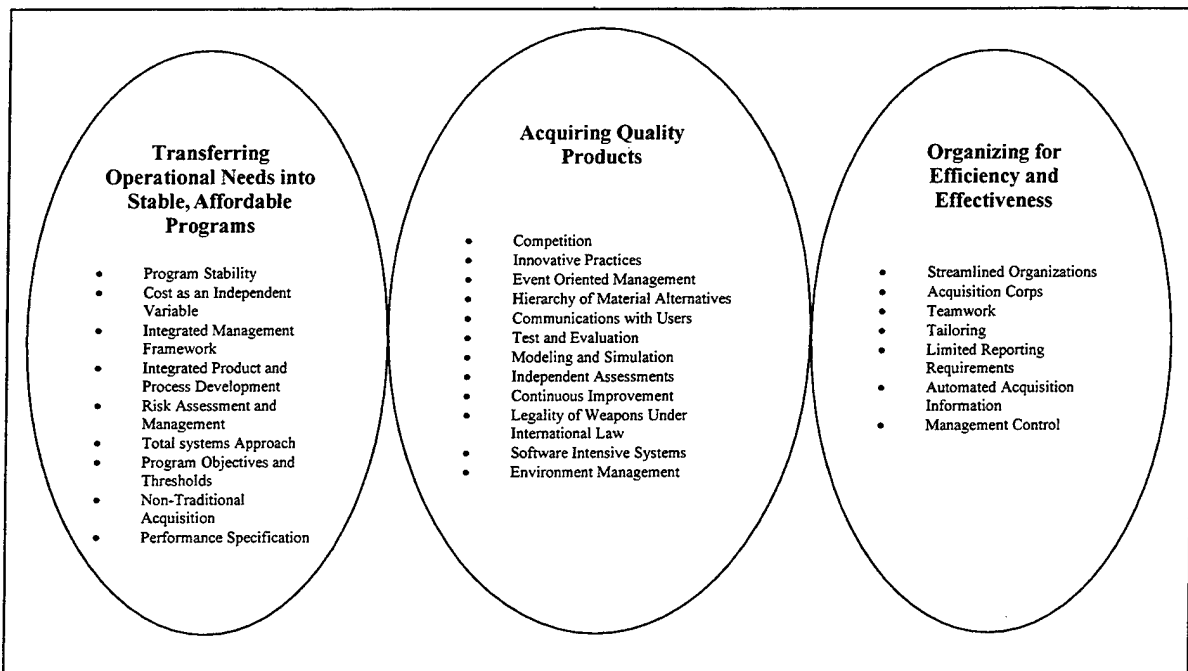


Figure 3.1. DoDD 5000.1 – Acquisition Programs Guiding Principles  
Source: Department of Defense 5000 Series

The program manager is responsible for encouraging full and open competition, acquiring the best quality product at the most affordable and reasonable cost, and ensuring equal opportunities to small businesses to perform on government contracts are achieved. [Ref. 18:p. 50] All of which begins with the fundamental principles the PM applies to the development of the acquisition strategy. These fundamental principles are:

- 1. Understand Program Objectives and Requirements.**
- 2. Relate the Strategy to Acquisition Phases and Milestone Decision Points.**
- 3. Structure the Program to Foster and Accommodate Cost/Performance Tradeoffs.**
- 4. Keep an Event-driven versus Schedule-driven Orientation.**
- 5. Harness Competitive Forces.**
- 6. Make Business and Contracts Approach Consistent with Authoritative Assessment of Risks.** [Ref. 24:p.1.2]

The PM must incorporate a rigorous, event-oriented management process that is based on significant events in the acquisition life-cycle. Program decisions are explicitly linked to demonstrated accomplishments in development, testing, initial production, and life-cycle support. The process should emphasize effective acquisition planning, improved and continuous communications with users, and prudent risk management by both government and industry. The Defense Department encourages PMs to continually search for innovative practices that reduce cycle time, reduce cost, and encourage teamwork. [Ref. 24:p. 2]

Title 10 of the United States Code (U.S.C.) Section 2304 states that DoD components shall acquire systems, subsystems, equipment, supplies, and services in accordance with the statutory requirements for competition. Competition must be maintained for as long as practicable in all acquisition programs. [Ref. 18:p.50] The Federal Acquisition Regulation (FAR) Part 6 addresses competition

requirements. Although the FAR allows for other methods of competition, full and open competition is the preferred method. It is the process by which all responsible offerors are allowed to compete. "Competition provides major incentives to industry to enhance the application of advanced technology and life-cycle cost advantages to defense programs, as well as a mechanism to obtain an advantageous price." [Ref. 18:p. 6] A PM, in developing his acquisition strategy, must make use of structural and procedural ways to provide for competition. A program's structure has a big impact on the potential for competition. Specific competitive strategies such as competitive prototyping, competition with other systems, and dual-sourcing, have great potential to enhance system performance, improve schedule, and reduce program cost. [Ref. 18:p. 55] The way these strategies are built into the program structure preordains the degree to which competition can be employed.

It is procedural that PM and contracting officers provide for full and open competition unless one of the limited statutory exceptions apply. They must ensure that solicitations and contracts are written without unnecessarily restrictive statements of need, unnecessarily detailed specifications, and unnecessarily burdensome contract clauses, and ensure that procurement and source selection procedures do not work to exclude or discourage potential offerors from submitting proposals. Program Managers must also provide for long-term access to data required for competitive sourcing of systems support. [Ref. 18:pp. 55-61]

Another program manager directive is to structure the acquisition strategy to promote sufficient program stability to encourage the defense industry to

invest, plan, and bear risks. The Department's 5000 series states that "programs needs shall be met through reliance on a national technology and industrial base sustained primarily by commercial demand, and minimize the need for defense-unique industrial capabilities." [Ref. 1:p. 6] The new business-like procedures have minimized the need for Service-unique requirements and decreased the number of duplicating events occurring in different industries. Acquisition reform initiatives, dual-use and commercial technologies, and changes in the defense industry, are avenues DoD has taken to improve its method of conducting business. Program offices are doing joint ventures in an effort to reduce program costs. Program costs continue to increase, and DoD can no longer afford to pay huge sums of money for weapon systems and other defense products. DoD must work to become a smarter customer -- pushing for efficiency and value from suppliers and better access to commercial suppliers. Acquisition managers must become smarter, well-informed buyers of defense products. It is imperative that acquisition managers use the procurement regulations to their advantage to save taxpayers dollars.

#### **b. Procurement Regulations**

Congress created the Commission on Government Procurement (COGP) in November 1969. The commission's charter was to study and recommend to Congress methods "to promote the economy, efficiency, and effectiveness" of procurement by the executive branch of the Federal Government. Several recommendations were made, but the two essential ones were the establishment of the FAR and procurement-related laws dealing with competitive negotiations.

[Ref. 31:p. 21] FAR Part 6 prescribes policies and procedures to promote full and open competition in the acquisition process and to provide for full and open competition, full and open competition after exclusion of sources, other than full and open competition, and competition advocates. [Ref. 24:p. 6.1]

The Competition in Contracting Act of 1984 (CICA), the Small Business and Federal Procurement Competition Enhancement Act of 1984 (SBA), and the Defense Procurement Reform Act of 1984, were three procurement-related laws that had a profound effect upon competition in the federal contracting process. The federal contracting process is affected by vertical integration which discourages competition in the market. The industrial base has shrunk considerably, and only a few defense contractors are highly-active in the defense business. Senator Bob Smith (R-NH), a member of the Senate Armed Services Subcommittee on Acquisition and Technology, remarked that he did not think it was particularly healthy to have two or three major defense contractors controlling 70 or 80 percent of the industrial base.” [Ref. 23:p. 40] The procurement regulations are efforts to sustain free and open competition. The Defense Procurement Reform Act of 1984 was an amalgamation of congressional initiatives designed to improve the effectiveness of the Department of Defense acquisition process. The other two acts, CICA and SBA, are discussed below.

### **1. The Small Business and Federal Procurement Competition Enhancement Act of 1984**

The Small Business Act’s purpose is to eliminate procurement procedures and practices that inhibit free and open competition. [Ref. 31:p. 21] Small

businesses are often at a disadvantage when trying to win federal contracts, however, the Small Business Administration (SBA) helps overcome that barrier by limiting large businesses, of which the majority are already vertically integrated, from exclusively contracting for all government's services. The SBA has a number of programs to assist small firms with the federal government's acquisition process. Among such programs are: the Prime Contracts Program, the Subcontracting Assistance Program, the Certificate of Competency Program, the Procurement Automated Source System, the Size Determination Program, and the Natural Resources Sales Assistance Program. [Ref. 29:p. 1] All these programs seek to keep small businesses active in the acquisition process of federal government contracting by ensuring that all business practices are fair.

## **2. The Competition In Contracting Act of 1984 (CICA)**

CICA, established in 1984, shifts the emphasis from the method of procurement to the use of sources. Its foremost concern is "from whom you procure," rather than "how you procure." Previously, the law clearly stated that formal advertising was the preferred method over negotiated procurements. CICA emphasizes the use of competitive procurement procedures rather than contracting with a single source. [Ref. 31:p. 21] Vertical integration of the defense industrial base leaves fewer defense contractors for the government to contract with for defense products and services. "The tremendous interlocking relationships between the major defense contractors and companies at the subcontracting levels is so great that no real winner or loser exists when a final decision is made on a program, and thus there is no real competition." Lawrence

Korb, a former Pentagon official and Raytheon executive now working as a senior analyst at the Brookings Institution, stated that consolidation in the defense industry has gone too far. [Ref. 23:p. 40]

The consolidation in the defense industry has given rise to changes in how DoD executes its acquisition process. Program Managers need to be made aware of potential problems posed by vertical integration and understand the effects it can cause on their acquisition programs. The inability of the PMs to have knowledge of the defense policy changes and how they affect their acquisition programs can partially be attributed to the significant changes in the Defense Department's buying practices. PMs are removing themselves from detailed oversight of their prime contractor's daily operations; prime contractors are bidding to more comprehensive packages of mission and logistic requirements; DoD program personnel have increasingly less interaction with suppliers or products below the prime level. It also stands to reason that PMs are unable to see the effects of their individual program on the broader industrial capabilities. [Ref. 21:p. vii] The implementation of Acquisition Reform Initiatives and Defense Reform Initiatives have changed the dynamics between DoD managers, defense prime contractors, and suppliers. Such initiatives are efforts to improve DoD's acquisitions by making it a more efficient and effective process.

### **C. CHANGES IN DoD ACQUISITION**

In the Clinton Administration, the focus is on how to acquire the military weapons, information systems, and other products and services necessary to implement the upcoming 21<sup>st</sup> century defense strategy. Initiated in 1994, acquisition reform supplied

DoD with many initiatives to enhance its business practices. DoD could no longer rely on a unique defense-only marketplace to meet its requirements and was in need of business reengineering. DoD decided to fundamentally reform the way it conducts business and looked outward to take maximum advantage of the commercial marketplace.

### **1. Acquisition Policy Reform**

The Department of Defense has long recognized the need to find ways to streamline its acquisition system and reduce the cost of the acquisition process to DoD directly, by reducing DoD's administrative costs, and indirectly, by reducing the costs of DoD's supplier base and thus the amount of money DoD pays for supplies and services received. Complicating DoD's desire to streamline the acquisition system and reduce costs, is DoD's obligation to ensure the integrity of the system, both in terms of the system's treatment of the supplier base and in terms of the way in which the taxpayer's dollars are spent. [Ref. 27:p. 1] In February of 1994, the vision for reforming DoD's acquisition system, later entitled Acquisition Reform -- Mandate for Change, was born. Acquisition Reform is leading the department's efforts to change federal procurement policy. The major goals include:

• Delivering Great Service	• Fostering Partnership	• Internal Reinvention
<ul style="list-style-type: none"> <li>• New weapons in less time</li> <li>• Better logistic supply services</li> <li>• Simplifying buying of goods and services</li> <li>• Educating and training the defense acquisition workforce</li> </ul>	<ul style="list-style-type: none"> <li>• Modernizing defense</li> <li>• Partnering with communities</li> <li>• Decreasing paper transactions</li> <li>• Reducing toxic pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Streamlining our workforce</li> <li>• Providing effective cost accounting</li> <li>• Reducing excess inventory</li> <li>• Minimizing weapons cost growth</li> </ul>

Figure 3.2. Acquisition Reform Major Goals  
Source: Reference 27

Acquisition Reform is a key partner to the Defense Reform Initiative. It supports the Department's efforts to respond to the warfighter's needs with products and services that work better, cost less, and are obtained from a globally-competitive national industrial base. [Ref. 27:p. 1]

## 2. Defense Policy Reform

Defense Reform initiatives serve to eliminate redundancy in the Defense Department, reduce management overhead, and streamline business processes. William Cohen, the Secretary of Defense, is championing dramatic changes in the way the Department does business and was responsible for the introduction of the Defense Reform Initiative (DRI) in November 1997. The focus of DRI is to aggressively apply to the Department of Defense the key business principles that American industry has successfully used to become leaner and more flexible. The DRI supports the efforts industry participants have taken in restructuring their companies and the future of the defense industrial base. A series of initiatives to re-engineer DoD business processes are being pursued throughout the Department in four main areas:

1. REENGINEER: Adopting modern business practices to achieve world-class standards of performance;

2. CONSOLIDATE: Streamlining organizations to remove redundancy and maximize synergy;
3. COMPETE: Applying market mechanisms to improve quality, reduce costs, and respond to customer needs; and
4. ELIMINATE: Reducing excess support structures to free resources and focus on core competencies.

The practice of vertical integration did allow for reengineering of business practices to eliminate excess support structures and redundancy in the industry. [Ref. 32:p. 1]

Although DoD did encourage the consolidation of companies in the defense industry, too much consolidation presented unintended consequences for DoD managers. One issue still being debated today is the allowability of restructuring costs.

The allowability of restructuring costs has caused much contention in how DoD deals with vertical integration in the defense industry. As part of ongoing streamlining efforts, defense firms consolidated their facilities and closed other plants to remain competitive in the market. In the early 1990's, Pentagon officials, concerned that too many defense companies would be left chasing too few programs -- leading to inefficiencies and an anemic defense industrial base -- encouraged mergers and consolidations. According to the Wall Street Journal, merger and acquisition activity in the U.S. defense industry ballooned from less than \$5 billion in 1991 to nearly \$40 billion in 1996. [Ref. 23:p. 38] The Pentagon allowed merging defense firms to charge some of the costs of reorganization as overhead against existing Pentagon contracts; costs included severance pay for terminated employees, early retirement incentives, and relocation expenses. Antagonists of allowing restructuring costs accused DoD officials of being too soft on defense firms and placing an unnecessary burden on taxpayers. The antagonists believe that private firms should pay their own restructuring costs. They

contend that the economic benefit of the integration is to the advantage of the firm, and not DoD or the taxpayers. The Defense Department's restructuring policy is based on saving taxpayers money. The allowability of costs incurred in performing a government contract is governed by the FAR. [Ref. 23:p. 38] On July 21, 1993, the Under Secretary of Defense for Acquisition and Technology issued a memorandum allowing restructuring costs when it could be shown that (1) savings to the government as a result of the restructuring would exceed the costs, or (2) the merger preserved a critical defense capability. [Ref. 33:p. 98] The Defense Department plays a vital role in the restructuring process. The department must ensure that they are fair and consistent in how they interpret their policy.

#### **D. CHAPTER SUMMARY**

In most acquisitions, except where specifically stated, acquisition managers must pursue full and open competition on all government contracts. The pursuit of full and open competition allows all responsible and responsive offerors to compete for the acquisition. Due to the shrinking defense budget and increasing costs of acquisitions, DoD officials are no longer able to pay unseemly high costs for their acquisition programs. Program managers are expected to effectively and efficiently acquire defense weapon systems and products at a reasonable cost. PMs must be able to recognize potential hazards to their programs in order to effectively enhance the execution of their programs. PMs must also stay abreast of changes in DoD procurement regulations and acquisition policies. These changes often have the purpose of improving the acquisition system by allowing both government and industry the flexibility to exploit successful commercial practices and to tailor acquisition procedures to meet the needs of the

warfighters. In an effort to streamline the acquisition system, small businesses' rights, acquisition and defense reform initiatives, all play part in achieving the goal of right-sizing America's defense industry, where adherence to standards of fair play among competitors in the defense industry is paramount.



#### **IV. ANALYSIS OF VERTICAL INTEGRATION AND DoD ACQUISITION PROGRAMS**

##### **A. INTRODUCTION**

The sharp decline in the defense budget led to dramatic consolidation in the defense industry. Firms realized that they had to consolidate, merge, restructure, reengineer, and eliminate jobs in order to remain competitive in what was becoming a smaller defense industrial environment. Consolidation increased the vertical capabilities in some defense firms. The increased vertical capabilities allowed major defense firms to gain a number of business units and provide entire subsystems or components to DoD. Normally, this was achieved through competition within the defense industry. The increased vertical capabilities of major defense firms raised many concerns for DoD acquisition managers for it limited competition and innovation in the defense market. DoD began to undertake policies to ensure that adequate competition was retained for future DoD programs, that essential capabilities were not lost, and that industry would take the necessary steps to operate efficiently and effectively. [Ref. 24:p. 1]

The monopsony relationship between the government and defense industry suppliers began to change. The government seeks more commercial business opportunities, and the defense industry suppliers practice vertical integration to keep their competitive edges. In a monopsony relationship, where the government is the only buyer, the government makes the rules, interprets the rules, and enforces the rules. They determine which costs are allowable, approve mergers and acquisitions, and certify the expected cost savings prior to the merger agreement being consummated. The industry's argument, that vertical integration is not harmful to DoD, lies within this relationship.

The industry ascertains that the government must approve the merger and expect a certain savings before it gets the go-ahead, so therefore, the government benefits from the merger. The practice of vertical integration presents many concerns to DoD managers. The greatest concern being competition. FAR Part 34 defines "effective competition," as a market condition which exists when two or more contractors, acting independently, actively contend for the government's business in a manner which ensures that the government will be offered the lowest cost or price alternative, or best technical design meeting its minimum needs. [Ref. 21:p. 1] This is precisely what program managers must do on all acquisitions, ensure that competition is actively sought. Through the enforcement of competitive procedures, DoD strives to make both competition and lower cost, top priorities.

The cost of acquisition programs continues to increase and cost savings to the government are questionable. This chapter addresses the concerns of DoD managers and analyzes the practice of vertical integration within the defense industry and its effects on acquisition programs.

## **B. DoD CONCERNS ABOUT MERGERS**

Proponents of vertical integration in the defense industry have commented that the creation of the huge contractors eases the tough management burden of the Pentagon by integrating all the complex components that go into modern weapons, and integrating different weapon systems so that they work properly together. They believe that such innovation on behalf of government contractors allows them to do what they do best -- build the weapon systems and the Pentagon to do what it does best -- fight wars. These proponents of vertical integration fail to realize the potential harm that could come to defense products or the regulations governing competition, if the practice of vertical

integration is not monitored and regulated. The concentration of the defense industry and the decline in new DoD program opportunities create a potentially static business environment. DoD's primary concerns with the practice of vertical integration are: 1) preferring internal over external suppliers, 2) increasing barriers to market entry, 3) compromising proprietary information, and 4) refusing to use suppliers owned by competitors. [Ref. 3:p. 3] These altered conditions in the industry could change the incentives for firms to employ vertical integration to their advantage. In so doing, firms might disadvantage other firms, potentially affecting the cost, quality, and performance of defense products. DoD concerns are addressed below.

### **1. Preferring Internal Over External Suppliers**

Gaining new internal sources of supply may cause a parent firm to favor the internal source over external suppliers, even if external suppliers are superior. This can not only weaken supplier-level competition, but may also result in inferior defense products. In fields as specialized as some defense products, if external suppliers cannot sell to a prime who favors internal sources, there may be few other buyers for the external suppliers' products. This may force competent suppliers to leave the field. [Ref. 3:p. 3]

A prime contractor's decision to award a subcontract internally versus externally should be based on the best value for the product. This may force the prime contractor to choose an external supplier if market research determines that the external supplier can provide the best value product. In an effort to keep the entire contract in-house, a prime contractor may make the decision to award a subcontract to its own internal supplier, thereby, increasing its overall profit. In this example, best value was not a consideration, and profit was the main objective. This action is contrary to good business practices of the Defense Department. It is up to DoD managers to ensure that competitive market research

and cost analyst is completed for the product being acquired. If competition is apparent, a vertically-integrated firm may be forced to seek the product external in order to reduce overhead costs and remain competitive. Although a prime contractor may exclude subtier suppliers from a new weapon system solicitation, presumably due to the existence of, and preference for, internal capabilities, the selection of a subtier supplier should be based on which subtier supplier offers the best value product. Best value, an acquisition reform initiative, seeks to encourage prime contractors to select the most qualified subtier contractor who can deliver the product.

## **2. Increasing Barriers To Market Entry**

Vertically-integrated firms who refuse to supply their competitors, or choose to supply them on undesirable terms, can raise barriers to the market entry of their competitors. If after a merger the new owner hinders or 'forecloses' a competitor from continued supply of critical elements, the competitor may be unable to continue in business or to compete effectively. If other suppliers or critical elements are not available or are inferior, the competitor may have to develop an internal source of supply. Since the skill and investment required to succeed as a supplier may be very different from that of making the finished product, the cost of entry can be so high as to jeopardize the competitor's ability to succeed. Short of foreclosure, competitors may find themselves receiving less favorable prices, a less advanced product, or less advantageous terms from the supplier than was the case before the acquisition. [Ref. 3:p. 4]

For example, the Lockheed and Martin Marietta merger formed an exclusive teaming agreement with a sensor provider for the Space Based Infrared System (SBIRS) new contract competition. They were the only two potential sensor providers available for the SBIRS contract competition, and so the teaming agreements, if enforced, would have prevented other SBIRS bidders from having access to the needed sensor suppliers. The FTC ordered that such a teaming arrangement could not be enforced for it created competitive concerns. The teaming arrangement had the potential to eliminate

competition and prevent potential competitors from gaining access to bid for the contract.

[Ref. 3:p. 4]

### **3. Compromising Proprietary Information**

The merger or acquisition of a firm's supplier by a competitor raises concerns about inappropriate use of the firm's proprietary information by the competitor in markets where the two firms compete. It may also raise concerns for the Department of Defense if the acquiring and newly-acquired firms are both part of an upcoming DoD acquisition solicitation. The merged firm may be able to free-ride on its competitors' innovation, thereby reducing the competitors' incentives to innovate. [Ref. 3:p. 4]

Contractors are adverse to disclosing their proprietary information for it reduces internal efforts to compete effectively on future solicitations. For example, when the government requests proprietary information for a contract from a prime or subcontractor, the government may not disclose such information to other contractors. Dr. Mark Stone, a contracting professor at the Naval Postgraduate School, stated that prime contractors solicit subcontracts similarly to the government for best value products, but the technical information received is not as detailed as a government's request. The contractors may be future or current competitors and are reluctant to share information with that might affect a competitive advantage. Vertical integration diminishes the effects of this external disclosure of proprietary information. Due to vertical integration of the defense industry, contractors share the necessary proprietary information on contracts. DoD can expect greater cooperation between contractors and this lessens the amount of contract disputes if contractors are collaborating on contracts.

### **4. Refusing To Use Suppliers Owned By Competitors**

After a merger or acquisition that restructures the vertical relationships between firms, competitors may be reluctant to enter into supply or teaming arrangements with the consolidated firm for fear that the firm could act to disadvantage its competitors. This effectively limits the competitors' supply options. [Ref. 3:p. 5]

Evident in a smaller industrial base, DoD must rely upon defense suppliers who actively seek the best opportunities for DoD. The fear of not trusting certain suppliers who have vertically-integrated is not conducive to sound business practices. It is in the best interest of DoD to have a qualified, competitive market base from which to select competitors.

These concerns have caused DoD officials to reassess their policies on mergers, consolidations, and the relationship between the government and its suppliers. A survey was conducted to examine the effects of vertical integration in the defense industry. Listed below are the results of the analysis.

### **C. ANALYSIS OF VERTICAL INTEGRATION AND ACQUISITION PROGRAMS**

Two separate questionnaires were sent out to selected industry and DoD participants. The response was less than overwhelming. The two types of questionnaires were entitled Industry and Program Manager/DoD questionnaire. The Industry questionnaire was sent to the four major defense contractors: Lockheed Martin - Mr. Lee Whitney, Boeing Company - Mr. Larry McCracken, Northrop Grumman - Mr. Mike Greywitt, and Raytheon Systems Company - Mr. Tony Simonetti. Several Training With Industry (TWI) Program Participants from DoD were contacted to participate in survey; seven responded and said they would complete the survey. A total of ten program offices were contacted to participate in survey and two responded that they would complete the survey.

None of the major defense contractors answered the survey. Northrop Grumman did phoned the researcher to say that due to the changes the company was undergoing, personnel drawdown was greatly affected. They replied that they no longer have the staff

to support student theses and regretted to inform the researcher that the survey would not be answered. Only two of the seven TWI officers and only one program manager's office answered the survey.

### **1. Industry Participants Questionnaire Results**

Listed below are the results of the industry questionnaire completed by Major Vincent A. Amos, a Missile Project Officer at Raytheon. Question one asked the recipient's to rank in the order of importance the reason considered most important when firms are deciding whether to merge or not. Major Amos answered:

1. Technological advances
2. Larger Market Share
3. Diversification
4. Defense Budget
5. Profit
6. To Provide DoD a Better Product
7. Eliminate Competition

Question two asked if vertical integration of the defense industry limited competition. He responded yes. "Vertical integration allows one defense contractor to control an entire line of manufacturing capability. There would be a consolidation of formerly-independent companies (each providing a specialized aspect of the production channel) now consolidated together with one company controlling all of the aspects of production within that channel. Therefore, competition will be significantly reduced." Question three asked if vertical integration of the defense industry stifled innovation in DoD defense products. His response was "actually, the answer to this question depends upon how the vertical integration is financed. If the defense acquisitions are heavily-leveraged, involving an enormous amount of debt, then the research and development budget will be cut significantly in order to control expenses. However, notwithstanding the financing

issue, the sole issue of vertical integration is a neutral parameter with respect to defense industry initiative and innovation.” Question four asked if commercial industry products could be used in each person’s organization to afford DoD the opportunity to obtain a product at a more reasonable cost. The reply was that “commercial products have some viable use within the DoD procurement process. However, all commercial products must be used within their stated limitations according to the manufacturer’s guidelines. The objective of DoD acquisition is not the cheapest product, but the best value for the product which is able to meet the requirements for military use during wartime.”

Question five asked the respondent if policy changes were necessary to improve and maintain the number of small businesses doing business with DoD. Major Amos answered that “no policy changes are necessary, the current small business initiatives are satisfactory to ensure participation of small business in the DoD acquisition process. DoD allocates 5% of its budget for small businesses, as long as this is maintained, then there will be business opportunities for small businesses.”

Major Todd Tolson, a Cost Analyst with Defense/Lockheed Martin Vought Systems answered the second industry questionnaire. Question one asked the recipient’s to rank in the order of importance, which reason was considered most important as to why firms considered mergers. Major Tolson’s response was the following:

1. Technological Advances
2. To Provide DoD a Better Product
3. Profit
4. Defense Budget
5. Larger Market Share
6. To Eliminate Competition
7. Diversification

Major Tolson replied to the second question about vertical integration of the defense industry limiting competition by stating no. "The vertical integration that is happening in the defense industry is happening mostly at the upper (system integration) level, not the component level. There is plenty of competition at the lower (component) level. It is not profitable for many businesses to compete at the systems integration level now because of a lower DoD budget and the amount of research and development the industry has to invest in." Major Tolson also does not believe that vertical integration of the defense industry stifles innovation in DoD defense products. "Again, for a weapon system (tank), its capabilities are determined by its components-not its system integration. Many of the advances in global positioning systems (GPS), forward looking infrared radar (FLIR), laser designators, munition guidance, and engines/transmissions are coming from businesses outside the defense industry." He replied to question four by stating that commercial industry products could be used in their organization. This would afford DoD the opportunity to obtain a product at a more reasonable cost, "if DoD would accept end items. Commercial-off-the-shelf (COTS) can make many systems more affordable, cutting component cost from 80-90%. Unfortunately, DoD often still doesn't accept these COTS because of still stringent performance specifications for end items (i.e. to operate system at -25 degrees Fahrenheit and +125 degrees Fahrenheit). COTS can't meet the extremes of these standards, so DoD still often pays more dollars." Major Tolson does not believe that policy changes are necessary to improve and maintain the number of small businesses doing business with DoD. He furthered commented that "the level of vertical integration referenced here became impossible after Henry Ford's Model T. Systems are so complex now, that it's impossible to own your own supply chain.

Less DoD dollars, not integration, will force lower-tier contractors out of the market. DoD, through its industrial base committees, needs to periodically review the lower-tier suppliers to determine if there is a capability (radar) that no U.S. firm has expertise in and we are importing 100% of this technology. There may be a need in these cases, or within a one-firm U.S. monopoly in a technology area, for DoD to provide contract incentives to get other vendors into that technical area for national security reasons.”

To summarize the results of the questionnaires, both participants felt that technological advances were the prime reason firms considered mergers, whereas profit, the defense budget, and a larger market share were among the top five reasons.

## INDUSTRY QUESTIONNAIRE

NAME	INDUSTRY/COMPANY	POSITION
DD/MM/YY		
<p>QUESTION 1: Rank In Order of Importance the following reasons your firm would consider a merger:</p> <p> <input type="checkbox"/> Profit    <input type="checkbox"/> To Eliminate Competition    <input type="checkbox"/> Diversification    <input type="checkbox"/> Larger Market Share  <input type="checkbox"/> Defense Budget    <input type="checkbox"/> To Provide DoD a Better Product    <input type="checkbox"/> Technological Advances  <input type="checkbox"/> Other         </p>		
<p>QUESTION 2: Does vertical integration of the defense industry limit competition? Explain.</p>		
<p>QUESTION 3: Does vertical integration of the defense industry stifle innovation of DoD defense products? (i.e. it is harmful or helpful to the quality and performance of product being produced?) Explain.</p>		
<p>QUESTION 4: The Defense Industrial Base accounts for approximately four percent of the National Industrial Base. Do you believe that more commercial industry products should be used in your organization to afford DoD the opportunity to obtain a product at a more reasonable cost? Explain.</p>		
<p>QUESTION 5: Vertical integration of the defense industry can lead to one company having the capability to build an entire system. In such circumstances, lower tier contractors are forced out of the defense market due to lack of business opportunities. Do you believe that DoD policy changes are necessary to improve and maintain the number of small businesses doing business with DoD? Explain.</p>		

## 2. Program Manager Questionnaire Results

The Theater High Altitude Air Defense (THAAD) Program Office also replied to the questionnaire. Mr. Tom Elkins, a contractor from the THAAD Program Office, commented on behalf of the THAAD Program Office. Question one was framed for DoD individuals and their responsibility as a member of DoD to solicit contracts for “full and open competition” for DoD products. Question one asked if they believe that vertical integration in the defense industry has any impact or influence upon how your organization effectively solicits for competition. Mr. Elkins answered yes. “He believes that it would limit the number of ‘qualified’ competitive offerors. Contractors, for THAAD support efforts, currently subcontract for certain expertise. The THAAD System will be acquired via other than full and open competition; therefore, competition is not an issue.”

When asked if vertical integration in the defense industry limited competition, Mr. Elkins replied yes. “The qualified competitive offeror pool will shrink as a result of vertical integration. It will encourage more mergers and the defense industrial base will shrink.”

Question three asked Mr. Elkins if vertical integration in the defense industry stifled innovation in DoD defense products. He replied yes; “a lot of defense innovations come from small business. Quality of certain components/sub-components may be in jeopardy since the government will have less ability to select the best qualified contractor for these items.”

The Defense Industrial Base accounts for approximately four percent of the National Industrial Base. Question four asked the respondents if more commercial

industry products should be used in their organization to afford DoD the opportunity to obtain a product at a more reasonable cost. He replied, yes. There are currently many reliable commercial items that can meet the Government's requirements, at a lesser cost."

When questioned about the whether or not policy changes were needed to ensure that small businesses remained competitive in the defense industry, Mr. Elkins replied no. "The current Competition in Contracting Act requires competition. Other programs like 8(A), Small Business Innovative Research (SBIR), and Small Business Set-Aside programs introduce competition and increase the small business pool for defense items/services."

## PROGRAM MANAGER/DOD QUESTIONNAIRE

NAME	PROGRAM/DOD OFFICE	POSITION
DD/MM/YY		

QUESTION 1: As a member of DoD, program managers and offices alike solicit contracts for "full and open competition" for DoD products. Do you believe that vertical integration of the defense industry has any impact or influence upon how your organization effectively solicits for competition? Explain.

QUESTION 2: Does vertical integration of the defense industry limit competition? Explain.

QUESTION 3: Does vertical integration of the defense industry stifle innovation of DoD defense products? (i.e. it is harmful or helpful to the quality and performance of product being produced?) Explain.

QUESTION 4: The Defense Industrial Base accounts for approximately four percent of the National Industrial Base. Do you believe that more commercial industry products should be used in your organization to afford DoD the opportunity to obtain a product at a more reasonable cost? Explain.

QUESTION 5: Vertical integration of the defense industry can lead to one company having the capability to build an entire system. In such circumstances, lower tier contractors are forced out of the defense market due to lack of business opportunities. Do you believe that DoD policy changes are necessary to improve and maintain the number of small businesses doing business with DoD? Explain.

### **3. Researcher's Independent Analysis**

Vertical integration in the defense industry poses potential competition limitation issues for DoD. This theory can be proven due to the nature of the relationship between the subtier supplier(s) and the prime contractor. Vertically-integrated firms can perform many actions that seem to limit competition and stifle innovation in the defense industry, such as excluding other suppliers, increasing market barriers to entry, and refusing to partner with selected firms.

#### **a. Subtier Supplier Relationship**

Vertically-integrated major defense firms own selected subtier suppliers, and have the capability to include each subtier supplier(s) on all contractual actions. They may choose a subtier supplier who is internal to their organization, if the needed skill exists in-house, or they may be forced to go outside the firm, choose externally, if the needed capability is not readily available internally. Nonetheless, vertically-integrated major defense firms are in a better position to take advantage of their internal resources to the detriment of DoD competition goals.

#### **b. Profit**

Economically, if a vertically-integrated major defense contractor chooses not to select a particular external subtier supplier because he possesses the capability internally, then he positions himself for a higher profit on the contract for all overhead costs stay within the organization. These overhead costs yield higher returns for the prime contractor. When a firm prefers internal suppliers over external suppliers, excessive profit is a major DoD consideration, but other

factors must also be addressed. The final price to the government, the performance of the product, and the quality of the product are among such issues. The government specifically structures a contract in order to preclude contractors from earning excessive profits on contract actions. The government believes that the contractor shall earn a "fair" profit, but not at the taxpayer's expense, because the government's main purpose in doing business with the contractor is to enhance the warfighter's ability to win in battle.

**c. Best Value Source Selection**

Vertically-integrated firms can exclude certain subtier suppliers if they, internally, own the capability to produce a product. Some contractors refuse to use suppliers owned by other competitors. The potential for disadvantaging another firm is imminent in this case. When a vertically-integrated major defense firm refuses to use a supplier who is better-qualified, better-equipped, or has a lower cost, he is preventing the government from receiving a more reasonable cost for the soon-to-be acquired product. This action stifles innovation and affects the defense product. When DoD solicits for proposals, they expect responsible and responsive offerors to respond. Once an offeror is chosen, the contractor is expected to provide DoD with a high-performance, high-quality, and affordable product. In other words, a product that is of best value.

Best value is primarily achieved when DoD enforces full and open competition in their contractual actions. Not all Acquisition Category (ACAT) I contracting actions, however, enjoy the benefits of competition. ACAT I products are so complex that frequently the ability to produce them comes from a sole

source. But competition can and shall be encouraged at the subtier contracting levels. It is up to the prime contractor to keep competition alive on the subcontracts. Although vertically-integrated major defense firms attempt to gain unique capabilities by producing entire systems, subsystems, or components, they are bounded to abide by DoD regulations and maintain adequate competition on all contracts, especially at the subtier contract levels. It is the expectation of DoD managers that contractors willingly display equitable contracting ethics. DoD must enforce competition regulations.

Vertically-integrated firms can stifle innovation of defense commodities if they do not diversify their commodities. Diversification in the defense industry allows for better defense products to be built. It allows the differences in production, manufacturing, and processing techniques of different firms to be manipulated in order for them to achieve the better-working product. Diversification in the defense industry encourages innovation.

Innovativeness in product design is attributed to the ability of DoD to encourage full and open competition which encourages firms to open their doors to collaborate on a specific product. Full and open competition does not permit DoD to disclose proprietary information to other competitors/offerors.

**d. Increasing Entry Barriers to Market**

Subtier contractors often are faced with entry barriers to the market. When a vertically-integrated firm refuses to supply a competitor or increases the price to the competitor, the competitor may be forced to pursue other alternatives to remain competitive and in business. Barriers to market entry are ever-

increasing and contribute to a potential decline in innovative products. DoD routinely tries to get those companies which possess the best technological advancements to do business with DoD, but some of businesses refuse to do business with DoD, citing primary reasons such as burdensome paperwork, too much government oversight, and not enough profit.

Vertically-integrated firms tend to stay in-house when developing defense products, because they are in a better position to control the process and affect the schedule. Not all the time is the best system designs or best practices available in the larger defense firms. Some in-house capabilities have not been perfected and may exist in a smaller business external to the firm. Therefore, it may be a good business practice to look outside your immediate firm and adapt those changes which may prove to be beneficial to your firm in the long term.

**e. Acquisition of Commercial Products**

Commercial products can be valuable assets for DoD acquisition programs. They are cheaper and often, more available than unique defense products. This is the reason why the Defense Department recognizes dual-use technologies as valuable, and recommends the use of them in acquisitions. Commercial products afford DoD the ability to obtain the product at a more reasonable cost, and to stay on schedule since product is readily-available in the commercial sector. Commercial products are known for frequently being better quality products than defense products, because the commercial sector possesses the best advance technologies. The commercial sector is also supported in large part by small businesses. Therefore, it is logical to believe that small businesses

are thriving and it is to DoD's advantage to encourage business opportunities with small companies.

**f. Small Business Opportunities**

Question five from the questionnaire asked the participants about the relationship between small businesses and DoD, specifically, were policy changes needed to maintain business relationships. The respondents all answered no, that current in-place procurement regulations facilitate adequate business. The researcher does not agree with the respondents on that question. Yes, small business regulations and other procurement policies are in-place to affect the amount of business relations done with small companies, but it is clear that small businesses are the vitality of the commercial sector. Simply put, this is the reason for large firms vertically-integrating. Large firms are buying the advanced technological small businesses which the government seeks to do business with. Large businesses are not only concerned with profit, but they are concerned about staying in business and remaining competitive as well. Large firms attempt to keep small businesses in a subserviant role to prevent them from adversely affecting the large firm's market position. DoD needs to do all it can to effectively work with current defense sector small businesses and to produce closer ties to other small businesses. DoD policy changes are needed to encourage more small business opportunities.

**D. CHAPTER SUMMARY**

Former Assistant Attorney General of the Antitrust Division of the Department of Justice, Mr. Joel Klein, in testimony before the 105<sup>th</sup> Congress stated that "free-market

competition is responsible for bringing our economy where it is today in the 20<sup>th</sup> century. The wave of mega-mergers occurring in the defense industry in this day and age raises very complicated and important market issues. It is an antitrust enforcer's responsibility to make sure that competition continues to be the engine that drives this great and powerful economy. Mergers which take place should contribute to competition when they can, and if they can't, those mergers should not take place in whole or at least in relevant part." [Ref. 17:p. 4]

This chapter examined the concerns of the Defense Department, and analyzed the questionnaire results. Chapter V provides recommendations and conclusions to the analysis.

## V. CONCLUSIONS AND RECOMMENDATIONS

### A. INTRODUCTION

The purpose of this study was to determine if vertical integration in the defense industrial base has had any effect upon DoD acquisition programs and what actions DoD could take to improve the industry-government relationship. Specifically, this research explored the defense industry's practice of vertical integration and addressed the concerns of the Department of Defense as identified in the Defense Science Board Task Force report on vertical integration and supplier decisions. The principal conclusions were derived from data accumulated and analyzed from a questionnaire that was distributed among various industry leaders and DoD officials which drew disappointing participation: This chapter is dedicated to providing the conclusions from the questionnaires and postulating recommendations for dealing with future potential mergers.

### B. CONCLUSIONS

**#1. Vertical integration contributes to anti-competitive business practices in the defense industry.** The statistics show that 66.0% of the respondents believe that vertical integration in the defense industry does limit competition. It limits the number of qualified competitive offerors and it allows one defense contractor to control the manufacturing capability of another. However, the decline in the number of subsystems or component-level firms supplying defense material in the last few years is due to spending declines, along with defense firms' purposeful strategies to increase efficiency by limiting their business to preferred suppliers. [Ref. 3:p. 13]

**#2. Vertical integration stifles innovation.** Innovation, mostly, comes from small businesses and the funding of research and development projects. If small businesses do not receive a fair share of defense business, then they may seek additional commercial opportunities or even get out of the defense business altogether. The research and development budget has been cut significantly in the past few years. Dual-use technology is defined as technologies that can be used for both the commercial and military sectors. The Defense Department is seeking to work with companies on the cutting-edge of technology and innovation in the fastest-growing commercial sectors. Incentives offered to industry to work with DoD's Deputy Undersecretary for Science and Technology Program include a 50 percent project cost share by the government; access to technology from the government; and increased market opportunities with the military services. Defense research and development (R&D) spending has grown by 50 percent since 1960, but U. S. commercial R&D has grown by more than 400 percent over the same period. Reduced defense procurements are other reasons that the department has to increase its utilization of commercial technologies. The Defense Department can no longer afford to maintain a defense-unique industrial base.

**#3. Technological advances is the primary reason why firms merge.** The questionnaire results revealed an overwhelming 100% belief that technological advances are the primary reason why defense firms choose to merge, with a larger market share being the second greatest reason, and the defense budget and profit tying for the third greatest reason. Diversification and the elimination of competition were recorded as the least important reasons.

**#4. Vertical integration lends itself to COTS.** Commercial-off-the-shelf products do have some viable use within the DoD procurement process, and there are available in the commercial marketplace. Many reliable commercial items can meet the government's requirements at a lesser cost.

**#5. Vertical integration does affect small businesses' ability to do business with DoD.** All of the questionnaire respondents replied that no DoD policy changes were necessary to improve or maintain the current level of small business services. They felt that current small business initiatives, such as CICA, SBA, etc., provided for adequate small business opportunities with DoD. The researcher believes that vertical integration does affect small businesses' ability to do business with DoD for vertical integration allows the large prime contractor to control the activities of the small businesses who belongs to them internally. The small business is not permitted to make its' own decisions for it is a part of a larger organization. When large firms acquire selected small businesses which possess certain advance technologies that DoD wants, then, yes, the ability of small businesses to effectively do business with DoD is affected. If large firms were choosing to vertically-integrate average small businesses, then DoD business opportunities may not be affected at all.

## **C. RECOMMENDATIONS**

**#1. Encourage competition with the use of a best value source selection contracting process.** The acquisition reform initiative, best value, encourages prime contractors to respond to government contracts based on the quality and performance characteristics of the intended product. DoD must select the appropriate contractor based

on the contractor's past performance record and his ability to provide a product with the best value for the taxpayer's dollars.

**#2. Require companies pursuing vertical integration to support innovation through research and development efforts.** DoD should require companies which DoD assists in vertically integrating, to establish and maintain a research and development department to promote innovation. Research and development efforts will look at the commercial sector in order to obtain technological advances for the future. The commercial sector is comprised of large and small businesses competing equally for technologically advanced and innovative products.

**#3. Recommend a future study on the realized cost-savings of vertical integration.** A major part of vertical integration is the restructuring costs. Restructuring costs are the costs that DoD must pay today to realize cost-savings tomorrow. Firms, which merge or consolidate, are allowed to charge certain expenditures to DoD. These costs are based on a two-to-one ratio of future cost-savings, but there is no method in place to determine the realized cost-savings.

#### **D. ANSWERS TO RESEARCH QUESTIONS**

The following are the researcher's answers to her primary and subsidiary research questions that were derived from her findings and conclusions that were drawn from this study.

**#1. Primary Research Question: How has the defense industry's practice of vertical integration affected Department of Defense Acquisition Programs?** The practice of vertical integration has affected Department of Defense Acquisition Programs by potentially limiting competition and stifling innovation in the defense marketplace. It

has limited the number of firms the Defense Department can effectively contract with for business opportunities. Major defense contractors have decided to merge and consolidate their businesses. There are many implications of vertical integration affecting acquisition programs. It reduces the amount of competition for some DoD programs. Those subtier contractors who have been acquired by major defense contractors, possibly could have been viable prime contract contenders for certain DoD products. But due to their acquisition, the major defense contractor, as their new owner, controls their business, actively deciding: who the subtier contractor does business with, what type of business is conducted, and the amount to invest in any given project. The subtier contractor is now no longer free to make those business decisions that he would have made in the past.

Another realization is the possibility of a lower-quality and lower-performance product. DoD actively seeks to obtain a reasonable cost on all acquisitions. This has spurred acquisition reform initiatives, such as Priced-Based Acquisitions and Cost As an Independent Variable, CAIV. Vertical integration does not reduce the cost of acquisition programs, and presently, acquisition program costs are continuing to increase.

**#2. Subsidiary Research Question: What is vertical integration?**

Vertical integration is a term that describes a firm that owns the capability to internally supply some of the subsystems or components required for its products. A fully vertically-integrated firm would produce the entire system, all the subsystems, components and the like, whereas a firm with a lesser amount of vertical capabilities would buy many subsystems and components from other firms.

**#3. Subsidiary Research Question: What are the reasons firms choose to merge and consolidate their businesses?**

There are several reasons why firms choose to merge their business ventures with another firm. If one were to ask a firm to discuss its reasons for merging, he or she would receive a plethora of answers ranging from diversification of business and product, to global expansion or advanced technology, etc. The elimination of competition, a larger market share, and higher profits are also, possibly, real reasons. The survey identified technological advances as the primary reason why firms decided to merge, with a larger market share being the second highest reason, and the defense budget and profit tying for the third highest reason. Diversification and the elimination of competition were recorded as the least important reasons.

**#4. Subsidiary Research Question: What is the present make-up of the defense industrial base?**

Since the Cold War peak, the defense industry has responded to the approximate 40 percent reduction in the defense budget by consolidating firms, eliminating jobs in the defense sector, and reducing the number of companies in the defense industry. From March 1994 to February 1998, the size of the defense industry changed dramatically. This period marked the wave of mega-mergers in the defense industry. Initially, the defense industrial base had consisted of over 100 companies, but now it has been reduced to three major prime contractors: the Lockheed-Martin, Boeing, and Raytheon Corporations. These three corporations comprise almost 90% of defense business. Although companies such as Texas Instruments, Loral, General Dynamics, Allied Signal, and Vought, maintain business relations with DoD, their business opportunities are now

largely determined by the primary beneficiary being either Lockheed Martin, Boeing, or Raytheon. The defense industrial base is highly-concentrated.

**#5. Subsidiary Research Question: What DoD acquisition strategies help support competition and innovation?**

In developing an acquisition strategy, a program manager must make use of structural and procedural methods to provide for competition. A program's structure has a big impact on the potential for competition. Specific competitive strategies such as competitive prototyping, competition with other systems, and dual-sourcing have great potential to enhance system performance, improve schedule, and reduce program cost. [Ref. 18:p. 55] The way these strategies are built into the program structure preordains the degree to which competition can be employed.

It is standard procedure that program managers provide for full and open competition, unless one of the limited statutory exceptions applies. They must ensure that solicitations and contracts are written without unnecessarily restrictive statements of need, unnecessarily detailed specifications, and unnecessarily burdensome contract clauses, and ensure that procurement and source selection procedures do not work to exclude or discourage potential offerors from submitting proposals. This procedural process also helps to achieve innovation through allowing competition for the defense product. The use of performance specifications, dual-use technology applications, integrated product teams, and other acquisition reform initiatives, seek to make defense business simpler.

Cost As an Independent Variable, (CAIV), is a continuous, user-oriented, overarching acquisition strategy. With this strategy, we tradeoff performance requirements against affordable costs to maximize value to the warfighter.

**#6. Subsidiary Research Question: What problems could a Program Manager face as a result of a firm's consolidation?**

The climate has changed. Industry is more concentrated today. There are fewer new DoD program opportunities and our budget is not growing. This potentially static business climate might in the future encourage firms to leverage their vertical business units for competitive advantage.

Defense contractors performed a series of mergers and consolidations in order to remain competitive in this smaller defense marketplace. Vertical integration concerned the Department of Defense leaders and managers because it could possibly lead to adverse consequences for acquisition reform initiatives in the form of higher costs, poorer quality, and lower performance products. Program Managers face many such problems in acquiring defense products. There is a limited defense budget, but it is clear that low performance and poor quality products are not acceptable when soldier's lives are at stake and taxpayers dollars are being spent. Program Managers have to become more creative in providing for competition and innovativeness in the acquisition of their defense products in the face of a smaller defense industrial base.

**#7. Subsidiary Research Question: To what regulations must Program Managers adhere?**

The program manager is responsible for encouraging full and open competition, acquiring the best quality product at the most affordable and reasonable cost, and

ensuring equal opportunities to small businesses to perform on government contracts are achieved. [Ref. 2:p. 50] DoD Directive (DoDD) 5000.1 establishes guiding principles for all defense acquisitions. DoD Regulation 5000.2-R specifies mandatory policies and procedures for Major Defense Acquisitions Programs (MDAPs) and Major Automated Information Systems (MAISs) Acquisition Programs. The Federal Acquisition Regulation (FAR) covers all federal acquisitions, and specifically, FAR Part 6 addresses competition requirements. The above-mentioned documents are not all-inclusive. There are Defense Supplements to the FAR (DFAR), laws, and other procurement regulations which the PM is largely responsible for adhering to, understanding, and executing. By no means is a PM's job considered a trivial affair, the amount of documentation he/she has to comprehend, alone, is excruciating.

#### **E. RECOMMENDATIONS FOR FUTURE RESEARCH**

The Globalization of Business and Industry, Partnering with Industry, and Civil-Military Integration, are three DoD initiatives that relate to vertical integration in the defense industry. The accelerating globalization of business and industry has potential effects upon the defense industrial base. There are potential national security risks and other security issues that will affect business and industry, including the number of U.S.-owned defense contractors with overseas facilities and the increased foreign ownership of U.S.-based suppliers. Presently, European Aerospace and Defense Company is considering purchasing Northrop Grumman. If the German-based firm acquires this company, critical U.S. military technological advancements will be basically handed over to the control of the Germans, our allies. Although this is a more

complicated issue than stated, the potential of losing vital technical knowledge is a real possibility.

Partnering With Industry is an initiative that seeks to move toward a single national technology and industrial base that will serve military as well as commercial needs. The dual-use investments are intended to benefit fighting forces today, and in the future. Defense R&D dollars are carefully invested to satisfy military needs--to promote lower costs and higher quality with increased performance. DoD maintains a strategy to do what it can to ensure US commercial industry remains at the cutting-edge in those technologies that are also critical to our military capabilities. This necessarily requires DoD to support leading-edge R&D that accelerates the development of emerging commercial technologies that simultaneously meet defense needs. A principal way to achieve the maximum from this dual-use R&D investment strategy is through government and industry partnerships that will lead to a single, integrated commercial and military industrial base.

Civil-Military Integration, (CMI) is a set of initiatives aimed at improving the acquisition process by enhancing access to world-class suppliers through applying best commercial business practices, while removing barriers, at all stages of the acquisition process, which prevent the Department from accessing commercial technology and products. In addition, industry must be incentivized to merge their civil and military facilities and practices. Implementation of CMI initiatives will leverage access to leading-edge technologies and practices.

**APPENDIX A: QUESTIONNAIRE AND COVER LETTER**



Memorandum For Record

Subject: Vertical Integration of the Defense Industry and Its Effects on DoD Acquisition Programs

To Respected DoD Officials, Industry Executive Officers, and TWI Colleagues:

This memorandum is attached to the following questionnaire in order to provide you with some background information on my research topic. This thesis is an unclassified document and will be placed in the thesis archive of the Naval Postgraduate School.

Vertical integration is defined by the Defense Department as the ability of a firm to internally supply all, or some of the subsystems and components needed to produce defense products or weapon systems. A fully, vertically-integrated firm would produce the entire system—meaning all the subsystems, all the components and the like—whereas a firm with a lesser amount of vertical capabilities would buy subsystems and components from other firms. Virtually, certain defense prime contractor could provide DoD with a certain defense product and not go outside its own company to do it. The practice of vertical integration in the defense industry has heightened DoD's concern for full and open competition, the production of innovative products, and the ability to obtain a more reasonable cost for its products.

This is where you can help. I have enclosed a questionnaire regarding vertical integration in the defense industry and am soliciting for your responses. Please answer the attached questionnaire and return it to me via email, [silky386@aol.com](mailto:silky386@aol.com), or fax, (831) 656-2138, I will greatly appreciate your assistance. If you have any questions, or need some additional information, or you can provide me with additional research information, please forward that information to me also.

Thank you for your time and consideration. Please comment liberally.

CPT Sharon L. Brown  
Naval Postgraduate School  
(831) 394-4757 (home)  
(831) 656-2138 (fax)



## INDUSTRY QUESTIONNAIRE

NAME	INDUSTRY/COMPANY	POSITION
DD/MM/YY		
<p>QUESTION 1: Rank In Order of Importance the following reasons your firm would consider a merger:</p> <p> <input type="checkbox"/> Profit    <input type="checkbox"/> To Eliminate Competition    <input type="checkbox"/> Diversification    <input type="checkbox"/> Larger Market Share  <input type="checkbox"/> Defense Budget    <input type="checkbox"/> To Provide DoD a Better Product    <input type="checkbox"/> Technological Advances  <input type="checkbox"/> Other         </p>		
<p>QUESTION 2: Does vertical integration of the defense industry limit competition? Explain.</p>		
<p>QUESTION 3: Does vertical integration of the defense industry stifle innovation of DoD defense products? (i.e. it is harmful or helpful to the quality and performance of product being produced?) Explain.</p>		
<p>QUESTION 4: The Defense Industrial Base accounts for approximately four percent of the National Industrial Base. Do you believe that more commercial industry products should be used in your organization to afford DoD the opportunity to obtain a product at a more reasonable cost? Explain.</p>		
<p>QUESTION 5: Vertical integration of the defense industry can lead to one company having the capability to build an entire system. In such circumstances, lower tier contractors are forced out of the defense market due to lack of business opportunities. Do you believe that DoD policy changes are necessary to improve and maintain the number of small businesses doing business with DoD? Explain.</p>		



**PROGRAM MANAGER/DOD QUESTIONNAIRE**

NAME	PROGRAM/DOD OFFICE	POSITION
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DD/MM/YY		
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QUESTION 1: As a member of DoD, program managers and offices alike solicit contracts for "full and open competition" for DoD products. Do you believe that vertical integration of the defense industry has any impact or influence upon how your organization effectively solicits for competition? Explain.

QUESTION 2: Does vertical integration of the defense industry limit competition? Explain.

QUESTION 3: Does vertical integration of the defense industry stifle innovation of DoD defense products? (i.e. it is harmful or helpful to the quality and performance of product being produced?) Explain.

QUESTION 4: The Defense Industrial Base accounts for approximately four percent of the National Industrial Base. Do you believe that more commercial industry products should be used in your organization to afford DoD the opportunity to obtain a product at a more reasonable cost? Explain.

QUESTION 5: Vertical integration of the defense industry can lead to one company having the capability to build an entire system. In such circumstances, lower tier contractors are forced out of the defense market due to lack of business opportunities. Do you believe that DoD policy changes are necessary to improve and maintain the number of small businesses doing business with DoD? Explain.



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