

OK, We Bought This Thing, but Can We Afford to Operate and Sustain It?

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U.S. Air Force photo by Airman 1st Class Tony Ritter

Can affordability of weapon systems acquisitions be achieved without considering operations and support (O&S) costs? The answer is a resounding "No!" With pressures to reduce costs driving DoD's continuous review of programs, business practices, modernization programs, civilian and military personnel levels, overhead costs, and more, leaders at DoD will not only focus on new weapon system procurements, but also the modernization and sustainment of current weapon systems. All DoD programs must strike a balance between requirements and total life cycle costs.

So what do we need to consider regarding the total life cycle costs of a program? And why is it so important?

When you buy a new car, you not only have to worry about the purchase price, but also the costs of any additional warranties, fuel, maintenance (parts and labor), insurance, taxes, cleaning, etc. You have to ask yourself, "Can I

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afford to not only buy a new car, but can I afford to own a new car?" That is, you need to consider the total life cycle costs involved in buying and operating the car.

The Beginning and End of O&S Costs

What are O&S costs? When do they begin, and when do they end? According to the 2007 *Operating and Support Cost Estimating Guide*, published by the Cost Analysis Improvement Group (CAIG), now part of the Cost Assessment and Program Evaluation (CAPE), O&S costs consist of sustainment costs incurred from the initial system deployment through the end of the system operations (operating, maintaining, and supporting). This includes the costs of personnel, equipment supplies, software, and services associated with operating, modifying, maintaining, supplying training and supporting the system in the DoD inventory. This may include interim contractor support when it is outside the scope of the production program and the acquisition baseline. O&S costs include costs directly and indirectly attributable to specific programs—i.e., costs that would not occur if the program did not exist, regardless of funding source or management control.

Although there can be different interpretations of this definition based on the acquisition strategy, O&S costs typically start when the first end-item is delivered to DoD or when the first "operational unit" is delivered. On the other hand, the end of the O&S phase may also be defined as the decommissioning or striking from official inventory records of one end item or an operational unit. Each program should address what defines the beginning and the end of the O&S phase in order to address the many costs that should be budgeted throughout the operational life of the weapon system's program.

Looking for All Costs in All the Wrong Phases

A weapon system's full life cycle is often described by either four major life cycle cost categories or in five phases. The four major cost categories are development, production and deployment, operation and support, and disposal. These terms may be confused with the five phases of the acquisition life cycle. The DODI 5000.02 describes the acquisition cycle phases to include materiel solution analysis, technology development, engineering and manufacturing development (EMD), production and deployment phase, and finally operations and support phase, to include demilitarization and disposal.

Figure 1 shows the life cycle cost categories and the five phases as modified to reflect the changes as put forth in

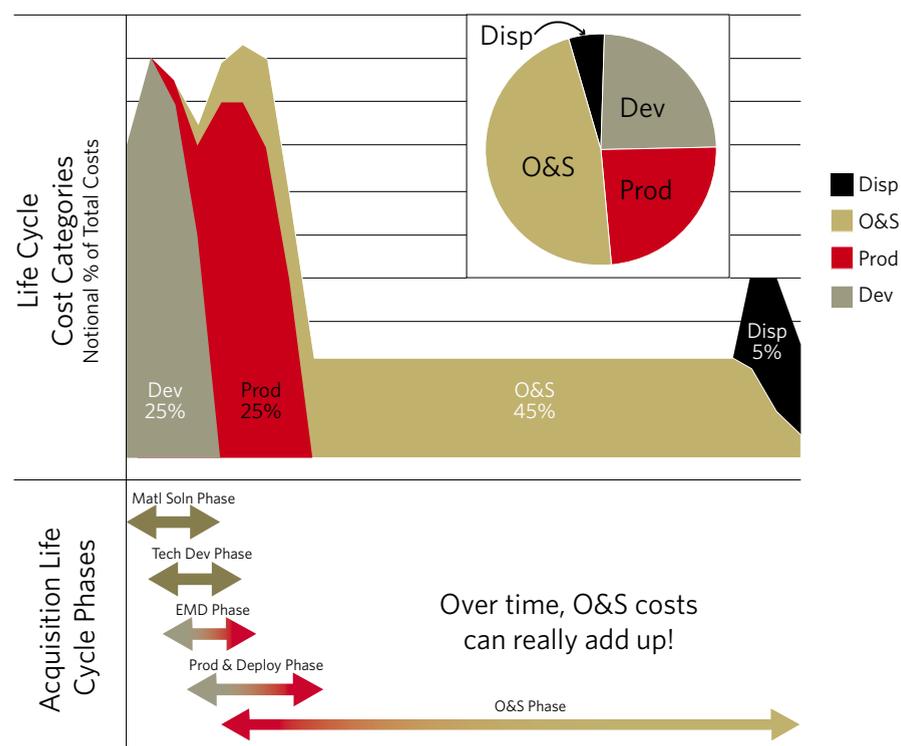
the DODI 5000.02. Of note, this graphic illustrates that O&S costs tend to be a large part of the life cycle cost. Depending on the type program and how long a program may be in service as well as other factors, O&S costs can reach as high as 60 percent-80 percent of the life cycle costs of a weapon system. With this in mind, we can see that since O&S costs can be a large part of DoD programs, especially if the O&S phase is extended, these costs cannot be ignored in considering a total systems approach to understanding total life cycle costs.

O&S: Not My Job!

DoDI 5000.02 states: "The purpose of the Operations and Support Phase is to execute a support program that meets materiel readiness and operational support performance requirements, and sustains the system in the most cost-effective manner over its total life cycle. Planning for this phase shall begin prior to program initiation and shall be documented in the [life cycle sustainment plan]."

The current Better Buying Power Initiatives' focus is on "should cost" and "affordability as a requirement" early in a program's life cycle before EMD and production. In doing so, these initiatives address affordability by driving design trades and choices based on projected budgets for the product over its life cycle, which, by the way... includes sustainment. This total systems approach is also dictated in the DoD Directive 5000.01 which states that planning for O&S and the estimation of total ownership costs shall begin as early as possible. It is during the design phase that the pressures of weapon systems management prevail to accelerate initial systems procurement, sometimes

Figure 1. Weapon System Life Cycle Cost Categories and Phases



at the expense of product support planning. These pressures to deliver the best performance possible at the optimum schedule and lowest costs are real in any program.

Historically, program offices and by extension, their contractors, are much more focused and incentivized toward design and procurement of weapon systems. Given this focus earlier in the life cycle, funding efforts are often centered on two appropriation categories: research, development, test and evaluation (RDT&E) and procurement (PROC) appropriations. Single-minded focus on these earlier phases and impacts to program appropriation budgets may increase the sustainment costs of the weapon system over its lifetime. Indeed, the force of statute is felt more in procurement costs and the larger category of program acquisition costs with program cost or schedule parameters for not only major defense acquisition programs (MDAPs) but also for acquisition category (ACAT) II and III programs. If specific parameters are not met, then a program breach may require documentation and reporting in selected acquisition reports (SARs), unit cost reports (UCRs), or acquisition program baselines (APBs). So what requirements, if any, should program offices focus on in order to achieve a balanced approach to reduce total ownership costs, and not just development and production costs?

To address a more balanced systems approach to acquisitions, the key system attribute (KSA) of ownership costs is now required for all acquisitions, in accordance with the Joint Capability Integration and Development System, or JCIDS (CJCSM 3170.01). The ownership cost KSA provides balance to the sustainment solution by ensuring that O&S costs are considered in making decisions. Unfortunately, visibility of sustainment costs is often delayed until the O&S phase where sustainment costs add significantly to the weapon system's total ownership costs.

Furthermore, these out-year costs reflect a myriad of decisions from different organizations at different levels, making modeling and predictability a challenge, especially considering increasing complexity of the weapon systems of the future. Additionally, these costs are borne and managed by operational commands and typically funded mainly through non-program office O&M appropriations, bringing to mind the old adage about "other people's money"! Clearly, it is not only a PSM's concern, nor should it be compartmented as an operational commander's or operational logistician's problem. At the risk of overemphasizing the team effort, it remains the PM's responsibility to balance requirements, schedule and costs to reduce total ownership costs throughout the acquisition process.

How Do I Account for O&S Costs?

The cost element structure (CES) on the operation and sustainment of a weapon system is focused into six major categories. The 2007 *Operating and Support Cost Estimating Guide* (O&S Guidebook) provides the CES cost elements and the

structure required when performing an O&S cost estimate. The CES elements and costs included in each element are as follows:

- **Unit-Level Manpower:** Costs of operators, maintenance and other support manpower assigned to operating units. May include military, civilian or contractor support.
- **Unit Operations:** Costs of unit material (e.g., fuel and training material, unit support services and unit travel. This excludes all maintenance and repair material.
- **Maintenance:** Cost of all maintenance other than maintenance manpower assigned to operating units. May include contractor maintenance.
- **Sustaining Support:** Cost of support activities other than maintenance that can be attributed to a system and are provided by organizations other than operating units.
- **Continuing system improvements:** Cost of hardware and software modifications to keep the system operating and operationally current.
- **Indirect Support:** Costs of support activities that provide general services that cannot be directly attributed to a system. Indirect support is generally provided by centrally managed activities that provide a wide range of activities.

A simple way of thinking of the CES structure is to ask, "What are the costs associated with operating and sustaining a weapon system?" Often these costs are more difficult to define, scope, and project than most program offices first realize. To help, the *O&S Guidebook* also details other considerations in life cycle costs, O&S cost information, and more information on the O&S cost estimating process, procedures, and sample formats.

We now need to account for O&S costs. This is where many people get confused on categorizing O&S costs—especially with respect to appropriation categories or in more detailed terms, program elements (PEs). It is a common mistake to say that only the O&M appropriation is used in O&S cost estimates. It is impractical to list all the possibilities that may arise in determining what appropriation categories should be included in O&S costs; however, there may be several different appropriations involved.

How Can I Ensure I Have Accounted For All Costs?

Many PSMs speak sustainment support in terms of the IPS Elements for supporting programs. These elements can all factor into O&S costs. The 12 IPS elements as outlined in the *DoD Product Support Manager (PSM) Guidebook* are:

- Product Support Management
- Design Interface
- Sustaining Engineering
- Supply Support
- Maintenance Planning and Management
- Package, Handling, Storage and Transportation (PHS&T)
- Technical Data
- Support Equipment
- Training and Training Support

- Manpower and Personnel
- Facilities and Infrastructure
- Computer Resources

On the other hand, many programmers and budgeters speak in terms of appropriations and/or program elements (PEs). They are concerned about ensuring that program offices properly translated the IPS elements or CES elements into the proper budget submission, or PE elements. So the question arises: "How do I ensure I have translated all my requirements into a proper budget to pay for the O&S costs?"

To help logisticians and cost and budget personnel avoid confusion in categorizing IPS elements, cost elements, and budgeting PEs, a new tool called the "Rosetta stone" is being developed by the Office of the Deputy Assistant Secretary for Defense Materiel Readiness (ODASD [MR]) in conjunction with the CAPE and the Office of the Under Secretary of Defense, Comptroller (OUSDC). This tool will help PMs, PSMs, cost estimators, budgeters, and programmers, etc., to ensure that O&S costs are captured, properly categorized, and accounted for in their budget submissions. It will provide a cross-walk to help avoid double counting or omissions of costs to a program across IPS elements, cost elements and PEs.

How Are O&S Cost Estimates Reported in Major Defense Acquisition Programs?

Senior DoD leadership uses meetings such as the Defense Acquisition Board (DAB), defense acquisition executive summaries (DAEs) reviews and overarching integrated product teams (OIPs) to address life cycle sustainment and management decisions. Currently, there are several different charts used to convey O&S costs. First, the Program Funding and Quantities Chart illuminates the resourcing levels of a program within the context of the full program review. Second, the "Sand Charts" show Operation and Maintenance funding requirements in specific Then Year dollars (TY\$) for similar portfolio programs. This paints an easy to interpret picture of affordability projections within a mission type or Service portfolio.

Finally, the new "sustainment quad chart," required for ACAT 1D programs, summarizes four areas of a program. (See Figure 2.) As stated by the former under secretary of Defense for acquisition, technology and logistics, "Increasing visibility of sustainment factors is vital to ensuring we deliver a program that meets warfighters' materiel readiness objectives with

long-term affordability consideration." With this in mind, the sustainment quad chart addresses these issues. The first quadrant is a narrative of the product support strategy approach, list of challenges, and discussion of solutions to those challenges. The second quadrant contains a collection of sustainment KPPs and KSA metrics: materiel availability; materiel reliability, O&S costs (previously ownership costs), and mean down time. The third quadrant of the chart describes an abbreviated sustainment schedule. Finally, the fourth quadrant reviews the total O&S cost data, baselines, and antecedent system data (when available) using the CAPE's CES structure.

These briefing formats are required for all MDAP presentations to the DAB. These tools are being used and are undergoing further refinement to present O&S cost information to senior managers with the goal of making better decisions in acquisition programs.

Where Can I Go for Help in Performing an O&S Cost Estimate?

First of all, the CAIG (now CAPE) has published the *Operating and Support Cost-Estimating Guide* and is working to publish a new *O&S Guide* in the near future to assist program offices in developing an O&S cost estimate. Additionally, ODASD (M&R) is also developing a new *Operating and Support Cost Management Guidebook* intended to supplement the CAPE's guidebook and to assist program office staff in understanding O&S cost estimating and reporting requirements.

Furthermore, Service cost agencies, program offices, and major command cost departments have personnel experienced in producing O&S cost estimates. Never underesti-

Figure 2. Sample Sustainment Quad Chart



mate the value of asking people with this expertise to assist you. Remember, no one works an issue of this importance or complexity in isolation.

Additionally, there are O&S cost data repositories that collect actual cost and non cost data from the services in vast informational databases that can assist PSMs, cost estimators, etc. in developing a O&S cost estimate. The organizations responsible for this data not only collect data from a many sources, they review and scrub the information for accuracy and provide standard and user-defined formats and reports. O&S data can be obtained from the following three major agencies:

- **U.S. Navy and U.S. Marine Corps:** Visibility and Management of Operating and Support Costs (VAMOSC): <http://www.vamosc.navy.mil>. VAMOSC help desk e-mail: support@vamosc.navy.mil
- **U.S. Army:** Operating and Support Management Information System (OSMIS): <https://www.osmisweb.army.mil>. OSMIS help desk e-mail: osmisweb@calibresys.com
- **U.S. Air Force:** Air Force Total Ownership Cost (AFTOC): <https://aftoc.hill.af.mil/>. AFTOC help desk e-mail: SMXG.AFTOC.helpdesk@hill.af.mil

Another excellent resource is provided by DAU: a 1-week training course on O&S costing analysis (course BCF 215), where students learn the basics of conducting an O&S cost estimate.

O&S Costs are Everybody's Business

Back to our initial question: "Why should I care about O&S costs?" With the promise of budget cuts and accelerating

efficiencies to defense programs, DoD will face continuous pressure to reduce development and procurement budget accounts. Additionally, modernization programs as well as sustainment budget accounts will also be impacted. This will present many problems not only for PMs responsible for new programs, but also for operational commanders responsible for sustaining our deployed forces. Numerous Service and materiel support agencies will also be responsible for reducing costs for supporting program offices and operational commanders.

But this is nothing many of us have not seen before. What is new to many of us is that expanding O&S costs garner ever more attention from senior DoD decision makers with regard to the total ownership costs of programs. If weapon systems are not sustainable within DoD budgets, the risks of major delays or cancellations will increase. It is up to the acquisition professionals who develop, procure, and field weapon systems to adopt a total life cycle approach to get the best value for our warfighters on or ahead of schedule and below costs. This urgency will be shared by the many organizations that service and support our weapon systems once they are in the hands of our warfighters. Understanding the requirements is a difficult task, but it is incumbent on all of us to understand the impacts of our decisions on O&S costs.

After all, we bought the thing; it would be nice to drive it a while.

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