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PATRIOT FIELDING: SUCCESSFUL AS A FUNCTION
OF INTEGRATED LOGISTIC SUPPORT (ILS)

BY

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USAWC MILITARY STUDIES PROGRAM PAPER

PATRIOT FIELDING: SUCCESSFUL AS A FUNCTION OF INTEGRATED
LOGISTIC SUPPORT (ILS)

AN INDIVIDUAL STUDY PROJECT

by

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16 April 1990

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ABSTRACT

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CHAPTER I

INTRODUCTION

The Phased Array Tracking Radar Intercept Onto Target (PATRIOT) deployment is a success story which has increased our front-line air defense capabilities. This success story emerged as a result of the extraordinary Army-wide planning, coordination, communication, and support by all participating and supporting organizations. Hopefully, the lessons learned from this deployment masterpiece can assist and inspire all Army organizations involved in the fielding process in their future endeavors.

The focus of this paper is on those critical areas of program management that most experts in the deployment business say are paramount to achieving a high standard of fielding efficiency. Program executive officers (PEOs) and program managers (PMs) have provided significant input as well as general officers and other senior leaders who participate in the procurement business, including the Secretary of the Army. During the course of the paper insight will be provided on how PATRIOT handled these critical areas during its deployment.

From the management aspect, the key ingredients which must be carefully weighed and implemented are: (1) a clearly stated and executable Deployment Plan, (2) extensive and meticulous planning, (3) succinct policy guidance and efficient personnel management, (4) a flexible and responsive fielding process, and (5) a

systematic method of acquiring and distributing information.

By the end of Calendar Year 1986, three battalions were successfully deployed to United States Army Europe (USAREUR) with better than a 98 percent fill at hand-off of all major end items, repair parts, and publications. To date, a total of seven battalions have been deployed to USAREUR and three battalions in CONUS.¹

Many of the views expressed and information cited was gathered by an extensive literature search and discussions with current and past PATRIOT PMs, Chief of Air Defense Artillery, Weapons Systems Director, Secretary of the Army for Research and Development, Department of the Army Systems Coordinator (DASC), and former Brigade and Battalion Commanders who deployed PATRIOT battalions. The gaining commands have been very satisfied with the fielding and are reporting readiness rates exceeding all expectations.²

ENDNOTES

¹Integrated Logistic Support, Report No. 2, (RCS AMCSA-1021), Commander USAMC (Materiel Readiness Support Activity), Lexington, Kentucky. July 1987, pp. 126-131.

²Marsh, John O. Secretary of the Army. Memorandum to the Honorable Barry Goldwater, Chairman, Committee on Armed Services, U.S. Senate, 26 March 1986.

CHAPTER II

A NEW WAY OF DOING BUSINESS

PATRIOT has been measured against some of the toughest criteria ever established for an Army weapon system. It is a "milestone" procurement and deployment program that served as the vanguard for new standards used to measure the effectiveness for Army weapon systems fielding.¹

Under the old way of doing business, the Army fielded new weapon systems in accordance with the Initial Operational Capability (IOC) concept. The IOC target date was the date that the unit, normally a battalion or battery, was expected to achieve operational capability. This concept was, in essence, based upon the manufacturer's prediction of when production models of the new system would begin rolling off the assembly line.

The PATRIOT program and the old IOC methodology, however, met head-to-head during Follow-on Evaluation (FOE) II. (June and July 1983). The equipment didn't work as advertised. System experts forecast that the shortcomings could be corrected in five weeks. The Army leadership and the Air Defense Artillery community were not satisfied that the shortcomings could be corrected in such a short time. Instead, the PATRIOT program was taken off the IOC concept and placed on a milestone schedule.²

The PATRIOT milestone concept was a three-step process designed to guarantee the system would be fielded only when it was

proven beyond doubt that it would work as designed, that the soldiers were trained to operate and maintain it, and that it could be logistically supported. The PATRIOT milestone plan, approved by senior Department of the Army officials, featured three basic milestones.

Milestone I required U.S. Army Air Defense Artillery School certification that the TOE-authorized complement of soldiers and equipment was ready to begin the 16 weeks of collective training required of all newly activated PATRIOT battalions. This meant that the Air Defense Artillery School had to be satisfied that the equipment worked properly and could be supported throughout both collective training and the 14-week FOE III. No target date was established for Milestone I. It was to be considered achieved only when the necessary conditions were met.

Milestone II was the battalion's successful completion of 16 weeks of collective training. Specific standards were developed for use as a yardstick to measure training effectiveness. The Air Defense Artillery School designed a "center certification" which combined portions of the PATRIOT Army Training and Evaluation Program (ARTEP) with the scoring methodology of NATO tactical evaluations.

Milestone III was the successful completion of FOE III which, like FOE II, was conducted by the U.S. Army Operational Test and Evaluation Agency. Milestone III was passed when the PATRIOT

soldiers and equipment met or exceeded the criteria established by the U.S. Army Training and Doctrine Command.

The milestone program, while simple in concept, presented unique challenges. As there was no set date for deployment, planners involved in the numerous decisions associated with fielding a new system scheduled to replace older systems were faced with a continuum of deployment possibilities.³

ENDNOTES

¹MG James P. Maloney, Air Defense Artillery-Intercept Point, Winter 1985, Ft. Bliss, Texas, pp. 19-20.

²Ibid.

³Lessons Learned, PATRIOT Missile System-"Tomorrow's Air Defense Today.", Patriot Project Office, United States Army Missile Command, Redstone Arsenal, Alabama, January 1987, pp. 3-9.

CHAPTER III

DEPLOYMENT CONCEPT

Central to the successful deployment of the PATRIOT system was a clear and well articulated deployment concept. In retrospect, this served as the framework for all other plans and actions that followed. Exceptional vision is required as well as a thorough knowledge and understanding of future problems and obstacles that may be avoided. The PATRIOT PM was faced with the task of insuring the timely arrival and integration of three major elements; repair parts, major end items (including missiles), and personnel into a combat ready Air Defense battalion stationed in Europe.

The process of receiving, controlling, inventorying, deprocessing, and checking out all PATRIOT peculiar and common equipment and repair parts is the responsibility of the Army Materiel Command's (AMC) Materiel Fielding Team (MFT), headed by the PATRIOT Project Manager's (PM) representative in Europe.¹

Because of the size and complexity of the program a lieutenant colonel was designated to perform this role. He (she) is hand-picked from within the PM organization so that terminology, issues, familiarity with the total package fielding process and, most importantly, planning, are learned prior to the assignment in Europe. PATRIOT peculiar equipment is "wrung out" and checked out by the MFT in the PATRIOT Field Army Support Center (PFASC). The PFASC is also used as the centralized intermediate maintenance

support activity for deployed US PATRIOT systems. Upon arrival of equipment, the battalion's tactical equipment shop area is used by the MFT for checkout and issue of the common equipment instead of a AMC central staging area. The shop area is the eventual home of the receiving unit and the facilities are available for the MFT.

To insure user satisfaction, system acceptance is accomplished using jointly developed criteria between the gaining major army commander and the PMO. The final check is a system acceptance briefing to a senior USAREUR general officer. This check completes the formal fielding process. With this concept as a cornerstone for deployment, the integration and management of the other critical elements fell into place and PATRIOT deployment was on its way.²

ENDNOTES

Matériel Fielding Plan for PATRIOT, USAREUR, Project Manager, PATRIOT Missile System, October 1985, pp. 89-97.

PATRIOT Theatre Action Plan (PTAP), Third Edition, 2-3d ADA (PATRIOT), Headquarters USAREUR, APO New York 09403-0103, 30 April 1986, pp. 1-7.

CHAPTER IV

PLANNING

Because the PATRIOT system was developed and fielded over several years, the PATRIOT Project Management Office (PMO) had the advantage, unlike those for many systems, of a long lead time to develop and implement a successful plan to survey sites and develop infrastructure requirements. This chapter provides insights about site surveys and infrastructure requirements that were paramount to the success of PATRIOT.

METICULOUS DEPLOYMENT PLANNING

It was recognized that a program of the magnitude of PATRIOT would be under constant and deliberate scrutiny and was certainly characterized as high risk. Because of this fact, the PATRIOT community made sure that early deployment planning was aggressively pursued. As mentioned earlier, a deployment concept, that included MFT composition, staging locations, and a time line of typical deployment sequences, were developed early on to minimize jeopardizing the fielding process.¹

Space requirements at each stage of the deployment process were identified and the optimum methods of shipment and movement were selected. Once the initial concept is developed, early and continual coordination with the depot designated for staging and processing equipment is an excellent means of fine tuning the deployment concept. Depots have unlimited experience in processing

equipment on both large and small scales. In addition, PATRIOT discovered that early planning provides for sufficient time to develop the scopes of work and Memorandum of Understanding/Memorandum of Agreement that the depot needs to support the PMO, along with the requisite funding.

The two depots involved in PATRIOT OCONUS fieldings, Letterkenny and New Cumberland, were invaluable in the planning and execution of the deployment sequence. A potential disaster was avoided early during the fielding process. The original plans called for fielding directly to CONUS installations. However, it proved to be too large an undertaking for a single installation, and the CONUS depot had to be used during the staging and fielding of PATRIOT. The discovery of the inadequacy of this part of the plan was directly attributed to the emphasis which had been given to the idea of continual coordination by the PATRIOT team. PATRIOT tried to pursue their plan diligently and without making numerous changes, but they discovered that flexibility is a key part of any plan and a really good plan inherently offers the chance to adapt to changing situations.²

NETWORK TECHNIQUES

Once the initial deployment planning was completed, the PATRIOT PM found various tracking techniques such as Program Evaluation and Review Technique (PERT) are extremely useful. Networking requires planners to think through each event and activity in sequence and

estimate times and resources for the process. If approached systematically, the network provided a "total picture" of the deployment and helps prevent oversights that may be at best embarrassing, and at worst cause stoppage of a deployment.³

Members of the PATRIOT PMO identified bottlenecks in the deployment sequence and were responsive to program changes and the continual barrage of "what if's" to which PMs are subjected. Networks are not a cure-all, but an additional management tool that assisted greatly in helping the PATRIOT PM do his job. One of the biggest payoffs and evidence of the value of networking is apparent by the overall responsiveness which the PM provided in light of a multitude of program changes and budget cuts. Additionally, the numerous Congressional "what if" drills required a technique and system that could provide reasonable answers to variations of the already approved program. As a dividend to Army planning, the networking used also prevented the perception of the Army not having its act together. All indications are that this initial investment in time and resources was worthwhile and enhanced the deployment of the PATRIOT system.

EARLY AND CONTINUAL COORDINATION WITH MSCs, INDIVIDUAL ITEM MANAGERS AND GAINING COMMANDS

The fielding process is a team effort, and integrated parts of the team are the Major Subordinate Commands (MSCs) and individual item managers. The data interchange system helped a great deal in

notifying MSCs and item managers of upcoming events and requirements. In addition, to ensure the item managers were truly a part of the team, visits were made to the MSCs and item managers to explain PATRIOT and the deployment concept, and to ensure PATRIOT requirements were identified and met.⁴

Once PATRIOT assets were received from the MSCs, they were identified, rebuilt, and redistribution implemented to meet the total fielding requirements. Pre-fielding reviews with MSCs, the project office, and the user, identify potential problems and allow the total "team" to workout solutions that are acceptable to ensure successful fielding. In the case of PATRIOT, reviews were held monthly.⁵

ENDNOTES

¹Department of Defense Directive 5000.39, Acquisition and Management of Integrated Logistic Support for Systems and Equipment, ASD (MRA&L), Washington: 17 November 1983, pp. 2-(4-2).

²Materiel Fielding Plan (USAREUR), pp. 41-46.

³Report by the General Accounting Office, Analysis of Department of Defense's Fiscal Year 1985 Multi-year Procurement Candidates, 25 October 1985, pp. 2-8.

⁴Interview with Donald Infante, MG, Commandant Air Defense School, Fort Bliss, Texas, December 1987.

⁵Extract: 32d Army Air Defense Command (Commanders Conference), Darmstadt, Germany, January 1988.

CHAPTER V

POLICY AND PERSONNEL

The project office maintained a section whose sole function was to plan and manage the PATRIOT fielding process. This entailed close interface with other activities, both within and external to AMC and the gaining command.

Supporting MSCs provided dedicated and functional area experts to the program. While this is critical from concept development through fielding of the system, it is moreso during the last two years prior to First Unit Equipped Date (FUED). During that period, personnel turbulence must be minimized. Using experienced people was key to the success of the deployment section. It was a general consensus by all of the PATRIOT personnel with whom I spoke, that the outstanding support received from other MSCs, was a function of experienced field personnel. Having experienced personnel forming the core of the PMs office who followed regulatory guidance, exceptionally close, proved to be quite successful for PATRIOT. Experienced personnel provided continuity throughout the deployment sequence. Areas which were directly benefitted were logistics, resource management, operations, international business, and contracting. Considering the volatile and dynamic environment in which PATRIOT found itself during the 1970s and 1980s, those persons with a significant amount of experience could better recognize, interpret, and recommend

substantive options along the way, which was an overall benefit to the program. Legislative as well as doctrinal changes were rampant and could have impacted severely on the program had it not been under the advisement of a team of experienced and professional people. The benefits can only be realized by keeping personnel turbulence to the lowest possible degree during the final preparations prior to and during deployment.¹

EARLY DRAFT MATERIEL FIELDING PLAN (MFP)

An early draft MFP provided within the established regulatory timeframe, provides an excellent vehicle to coordinate the actions of the PMO, supporting activities, and the gaining command to accomplish the planning and fielding of any system. A key element in the initial draft and all subsequent versions, is direct, responsive input, and support by all participating activities. In PATRIOT's case, this was accomplished by reviewing the draft MFPs, page by page, with all the participants.

Direct coordination, down to the lowest level possible, provides an opportunity to surface any unique problems that requires action, but may not be visible at the theater or major gaining command level. A yearly or semiannual revision of the MFP and frequent In Process Reviews (IPRs) with various agencies also helped to minimize fielding problems and misunderstandings.²

STAGING OF FIELD OFFICES AT KEY LOCATIONS

For PATRIOT the placement of on-site project office

representation was proven to be invaluable. Where a system is in the development cycle determines the location of the various field offices. PATRIOT placed field offices at the following locations; Raytheon Corporation, staging depot, major subcontractor, the Air Defense School, TRADOC, and USAREUR.

The PMO presence at these locations ensured prompt response to issues and problems that surfaced. As PATRIOT was transitioning from the development to the early production phase, it proved very useful to collocate a U.S. Army representative at the project office to maintain important coordination between the system developer and the user representatives.

TOTAL PACKAGE/UNIT MATERIEL FIELDING (TP/UMF) Implementation

PATRIOT was originally planned to be fielded using the Force Modernization packaging method of fielding. The PATRIOT PMO did an excellent job in planning the necessary resources for that method.³

TP/UMF was developed as an improved fielding method and the decision was made to use TP/UMF for fielding PATRIOT. This decision increased the PMO responsibilities, the numbers and type of common equipment to be provided, and the personnel, facility, and resource requirements for fielding that equipment. This shift to TP/UMF forced a major reprogramming effort to provide adequate resources.

Under TP/UMF, the initial shipment of end items and repair

parts arrive in consolidated, easily identified packages which are tracked, controlled, and issued by the MFT. However, problems occur when subsequent shipments, which make up any shortfalls in the initial package or parts required, are sent to a staging area or directly to a gaining unit.⁴

During the fielding of PATRIOT it was quickly realized that, when materiel arrives after the Materiel Fielding Team (MFT) has departed, it is difficult for the fielding command to maintain an audit trail showing the materiel was provided to the unit. When an MFT is not present, proper accountability is dependent upon the gaining unit processing all the accounting documents which are provided with the materiel by the fielding command. A solution to this problem for large-scale, long-term fielding, in which MFT personnel stay in theater, is to have a Department of Defense Activity Address Code (DODAAC) assigned to the MFT location. Implementing this code enabled PATRIOT to have its shipments earmarked and shipped directly to the MFT, which then assured that the accounting documents provided by the fielding command were processed by the gaining units.

FREEZING MODIFIED TABLE OF EQUIPMENT (MTOE)

CHANGES

MTOE changes can become a serious problem under TP/UMF procedures. From the time requisitions are dropped until the time actual fieldings occur, it is not unusual to see several MTOE

changes. In order to alleviate the problem of trying to figure out which is the appropriate provisioning document, PATRIOT established an agreement with the gaining command(s) to freeze their MTOE from a fielding command perspective, 12 months prior to the projected FUED.⁵

This frozen MTOE represented the configuration that the PMO and/or fielding activity would field to, and any changes in MTOEs from that date would be handled by the gaining command. The joint agreement on MTOE configuration is a good method of ensuring that both the fielder and the gaining command distinguish and document what the fielding package will consist of. These materiel requirements list (MRL) discussions, as they are called, help to ensure that everyone is aware of all the components in the total package. These discussions are held well in advance of equipment arrival and requisitions dropped by the fielding command, usually up to 1 year prior to FUED.⁶

ENDNOTES

¹Jonathan W. Case, Weapon Systems Analysis: PATRIOT-A Case of Excellence, Houston: Macmillan, February 1986.

²Materiel Fielding Plan (USAREUR), pp. 2-4.

³Secretary of the Army Memorandum, Response to Senate Report 98-500, Washington: 18 April 1987.

⁴PATRIOT Deployment Division, "Total Package Fielding Concept for PATRIOT", Briefing to Deputy Chief of Staff Research, Development, and Acquisition, 22 June 1987.

⁵Materiel Fielding Plan (USAREUR), pp. 49,75.

⁶Ibid., pp. 2-3.

CHAPTER VI

FIELDING

There are good, competent personnel in all the supporting activities, but the PMO is the one activity that knows the day-to-day changes and provides the overall management of the deployment concept. It is important to sustain continual coordination and communication. Additionally, having supporting MSCs and the gaining command on the MFT was beneficial in PATRIOT fielding because it provided the user the opportunity to provide input early and play a part in the decision making cycle whenever new, unplanned changes came about.

Deployment of a major weapon system requires a tremendous amount of teamwork among many diverse organizations. The PMO has the ultimate responsibility for the deployment and must be involved in every aspect of the deployment sequence.¹

ORGANIZING THE MATERIEL FIELDING TEAM

Because PATRIOT was both complex and employed using advanced technology using the prime contractor as part of the MFT contributed greatly. Contractor presence provides technical expertise and a direct link back to the factory when required. In fact, PM-PATRIOT placed a senior contractor manager with a PM representative in Europe to ensure this coordination took place.²

To field a PATRIOT battalion, items from almost every MSC are required. Where equipment complexity and/or density supported it, MSC

representation on the MFT was requested. This provided the technical expertise on the ground, a completely checked out and ready deployment package to the user, and enhanced the "team" atmosphere needed for a successful deployment.

Logistic Assistance Representatives (LARs) were assigned to each battalion. The LAR was an integral part of the MFT, and the LAR for the next scheduled battalion was encouraged to be a member also. This created good relationships between the PMO, LAR, and the unit from the very beginning.³

SYSTEM ACCEPTANCE CRITERIA

Prior to the actual deployment, the PMO mandated that the gaining command be involved in establishing joint system acceptance criteria under which the equipment would be accepted. This acceptance criteria prevents misunderstandings and also established the "rules for fielding" that are peculiar to the gaining command and PMO. This gives the gaining command confidence that when the equipment is accepted it will perform as intended.⁴

In PATRIOT, the PMO used the criteria that if the system passed all checks, and the user was satisfied, the equipment was ready for acceptance. For instance, the gaining command insisted that all rolling stock be brake tested prior to movement by their personnel.

Since no operating procedures for testing brakes were planned, and the MFT was short of personnel to perform the check, a serious bottleneck in processing of equipment was created. Close attention

to detail, documenting the criteria and including it in the Materiel Fielding Agreement/MFP provides for the mutual understanding needed for a smooth deployment.⁵

DEPLOYMENT/READINESS CENTERS

The Patriot Readiness Center (PRC), a new concept in logistics management, smoothes PATRIOT's trip from production lines to firing sites and helped soldiers maintain the edge during deployment and fielding.⁶

Project Manager PATRIOT established the PRC within the PMO, Redstone Arsenal, Alabama, to facilitate PATRIOT's transition from development to fielding and to provide PATRIOT battalions with speedy solutions to problems encountered in the field.

Display units throughout the PRC, monitor PATRIOT system readiness around the world. But the center owes its true effectiveness to less conspicuous computer data links that tie the PATRIOT community together. A data link with the Defense Data Network permitted the PATRIOT Project Office staff access to the Missile Command's Logistics Intelligence File.

During October 1984, in preparation for the deployment of the 4th Battalion (PATRIOT), 3rd Air Defense Artillery, to West Germany, the center established direct data links to the 32nd Army Air Defense Command, U.S. Army Europe, and to PATRIOT's prime contractor. Data lines to the PATRIOT Field Army Support Center at Fort Bliss and Miesau, West Germany; to the 200th Theater Materiel

Management Center, Zweibrucken, West Germany; and to Headquarters, U.S. Army Europe, Heidelberg, West Germany, followed.⁷

The combination of data links allowed the PMO to interface from field unit to contractor and created a rapid flow of accurate information. The PRC considers the field units' needs and serves as a management tool for the PATRIOT PM, redirecting the activities of the PMO in order to aid units in the field, which it did successfully.

Under its umbrella were the following crucial functions:

- oo Report readiness status of all deployed PATRIOT units through automated data processing.
- oo Monitor the disposition of Class VII and Class IX supply items.
- oo Provide a history of equipment outages through automatic data processing.
- oo Act as the PMO's equipment status and readiness interface point with major commands.
- oo Maintain a master program list of critical readiness issues for use by the PMO and the user community.

During the first and subsequent PATRIOT battalion's deployment to West Germany, the PRC tracked critical spare parts for overseas shipment as well as Material Review Release Board factors that had to be worked out to achieve a full release status. As more PATRIOT units are activated, the PRC will continue to help the soldier maintain the Army's most sophisticated weapon system in a superior readiness posture.⁸

ENDNOTES

¹Wilbur D. Jones, Jr., Introduction to Defense Acquisition Management, Ft. Belvoir, Virginia, Defense Systems Management College, March 1989, pp. 29-30.

²Materiel Fielding Plan (USAREUR), pp. 87-89.

³PMO Lessons Learned, pp. 8-10.

⁴Ibid., pp. 11-13.

⁵Ibid., pp. 18-19.

⁶Patriot Logistics Support Plan, Patriot Project Managers Office, DARCOM, Redstone Arsenal, Alabama.

⁷Air Defense Artillery Magazine, Winter 1985, Air Defense Artillery School, Ft. Bliss, Texas, pp. 20-41.

⁸Ibid.

CHAPTER VII

CONCLUSIONS

I am convinced, although there were some rough spots during the deployment of PATRIOT, overall, it was a success. If the lessons/observations, and opinions represented in this paper are applied judiciously from system to system, the future PMs of major systems will have a good template to follow for the deployment phase of the acquisition process.

The senior leaders that I cited in the introduction have presented some compelling arguments as to what led to the success of PATRIOT. They are certain that those key elements presented in this paper were the mainstay for the program. Not only the meticulous planning and innovations, but also the teamwork and concern for perfection was evident and the results support it. Execution as well as concept is really what made the day and generated readiness levels that had not been witnessed in our history for a state of the art item of equipment.

System reliability in the field is well above requirements specified in system specification documents and user expectations. Deployments have been smooth, demonstrating the merit of the detailed planning and execution by all involved.

Most of the innovations implemented by the PMO were the result of vision, flexibility, and willingness to take risk. I am led to conclude that PATRIOT has been the pioneer in a new way of doing

business that has found its way into todays mode of operation.

CHAPTER VIII

RECOMMENDATIONS

Early planning and definition of facilities, military construction requirements and associated funding is a must. This needs to involve the gaining commands, supporting commands and the Corp of Engineers. In PATRIOT's case, NATO was involved so even additional time was necessary.

Prepare a detailed Materiel Fielding Plan early in the deployment planning process and maintain direct and frequent coordination with theater representatives to the lowest unit level as well as depot and supporting command representatives. Starting this process at least two years before deployment is not too soon on a complex weapon system.

Conduct general officer level IPRs starting at least 12 months prior to first fielding to highlight and resolve fielding and support issues. Follow on action by the responsible action officers should continue with monthly coordination as deployment approaches.

The traditional work ethics are very applicable in this area. Detailed planning of each spare, maintenance procedure, training task, tools, and test equipment has paid multiple dividends in the successful deployment of PATRIOT. Top level Army support was solicited for priority assets and HAWK and Nike/Hercules assets were fenced whenever possible. These actions contributed significantly to a superior deployment.

The importance of establishing and maintaining the training base cannot be over emphasized. The training base must receive high priority on configuration control of equipment and parts availability.

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