

Introduction

The U.S. Army is in the process of a sweeping revolution not seen since World War II. According to *Army Magazine's Hooah Guide to Army Digitalization*, the foundation for the new revolution in military affairs is the shift away from producing and employing individual platforms or systems toward integrating all platforms and systems into a single networked grid. This grid continuously monitors changing circumstances and facilitates its own success or survival. This so-called system-of-systems concept is driving the development and design of the Army's Objective Force.

The Objective Force will be an offensively oriented, combined-arms, multidimensional maneuver force that will employ revolutionary operational concepts enabled by new technology. The Army relies on weapons technology breakthroughs to provide greater tactical, operational, and strategic lethality from smaller, more agile forces. The Army's vision involves leveraging state-of-the-art technology to create network-centric

IMPLEMENTING EVOLUTIONARY ACQUISITIONS

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systems. These systems will allow commanders to dominate the battlefield through better control, improved situational awareness, and enhanced abilities to target and engage the enemy seamlessly with the most effective weapon systems available.

The problem with this scenario is that DOD and the Army take too long to incorporate advanced technologies into weapon systems using the traditional program model structure. This is especially true in the informa-

tion technology (IT) area where commercial market demand drives desperately needed innovations that are necessary to successfully implement the Objective Force's system-of-systems concept. This article illustrates how accelerating the use and implementation of the evolutionary approach will facilitate the Army's transformation and maintain its technological advantage over future adversaries.

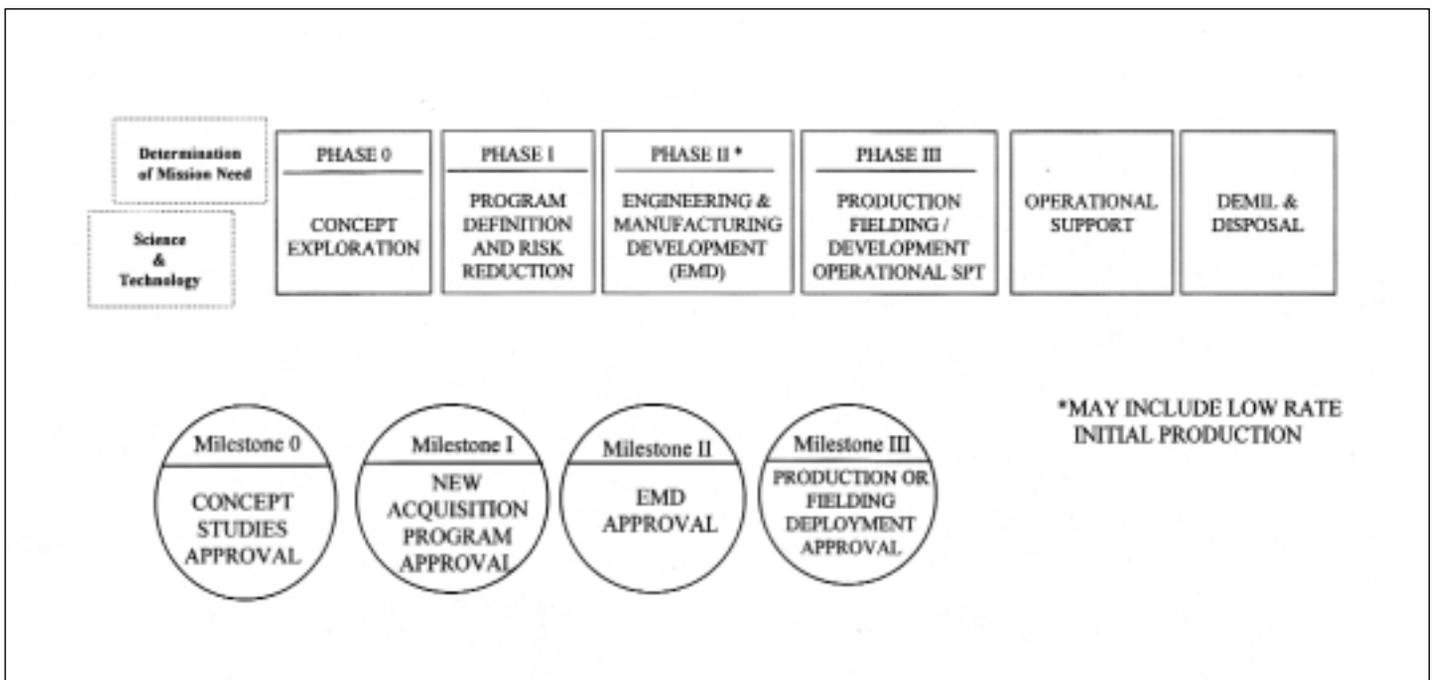


Figure 1.
DOD Traditional Program Structure Model before October 2000

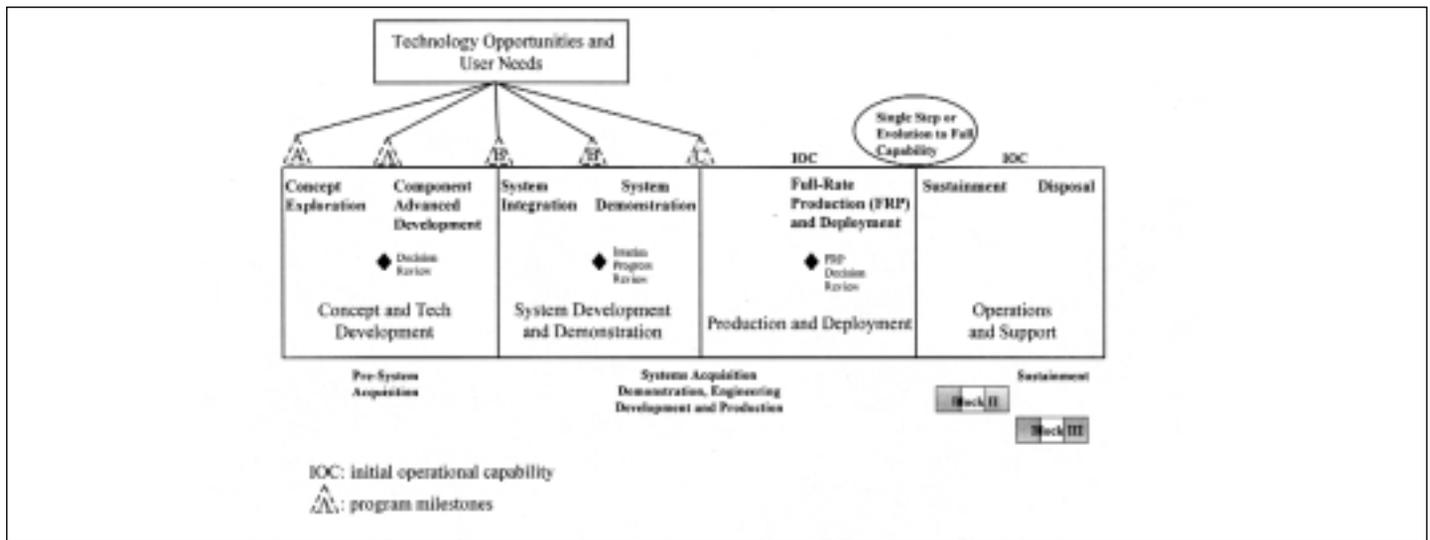


Figure 2.
Defense Acquisition Model as of October 2000

Program Structure

The *DOD Deskbook* defines “program structure” as “the phases and milestone decision points established for a program.” Phases and milestone decision points facilitate the orderly translation of broadly stated mission needs into system-specific performance requirements and a stable design that can be efficiently produced. Program structure provides the context within which a system is designed, developed, and deployed during its life cycle. Program structure is a fundamental building block of the program’s acquisition strategy. Use of a particular program structure is one of the most important decisions a program manager (PM) will make because it has a lasting impact on the program throughout its life cycle.

Generally, government PMs use one of four basic types of program structure models to achieve their program objectives: grand design, incremental, evolutionary, or traditional. Prior to October 2000, the traditional program structure model represented DOD’s typical approach to major acquisition development programs. Figure 1 shows the traditional program structure model that was depicted throughout the 1990s in DoD Directive 5000.1. Figure 2

depicts the new evolutionary acquisition model.

In October 2000, a major revision to DoD Directive 5000 gave preference to evolutionary acquisition strategies over the traditional acquisition model. Evolutionary acquisition strategies define, develop, and produce/deploy an initial, militarily useful capability based on proven technologies and time-phased requirements, projected threat assessments, and demonstrated manufacturing capabilities.

Evolutionary Acquisitions

According to the updated DoD Directive 5000.2, evolutionary acquisition strategies were given preference over other models to accelerate the incorporation of commercial technology and shorten the acquisition cycle. Actually, the current pace of commercial technology advancement in many sectors exceeds the government-sponsored efforts. Current commercial development cycle times are less than 3-4 years versus 8-10 years for DOD-sponsored development. Taking 8 to 12 years to develop a new weapon system using the traditional model is impractical given the current global rate of technological change. Clearly, the traditional DOD acquisition model can-

not assimilate technological changes into weapon systems fast enough to guarantee that our soldiers will maintain the technological overmatch against our future adversaries. In addition, an evolutionary approach to weapon system development acknowledges the difficulty in predicting future technology advancements as well as future warfighter requirements 10 to 15 years into the future.

To its credit, the Army recently reorganized its Science and Technology Program to accelerate and improve the integration of new technology into Army weapon systems. However, it is unlikely that DOD will greatly influence the majority of future technological advances, particularly in the area of information technology, on which the system-of-systems concept will rely. In this area, commercial sector technological advancements will outpace DOD’s developmental efforts.

Rapidly integrating state-of-the-art technology into the Army’s new network-centric systems is a formidable task, but keeping the systems current with modern technology is the greatest challenge. Adding mature technology capabilities through block upgrades is the best way to address the changing needs of

our warfighters. Today, these changes are dictated by an uncertain enemy and an unclear picture of what future capabilities new technologies may bring.

Shortening acquisition cycles and rapidly incorporating and refreshing new technology into our weapon systems are not the only reasons for accelerating the use of evolutionary acquisition strategies. Other important reasons are to increase the number of contractors willing to do business with DOD and to address the problem of parts obsolescence.

Expanding DOD Contractors

Until the latter part of the 20th century, the government market dominated the technology marketplace. Using competition and research and development funding, the government pushed companies to achieve technological breakthroughs, then allowed them to commercialize the technology over time. In recent years, however, reductions in Defense budgets, coupled with the growing demand for "high-tech" products, made the commercial marketplace more attractive to technology companies. As a result, the number of major technology companies willing to do business with DOD on a large scale has declined at an alarming rate. In fact, the Defense industrial base of major DOD technology companies has decreased from more than 30 contractors to 4.

The diminishing U.S. Defense industry may not be bad. According to then Deputy Secretary of Defense John J. Hamre, "DOD wants nothing less than to dissolve the infamous 'military-industrial complex' that has existed as a parallel universe to civilian industry since the end of World War II. We don't want a defense industrial base anymore. We just want an American industrial base."

While this sounds good, to achieve this goal the military must change its acquisition process. The

government must receive current technology from commercial production lines instead of requiring industry to fabricate specialized weapon system components based on 5-year-old technology that was state-of-the-art during the acquisition design phase. Evolutionary acquisition strategies seek to use mature, commercially available technologies. Using mature commercial technology in weapon systems will make future DOD business more attractive to industry, resulting in greater competition and more technological options available to DOD customers.

Parts Obsolescence

The second reason for accelerating an evolutionary acquisition methodology is to address the parts obsolescence problems afflicting most DOD weapon systems. The latest high-performance, commercial off-the-shelf (COTS) technologies become obsolete in 18 months or less, while weapon systems still have 5 to 10 years in design cycles and service life spans of 20 to 30 years. The military's problem is exacerbated by the fact that crucial semiconductors, transistors, diodes, capacitors, and circuits that keep technologies running smoothly are wearing out. Many manufacturers that produced them have abandoned the military to focus on other consumer markets.

Parts obsolescence is a PM's nightmare. The Army's M1 tank has some significant obsolescence issues that may require redesigning the tank to address the problems. Another example is the Army's FireFinder Radar System. In March 2001, the Army was forced to upgrade FireFinder's COTS circuit boards because parts on the old boards were obsolete. COL Michael Cox, Deputy Program Director, Joint Tactical Radio System stated it best when he wrote, "The dramatic pace of advances in communications technology coupled with the military's traditionally long system-acquisition cycles has

resulted in technological obsolescence of new systems before they are fielded. Costs have prohibited retrofitting old systems with improved capabilities, resulting in reduced military readiness."

Failure to accelerate the use of evolutionary acquisition strategies could mean sending our soldiers into harm's way with obsolete technology, which could cost soldiers' lives in addition to extra time and money to manage the problem. Moreover, the Army's vision of rapidly fielding the Objective Force cannot be achieved without accelerating the use of evolutionary strategies.

Conclusion

The rapid technological change confronting the Army mandates that we change the way we do business. In the long run, we cannot continue to design and produce weapon systems as we have in the past and expect our soldiers to maintain a technological advantage. Moreover, if we do not change the way we do business, we will not be able to sustain our weapon systems given the growing problems of parts obsolescence and the shrinking number of DOD contractors. Evolutionary acquisition strategies will not completely solve all of these problems. However, it is a step in the right direction and should be aggressively used by PMs whenever possible.

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