Reengineering the Picture Archiving and Communication System (PACS) Process for Digital Imaging Networks PACS

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Prior to June 1997, military picture archiving and communications systems (PACS) were planned, procured, and installed with key decisions on the system, equipment, and even funding sources made through a research and development office called Medical Diagnostic Imaging Systems (MDIS). Beginning in June 1997, the Joint Imaging Technology Project Office (JITPO) initiated a collaborative and consultative process for planning and implementing PACS into military treatment facilities through a new Department of Defense (DoD) contract vehicle called digital imaging networks (DIN)-PACS. The JITPO reengineered this process incorporating multiple organizations and politics. The reengineered PACS process administered through the JITPO transformed the decision process and accountability from a single office to a consultative method that increased end-user knowledge, responsibility, and ownership in PACS. The JITPO continues to provide information and services that assist multiple groups and users in rendering PACS planning and implementation decisions. Local site project managers are involved from the outset and this end-user collaboration has made the sometimes difficult transition to PACS an easier and more acceptable process for all involved. Corporately, this process saved DoD sites millions by having PACS plans developed within the government and proposed to vendors second, and then having vendors respond specifically to those plans. The integrity and efficiency of the process have reduced the opportunity for implementing nonstandard systems while sharing resources and reducing wasted government dollars. This presentation will describe the chronology of changes, encountered obstacles, and lessons learned within the reengineering of the PACS process for DIN-PACS.

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PROFESSIONAL JOURNALS and medical equipment trade magazines have primarily discussed picture archiving and communication systems (PACS) in regard to the planning and implementation experiences of individual hospitals and medical centers.^{1,2} Others have outlined common "do's and don'ts" in regard to planning or implementing PACS with hired consultants, vendor direction, or in-house expertise.^{3,4} Less commonly discussed is the benefit of devising a PACS process for planning and implementation, which may be used among a group of facilities linked by funding, practice, or necessity in this era of managed care. The reengineered process developed by the Joint Imaging Technology Project Office (JITPO) for

implementing digital imaging networks (DIN)-PACS among the three military health care services may serve as a guideline for other networked facilities.

BACKGROUND

PACS efforts among the Army, Navy, and Air Force began in the early 1990s as a research and development project with Loral under the direction of the US Army Medical Advanced Technologies Management Office (MATMO). The project was called Medical Diagnostic Imaging System (MDIS) and made the military a pioneer in PACS. Between 1993 and 1997, MDIS hubs and spokes were installed in a total of 31 sites. The central project office for MDIS executed the majority of decisions for planning and implementation, including equipment configurations, negotiated maintenance costs, and local goals for PACS. Because the MDIS office provided the funding and critical decisions concerning PACS and teleradiology, local site "buy in" to PACS technology and the accompanying need for business practice changes were sometimes missing. Presumed expectations during implementation included local users teaching themselves about PACS, contract requirements, and budgeting for out-year maintenance. As the initial PACS implementation for the military, MDIS has worked well in some of these installations, but others have since discontinued use.

OFFICE CHANGES

Events leading to the re-engineered PACS process began in May 1997, when the Joint Imaging Technology Project Office (JITPO) separated from

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the MATMO office. Simultaneously to this change, PACS experts from the three services, under the direction of CAPT Jerry Thomas, MSC, USN, set about evaluating and implementing a standards based on a Department of Defense (DoD) contract called DIN-PACS. This "off-the-shelf" PACS technology from two vendors was placed on contract November 20, 1997 for rapid deployment among the three services.

Prior to the contract award, JITPO leadership recognized the need for a standardized PACS planning process for use by all Army, Navy, and Air Force military services implementing DIN-PACS. Previous MDIS experience demonstrated that military sites functioned well with PACS, but planning and deployment methodologies for the military could be clearer. Other obvious lessons from this past experience came from smaller sites that needed PACS capabilities to improve teleradiology interpretation and consultation. These smaller sites continue to struggle with out-year maintenance costs, local disinterest and accountability, and network communication problems.⁵ As a result of these lessons and the need to prepare for an unknown number of sites implementing DIN-PACS, a standardized PACS process developed. A secondary reason for reengineering the process was the need to leverage corporate knowledge and capabilities in an office of just eight individuals.

THE REENGINEERED PACS PROCESS

The reengineered PACS process for DIN-PACS emphasizes a consultative role for the JITPO. The JITPO consultative services are both optional and at no cost to the sites installing DIN-PACS. The JITPO initially responds to requests by phone and electronic mail followed by an on-site meeting convenient to all parties. This first on-site visit is used for PACS education and team building. Through education local champions for PACS are

identified and encouraged to take ownership for the facility's PACS in the form of a team or committee.⁶ After identifying the facility's mission and goal for PACS, a site survey by JITPO engineers is completed with local staff. The local team and JITPO then maintain a relationship until implementation and acceptance testing are complete. This ongoing consultative work is done via phone, visits, and electronic mail as the situations warrant.

Next, JITPO engineers develop a written configuration plan for approval by the local PACS team based on the available funding and the mission for the military site. Then, the plan is sent by either JITPO or the contracting office to both DIN-PACS vendors requesting comments and pricing to meet the known mission of the facility. The vendors then respond to the site with a pricing proposal. In most cases, the local site receives a marketing presentation from each vendor followed by a question and answer period. JITPO engineers then review the proposals for technical capabilities. Once local PACS committees are satisfied with answers, they select a DIN-PACS vendor based on the DIN-PACS contract criteria of past performance, unique clinical or user requirements, delivery, and price.⁷

This reengineered process has consistently resulted in competitive pricing below the original listed contract prices. Cost savings and price reductions are achieved through more specific and accurate equipment configurations. By not buying unnecessary equipment, up-front costs are lower. More accurate equipment configurations mean that maintenance is not being paid on unused or unwanted equipment in the out years; thus, life-cycle costs are lower. Overall contract price reductions per proposal have ranged between 9% and 29%. Figure 1 highlights costs avoided from this reengineered process for vendors selected since December 1997. Reduced prices in the proposals of the vendor not selected were also obtained for each of these sites.

Fig 1. Cost avoidance in millions using the JITPO process.

PROCESS CHALLENGES

Since June 1997, there have been multiple challenges encountered to implementing this process. Some of the first obstacles included marketing the office's services and gaining creditability that a no-cost consultant group could and would provide value added to PACS deployment throughout the DoD. The JITPO gained creditability and marketing through publishing articles, presenting posters, developing a web site, and beginning the PACS process with a few pioneering sites. Another challenge to implementing this process was local resistance to an objective intermediary (JITPO). Reactions and dialogue suggested that the use of a tri-service office created for some the impression that the "buyer lost control," despite the fact that the JITPO has only provided technical review and comments based on knowledge of the contract and the technical capabilities expected by DIN-PACS. The JITPO has throughout the use of this process not made any purchasing decisions or provided any funding. The JITPO has overcome much of this resistance through assisting new sites willing to try a new process. As in any business, "word of mouth" advertising is often the best. The JITPO currently has 15 sites in different stages of this reengineered process. One last deterrent to the use

of this process by more sites over the last year has been the successful, but aggressive sales tactics made by civilian contractors. Often, these companies emphasize greater local control without oversight. Many of these contractors provide similar functions compared with the JITPO, without standardization, and at a cost to the local site.

SUMMARY

The JITPO acts as a "value broker" in the standardized planning and implementation of military PACS under the DIN-PACS contract. The JITPO provides objective technical evaluation of proposals while facilitating local PACS education and accountability at no cost to the facility. This process has resulted in knowledgeable and satisfied local users, cost savings, and an improved configuration "fit" for the site while eliminating the "cookie cutter" mentality of "one size fits all." The reengineered process for DIN-PACS is suitable for any group of networked hospitals planning to install PACS or teleradiology in their facilities over a short period of time. This method allows for the unique requirements and local funding of individual facilities while managing costs, interoperability, and product evolution in the out years.

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