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ISSUES FACING THE DEPARTMENT OF DEFENSE

This chapter addresses some of the issues surrounding the exploitation of the digital environment within the Department of Defense (DoD) Acquisition Community, and discusses recommendations for Program Managers (PMs) to consider. They include:

- Lack of a *single face* to industry;
- DoD-wide integrated data environment (IDE) efforts are led by the logistics community;
- Lack of a DoD-wide infrastructure;
- Use of standards;
- Continuous Acquisition and Life-cycle Support (CALS) "compliance";
- Education and training;
- DoD implementation guidance;
- Incentives and metrics;
- Data requirements: access, delivery, and use; and
- Cultural barriers.

The degree to which they impact a program management office (PMO) will vary depending upon the program and its Acquisition Program's Digital Environment (APDE) implementation. However, it is important that the PMO at least be cognizant of these issues in order to mitigate their potential impact.

Issue: Lack of a *Single face* to Industry

While many advocate the concept of presenting a *single face* to industry, the fact is that the numerous agencies involved in various aspects of the digital business infrastructure precludes a singular coordinated effort. Within DoD, Electronic Commerce/Electronic Data Interchange (EC/EDI) falls under the responsibility of Deputy Under Secretary of Defense (Acquisition Reform) (DUSD(AR)) and has centered on the contracting community and automating procurement processes, particularly transactions under $100K. The CALS effort within Deputy Under Secretary of Defense (Logistics) (DUSD(L)) has a logistics and sustainment focus, although its vision is to support cross functional data integration across the program life cycle. The development

of standards and the data exchange infrastructure is led by Defense Information System Agency (DISA).

There are also other government and industry players involved in the development of standards and policies, such as the Department of Commerce (DoC), National Institute of Standards and Technology (NIST), industry steering groups, and national and international standards bodies. While there is clearly discussion and cooperation between the involved organizations, there is also a lack of oversight and enforcement with respect to conflicting or overlapping functions and responsibilities. Most of our interviewees cited that these apparent functional stove pipes or "rice bowls" at the top result in confusion and lack of clear guidance or direction at the grass roots level. Not only does this preclude a *single face* to industry, but it also prevents the DoD acquisition workforce from understanding the mission, objectives, goals, and requirements. The answers change depending upon who responds to the question. A recent independent study highlighted similar concerns within DoD and industry:[1]

- numbers of seemingly uncoordinated demonstration and pilot projects;
- the perceived lack of central oversight and monitorship;
- inadequate and poor communications between the community, PMOs, users, and customers;
- constant personnel change-over within government (military and civilian) which provides little consistency and long-term vision;
- inadequate or incomplete requirements for interface; and
- lessons learned, success stories and major systems implementation status using digital data are not widely disseminated.

This "functional" approach to digital infrastructure development within DoD also results in a non-integrated approach at the Service and program levels, and extends to industry. In an Army pilot program after action report, it was noted that "[we] experienced extraordinary levels of frustration while trying to discover where in the Government bureaucracy the solutions to daily problems could be found."[2] While they went on to say that "IDE advocates at high levels within DUSD(L), DISA, AMC [U.S. Army Materiel Command] and PEO [Program Executive Office] ASM (to name just a few) have been instrumental in the successes achieved to date," it remains that a single focal point, or *single face* to the acquisition community is lacking.

Despite the goal of a cross functional "integrated" digital environment, research finds the Services, PMOs, and industry partners each to be mirroring the functionally segregated DoD organizational structure. In most cases, different offices are responsible for program management, digital infrastructure issues, CALS issues, and EC/EDI issues. Offices are typically separated, both physically and functionally, and often not cognizant of what the others are doing. This appears to happen because at the DoD-level, guidance and policy are typically disseminated through the different functional chains such as PEO/acquisition, logistics, or contracting.

Recommendation

At the PMO level, it is important for the PM to take a total systems approach, examine how the functional and business processes interact, and plan for the entire information life cycle

of the program. While there is little a PM can do about the assignment of responsibilities within the DoD and the Service hierarchies, the PM can ensure that efforts controlled by the PMO are coordinated. A major step is to establish a clear APDE vision through a Concept of Operations (CONOPS). (Refer to Chapter 5 for a discussion of CONOPS.) Functional boundaries that act as barriers to information exchange and coordination must be eliminated, wherever possible. The efforts of everyone involved in the development and evolution of the APDE, especially industry partners and support agencies, need to be consolidated and coordinated. The result is a single shared vision of the APDE that is understood and, hopefully, supported by all concerned.

Issue: DoD-wide IDE Efforts Are Led by the Logistics Community

The development and support of the DoD-wide strategic IDE vision is the responsibility of the CALS office under DUSD(L). Unfortunately, DoD has been unable to refocus the reputation of CALS from a logistics effort to one that supports the entire acquisition community.[3] PMs and industry counterparts interviewed consistently viewed IDE/CALS efforts as logistics initiatives. Even today, as the CALS office attempts to embrace total life cycle support, which includes development and initial acquisition, the CALS efforts at DoD and the Service levels are managed by the logistics community and focus on post-production maintenance and sustainment activities.[4] In the Advanced Program Management Course (APMC) at the Defense Systems Management College (DSMC), CALS and IDE are taught as a logistics elective. As a result, many on the materiel acquisition and program management side tend to relegate CALS issues to their senior logistics personnel. Industry counterparts often mirror this organizational structure.

Recommendation

At the DoD and the Service levels, the placement of CALS/IDE efforts under the logistics chain effectively precludes them from directly influencing the PM. Research findings provide many examples of programs attempting to move toward an APDE. In most cases their approach closely parallels the commonsense approach of the CALS office, but is followed without knowledge of, or coordination with, the DoD or the Service CALS organizations. While much credit goes to the logistics community for attempting to develop an environment that supports a cross functional digital integration effort, making it happen is a PM's responsibility. The logistics community or the senior logistician within a PMO, for the most part, lacks training, experience, responsibility, and program authority to bring all these various functions, activities, and processes together. That is the job of the PM and is achieved through partnership arrangements with industry and other DoD agencies. Thus, at the PMO level, it is imperative that IDE/APDE efforts not be focused solely around logistics requirements.

Issue: Lack of a DoD-wide Infrastructure

The DoD does not have an adequate infrastructure in place to access, receive, manage, or effectively use data digitally delivered by the PMO.[5] This is a problem that has been identified repeatedly over the past several years.[6] The vision of a DoD-level IDE necessitates an infrastructure that is capable of handling digital data. Research shows repeated instances where programs are attempting to transition to a digital environment only to be stymied by support systems or processes that are still entrenched in paper-based rules. Work orders, program actions, and purchases can be held up for days or weeks because someone still re-

quires a printed document with an original signature. Information exchange is unreliable or ineffective because of incompatible file transfer mechanisms or inadequate communications links. Digital data, documents, and technical drawings are incompatible with the format required or desired by a support agency. In one case the government is paying a prime contractor to sub-contract the conversion of digital drawings (vector/computer-aided design (CAD)) to aperture cards because they have "always required drawings on aperture cards."[7] At the same time, the government was taking aperture cards and paying to have them scanned and converted to digital form. These second or third generation raster scanned drawings not only increase overall cost, but also have lower resolution and contain far less useful information than the original vector drawings.

The requirement for aperture cards is largely being eliminated in all the Services. These simple examples highlight how the lack of a common DoD-wide infrastructure for digital data negates many advantages of an APDE or DoD-wide IDE. If the contracting office, contractor, user, finance, procurement, or logistics chain cannot support digital data, PMs must resort to paper. This not only incurs additional cost, but limits the potential benefits that the APDE can achieve.

Recommendation

The PM has several commercial off-the-shelf (COTS) and government off-the-shelf (GOTS) hardware and software options available, as well as contractor developed solutions, to effect an integrated digital environment that supports the program. Government development efforts such as Joint Computer-aided Acquisition and Logistics Support (JCALS), Configuration Management Information System (CMIS), Joint Engineering Data Management and Information Control System (JEDMICS), and Federal Acquisition Computer Network (FACNET) may be of value or they may clearly not be preferred when compared to more current commercial products and systems. Whatever path the PMO chooses to take, the key to success is a focus on integration, interoperability, and a clear migratory path to the future. These are supported through the use of national and international standards, practices, and technologies to automate the management and exchange of information. Current standards (see Appendix B) supporting the IDE and APDE have the ability to grow as requirements change. A path for planned migration is essential to the success of an APDE implementation. While there may not be an existing DoD IDE infrastructure in place, it has clearly been established that the future infrastructure will employ standards and standard business practices wherever possible. The APDE must be designed such that it too has an evolutionary path that will support an ability to adapt to future requirements and standards.[8]

Issue: Use of Standards

Many organizations involved in EC/EDI and IDE are relying on the use of standards and accepted commercial practices to provide data compatibility and system interoperability. Indeed, the adoption of commercial products, standards, and practices will "help to ensure maximum integration of the information infrastructure for weapon system acquisition management and support."[9] The use of common standards, however, does not always enable an acceptable level of integration or interoperability. Most standards are developed with inherent flexibility designed to support additional requirements, future growth/migration, and the ability to tailor the standard to specific or unique applications. In some cases, this flexibility in fact detracts from data integration

efforts, particularly where fields or implementation capabilities are optional or conditional. Numerous instances exist where government agencies and industry continue to use different implementation conventions, and thus are unable to exchange data.[10] Typically, GOTS or COTS packages support specific user requirements and do not support every option embedded within a standard. When one agency chooses to utilize optional fields different from another agency, there is an information disconnect. A DoD supplier notes that one installation requires the use of a given standard for data exchange, but because the standard is applied differently by different organizations, the net effect is that the supplier has to do business three different ways.[11] The DoD offices are each using valid applications of the standard. While the differences in implementation are subtle, including version differences and optional/conditional fields that are not universally supported, they have a compounding negative effect on the supplier.

DoD is a strong advocate of commercial practices and standards, but shows reluctance in dictating exactly which practices or standards must be used and how they should be incorporated into an acquisition program. Applying strict requirements immediately ties the PM's hands and limits available options in an evolving business environment. However, failing to specify a given standard or implementation causes discontinuity between organizations and agencies that, by their very nature, require data compatibility and integration. Requiring DoD agencies or contractors to support all possible variants of the different standards is an unnecessary imposition and not cost efficient. As one major Defense contractor stated, "All of our data is digital. If DoD would just tell us exactly how they want the data, we could easily give it to them that way and it would save a lot of time and money."[12]

Recommendation

The PM cannot simply rely on standards to ensure interoperability and data compatibility. In identifying data requirements for an APDE, one must at least be aware of how standards are applied by each user, specifically in the area of data elements, formats, and interface protocols. Interoperability issues need addressing up front, either by way of dictating specific standards applications or through the use of data translation mechanisms to provide a reliable interface between two seemingly incompatible data systems. As one PMO expressed, "a PM should identify what we call our 'least common denominator' (LCD) for all file formats. This means that if an individual has the capability to send/receive in all of the formats specified in the LCD, he can effectively participate in the various teams."[13] Different formats to address include such things as e-mail and attachments, word processing, spreadsheets, graphics, engineering drawings, and scheduling information.

Issue: CALS "Compliant"

During the research interviews, the term "CALS compliant" was used in many different ways. Some organizations claim to be CALS compliant because they are using commercial products, technology, and standards. To others, CALS compliant infers the use or planned employment of the CALS flagship programs (JCALS, JEDMICS, and CMIS). The DoD CALS office indicates that "CALS compliant" has no meaning *per se* because CALS is a strategy, not a program. CALS involves the exploitation of an evolving set of standards, practices, and technologies and does not lend itself to a fixed architecture or "compliance" certification.

Contractors and PMOs alike are implementing commercial standards, practices, and tech-

nology to develop integrated digital environments. In many cases this is done without an understanding of the CALS initiative or its DoD IDE strategy. However, there is still "a lack of a conformance testing process to ensure compliance with a standard."[14] Flexibility within standards (addressed above), and unique features embedded in individual applications, often result in system incompatibilities. In many cases the degree of interoperability between separate systems, both employing the same "standard" and designed to work together, is often unknown until the systems are actually in place and tested. Another common problem is COTS packages that are considered compatible, but only under given circumstances. A simple example, but one that is cited repeatedly, is with word processing software; MS Word and WordPerfect are compatible since each can import and manipulate the files of the other. However, in many cases when these files contain imported database files, graphics, or perhaps even audio clips, they become incompatible. Another common problem is in transferring data between organizations via e-mail, where file attachments are often treated differently depending upon the commercial product.

Recommendation

Unless specific standards for system and interface interoperability are established, these types of problems will persist. In the absence of such requirements from the DoD-level, the PMO needs to ensure that interoperability requirements and specifications are clearly defined in the APDE implementation plan or CONOPS. Compliance standards and performance specifications relating to the digital data infrastructure between government agencies needs addressing, and should be clearly articulated in contracts with industry.

Issue: Education and Training

Each PM within DoD, and in many cases their industry counterparts, have little training or experience in the area of increasing efficiencies through the use of information technology. During interviews, all PMOs highlighted the fact that personal professional development was inadequate for developing anything resembling an APDE. Training of the acquisition workforce on digital environment issues is largely left to the Services. Little is done at the DoD-level to ensure that the Services are even conducting training on CALS/IDE/EC/EDI, or the adequacy of that training. As the Service CALS offices are located in the logistics arena, training and information dissemination is confined mostly to the logistics community. Integrating processes and crossing functional boundaries between management, logistics, engineering, manufacturing, and contracting is sporadic. Within the Defense Acquisition University (DAU), CALS and IDE materials are taught as a logistics function, although they are currently studying a transition to program management and systems engineering. The same functional separation is true of EC/EDI initiatives; currently they are treated separately from the IDE, led by Acquisition Reform, and focus on contracting and procurement.

The problem, in part, appears to be the lack of an effective mechanism for the relevant DoD agencies to get the information to the PM or entrenched within the PMO. The leadership in both the DoD CALS and the DoD EC/EDI offices express a sense of frustration over the inability to get the message to the acquisition community, despite a concerted effort. The DoD CALS office recently produced the *Program Manager's Desktop Guide for CALS Implementation*, an interactive CD-ROM that provides extensive background and information on CALS, the IDE, standards, and top level

guidance for implementation of an APDE/IDE.[15] Unfortunately, even on occasions where PMOs or contractors have the Desktop Guide, it is typically in the possession of a logistics manager and receives little, if any, use. The CALS Industry Steering Group (ISG) also sponsors a CALS symposium each year and actively seeks participation by PMOs, DoD agencies, and industry. Here too, attendance is largely confined to the logistics community. There have been numerous EC/EDI information dissemination efforts by DUSD(AR). One example is the *Introduction to Department of Defense Electronic Commerce: A Handbook for Business*. Yet the EC Office still admits that the information does not appear to reach the people who need to understand.[16] Getting the word out to PMOs has largely been left to the Service Acquisition Executives (SAEs) and the DSMC, both of whom interact directly with the PM. Unfortunately, neither the Services nor DAU have developed an integrated approach to educating the acquisition community on exploiting the digital environment from a cross functional perspective.

Recommendation

An APDE has significant potential to improve processes, increase efficiency, save time, reduce cost, and improve performance. Unfortunately, most within the acquisition community have little experience or expertise in this arena. Education and training enables the organization to understand the concepts, appreciate the technology, recognize the potential, support the objectives, and then realize the benefits. In the absence of a well developed training program at the DoD-level, PMs need to recognize the importance of having a knowledge base within the PMO and industry partners. Training at the program level can be the key to a successful APDE implementation with inclusion of the following areas:

- formal training;
- information sharing between organizations; and
- working with other DoD/Service agencies and PMOs.

Issue: DoD Implementation Guidance

Acquisition guidance and direction stipulates on-line access to, or delivery of, programmatic and technical data in digital form[17] and the use of electronic media.[18] But DoD has purposely avoided requiring specific implementations or standards in its efforts to allow the PM maximum flexibility. (Refer to the paragraph on Use of Standards, above.) This permits and encourages the PMO and its industry partners to seek innovative solutions and exploit the digital environment in new and creative ways. However, it also allows less resourceful PMOs to implement solutions that may satisfy the letter but not the spirit of the DoD digital acquisition initiatives. The result is that the development of a cross functional digital infrastructure that supports the full life cycle of a weapon system (i.e., an APDE or IDE) is largely optional. Further, due to the lack of a substantive set of metrics or decision tools with which to perform a true cost/benefit analysis, the decision at the program level can be highly subjective. In some cases it can be argued that the creation and maintenance of such an infrastructure will conceivably increase life cycle costs, particularly in the short-term. As a cross functional APDE may well be resource intensive, particularly in the initial development stage, it is easy to see why PMs might elect not to implement. Even where the digital access or delivery requirement is met, this does not necessarily infer that it will support the future goals of an IDE and significant life cycle cost savings. A 1994 GAO report highlights: “It is of para-

mount importance that Defense decide how it wants to change the current way it does business and not merely automate existing practices."[19]

Recommendation

PMs must focus on the intent, in addition to the letter, of the new Defense acquisition regulations and guidance. They need to understand the opportunities for process improvement and reengineering within PMOs and the role that an integrated digital environment plays in enabling such efforts. The PMO needs to go beyond using digital technology for its own sake, and examine how this technology is useful to reengineer ways in which they conduct business. In order to truly achieve substantial cost savings and improvements in efficiency, an evolving APDE must address the fundamental questions of data acquisition, maintenance, access, and use across the entire life cycle of the program. Mirroring existing functions and processes will not get the job done and may, in fact, increase costs. This may involve very difficult decisions because current DoD regulations leave the degree to which the PMO implements an APDE or IDE totally to the discretion of the PM. The "optional" nature of an integrated APDE is furthered by the fact that DoD does not provide formal funding or administrative infrastructure support for digital integration efforts.[20] However, PMs need to be aware that implementing the DoD vision, or more specifically the development of an APDE-like environment, has inherent benefits and makes good business sense within a PMO. The application of existing national and international standards, practices, and technologies is evolutionary.[21] They enable process improvements and reengineering efforts that provide substantial returns on investment (ROI) throughout the entire program life cycle. It is truly the hope of DoD and the leadership within the acquisition community that the lack of fixed requirements regarding digital integration efforts will be seen by the PM as an opportunity rather than a limitation.

Issue: Incentives and Metrics

Implementing an integrated APDE, and the degree to which it supports the full life cycle of the program, is largely up to the discretion of the PM. Other than DoD guidance that generally supports a digital environment, we found that there are no real incentive programs to encourage PMs to implement an APDE/IDE.[22] Most APDE benefits: cost savings, shorter cycle times, increased access to shared data, and an improved management infrastructure, are realized after a substantial initial resource commitment. Since PMs are typically assigned for relatively short periods of time, they often do not see the APDE program rewards. This is somewhat true, though to a lesser degree, in industry where promotions and bonuses are often tied to visible short-term cost savings or increases in profits. Within DoD, PMs are primarily evaluated on achieving milestones and staying within budget. An historical problem is that even where PMs recognize the advantages of an integrated digital environment, they are often reluctant to spend scarce program dollars for 'potential' future and long-range benefits,[23] particularly in today's environment where programs are becoming increasingly budget constrained.

There has also been a problem with identifying metrics or evaluation tools that can support a valid APDE cost-benefit analysis. Many industry leaders in this area are reluctant to reveal specific details as it offers a source of competitive advantage. Also, much of the cost savings seen in industry results from corporate downsizing—enabled by process improvement and reengineering. Personnel costs are a

major factor in the business community. While a PM may be able to improve efficiency and streamline processes, they often do not have the ability to follow through with the next logical step of reducing personnel overhead costs within the PMO or support structure. Cutting administrative requirements by 50 percent is of little value if the administrative office must still operate at 100 percent personnel strength. A PMO that no longer requires two floors of a building, probably cannot reduce costs by selling or sub-leasing the space. Despite these limitations, if the cost of developing and implementing an APDE cannot be directly linked to cost savings, it is difficult to justify.

At the DoD-level, there has historically been a lack of "lessons learned" or sharing of experiences that would assist a PMO in evaluating the potential benefits and justifying the expense of an APDE.[24] As one official cites, a problem with "acquisition PMs, and especially the money counters, is when we try to 'sell them' on the idea that some money invested now in digitizing data and applying some CALS standards up front will yield a 'profit.' We just don't have the hard data, evidence, or metrics to back up our claims."[25] There are PMOs exploiting the digital environment in a variety of ways and with differing degrees of success. Unfortunately, their experiences are not well documented or available to other PMOs wishing to explore similar opportunities.

Recommendation

There are several efforts underway to address incentives and metrics. Incentives and support for APDE-related initiatives differ between the Services. The acquisition community, notably the CALS and EC/EDI offices, are actively involved in developing lessons learned and real-world metrics to support PMO efforts. However, there are presently few DoD examples that have been well documented. Most of the benefit models in use today are based upon commercial examples, which may not be fully applicable within a PMO. In the near term, consult with other PMOs, as well as with the Services and DoD agencies, to identify metrics and incentive opportunities. Carefully identifying and examining the benefits enabled by a digital infrastructure in order to justify its implementation is essential. In some cases these can be directly linked to cost savings. In others, the benefits are less tangible yet equally important.

Issue: Data Requirements: Access, Delivery, and Use

Historically in a paper-based environment contract data requirements list (CDRL) items were identified by the government, and the contractor made physical delivery of documents and drawings that the government stored and maintained for future use. This was particularly true of technical data; the totality of data required to design, analyze, manufacture, test, inspect, and sustain end items.[26] In today's highly technical digital environment, questions arise as to the utility of the government requiring physical delivery of documents and technical data. New acquisition regulations clearly state a preference for "on-line access to contractor developed data through contractor information services rather than data delivery."[27] Even where data are required for competitive sourcing of system support, the general direction is for the PM to provide for long-term access to the data, which does not necessitate physical delivery.[28]

Care is necessary to ensure that the PMO understands what data/information are required in order to develop, produce, manage, and maintain the system. However, it is also important to understand what is not needed. In the past, concerns over not having enough in-

formation when it was needed led to a "we need everything" mentality. These deliverables are not only costly but result in mountains of paper that require storage and maintenance, which again adds to the government's burden. In a digital environment, virtually everything relating to an acquisition program is created on a computer: documents, drawings, status reports, requests, proposals, contracts, briefings, financial information, etc. There often is a greater temptation to ask for everything simply because it appears to be readily available.

Buying too much data can be as costly, if not more so, than buying too little. PMs need to make early examination to ensure CDRLs: "represent the minimum essential to effectively support the fielded system."[29] In some cases, concerns arise over data that may never be used, but under certain scenarios the lack of that data might prove critical. In these situations the PM must determine the best way to support the system and the user. This is done by including the user and maintainer in the decision process as part of the APDE CONOPS development process. If the data are not required today, can it be accessed down the road? In some cases CDRL items, notably technical drawings, that are routinely delivered early in the development cycle, now perhaps are better left with the contractor and accessed only when needed. This is particularly true where modifications to drawings or components are ongoing. What is the life cycle cost of the data as compared to the cost of not having the data at a later date? Many questions need to be asked to ensure that prudent decisions are made. The Federal Advisory Committee Act (FACA) and DoD 5000.2-R recommend the PMOs take advantage of industry expertise,[30] contractor personnel, to improve the acquisition strategy. They, along with functional experts within the PMO, the DoD support structure, and the user community can help identify areas where data requirements are not essential or data support can be improved. In the past, many data requirements were levied as a matter of routine. Today's acquisition reform initiatives stress that the PM take a commonsense approach to all aspects of the acquisition cycle. "Relief or exemption shall be sought for those requirements that fail to add value, are not essential, or not cost-effective."[31]

Integrating functions within an acquisition program is only the first step. In addition to coordinating the efforts of logistics, contracting, transportation, and other functional communities, further efforts to integrate data requirements and streamline processes at the DoD-level are necessary. This means not only to get organizations working together, but to get functional organizations to examine their ways of doing business and consider how to improve efficiency. One office lamented that if you digitize technical manuals, but are still required to go through 14 different offices in order to get changes approved, you are still working in the dark ages.

Example: When identifying data requirements, it is equally important to identify opportunities for process improvement or reengineering. In many cases, data requirements and serial processes are generated by actions that may no longer be justified or needed. A familiar example is with government business travel. With its strict rules for maximum allowable per diem (lodging and miscellaneous) and reimbursable expenses, processing of travel vouchers lends itself extremely well to automation. The numbers do not change, the rules for applying those numbers do not change, and there is little need for human intervention or judgment in the process. However, in most organizations, the following occurs: (a) Individual prints, reproduces, and submits multiple copies of the voucher, travel orders, tickets, and

receipts over $25; (b) the voucher is reviewed and signed by a supervisor/approving officer (two signatures required if an official phone call is made); (c) local travel office reviews voucher submission, maintains a file copy, and mails the completed packet to the processing finance office; (d) finance personnel manually process the voucher for settlement (note: computers actually process the settlement. However, because the voucher is in paper form, the information requires manual input into the computer. For the settlement to be processed correctly the information must be transferred without error); and (e) the settlement voucher is mailed back to the traveler.

While this is not a defense acquisition specific example, it does highlight how the age old requirements dictating serial processing can hamper streamlining goals. Each step cited above (with many steps omitted) adds time, cost, and potential for errors to the process of a travel voucher settlement. Many of the steps add no real value to the process. In fact, some clearly detract from the process. Automating the current serial functions would save both time and money, and reduce the potential for errors. However, *integrating* the processes could do significantly more. Imagine a travel request that automatically enabled not only the generation of travel orders, but also scheduling of transportation and lodging through the local travel office and a return receipt of itinerary on-line. Turn around time decreases dramatically, as does administrative support costs. Allow vouchers to be submitted on-line and the result would again decrease completion time, reduce processing cost, cut cost of paper and copying, and cut mailing costs. Why does a finance officer hundreds of miles away need to physically see a copy of a hotel bill? One U.S. Department of Treasury official spoke of a similar system they have installed that results in employee electronic reimbursement 2-5 days after return from travel.[32] To further integrate the process, official charges to the Government American Express card, listed on the travel voucher, could be paid directly to American Express. There is little doubt that American Express would be interested in working jointly with the Government to support such a concept, and perhaps be willing to bear part of the development burden as part of a "shared savings" concept.[33] Currently, charges to American Express are paid on the average of 20-50 days after they are incurred. Under a direct on-line payment system American Express could conceivably cut that average time to under 10 days, a 50-80 percent reduction. The "cost of money" savings alone would be significant and perhaps warrant financial consideration during contract negotiation with the Government charge card supplier.

Recommendation

The PM needs to ensure government data needs are met to secure critical information on weapon system design, development, manufacture, reliability, maintainability, and support. Once those data requirements are identified, the PM then determines whether the government's needs are best satisfied by delivery of the data, preferably in digital form, or access to a contractor maintained database. The PM examines data requirements from a total system life cycle perspective, with a clear view of short- and long-term costs and risk mitigation. What is the cost of data delivery with associated government storage and maintenance burden, as compared to government access to a contractor repository? What are the benefits? Sometimes the technical or proprietary nature of a design effectively means any further modification or manufacture will be performed by the original contractor. In this case, configuration management is arguably best performed by the Original Equipment Manufacturer

(OEM) as opposed to a government agency. The most up to date information about the part, design, process, or manufacturing technique would clearly reside at the contractor facility, and likely differ from that originally delivered to the Government weeks, months or years before. Minimizing data duplications, redundancies and inconsistencies is a clear objective. Both the PMO and industry partners should examine the potential for process improvement and reengineering initiatives enabled by the APDE, realizing substantive savings wherever possible.

Issue: Cultural Barriers

An essential area to address when implementing significant change are cultural barriers; both internal and external to the PMO.[34] The syndrome—"That's the way we've always done it" is difficult to overcome in most organizations, particularly when dealing with managers and users who have grown up within a relatively stable environment. As a program moves toward an advanced APDE, significant opportunities arise for process reengineering and functional reorganization. This reduces comfort levels and often elicits a backlash of resentment and resistance.

Recommendation

The success resulting from the exploitation of an APDE is directly related to the commitment of the PM and leadership within the PMO. (See Chapter 5 for a detailed discussion of negotiating the digital environment and leading organizational change.) Several persons stated the lack of a focused and integrated approach to an integrated digital environment is clearly attributable to leadership unawareness or uninvolvement in the process. Within a PMO, effective leadership and perseverance is critical to overcoming cultural barriers. The PM clearly identifies the vision; where we are, where we are going, and how we intend to get there. The PM must get buy-in from functional and process managers, staffs, and the ultimate users. When dealing with the psychology of change, those who are not committed to being part of the solution, potentially become part of the problem. Committing the resources (money, time, training, and personnel) on the part of the PM clearly demonstrates personal commitment and fosters similar commitment throughout the organization.

1. KPMG. (February 12, 1996). Technical data acquisition study. Joint Technical Coordinating Group—Integrated Product Data Environment (JTCG-IPDE). Draft final report, p 16. Dayton, OH: Author

2. Combat Mobility Systems (CMS). (March 1996). Interim lessons learned for PM, CMS IDE implementation. Unpublished paper submitted for this research report by the CMS PMO.

3. Office of the Inspector General. (June 8, 1994). Management of digitized technical data inspection report, p 23. (IG Report No. 94-INS-05). Washington, D.C.: U.S. Government Printing Office.

4. Taped interview with Mr. Phillips, Deputy Under Secretary of Defense (Logistics), 3 May 1996. Taped interview with Ms. Elaine Litman, Director, DoD CALS Office, 10 May 1996. Both interviews took place in Washington, D.C.

5. Office of the Inspector General. (June 8, 1994). Management of digitized technical data inspection report, p 33. (IG Report No. 94-INS-05). Washington, D.C.: U.S. Government Printing Office.

6. Office of the Inspector General. (June 8, 1994). Management of digitized technical data inspection report. (IG Report No. 94-INS-05). Washington, D.C.: U.S. Government Printing Office. AND U.S. General Accounting Office. (September 30, 1994). DoD's CALS initiative report. (GAO Report AIMD-94-197R). Washington, D.C.: U.S. Government Printing Office.

7. Ball Aerospace. (February 27, 1996). Taped interview and discussion. Boulder, Colorado.

8. Numerous interviews and documents reinforced this recommendation.

9. DoD CALS Office. (December 1995). CALS strategic overview. [On-line]. Available Internet: http://www.acq.osd.mil/cals/mp_vol_1.html

10. DoD Electronic Commerce Office. (June 2, 1996). Introduction to DoD electronic commerce: A handbook for business. Version 2, p 8. Washington, D.C.: Author.

11. Interview with a defense contractor under the DSMC policy of non-attribution, March 1996.

12. Lockheed Martin Enterprise Information Systems. (February 28, 1996). Electronic commerce overview and preliminary strategy. (Briefing package, taped interview, and discussion provided information for this report). Denver, CO: Author.

13. Herndon, E. (March-June 1996). Electronic and telephonic interviews with Information Systems Manager, Non-line of Sight Program Office.

14. Office of the Inspector General. (June 8, 1994). Management of digitized technical data inspection report, p 67. (IG Report No. 94-INS-05). Washington, D.C.: U.S. Government Printing Office.

15. DoD CALS Office. (September 29, 1995). Program manager's desktop guide for continuous acquisition and life-cycle support (CALS) implementation. Washington, D.C.: Author.

16. Taped interview and discussion at the Pentagon, with the DoD EC Office Director, Ms. Dee Smith. Washington, D.C.

17. Office of the Secretary of Defense. (March 15, 1996). Department of Defense Regulation 5000.2-R, mandatory procedures for major defense acquisition programs (MDAPs) and major automated information system (MAIS) acquisition programs, paragraph 3.3.4.5. Washington, D.C.: Author.

18. Ibid., paragraph 3.3.6.4.

19. U.S. General Accounting Office. (September 30, 1994). DoD's CALS initiative report. (GAO Report AIMD-94-197R). Washington, D.C.: U.S. Government Printing Office.

20. Office of the Inspector General. (June 8, 1994). Management of digitized technical data inspection report, p 11. (IG Report No. 94-INS-05). Washington, D.C.: U.S. Government Printing Office.

21. Reinforced in numerous interviews and cited specifically in DoD CALS Office. (December 1995). CALS strategic overview. [On-line]. Available Internet: http://www.acq.osd.mil/cals/mp_vol_1.html

22. Reinforced in numerous interviews and cited specifically in Office of the Inspector General. (June 8, 1994). Management of digitized technical data inspection report, p 11. (IG Report No. 94-INS-05). Washington, D.C.: U.S. Government Printing Office.

23. Office of the Inspector General. (June 8, 1994). Management of digitized technical data inspection report, p 11. (IG Report No. 94-INS-05). Washington, D.C.: U.S. Government Printing Office.

24. Numerous interviews and documents reinforced this idea.

25. Interview with a DoD CALS official.

26. KPMG. (February 12, 1996). Technical data acquisition study. Joint Technical Coordinating Group—Integrated Product Data Environment (JTCG-IPDE). Draft final report, p 9. Dayton, OH: Author.

27. Office of the Secretary of Defense. (March 15, 1996). Department of Defense Regulation 5000.2-R, mandatory procedures for major defense acquisition programs (MDAPs) and major automated information system (MAIS) acquisition programs, paragraph 3.3.4.5. Washington, D.C.: Author.

28. Ibid., paragraph 3.3.7.

29. Ibid., paragraph 4.3.3.3.

30. Federal Advisory Committee Act (FACA) as cited in: Office of the Secretary of Defense. (March 15, 1996). Department of Defense Regulation 5000.2-R, mandatory procedures for major defense acquisition programs (MDAPs) and major automated information system (MAIS) acquisition programs, paragraph 3.3.5.1. Washington, D.C.: Author.

31. Office of the Secretary of Defense. (March 15, 1996). Department of Defense Regulation 5000.2-R, mandatory procedures for major defense acquisition programs (MDAPs) and major automated information system (MAIS) acquisition programs, paragraph 3.3.5.1. Washington, D.C.: Author.

32. Interview with a U.S. Department of Treasury employee in the Office of Telecommunications Management. Arlington, VA February 14-15, 1996.

33. Shared savings programs recommended by: Office of the Secretary of Defense. (March 15, 1996). Department of Defense Regulation 5000.2-R, mandatory procedures for major defense acquisition programs (MDAPs) and major automated information system (MAIS) acquisition programs, paragraph 3.3.3.2. Washington, D.C.: Author.

34. KPMG. (February 12, 1996). Technical data acquisition study. Joint Technical Coordinating Group — Integrated Product Data Environment (JTCG-IPDE). Draft final report, p 23. Dayton, OH: Author.