



Unmanned Aircraft Systems (UAS) Project Office (PO) Finds Powerful Cost Efficiency Advantages Through Proper Performance-Based Logistics (PBL)

Tim Owings

In today's challenging economic landscape, cost efficiency and operational performance have become two of the most important metrics of success for DOD acquisition programs. This is especially true in the areas of system support and sustainment. The size of logistics contracts in relation to the rest of the program budget and the long-term implications for total life-cycle management dictate that DOD acquisition programs continually strive to improve upon past methodologies and challenge traditional norms to realize cost reductions while simultaneously improving performance and safeguarding readiness.

PFC Thomas Montgomery, assigned to Unmanned Aerial Systems Platoon, Alpha Co., Special Troops Battalion (Bn), 3rd Brigade (Bde), 1st Cavalry Division (Div.), stores a Shadow Tactical UAS in a hangar at Forward Operating Base (FOB) Diamondback, near Mosul, Iraq, July 22, 2009. (U.S. Navy photo by MC1 Carmichael Yopez.)

One methodology at the center of the current debate over best business practices is PBL. The purpose of this article is not to convert the unreformed, but rather to dispel some of the rumors and stereotypes surrounding PBL and show how the Army UAS PO has used this contractual approach to great advantage.

To fully understand PBL, it is best to understand what it is not. It is not Contracted Logistics Services, and it is not something that can be turned off and on easily. To work properly, a

PBL program requires a high level of trust and long-term commitment and, therefore, the initial buy-in costs can be high. This is because PBL uses metrics and incentives to align the contractor's goals with the government's desires, but it does not dictate the methods or limit the contractor's ability to determine how to do so. Yet, it is that very flexibility and freedom that often dissuades program managers from adopting a PBL construct. To do so entails a full-scale conversion that can be all encompassing. One can liken it to a

switch from English measurement to the metric system; half measures do not work well and dilute the benefits that a PBL strategy can provide.

Shadow PBL Product Support Team

The Product Manager's Office for Ground Maneuver, supporting the Shadow Tactical UAS within the UAS PO, has used a PBL contracting strategy with its prime vendor, AAI Corp., since its inception in 2003. During its initial stages, there was a learning curve

accompanied by some unrealistic expectations. It was first believed that the government would only need to acquire spare parts for system support one time, but the rapid procurement of additional systems beyond the initial Army Acquisition Objective dictated otherwise. Additionally, the Product Office never anticipated the eight to tenfold increase in flight operations from combat deployment. Something had to be done.

The Shadow PBL Product Support Team, consisting of logistics and acquisition specialists from both the UAS PO and AAI Corp., has proactively pursued the continued implementation of PBL, conducting annual assessments of the program. During the FY08 assessment, our team felt that the program was exceptionally effective in maintaining warfighter readiness with increasing cost efficiency, but that we were not yet experiencing the cost efficiency anticipated. As a result, the team refocused on how to modify the PBL strategy to change this paradigm.

The first step was to revisit the performance metrics. Originally, four metrics were developed in FY03 to define the performance-based, contractor-managed support efforts. These metrics were mapped to the Operational Requirements Document. The original metrics are defined in Chart 1.A on Page 17.

As a result of the FY07 PBL audit, the Shadow PBL Team agreed upon an updated set of metrics (Chart 1.B) that put emphasis on reducing open depot maintenance work orders and also added a metric aimed at the reduction of air vehicle mishaps. It was felt that focus in both of these areas would, over time, contribute to the reduction of total ownership cost. The results seen over that contract period were extremely positive with a clear reduction in mishaps, from approximately 450 mishaps per 100,000 flight hours to less than 150, and significant improvements in cost efficiency evidenced by a 25-percent reduction in contract cost.

With the FY08 PBL contract, the Shadow PBL Product Support Team matured the metrics (shown in Chart 1.C) based on a better way to quantify depot efficiency and the Depot Maintenance Ratio (DMR) metric was replaced with the Depot Mean Down Time (DMDT) metric. The rationale was simple: under the DMR metric, the total time that a part spent in maintenance was not adequately accounted for, so more involved repairs were delayed. A part broken for 1 day counted the same as a part broken for 365 days. DMDT, by factoring in the time component, forced the vendor from a last in, first out model to a first in, first out model. This has resulted in reduced repair turnaround time from more than 105 days to less than 55 days. The impact of this minor adjustment resulted in a 25-percent contract cost reduction while the System Status Readiness (SSR) rate remained consistently above 90 percent.

It is important to understand that under the PBL construct, the Product Support Integrator (PSI), AAI Corp., receives no fee based on expenditure of cost. The PSI can only receive a fee by achieving the contractual performance-based metrics. Additionally, the PBL contract has traditionally provided for cost sharing. If the PSI underruns the projected cost of the effort, the PSI shares financially in the savings. Likewise, if the PSI overruns the effort, it does not receive cost reimbursement for a considerable percentage of the cost growth.

Results

The terms and conditions of the PBL contract define the incentive score (IS) as representing the weighted sum of the metrics. In FY08, SSR was weighted at 30 percent, Reliability Growth Rate (RGR) at 35 percent, and DMDT at 35 percent. In Chart 2 on Page 18, note the Shadow PBL Team's performance during the FY08 reporting period.



SPC Christopher Ellis, assigned to Unmanned Aerial Systems Platoon, Alpha Co., Special Troops Bn, 3rd Bde, 1st Cavalry Div., conducts a radio check as he prepares to launch a Shadow Tactical UAS at FOB Diamondback July 22, 2009. (U.S. Navy photo by MC1 Carmichael Yopez.)

Particularly noteworthy, as related to the performance of the Shadow PBL Team, is that despite increasing operational tempo (OPTEMPO):

- Operational readiness and availability, as encompassed in the SSR, has remained at or above 90 percent.
- The mishap rate, as measured by the RGR, is continuing its downward trend to less than half of the 2006 rate.
- The DMDT for an item being repaired at the depot is less than 60 days including transportation time in and out of theater.

Just as importantly, Chart 3 on Page 19 shows the impact, over the phases of the Shadow PBL implementation, that the Shadow PBL Team has had on life-cycle total ownership cost reduction:

- The Army Cost Position was provided as part of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology Milestone C decision process. It was estimated to be 10 percent of the total system procurement cost. At the time, the plan was based on a fielding plan that supported 44 RQ-7B systems, to include the UAS training center at Fort Huachuca, AZ.



Shown here is a Shadow Tactical UAS in flight. (DOD photo.)

- Base PBL is the peacetime OPTEMPO profile that supports contracted hours/system/year at 85 percent operational readiness.
- System months represent the number of systems that must be supported cumulatively each month of the contract period of performance. As the RQ-7B is still being fielded and as units fall into the deployment cycle, system months help manage the dynamics of the RQ-7B schedule.

In certain circles, PBL has been viewed as a business fad and is derided in much the same fashion as Total Quality Management and Lean Six Sigma when

those concepts were first espoused. It is true that these methods are not a panacea, but time has shown that when applied under the right circumstances, they can provide powerful results. The results above prove that the same is true of PBL.

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CHART 1. PERFORMANCE METRICS

A. ORIGINAL METRICS	B. UPDATED METRICS	C. MATURED METRICS
<p>SSR = 85 percent $\frac{\text{Total Time} - \text{Down Time (at Subsystem Level)}}{\text{Total Time}}$</p> <p>CWT = 90 percent $\frac{\text{Total Requirements} - \text{Number of Unsuccessfully Filled Total Requirements}}{\text{Total Requirements}}$</p> <p>Field Service Representative Quotient Customer satisfaction quotients evaluated via Contractor Performance Assessment Reporting System Report</p> <p>Logistics Maintenance Ratio $\frac{\text{Total Operating Hours}}{\text{Number of Unscheduled Maintenance Actions}}$</p>	<p>SSR = 85 percent $\frac{\text{Total Time} - \text{Down Time (at Subsystem Level)}}{\text{Total Time}}$</p> <p>DMR $\frac{\text{Total Flight Hours Current Quarter}}{\text{Number of Open Depot Maintenance Actions}}$</p> <p>Performance Requirement: 17-18 to 1</p> <p>RGR Performance against a Reliability Growth Curve</p>	<p>SSR = 85 percent $\frac{\text{Total Time} - \text{Down Time (at Subsystem Level)}}{\text{Total Time}}$</p> <p>DMDT = 60 Days $\frac{\text{Total Down Time}}{\text{Depot Maintenance Actions}}$</p> <p>Performance Requirement: 17-18 to 1</p> <p>RGR = average 33.5/100,000 hours Performance against a Reliability Growth Curve</p>

CHART 2. SCORING CONFERENCE RESULTS TABLES

NOVEMBER 2007 – JANUARY 2008

Metric	Nov. 2007		Dec. 2007		Jan. 2008		Average Quarterly Score	Average Quarterly Points	Weight Factor	Quarterly Weighted IS Points
	Score	Points	Score	Points	Score	Points				
SSR	97	115	97.5	115	96.8	110	972.8	115	0.3	34.5
RGR	0.63	110	0.59	110	1.82	80	N/A	100	0.35	35
DMDT	N/A	N/A	N/A	N/A	N/A	N/A	76	95	0.35	33.25

2008 1ST QUARTER INCENTIVE SCORE 102.75

FEBRUARY 2008 – APRIL 2008

Metric	Feb. 2008		March 2008		April 2008		Average Quarterly Score	Average Quarterly Points	Weight Factor	Quarterly Weighted IS Points
	Score	Points	Score	Points	Score	Points				
SSR	96.7	110	96.3	110	96.5	110	96.5	110	0.3	33
RGR	2.04	75	0.44	115	1.06	90	N/A	93.33	0.35	32.67
DMDT	N/A	N/A	N/A	N/A	N/A	N/A	74	95	0.35	33.25

QUARTERLY INCENTIVE SCORE 98.9

MAY 2008 – JULY 2008

Metric	May 2008		June 2008		July 2008		Average Quarterly Score	Average Quarterly Points	Weight Factor	Quarterly Weighted IS Points
	Score	Points	Score	Points	Score	Points				
SSR	92.4	105	96.8	110	95.5	110	94.1	110	0.3	33
RGR	1.52	93	0.94	95	1.59	83	N/A	87	0.35	30.45
DMDT	N/A	N/A	N/A	N/A	N/A	N/A	75	95	0.35	33.25

QUARTERLY INCENTIVE SCORE 96.7

AUGUST 2008 – OCTOBER 2008

Metric	Aug. 2008		Sept. 2008		Oct. 2008		Average Quarterly Score	Average Quarterly Points	Weight Factor	Quarterly Weighted IS Points
	Score	Points	Score	Points	Score	Points				
SSR	95.2	110	95.6	110	99.5	120	94.91	110	0.3	33
RGR	1.92	80	3.33	60	2.13	75	N/A	71.6	0.35	25.08
DMDT	N/A	N/A	N/A	N/A	N/A	N/A	59.4	110	0.35	38.5

QUARTERLY INCENTIVE SCORE 96.6

CHART 3. PBL COSTS

PBL COST FOR THE BASE EFFORTS FYs 06-08 VERSUS THE ORIGINAL ARMY COST POSITION (ACP)

	ACP (Milestone C) FY03	FY06 ⁵ (600 hours/OPTempo)	FY07 ⁵	FY08 ⁵ (300 hours/OPTempo)
Contact Line Item Number 0101 (Base PBL)	\$66,000,000	\$32,000,000	\$53,803,721	\$50,777,428
System Months Supported	528	225	645	737
Cost of Readiness (COR)/Month ¹	\$125,000	\$116,334	\$83,417	\$68,897
COR/Year ²	\$1,500,000	\$1,396,008	\$1,000,999	\$826,770
Percent Cost Reduction vs Previous Fiscal Year ³			28.3 percent	17.41 percent
Percent Reduction of Total Ownership Cost (TOC) vs ACP ⁴		6.93 percent	33.27 percent	44.88 percent

PBL COST FOR DEPLOYMENT WITH OPTempo⁶ MORE THAN 8 TIMES BASE PEACETIME PLANNING⁶

	FY06 (OPTempo Hours) ~34,500	FY07 (OPTempo Hours) ~86,250	FY08 (OPTempo Hours) ~104,575
Contract Line Item Number 0109 Deployment (not U.S. Marine Corps)	\$66,000,000	\$61,413,037	\$66,579,166
System Months Supported	115	225	327
COR/Month	\$521,739	\$272,947	\$203,606
COR/Year	\$6,260,870	\$3,275,362	\$2,443,272
Percent Cost Reduction vs Previous Fiscal Year		47.69 percent	25.4 percent

- The "COR/Month" is calculated as follows: Total Negotiated Contract Price (for the Base or Deployment Contract Line Item Number) ÷ Number of System Months = COR/Month.
- The "COR/Year" is calculated as follows: COR per Month × 12 = COR/Year.
- The following formula calculates "Percent Cost Reduction vs Previous Fiscal Year": $1 - (\text{Current Fiscal Year COR/Year} \div \text{Previous Fiscal Year COR/Year})$.
- The following formula calculates "Percent Reduction of TOC vs ACP": $1 - (\text{Current Fiscal Year COR/Year} \div \text{ACP COR/Year})$.
- Planning OPTempo for the base PBL efforts has equaled 600 hours/year (50 hours/month) at 85 percent operational readiness. For FY08, based on overseas contingency operation efforts, base hours have been reduced to 300 hours/year (25 hours/month).
- Planning OPTempo for deployments is "over and above" the base hours and fluctuates based on warfighter requirements.

Contracted Deployed OPTempo per Month			
	FY06	FY07	FY08
Contracted Hours	34,500	86,250	104,575
Hours/System Month	300	383	320
Hours/System Year	3,600	4,600	3,838

OPTempo hours, for each system, are in addition to the base OPTempo hours. Total OPTempo hours procured by the FY08 effort (deployed and CONUS) are 114,536.