



PRODUCT SUPPORT **Should-Cost** Opportunities

O&S Strategies to Boost Affordability

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Much has been written about “Should Cost” in recent years. Department of Defense (DoD) policy and guidance are replete with both requirements and examples. Yet product support and sustainment Should Cost remains a mystery to many in the acquisition workforce. Let’s shed some light on the subject.


Start with what we know. Should Cost is defined in policy (DoD Instruction [DoDI] 5000.02, Enclosure 2) as “a management tool designed to proactively target cost reduction and drive productivity improvement into programs. Should Cost management challenges managers to identify and achieve savings below budgeted most-likely costs.” Or as the *DAU Glossary* indicates “... a program’s “Should Cost” target represents what the program manager believes the program ought to cost if identified cost saving initiatives are achieved.”

That’s all well and good, but what does that mean for my product support and sustainment strategy? And, perhaps more importantly, how exactly do I identify and implement Should-Cost opportunities for my program?

A great place to start is Chapter 4 of the *Defense Acquisition Guidebook (DAG)*, available on the DAU website at <https://shortcut.dau.mil/DAG/CH4>. Here program managers, product support managers, and life-cycle logisticians will find detailed information on operating and support (O&S) Should-Cost initiatives for every phase of the life cycle.

The DAG identifies not just the what, but the how, reminding us in paragraph 3.2.4.1.3 that “the PM [program manager] should record all O&S Should-Cost initiatives in the life cycle sustainment plan (LCSP)” and that “O&S Should Cost initiatives are a way for the program to meet established O&S Cost affordability constraints. However, the PM should not stop developing and implementing O&S Should Cost initiatives if/when the O&S Will Cost estimate is lower than the O&S Cost Affordability constraint. PMs use O&S Should Cost initiatives as an ongoing way to improve the O&S Cost and performance of the system.”

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The DAG also includes a number of notional examples, including: multi-vendor competition for supply support, investigating potential cost drivers based on design parameters, process improvements to reduce component repair times, and processes to evaluate whether O&S Should-Cost initiatives are delivering expected savings, among a range of others.

Additionally, Chapter 4 of the DoD *Operating and Support (O&S) Cost Management Guidebook* (<https://shortcut.dau.mil/JST/cost-guidebook>) provides an excellent overview of O&S Should Cost, along with a plethora of specific examples and in-depth information on analysis, development, documentation, oversight, tracking, assessment and reporting of O&S Should-Cost initiatives.

As the *O&S Cost Management Guidebook* reminds us, “the magnitude of O&S cost makes it a particularly important target for programs to apply Should Cost procedures and management. Since many drivers of O&S cost are determined by decisions made early in the acquisition process, program managers (PMs) and their staff need access to the best tools and practices available.” Several excellent examples of potential Should Cost enablers are addressed in detail in paragraph 4.2.1.6. Those examples and more will be discussed later in this article.

More generally speaking, analysis indicates the majority of O&S Should-Cost opportunities fall into the three broadly based areas of people, parts and fuel. If we apply the Pareto Principle, it would be logical to focus our Should-Cost energies there. How, you might ask. Great question.

A key step is to devise system acquisition and product support strategies that meets the warfighter’s performance requirements while minimizing and mitigating these areas. This can be achieved in several ways. From a product per-

spective, designing and fielding more reliable, maintainable, supportable, sustainable, suitable and transportable systems would by extension positively impact a range of other product support elements such as maintenance planning and management, supply support, packaging, handling storage and transportation (PHS&T), manpower and personnel, facilities and infrastructure, and training requirements. Result: Reduced O&S costs. Similarly, fuel, particularly petroleum-based fuel, is bulky, necessitating a large support infrastructure, transportation requirements and logistics footprint. Reductions in such requirements through fuel efficiency and alternative fuel initiatives can provide the same result: Reduced O&S costs. These efforts involve impacting the product by designing and developing supportable systems.

Processes can also be designed and developed to more effectively and efficiently support and sustain fielded systems. This includes a range of multidisciplinary sustaining engineering initiatives as well as improvements in management of the supply chain, product support, maintenance, information technology (IT) and data. Process-related examples include: a more responsive supply chain, robust deficiency reporting or proactive obsolescence mitigation processes.

To be successful, acquisition professionals need to adopt a holistic, interdisciplinary, truly life-cycle perspective, considering a diverse mix of product- and/or process-related initiatives such as but not limited to:

Product-Focused O&S Should-Cost Opportunities

Early, Upfront Investment in Reliability, Maintainability and Supportability. Often, the greatest opportunities to save costs are manifested well before a weapon system is produced and deployed. Giving due consideration to reliability and maintainability and electing to pursue thoughtful trade decisions in the design affords the opportunity to reap tremendous life-cycle cost (LCC) savings. We like to talk about “upfront and early” since, notionally, 80 percent of O&S costs are determined during design development. Judicious investments in supportability analysis tools is key to enabling good trade decisions. Reliability centered maintenance (RCM) allows for determining the best trades between the cost for reliability in design and development versus cost on O&S. Condition based maintenance-plus (CBM+) can also complement RCM and identify cost effective monitoring and sensing systems to the cost of component failures and induced failures. The trades are not limited to selecting the components that provide the best reliability (cost considered). Maintainability-related trades also can yield significant cost savings.

Failure Reporting, Analysis and Corrective Action System (FRACAS). RCM and CBM+ are not simply cost-savings initiatives during initial maintenance planning. They have the potential to deliver additional savings throughout the life cycle. Most programs have some sort of FRACAS, which enables identifying potential changes in RCM plans. If

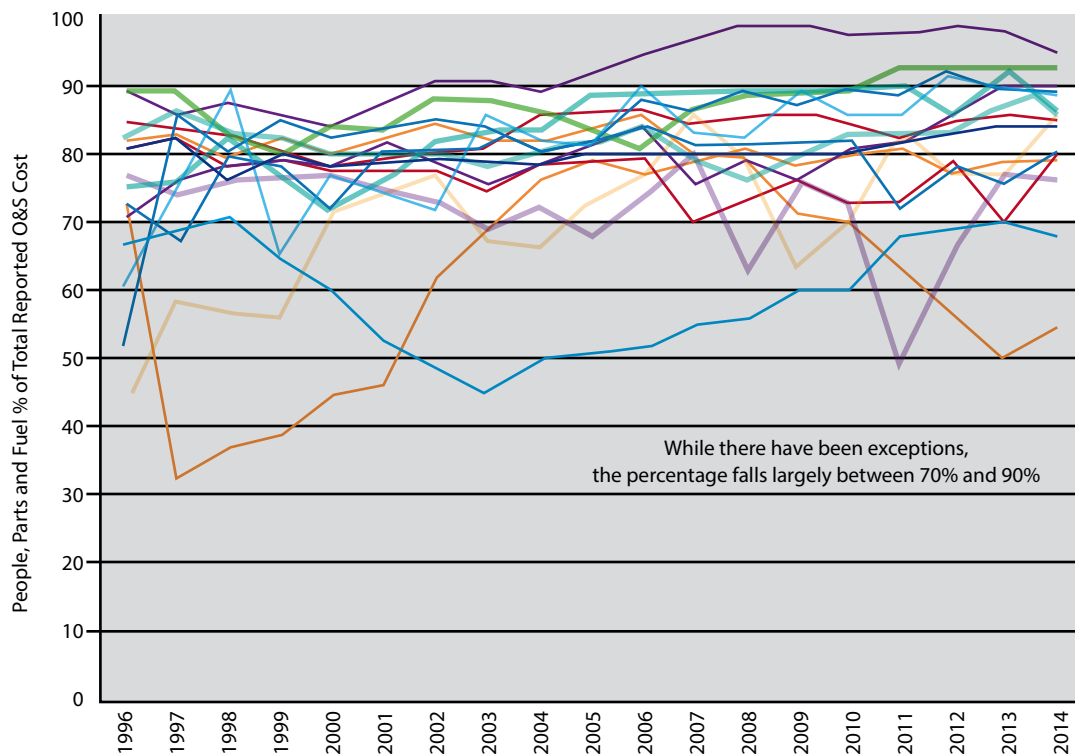
failure data indicate components are not reliable, consider inserting preventative maintenance to improve the mean time between failure and avoiding the cost associated with unexpected failures. You can also reduce forced removal times which will provide savings on unplanned maintenance and induced failures of other components. If FRACAS data indicate there are no failures, or there is significant remaining life during the current schedule for removals and/or inspections, then the period of use can be extended, saving considerable costs. This same activity

can be applied to calibration items. Field and usage data can be used to identify the most likely candidates to transition from RCM to a CBM+ construct to minimize unnecessary maintenance and to reduce service costs. Each determination should be based on using an appropriate model feeding a cost benefit analysis.

Prognostics and Health Management (PHM). An integral part of CBM+, PHM is a comprehensive system for detecting and isolating failures as well as predicting remaining useful life for critical components. There are costs associated with implementing a PHM system—but much like RCM and CBM+, the benefits can be significant. The main cost benefit is due to a reduction in the assumed unscheduled and fixed-interval scheduled maintenance based on the precursor-to-failure and life-consumption monitoring PHM capabilities.

Parts Standardization and Commonality. As noted in the DoD *SD-19 Parts Management Guide*, the average total cost for adding a single new part into a system is about \$27,500. Giving preference to standard parts reduces the cost of cataloging new parts. Use of standard parts also leverages existing supply chains, with price breaks for bulk purchases and reduced inventory requirements. Giving preference to standard can reduce the likelihood of Diminishing Manufacturing Sources and Material Shortages (DMSMS) issues and resolution costs. Parts standardization can even reduce training costs and the

Figure 1. Distribution of Should-Cost Opportunities



Source: DoD O&S Cost Management Guidebook, Figure 11—Percentage of total program O&S cost driven by people, parts, and fuel (inclusive of contractor logistics support and depot) since 1996 for 17 aircraft programs).

need for peculiar support equipment. The usual cost benefits of parts commonality extends to the use of common tools and support equipment.

Value Engineering (VE). VE is not an option; it is a requirement by statute and policy. Contractor-submitted Value Engineering Change Proposals (VECPs) are designed to lower a project's life-cycle cost to DoD while improving producibility, reliability, maintainability and, if properly executed, ultimate system availability. VECPs are applicable to all contract types, including performance based. If a VECP yields cost savings, it should be reported as Should-Cost savings. This a wonderful marriage of Continuous Process Improvement (CPI) and Should Cost. The Navy's Logistics Engineering Change Proposals (LECPs) seek to achieve similar benefits as VECPs, but with an emphasis on changes that will save on product support costs or enhanced logistics capabilities. Service life extensions, identification of replacement parts with better reliability/maintainability, changing maintenance tasks that reduce damage to equipment, consumption of material or hazardous wastes (HAZWASTE) generation are all VECPs/LCEPs that can be reported as Should-Cost initiatives.

Fuel and Energy Efficiencies. Tremendous savings can be realized by eliminating or reducing energy needs or by seeking less-expensive energy alternatives. There are two primary, broad approaches: changes in practices and procedures and

investments in technologies. Required operational checks, which consume energy without contributing to a warfighting mission, should be scrutinized. One aircraft eliminated a functional check flight in cases where a known good engine received from supply was installed and passed all ground checks. Can simulators and test procedures reasonably substitute actual operation? New technologies may include new means of propulsion (fuel cells, hybrid engines, and batteries), more fuel-efficient engines, lightweight and stronger materials, new designs, enhanced payloads and subsystems, and even directed energy weapons. The use of additive manufacturing (AM) technologies may allow for reduced fuel/energy requirements by reducing material moving through the supply chain.

Hazardous Materials (HAZMAT)/HAZWASTE Management. Designing, developing and fielding systems that are more sustainable and environmentally friendly saves money. There are numerous cost savings opportunities in HAZMAT and HAZWASTE. A requirement to perform maintenance without disturbing a low observable surface goes beyond improved availability due to reduced cure time requirements, but there is a dramatic reduction of HAZMAT and HAZWASTE produced in performing routine maintenance. The cost of PHS&T and disposal of HAZMAT/HAZWASTE in many cases may exceed the cost of engineering to find more sustainable alternatives.

AM. According to the Joint Technology Exchange Group (JTEG) “additive manufacturing also referred to as 3D printing, is a layer-by-layer technique of producing three-dimensional (3D) objects directly from a digital model. AM increasingly is used for maintenance and repair of damaged parts, particularly for products for which a long lead time or expense is associated with procurement of new parts. The ability to repair metal parts to near-new shape has significant advantages over manufacturing new parts, particularly large parts where only a small portion has been damaged.” Once AM policies, guidance, standards, engineering approval, and materiel disposition procedures are fully embedded into the DoD’s culture and Service manufacturing, maintenance, engineering, supply chain, and workforce training, AM has the long-run potential to be one of the most powerful product support Should-Cost enablers.

Logistics Footprint Reductions. Moving, storing, maintaining, packaging, protecting, managing, and sustaining stuff is expensive and often manpower intensive. Look for initiatives to reduce the so-called “tooth to tail” ratio. Leveraging “sense and respond” strategies, can facilitate strategic placement of shared pools of assets accessible and expedited through available distribution networks for identified needs. Just-in-time (JIT) inventory management, supported by readiness-based sparing and lean supply chains, can reduce the inventory. Judicious manning and equipping for on-site maintenance support will optimize readiness and reduce achievable footprint by applying appropriate models to big

data. Leveraging CBM+ and PHM can help, based on built-in test and troubleshooting capabilities, reduce test equipment, manpower and supply support needs. Moreover, targeted investments in reliability, availability, maintainability and supportability can improve system performance and readiness but also facilitate logistics footprint reductions to ultimately reduce life-cycle costs.

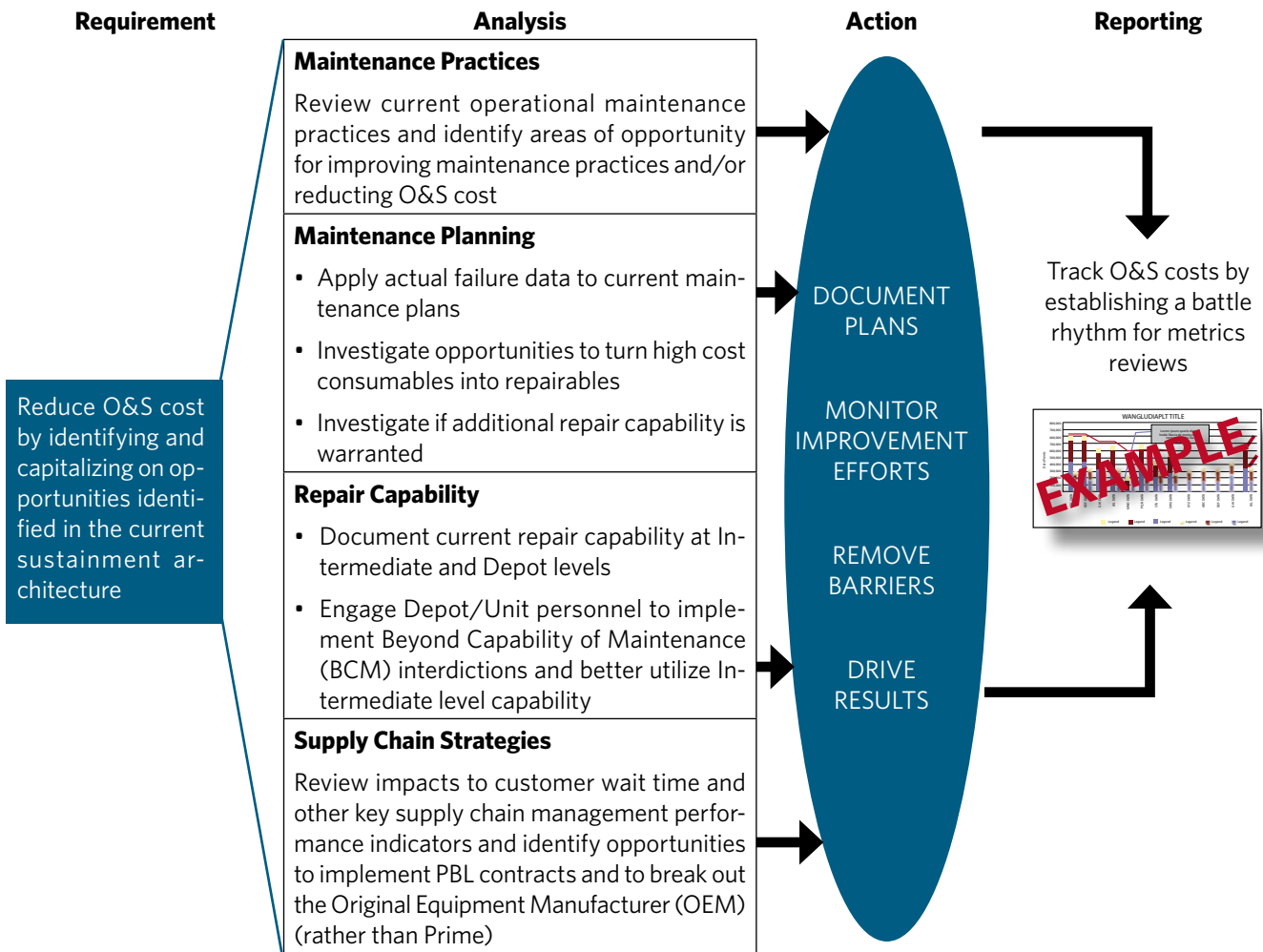
Process-Focused O&S Should-Cost Opportunities

Long-Term Performance Based Logistics (PBL) Product Support Strategies. According to a Nov. 22, 2013, memo from the Assistant Secretary of Defense for Logistics and Materiel Readiness titled “PBL Comprehensive Guidance” and the 2016 DoD *PBL Guidebook*, “PBL is synonymous with performance-based life cycle product support, where outcomes are acquired through performance-based arrangements that deliver Warfighter requirements and incentivize product support providers to reduce costs through innovation. These arrangements are contracts with industry or intragovernmental agreements. ... PBL arrangements, on the other hand, are tied to Warfighter outcomes and integrate the various product support activities (e.g., supply support, sustaining engineering, maintenance, etc.) of the supply chain with appropriate incentives and metrics. In addition, PBL focuses on combining best practices of both Government and industry.” Sounds a lot like a golden O&S Should-Cost enabler, doesn’t it?

Supply Chain Management (SCM) Efficiencies. SCM often is procured as a service or deliverable. Knowing the supply chain from end-to-end enables the identification of Should-Cost opportunities. The most common way to look at the supply chain is in the context of the “three Vs,” which directly aligns with process-focused Should-Cost efforts.

- **Velocity.** How fast does material flow through the supply chain? Time can be money, so increase velocity through supply chain simplification—reduce nodes (use direct vendor delivery) and co-locate product providers. JIT inventory management and CPI methodologies for lean supply chains emphasize flow. For DoD, this can include transportation and maintenance improvements such as repair turnaround time reductions or “factory to foxhole” measures.
- **Visibility.** This is not just knowing what the supply chain looks like, but being able to pulse it at any point and any time to determine the supply chain’s health. Using technologies such as Radio Frequency Identification (RFID) and Item Unique Identification (IUID) can provide the data to reduce inventory levels and improve the supply chains’ efficiency and cost effectiveness. Use Manufacturing Resources Planning and Enterprise Resource Planning applications to better understand resource needs.
- **Variability.** How robust is the supply chain; can it absorb fluctuations in demand? Exploring options to buying access to inventory rather than holding large amounts of spares can result in significant savings. This is best done when the supply chain can be very responsive to demand changes.

Figure 2. Identifying O&S Should-Cost Opportunities



Source: DoD O&S Cost Management Guidebook, Figure 3—Example process for identifying Should-Cost initiatives that target O&S cost reduction.

Inventory Management. Any number of heuristics can be used to determine the right amount of inventory and reorder points. Simply asking to determine the amount of needed inventory and how much excess you have can be very revealing. Often, it can be found that excess inventory is carried for two reasons, “Just Because,” or “Just in Case.” While this may provide a certain amount of comfort, it is one of the most expensive forms of availability insurance. The cost of storage, security, climate control, obsolescence, and lost opportunity can be tremendous. This applies to parts, consumables, tools, support equipment and plant account. Are IUID, RFID and Serialized Item Management (SIM) being leveraged to reduce program and/or platform costs? IUD can contribute to improved total asset visibility, and RFID can give us true in-transit asset visibility when properly applied. Most SIMs provide tracking and status information. Is this being used to determine excess opportunities, directives issuance status, and ready-for-issue (RFI) versus non-RFI condition?

PHS&T. This has been the source of numerous potential cost savings initiatives. Examine support data to identify

items subject to damage during transportation, to determine if a minor cost for additional protective packaging can reduce component damage like the glass in the F-18 heads up display. Make sure items are properly stored to retain their useful life. For example, tire rubber should be stored upright, not stacked.

Proactive DMSMS Strategies. Proactive DMSMS management leads to early identification of DMSMS and related obsolescence issues, potentially increasing your ability to head off. The more lead time, the greater the likelihood of more lower-cost options to resolve DMSMS and obsolescence issues. Late recognition of an issue means an expensive redesign. Consider a technology refreshment strategy that replaces items before they become obsolete. (This is especially suitable for commercial off-the-shelf electronics and data processing equipment). Technology refreshment also avoids the need to pay for an out-of-cycle redesign. Although categorized under process-focused Should-Cost opportunities, DMSMS could arguably just as easily fall under product-focused area.

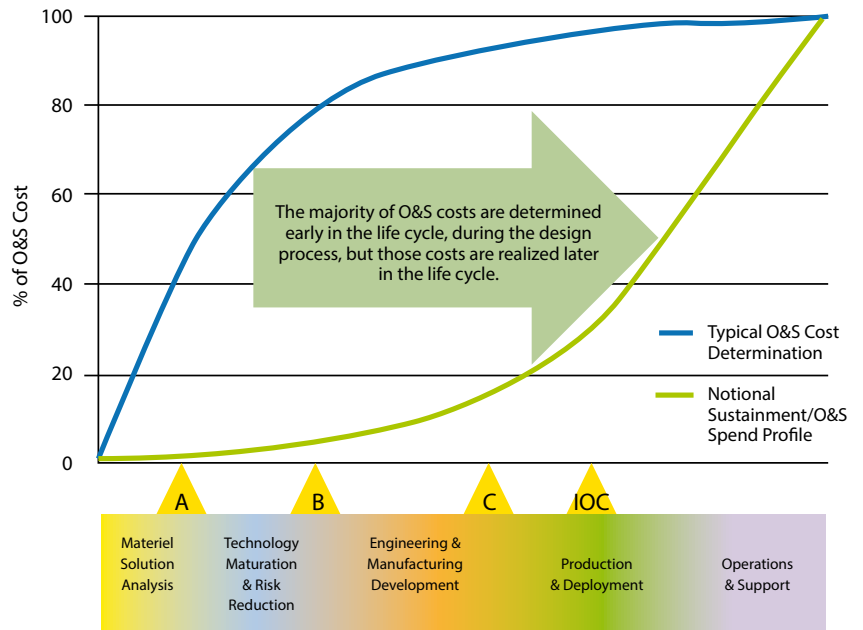
Contract Type (and Associated Incentives).

It is important to know what you are incentivizing with the contract type used. Selecting the most appropriate contract type for the position in the life cycle and the associated risk can save a tremendous amount. If you have been buying logistics support as “time and material” and you have enough historical data to develop averages and identify trends, it may be advantageous to shift to a fixed-price construct. This is very much the case when shifting from a transactional construct to PBL product-support arrangements. Many articles have emphasized the benefits of paying for performance rather than for failures and the opportunities created for both customer and provider identification of ways to reduce resource consumption. Often a major modification gives rise to an impulse to go from a firm fixed-price contract for support to a cost-plus contract. Programs should instead consider stepping back to a fixed-price incentive firm target contract and leverage applicable historical data. For more insights into incentivizing performance, see the in-depth “Incentives—Motivating Achievement of Desired Product Support Outcomes” ACQuipedia article <https://shortcut.dau.mil/acq/psi-mado>.

Proactive System Disposal, Demilitarization, and Material Disposition Planning. As DoD Manual 4160.21, Volume 1, indicates, it is important to “treat the disposal of DoD property as an integral part of DoD Supply Chain Management; ensure that disposal actions and costs are a part of each stage of the supply chain management of items and that disposal of property is a planned event at all levels of (your) organization.” Expected outcomes include “... protecting national security interests, minimizing environmental mishaps, satisfying valid needs by extended use of property, permitting authorized donations, obtaining optimum monetary return to the U.S. Government, and minimizing abandonment or destruction of property.” All that affords tangible and viable O&S Should-Cost opportunities.

Public-Private Partnering (PPP). This partnering creates opportunities to leverage the best capabilities of organic and industry providers to realize synergy. Partners are able to take advantage of their strengths while mitigating weaknesses and gaps in their competencies. This can reduce overall cost, by assigning responsibilities to the organization that can most cost effectively provide that support. This cooperative arrangement also can result in joint efficiency improvements. The transparency can enable cost elements to be challenged. Specific benefits of PPPs can include: access to expertise (both sustaining engineering and maintenance), support decisions that are not made in a vacuum, more cost effective supply chains, and ac-

Figure 3. Time Between O&S Decisions and Cost Results



Source: DoD O&S Cost Management Guidebook, Figure 4—“Time delay between decisions affecting O&S cost and the realization of those costs.”

Note: A,B,C = acquisition milestones/decision points; IOC = initial operational capability.

cess to skilled artisans, technical expertise, best commercial practices, as well as state-of-the-art equipment and facilities.

Integrated Product Life-Cycle Management (PLM) in an Integrated Data/Decision Environment (IDE). PLM manages the entire life cycle of a product—from inception through disposal. An IDE or PLM system allows every program activity to create, store, access, manipulate and exchange digital data. It enables transparency and provides the opportunity to “see” potential cost-saving initiatives and facilitates better articulation of investment costs, unintended cost impacts, direct savings and related and/or second-order savings. Because boundaries are crossed, applicable stakeholders can see into the processes and products associated with the platform. And synergy is realized through integrated enterprise constructs, while the supply chain(s) are better managed. The IDE is more than just an IT system. It is key to Weapon System Configuration Management; providing traceability, thereby reducing costs associated with management of change proposals and upgrades. The IDE should also provide Product Data Management, ensuring there is system completeness, accuracy and validity to support initial and ongoing supportability analysis and associate all weapons system information with a configuration item, assembly, or end item. Finally, the IDE provides the foundation for trade decisions and optimal design solutions involving affordability and Should-Cost implications. An IDE allows the key players involved in the Should-Cost efforts to communicate and understand how their respective functional areas affect the trade studies and drive down will-cost estimates.

Data Analytics. Big data are out there. However, are the data being leveraged? DoD is a data-rich environment, but translating this into actionable information and enabling systems optimization is where “the rubber meets the road.” Data analytics and associated tools can be used to scrutinize the supply chain and evaluate supplier performance relative to timeliness, quantity, quality and pricing. This may create opportunities to reduce supply support and PHS&T and costs. Data analytics also can be used to optimize depot maintenance and planned maintenance scheduling—not just to reduce equipment down time but to realize efficiencies in resource allocations and reduce redundant and overlapping activities. Data analytics can point to areas where assignment of a depot technician to a lower-level maintenance organization may allow for numerous cost saving interdictions “beyond capability of maintenance.” All of these can translate into future Should-Cost wins.

IT Refresh Rates. Often, we look at historical refresh rates or standard refresh rates that broadly apply to software. This is the easiest and least time-consuming way to form a determination. A deeper analysis may find that a longer refresh cycle is appropriate in a particular operating environment, given the stability of the system to which it is applied or the nature of the software itself. The longer cycle could save on significant procurement and deployment expenses as well as potential integration issues. Software sustainment strategies are increasingly important in weapon system product support and, by extension, in product support Should-Cost opportunities.

CPI. Most organizations have a CPI methodology in place to guide projects and events. Whether the organization uses Lean, Six Sigma, Theory of Constraints, Total Quality Management or some combination thereof, consideration should be given to aligning Should-Cost efforts with it. Should Cost can be viewed as a particular subset of an overall CPI construct in

that it is an improvement effort aimed at initiatives that specifically result in cost savings (as opposed to making quality improvements or reducing cycle time).

Say what you will about logisticians and product support managers—if you want to truly tackle your program’s LCCs and deliver some tangible, high-impact Should-Cost wins, you inevitably must address O&S costs through innovative product support initiatives. You very quickly will realize that those wins must come either in product or process. Product initiatives very often revolve around designing, developing and fielding reliable, maintainable, supportable, transportable and energy-efficient systems. Process initiatives very often involve efficient and effective supply chains, rapid identification, turnaround and return to service of failed items, maintenance process efficiencies, reduced manpower requirements, and the like.

As the DoD *Product Support Manager’s Guidebook* pointedly reminds us, “PMs (and by extension, PSMs and Life Cycle Logisticians) pursue two primary support objectives. First, the weapon system must be designed to deliver the required warfighting capability and be affordable. Second, the product support solution must be efficient and effective, and it must reduce the demand for product support while meeting Warfighter requirements. When developing and implementing a product support strategy, the goal is to balance and integrate the support activities necessary to meet these two objectives.”

We would contend that delivering tangible, measurable O&S Should-Cost wins is, quite simply, one of the best ways to demonstrate successful achievement of these outcomes. 📧

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