

# 2 (Historical) Development and today's state-of-the-art of PBL in the USA

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**ABSTRACT**

Performance Based Logistics (PBL) is the preferred product support approach for the United States Department of Defense. The associated Department of Defense instruction 5000.02 explains: "PBL offers the best strategic approach for delivering required life cycle readiness, reliability and ownership costs." This contribution explores and describes the origin of PBL as an ongoing process which continues to evolve even today. The analysis of the emergence of PBL provides the basis for understanding the current state of the art of PBL, its driving forces and the status quo of PBL implementation.

## 2.1 Introduction

Performance Based Logistics (PBL) is the preferred product support approach for the United States Department of Defense. PBL is also in use, to varying degrees, by other militaries around the world, and variations are also found in other equipment segments. PBL is an idea, a body of thought, an approach to outcome based product support strategies, that plans and delivers support as an integrated, affordable, performance package designed to optimize material availability and meet performance goals for a system through long-term support arrangements with clear lines of authority and responsibility.

Department of Defense Directive 5000.01 sets down the broad outline of the Defense Acquisition System, and says that program managers “shall develop and implement performance based logistics strategies that optimize total system availability while minimizing cost and logistics footprint” (DODD, 2003). In the associated Department of Defense Instruction 5000.02, the PM is required to employ effective PBL planning, development, implementation, and management. It then explains, “PBL offers the best strategic approach for delivering required life cycle readiness, reliability, and ownership costs. Sources of support may be organic, commercial, or a combination, with the primary focus optimizing customer support, weapon system availability, and reduced ownership costs” (DODI, 2008). These two contemporary documents are the foundation for PBL at the United States Department of Defense.

But, where did this idea we know as PBL come from? The origin of an idea is difficult to trace. Success has many fathers, but failure is an orphan. Performance Based Logistics, today widely implemented, did not arrive at any particular moment in time. Instead, it grew at the intersection of best business practice, circumstance, and adoption. In the wake of each success, additional variations emerged, and across the contemporary defense environment there is a variegated collection of similar, but far from identical, applications of the idea that is PBL.

The development of PBL can be described as an evolution, an emergence, not birth at a moment in time, and it continues to evolve today, a proven approach to dealing with identifying best value trade-offs during a time of escalating pressure on available resources. To endeavor to understand Performance Based Logistics, we must understand what it is today, but as importantly, we need to first understand the forces that drove its emergence. Then we can trace its development, and understand the contemporary state of the art in its implementation.

## 2.2 The Cold War

For decades, from the end of World War II, a supporting standing army strong enough to counter the threats of the Cold War formed the heart of US military planning. In this view, the US was not alone, and allied with many other nations in Western Europe to form the

North Atlantic Treaty Organization (NATO). On one side of the Iron Curtain stood NATO, and on the other side the Soviet Union and its Warsaw Pact allies.

The resource commitment required to sustain the Cold War was significant. One estimate, prepared in the late 70's, counted military manpower in the NATO countries at 4.8 million and in the Warsaw Pact nations between 4.8 million and 5.5 million (CBO, 1977). While the end of the Vietnam War allowed for a decline in defense spending through the 1970's, that changed with the new decade. In the 1980's, the United States increased pressure on the Soviet Union and the Warsaw pact, executing a significant military buildup.

According to the Baltimore Sun, between 1980 and 1985, the annual defense budget more than doubled, from \$142.6 billion to \$286.8 billion. The Navy increased its force from 479 combat ships to 525, while the Army bought thousands of the new Abrams tanks and Bradley Fighting Vehicles. Hundreds of new attack aircraft, from the Navy's F-14 Tomcat to the Air Force's F-15 Eagle, took to the skies, while the Pentagon rapidly modernized its nuclear force with the Peacekeeper intercontinental ballistic missile, the Trident submarine, and the B-1B bomber. In response, in late 1984, the Kremlin incorporated a 45 percent increase in military spending into its next five-year plan.

In 1985, Mikhail Gorbachev ascended to lead the Soviet Union. First on his agenda was reviving the Soviet economy, and he launched significant social, political, and military reforms. Through the latter part of the decade, as the reforms played out, turmoil overcame the Soviet Union. In November of 1989, the Berlin Wall fell, perhaps the most visible event in the west, as the curtain fell, but it took another two years for the process to play out. On Christmas Day, 1991 Mikhail Gorbachev resigned as leader of the Soviet Union and on the following day the Soviet Union dissolved.

## 2.3 The Peace Dividend

The end of the Cold War, in the eyes of many, ended the need for a large standing military in the United States. Without doubt, it did represent the end of the critical national security threat the US military had been designed to counter, the Soviet Union. At a minimum, the military would need to be reshaped, and associated with the reshaping emerged the concept of a "peace dividend."

Said Les Aspin, a Secretary of Defense in the Clinton Administration, "The Cold War is behind us. The Soviet Union is no longer the threat that drove our defense decision-making for four and a half decades--that determined our strategy and tactics, our doctrine, the size and shape of our forces, the design of our weapons, and the size of our defense budgets--is gone" (Aspin, 1993).

The concept underlying a peace dividend is simple. "Every gun that is made, every warship launched, every rocket fired signifies, in the final sense, a theft from those who hunger and are not fed, those who are cold and are not clothed. This world in arms is not spending



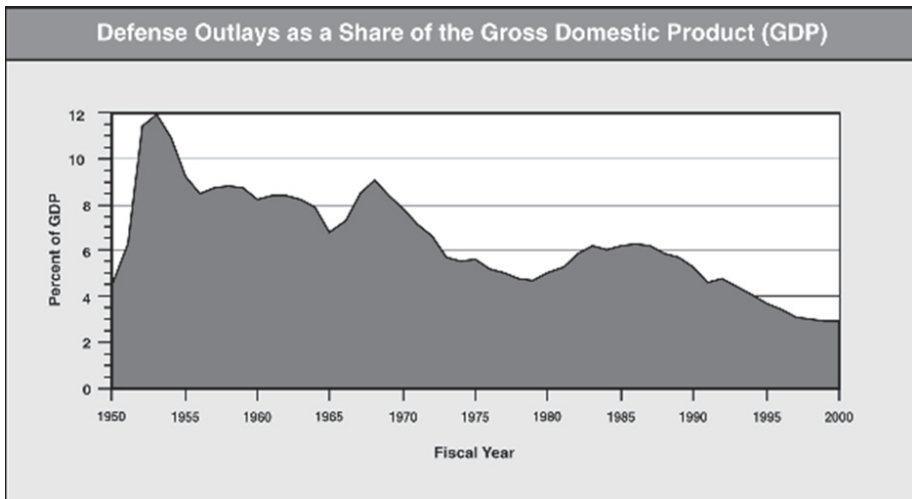
money alone” (Eisenhower, 1953). With the Cold war over, fewer weapons, and fewer people, should be required, and more resources could be devoted to other serious issues. This logic struck a responsive chord with the people, and with the politicians, and the defense budget revisions began.

In 1993, the Department of Defense completed a “bottom-up” review. “Now that the Cold War is over, the questions we face in the Department of Defense are: How do we structure the armed forces of the United States for the future? How much defense is enough in the post-Cold War era?” (Aspin, 1993). In the study, the Department sought to select the right strategy, force structure, modernization programs, and supporting industrial base and infrastructure to provide for American’s defense in the post-Cold War era.

By the time the recommendations of the bottom-up review percolated through to the budget, the “restructuring” of the military was in full swing. According to the administration’s Annual Defense Review for 1995, “Requested FY 1996 DoD budget authority is, in real terms, 39 percent below FY 1985, the peak year for inflation-adjusted defense budget authority since the Korean War. Under the President’s budget, by FY 1997 the cumulative real decline since FY 1985 will reach 41 percent. In FY 1998 and FY 1999, DoD budget authority will rise just enough to keep pace with inflation, then experience a real increase in FY 2000 and FY 2001, primarily because of higher funding for procurement” (DOD, 1995).

As illustrated in **Figure 2.1**, not only did real spending on defense collapse, defense spending as a share of overall economic activity – measured as a percentage of gross domestic product – would fall to levels not seen since before World War II.

**Figure 2.1** Defense Outlays Over Time



Source: Annual Defense Report, 1995

## 2.4 A Perfect Storm: The Implications of the Budget Compression

Collecting on the peace dividend – beating swords into plowshares – resulted in a painful decade for the defense industrial base. One demonstration of the impact of the peace dividend on the military during the 1990's is the impact on end strength. At the end of fiscal year 1987, the active duty U.S. military was at its post-Vietnam peak of 2,174,217 positions. During the various annual budget-planning cycles, the specific end strength oscillated a bit, but was generally consistent in targeting about a 25% reduction, or end strength of a little over 1.6 million (GAO, 1993). There were further reductions in following years. By fiscal year 2001, the authorized end strength drop just below 1.4 million (United States Congress, 2001).

Along with the reduction in headcount came a reduction in the military facilities infrastructure. Beginning in 1988, a series of four commissions were established, following a process specified in law, to select bases for closure. From 1988 to 1995, four commissions recommended closure of 98 major bases and hundreds of smaller installations, and the realignment of many other bases and facilities. The first closure, Pease Air Force Base in New Hampshire took place in 1991, and the balance of the recommendations were scheduled to be implemented over time and completed by the year 2001 (Lockwood and Siehl, 2004). With the reductions in force strength, and the closure of bases, hundreds of thousands of civilian government jobs disappeared, as well.

Dislocation was not restricted to the military. While the overall size and footprint of the military decreased, a collapse in procurement took place. This in turn triggered massive downsizings in employment at private sector Aerospace and Defense companies. Layoffs in defense industries amounted to almost 2 million people.

The private sector A&D compression created a dilemma for the private sector companies. On the one hand, they needed to seek other revenues – hopefully commercial revenues - to replace the defense business lost, and on the other hand find a way to maintain core capabilities for their continuing, though diminished, market for defense products. The word transformation began to slip into conversations on what to do about the defense industrial base, and the issue of defense “conversion,” shifting the industrial base to technologies useful in both military and civilian applications.

While the defense industrial base – both military and commercial – became less capable as a natural by-product of the compression, another variable came into play. Faced with declining budgets for the purchase of newer systems, legacy weapons systems stayed in service longer and longer. As a result, maintenance costs rose and as reliability dropped, so did readiness. Year on year, the effect compounded. Dr. Jacques Gansler, at the time Under Secretary of Defense (Acquisition, Technology and Logistics), warned “unless we reverse the trend quickly and deliberately we face what I have described as a ‘death spiral’ -- a situation where reduced readiness requires us to keep removing more and more dollars from equipment modernization and putting it into daily O&M, thus further delaying mod-

ernization, causing the aging equipment to be over-used, further reducing readiness, and increasing O&M -- a vicious circle" (Gansler, 2000).

Clearly, with an organizational compression of this magnitude capability dislocations within the government-owned infrastructure took place. Overall capacity diminished, and in some cases, specific capabilities were lost. While still a formidable standing military, as the decade progressed challenges emerged. The military had to find ways to accomplish things they could no longer accomplish themselves, in addition, the conversion of swords into plowshares had a perverse impact, driving up the support requirements and associated costs of the remaining equipment.

The Peace Dividend set the stage for fundamental change. After a decade of reductions in support infrastructure, combined with the death spiral of sustainment costs, a consensus emerged that new approaches needed to be tried. Business as usual would not be good enough, and the defense industrial base needed to adapt to the new reality.

## 2.5 The Emergence of PBL

In the Fiscal Year 1998 National Defense Authorization Act, Congress recognized the need for change and directed DoD to overhaul weapons systems sustainment practices. Responding to Congressional tasking, in April of 1998 then Secretary of Defense William S. Cohen submitted "Actions to Accelerate the Movement to the New Workforce Vision". In that report the Secretary committed to "direct the Under Secretary of Defense (Acquisition and Technology) (USD (A&T)) to establish a task force charged with identifying ways to change the focus of the Department in product support from managing supplies to managing suppliers" (DOD, 1998).

Brought together under the simple thought of reengineering product support, the USD (A&T) set out to develop a plan to reengineer product support, and in July of 1999 released an implementation plan (DOD Product Support Reengineering Implementation Team, 1999). As the starting point for the implementation plan, the department set out the details of the four top-level implementation actions:

- Reengineer product support from the warfighters through the sustaining base. This effort builds on Service initiatives to integrate their supply chains and includes simplifying customer interfaces, evolving customer relationships based on output (i.e., readiness), ensuring appropriate combat support integration, enhancing interfaces with theater distribution, and continuing Service efforts to integrate across functions.
- Competitively source product support for 30 pilot programs (10 from each Military Department), leading to competitive sourcing for all major weapon systems by FY05.

- Expand Prime Vendor and Virtual Prime Vendor arrangements to appropriate consumables by FY05 by executing a systematic effort to link Prime Vendor and Virtual Prime Vendor strategies with pilot programs and extending those programs, as appropriate, to other weapon programs.
- Increase funding and incentives for reliability, maintainability, and sustainability (RM&S) enhancements through continuous technology refreshment in each Military Department by increasing program managers' life-cycle cost responsibilities, clarifying RM&S investment policy, and migrating to open architectures for new systems.

In support of the high-priority implementation tasks, the three key enabling actions were identified to set up a coherent, supportive environment for the reengineered processes:

- Foster a competitive supplier base for product support through innovative partnering strategies and the elimination of barriers for life-cycle competition. These strategies evolved based on pilot program experience in FY00 through FY02.
- Reengineer financial processes to support integrated product support practices, including the evolution of new activity groups to enable output based customer transactions.
- Modernize existing logistics information systems to enable seamless, secure provision of product support. This effort will build on DoD initiatives to adopt commercial standards for electronic commerce and deploy secure, interoperable systems determined by unique Service requirements. Actions include migrating to commercial transaction standards, integrating supply and transportation systems, accelerating the deployment of intrusive diagnostics, and modernizing transaction systems to support customer focused metrics.

The goal of all of these actions was the creation of a reengineered product support process with the following characteristics:

- Integrated logistics chains focused on customer service and system readiness—driven by unique requirements of the Military Services
- Customer relationships based on output (such as availability of mission equipment)
- Logistics chains integrated across industry and Government
- Best-value providers selected from Government, industry, or Government-industry partnerships
- Support environment that maintains long-term competitive pressures
- Secure, integrated information systems across industry and Government that enable comprehensive logistics chain integration and full asset visibility
- Continuous improvement of weapon system RM&S through dedicated investments
- Effective integration of weapon system-focused support to provide total combat logistics

Though the term “Performance Based Logistics” was never used, by 1999 the idea had been born. The entire implementation plan is a treatise on implementing PBL, on fundamentally reengineering product support. Across the services, a set of 30 programs were selected as pilots for reengineering product support. These programs are listed in **Table 2.1**.

**Table 2.1** Pilot Programs for Product Support Strategies

| Army                    | Navy            | Air Force                 |
|-------------------------|-----------------|---------------------------|
| Abrams M-1 Tank         | AAAV            | AWACS                     |
| AFATDS                  | AEGIS Cruiser   | B-1B Lancer               |
| Apache AH-64            | ASE/CASS        | C-17 Globemaster          |
| Chinook CH-47           | Common Ship     | C-5 Galaxy                |
| Comanche RAH-66         | CVN-68          | Cheyenne Mountain Complex |
| Crusader                | EA-6B Prowler   | F-117 Nighthawk           |
| Gaurdrail/Common Sensor | H-60 Helicopter | F-16 Falcon               |
| HEMTT                   | LPD-17          | J-STARS                   |
| HIMARS                  | MTVR            | KC-135 Stratotanker       |
| TOW/ITAS                | SLAM-ER         | SBIRS                     |

Product Support for the 21st Century: A Year Later

In September of 2000, the department reviewed progress toward a reengineered product support process. In the chapter devoted to “Implementing Fundamental Strategies,” we find one of the earliest – or perhaps the first – use of the term Performance Based Logistics in government published reference. “*Performance Based logistics (PBL)*. PBL agreements establish measurable performance targets that suppliers are expected to meet in support of warfighter requirements; PBL agreements are in place for 19 of the 30 pilot programs. Compensation that is based on how an organization performs against specific metrics is gaining greater acceptance in the government and commercial sectors” (Study Group for Product Support, 2000).

## 2.6 Setting the Bar: APU PBL

One of the earliest examples of a successful and comprehensive implementation of PBL is the Auxiliary Power Unit (APU) at the United States Navy. An APU is a turbine used to provide ground power to aircraft when their engines are not running. The partnership between NADEP Cherry Point, NC, (touch labor) and Honeywell (program management) was implemented through a contract from the Naval Inventory Control Point in June of 2000 and was the Navy’s first. Under the ten-year contract (five base years plus five one-year renewal options) the Navy paid Honeywell a fixed amount per flight hour.

Under the APU TLS program, availability and reliability increases were guaranteed. Specifically, the contract required Honeywell to maintain 90 percent availability of reparable items and stipulated incremental payment reductions if the annual availability was not achieved. Moreover, CONUS (continental United States) routine requisitions carried a delivery guarantee of five business days, Issue Priority Group 01 (IPG 01) requisitions inside the continental United States within two business days, and all OCONUS IPG 01 (outside the continental United States) requisitions within four days. Guaranteed reliability increases were part of the contract, (see **Table 2.2**) and provided for a flat payment downward adjustment if the annual reliability goal was not met.

The APU TLS contract also provided an incentive to encourage Honeywell to exceed reliability requirements in the form of a gain share provision; if reliability surpassed guarantees by more than 25 percent the gain sharing kicked in. In addition, the contract stipulated a surge capability of 120 percent of annual flight hours.

**Table 2.2** APU TLS Reliability Increase Guarantees

| Aircraft | Reliability Increase |
|----------|----------------------|
| F/A-18   | 45%                  |
| C-2      | 15%                  |
| S-3      | 25%                  |
| P-3      | 390%                 |

Across all outcome measures, the PBL delivered. By 2004, the number of APUs awaiting depot repair because of lack of parts went from 232 to zero, back orders were reduced from 125 to 0, average delivery time went from 35 days to 5 days, 98 percent of requisitions were filled within contractual requirements, supply material availability increased from 65 to 95 percent, and Depot Repair Turn-Around-Time (RTAT) reduced from 162 days to 38 days. NAVAIR also credited over 30 reliability improvements to the program, and over \$50 million in cost avoidance.

Unlike traditional support strategies, Honeywell was not paid for repairing APUs; they were paid for providing flight hours. The improvements resulted in longer component life, which prevented APUs from entering the repair cycle. With fewer repairs necessary and flight hours remaining constant, Honeywell realized more profit. The success of the APU also demonstrated that the vision of reengineered product support could be realized. In the original report envisioning PBL, DoD laid out eight characteristics:

- Integrated logistics chains focused on customer service and system readiness—driven by the unique requirements of the Military Services
- Customer relationships based on output (such as availability of mission equipment)
- Logistics chains integrated across industry and Government

Performance Based Logistics

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