Development of an Acquisition Management Course

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Abstract

In response to external feedback and a continual desire to increase the diversity and applicability of the curriculum for our students, the Engineering Management Program at USMA will offer an acquisition systems management course for the first time in Spring 2005. This course will provide graduates with relevant skills related to the acquisition goals of strategically managing, planning, and implementing acquisition programs and reforms. Topics will include acquisition core competencies, such as: theory and principles, systems perspective, project management, technology integration, modeling and simulation. Other topics include knowledge management, organizational behavior, decision making, and risk management.

The use of a rigorous systems engineering management process in the development of the course curriculum is necessary to ensure we meet the needs of our students (USMA cadets) and primary constituency, the US Army.

Introduction

The need to transform the Armed Forces to meet the challenges and opportunities of the twenty-first century has never been greater. Current conflicts and operations are fundamentally changing the nature of warfare. In response to these changes the military's needs have also changed from that of a heavily armored large-scale force to a rapidly deployable, digitally commanded, and fully integrated joint force that combines all services. This new emerging force relies on computer-enhanced systems and the proliferation of advanced technology down to the individual soldier level to gain information dominance on the battlefield.

Current conflicts dictate a need for rapid integration of these new technologies into the force structure. This change in force structure and rapid integration also created concerns and questions in our acquisition practices. How do you shorten the acquisition life cycle while still completing the necessary research and adequate testing to produce a reliable interoperable system that increases our warfighting capability and effectiveness? To meet these challenges the Secretary of Defense in 2003 issued planning guidance to the Department of Defense (DoD) intended to transform acquisition business practices to a more "future-oriented capabilities-based resource allocation, accelerated acquisition cycles built on spiral development, out-put based management, and a reformed analytic support agenda." [1] In response to this new guidance, the DoD community has revised the Defense Acquisition System to establish "a simplified and flexible management framework for translating mission needs and technology opportunities . . . into stable, affordable, and well-managed acquisition programs." [2] The Defense community also created a new requirements development process called the Joint Capabilities Integration and Development System (JCIDS). [3] The JCIDS process has been adopted to better develop systems

that meet the capability requirements of our fighting forces. This process links joint force capability needs within all aspects of the acquisition process providing traceability of system requirements to a capability requirement. The realization of these new processes hinges on the expertise of government agencies, military, academia, and industry using collaborative environments, systems perspective, modeling and simulation. The end result is a more efficient acquisition business process, which produces systems that meet war fighter requirements and can be fielded to units faster.

This framework shift in both acquisition processes and beliefs will require time and education in the community. In support of this transformation the Department of Systems Engineering at West Point has developed a new course to give young Army officers an understanding of acquisition systems management. The purpose of this paper is to illustrate a course development example to assist other new programs, and present a unique acquisition methodology not yet taught in academic acquisition curricula.

Because of the Army's emphasis on developing leadership, almost all USMA graduates spend their first ten years after graduation with troops, culminating in command of a company or equivalent unit. Very few will work in a systems acquisition program office during this period. This presented us with a unique challenge: we needed to make clear to the cadets the relevance and importance of systems acquisition to the Army and to their careers. We were also confronted with the task of providing them material that would be of benefit and would be remembered to establish a foundation of acquisition management understanding. Our response was to design the course with three purposes in mind: (1) Give the cadets a background such that, when they are in the field and a new Army system is delivered to them, they understand the process that brought it to them; (2) Enable them to give better feedback to systems developers and to function as user representatives in systems development teams; and (3) Give them a theoretical understanding of how the acquisition process works during their years in the field, so that they can become better Acquisition Corps officers, if their careers take them in that direction.

Course Development Methodology

We started the development process by identifying those learning objectives that would lead to intellectually capable officers that understood universal acquisition concepts and could lead in acquisition programs. After a thorough needs analysis and an iterative review process, seven overarching course objectives were created that together will help develop capable acquisition leaders. The courses objectives include:

1. Apply a holistic acquisition methodology to solve a large-scale, complex acquisition problem.
2. Utilize a family of dynamic models to evaluate an acquisition system, and explore its operations and processes.
3. Use engineering management and system engineering principles to develop an acquisition strategy of real-world systems, operations, and processes.
4. Design control options and other criteria to evaluate, improve, and manage an acquisition system's operations and processes.
5. Understand the role of modeling in the engineering management process and how it helps engineering managers understand the relationships between acquisition planning, organizing, staffing, and controlling of projects.

6. Apply information technology solutions to improve the data and information exchange within the acquisition process and identify ways to foster a culture of innovation.
7. Prepare and present the results of an acquisition system analysis in oral and written form.

To meet these objectives we completed a review of government agencies, academia, and industry to identify existing acquisition courses, topics and material that would support the vision for the course. The list below includes those sources that provided substantial material to the development of the course.

Table 1: Course Material Sources

SOURCE	BLOCK	MATERIALS
Air Force Institute of Technology (AFIT)	1, 2	History, Contracting, Framework
Naval Post Graduate School	1-3	History, Key Players
Defense Acquisition University (DAU)	1-4	Current Policy and Application
United States Air Force Academy	4	Contract Management and Negotiations
Federal Aviation Administration	1, 2	FAA Acq. System Toolset (FAST)
Harvard Business School	NA	Case Studies
Kennedy School of Government	NA	Case Studies
Industrial College of the Armed Forces	2	Acquisition in the Military Strategy
Alion Research and Development	2	Simulations and Modeling Tenets

We then systematically captured the material relevant to our course objectives and grouped them based on their affinity. Much of the most useful material we received was from courses designed for military officers entering an acquisition management career field (e.g. from AFIT and DAU). This material is oriented towards training people for a specific job. The USMA mission is education; thus, we are acutely focused on learning and understanding of the core principles, tenets, and enduring concepts that underpin the acquisition process and less concerned with providing detail on the current DoD procedures. This meant that we had to use these materials judiciously. For the most part, we covered the same topics, but there was a general difference in emphasis and in manner of presentation. We treat current DoD practices as only one instance of how to manage systems acquisition. When our cadets go into an acquisition job, the details of how it's done are very likely to have changed, but the nature and unique challenges of systems acquisition will be the same. The overall results of this course development process framed a systems focused holistic acquisition course that met our established objectives.

Major Course Concepts

This course is divided into four major blocks (Figure 1) that align with the major competencies of successful acquisition managers. The first block, *Acquisition Fundamentals and Principles*, provides cadets with the principles and concepts necessary to understand the acquisition process. These topics include: the history of acquisition, the key players and current governmental acquisition policies. This section will outline the acquisition environment and is essential for understanding the basic acquisition process concepts. Block two, the *Determining Needs and the Acquisition Management Framework* block, will build on the acquisition fundamentals and provide cadets with an understanding of the acquisition

management framework. In this block, cadets will learn the Joint Capabilities Integration and Development System, needs analysis, Simulation & Modeling for Acquisition Requirements & Training, and gain an overall working knowledge of current acquisition procedures.

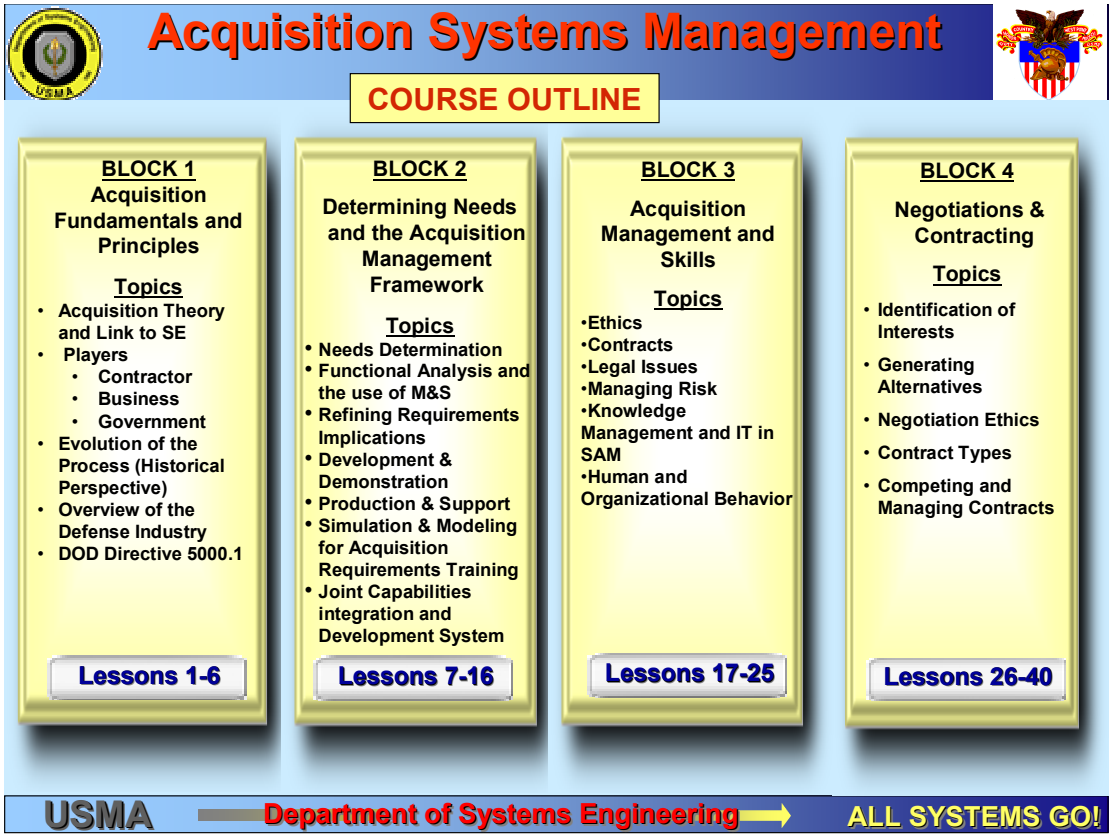

Figure 1: Acquisition Systems Management (ASM) Course Outline

They will become familiar with the complete life cycle from the initial stages of capabilities assessment to the support, concept exploration and operational use of the system, to the eventual retirement of the system. An overview of this process is in Figure 2. [4]

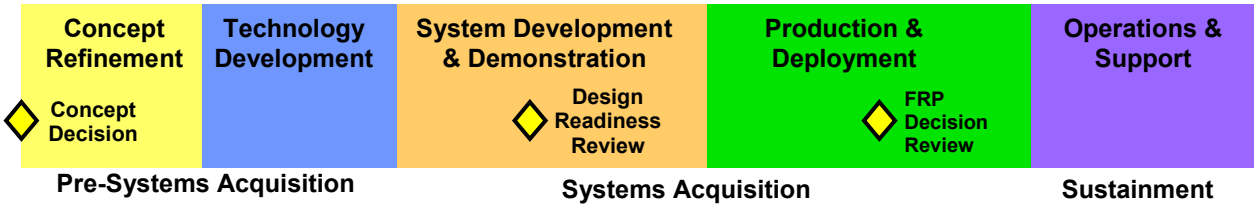

Figure 2: DOD Acquisition Process

The third block, *Acquisition Management Skills and Challenges*, will cover the necessary skills required to successfully complete an acquisition. These skills include: Total Quality Management, risk management, knowledge management, engineering test & evaluation, earned value analysis and resource allocation. One of the skills not covered in this third block and essential for successful acquisition management is supply chain management. Cadets

taking Acquisition Management also take a course entitled "Production Operations Management" where they gain a comprehensive background in supply chain management and are expected to utilize this knowledge in the new course. Finally, the last block on *Negotiations and Contracting* provides cadets with the skills to effectively negotiate and manage a contract. Both sets of skills are essential for acquisition management and will also assist our cadets in other facets of their military careers. This block also provides the opportunity to introduce new concepts such as "Technology Insertion Strategies for Spiral Development of Complex Weapon Systems" [5] and the latest challenges in systems acquisition management.

To assist in meeting the course objectives and reinforce the individual topic learning points the Department of Systems Engineering has invested in state of the art laboratory facilities and systems. These investments include hardware and software. Technology for 3D modeling and simulation environments, information visualization and knowledge processing technology make up the analysis and investigative environments needed to explore complex issues and problems facing our future force and acquisition community. The environments are buttressed with a suite of software that allow researchers (faculty, cadets, and professionals) to conduct experiments, investigations and analysis. Cadets in this course will have the opportunity to work with these tools and see their functionality in a complete acquisition process from design to production.

The course will use case studies throughout each block of instruction to provide the cadets with an active learning environment to solidify concepts. Military, governmental, and civilian acquisition case studies, like those listed below (Table 2), will be used in the course to provide a broad view of the acquisition management discipline.

Table 2: Course Potential Case Study List

Mast Bumping in Huey and Cobra Helicopters	Motorola: Bandit Pager
Trident: Setting the Requirements	DuPont
Breaking the Bad News: DIVAD	Boeing 767
Selling Innovation: FOG-M	A-12 Aircraft
Certifying AMRAAM	F-111 Case study
Buying the Beretta: The Army Dilemma	C-5 Case Study
F-14: After the Ink was Dry	Hubble Case Study
Patriot Crisis	Theatre Battle Management Case Study
CALS: Linking the Government and its Vendors	JDAM
Campbell Soup Company	

The case studies are an important means of giving the students an appreciation of the real-life experience of system acquisitions, but they are not the only means. We plan to take every opportunity to bring in guest speakers from the acquisition community to talk about their experience. We will also bring in USMA faculty members with an acquisition background, and we will invite visitors to USMA from acquisition offices to talk about their programs. In the first term the course is being offered, we have five guest lecturers scheduled. This will give the

students a feel for the practical realities of defense system acquisition. I will also show them the tangible results of system acquisition, when they hear about current new systems being deployed to the field.

The topics and sequence of the course material will provide our cadets with a holistic acquisition methodology and the skills to manage the process in any environment. These skills combined with the latest learning and investigative research technology will provide cadets with a unique experience that will enhance their ability to lead in our dynamic and transforming force.

Conclusion

The purpose of this course is to develop intellectually capable leaders who understand acquisition and will contribute to the on-going DoD force transformation. Our learning environment will provide both a historical perspective and current view of acquisition systems management. Our course is unique in that it provides a systematic focused framework from which to view, think, analyze and execute new ways of acquisition systems management. This framework is grounded in sound education principles. This curriculum focuses on providing Army officers with the foundational knowledge and skills to effectively manage large-scale complex acquisition problems by exposing cadets to a universal systematic methodology.[6] The product of our educational efforts will be young leaders who are effective in planning, programming, modeling, implementing, and leading. These same leaders will drive our future-oriented accelerated acquisition cycles and transform our institutions to meet the challenges and opportunities of the twenty-first century.

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[1] Secretary Of Defense Donald Rumsfeld, Transformation Planning Guidance, April 2003.

[2] Department of Defense Instruction 5000.2, *Operation of the Defense Acquisition System*, 12 May 2003, para. 1.3.

[3] Chairman of the Joint Chiefs of Staff Instruction 3170.01D, *Joint Capabilities Integration and Development System*, 12 March 204.

[4] Department of Defense Instruction 5000.2, *op. cit.*

[5] Farr, J., Verma, D., McFadden, W., (2004) *Technology Insertion Strategies for Spiral Development of Complex Weapon Systems.* Stevens Institute of Technology and U.S. Military Academy, Systems Engineering and Engineering Management (SEEM) presentation.

[6] McFadden, W., Bryant, T., Brantley, M., Vann-Olejasz, S. *Acquisition Systems Management: Curriculum Development.* United States Military Academy.

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