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## INTRODUCTION

The end of the Cold War was projected to bring an era of greater worldwide stability, however, just the opposite seems true. Deployment of the U.S. military to more places and more conflicts is greater than at any time since World War II. Adding to the U.S.' demanding global involvement, the Department of Defense (DoD) itself is undergoing its widest breadth of changes ever. Our force structure and budgets are down about 33 percent since 1985 and procurement is down 65 percent. This reduction, in the investment dollar available, has forced the DoD leadership to find more innovative ways to maximize each defense dollar. Leveraging advance technologies into our current systems through modifications and upgrades offers a cost effective solution.

We chose this subject because it is apparent that modifications and upgrades will play a greater role in today's and tomorrow's DoD modernization plans. Several reasons appear causal:

- Today's weapon systems are very complex making each one expensive.
- The time required to develop and produce new systems has grown so exhausting that often pieces of these new systems are

obsolete or nearly ineffective at their fielding.

- The speed of technology growth increases the risk of system obsolescence but offers new opportunities for using an incremental improvement philosophy.
- Declining DoD budgets preclude buying large amounts of new equipment.
- Several old systems could remain viable weapon systems with continuous modest improvements.

Also, our interest was piqued because there is little published information or research on the modification and upgrade processes or procedures. Thus, our goal is to provide the reader with fresh and useful insights into how DoD and the components intend to manage this potential growth area.

### **Purpose**

This report will help the acquisition community understand the current modification and upgrade process. As the service life for weapon systems grows and the half-life of technologies shorten, one answer to maintaining effective weapon systems is through

modifications or upgrades. This report provides a concise, top level review of DoD regulations, policies and guidance pertaining to the modification and upgrade of weapon systems. Since the Services handle modification and upgrades, this report offers a review of each Service's policies and procedures. This report extends beyond the DoD, by looking at the modification and upgrade procedures for industry, other countries and one other U.S. governmental agency. This report is not designed to be a "how to guide" for modifications and upgrades. It is however, a starting point for a future study of the processes. This report offers DoD and Service policy makers an opportunity to review the policies and procedures of their sister Services with an eye to improving the overall modification and upgrade process.

### **Methodology**

We approached this project from three different vantages. While attending the Harvard Graduate School of Business, we discussed our topic with faculty members and with our fellow classmates from U.S. and international companies. Generally speaking our classmates were middle level managers responsible for making their companies' processes work. Our discussions, with our classmates, were focused on product life extension programs within their corporations. We concentrated on what decision points were used and how the programs were developed. We were also very fortunate to have classmates working for U.S. Defense contractors. We focused these discussions on their management processes and tried to identify differences between the management process for a new product and upgrade/modification. Our time at Harvard University offered a unique opportunity to discuss management processes with class-

mates and friends, whom are currently managers for some of the world's leading corporations.

Upon returning to the Defense Systems Management College (DSMC) we began an extensive literature review. Identifying over two hundred related writings including books, periodicals, research reports, government policy letters, instructions and regulations; we distilled this number to 50 key documents. We heavily relied upon these documents for the development of this report. Our research indicates an interesting timing sequence for articles on modifications and upgrades. The documents normally fall into two distinct time frames, prior to 1979 and later than 1994, which coincide with the last reductions in DoD funding. The search also indicates there has been no comprehensive study of the Modification and Upgrade process within the DoD, as of this report.

Finally, we conducted more than 50 interviews with key personnel from academia, government, industry and allied nations involved in the modification and upgrade process. These interviews lasted from one hour to several days, covering most aspects of the modification and upgrade process. We spoke with senior acquisition officials, Program Executive Officers (PEOs), Program Managers (PMs), Program Logistics Managers, Weapon Systems Managers, Force Developers, Fleet Maintenance Officers and Item Managers (IMs). We collected as much information as possible from these individuals using their experiences, both bad and good, with the modification and upgrade processes.

### **Assumptions**

The following assumptions established a

common starting point for this modifications and upgrades report:

- Modifications and Upgrades will continue to be accomplished using the acquisition process established by DoD Directive 5000.1, *Defense Acquisition*, dated February 1991 and DoD Instruction 5000.2 with Change 1, *Defense Acquisition Management Policies and Procedures*, dated February 1993.
- DoD funding for its investment account will not increase in the near future.
- Acquisition Streamlining process will continue to affect the Modification and Upgrade process.

Using these three fundamental assumptions, we began our report of the DoD's Modification and Upgrade Process.

## **Objective**

The Research Fellows corporately defined, researched and contemplated the issues of modifications and upgrades in order to offer this work as a primer for the acquisition leaders who will chart the future course for these activities. We strongly feel that this report arms the decision maker with the background information necessary to design surgical changes to an already functioning process. This will further enhance the DoD's ability to capitalize on technological advances, while living on meager resources. If decision makers are able to distill from our work those "knowledge nuggets" which persuade to "best effect" as opposed to "wholesale changes" and their associated confusion, then we confidently offer that this effort will have value to the DoD beyond the "opportunity costs" to our individual services for the fellowship year.

