

Welcome to Metrics

This lesson addresses the development of system sustainment metrics that will be used in the evaluation of product support capabilities. Department of Defense (DoD) [policy](#) assigns responsibility for accomplishing program objectives across the life cycle to the Program Manager (PM). As the PM's subject matter expert in life cycle logistics, the Life Cycle Logistician (LCL) is charged with developing a performance-based life cycle product support strategy, tied to sustainment metrics, to deliver materiel readiness to the warfighter. This is the LCL's first opportunity to develop supportability metrics that will help influence weapon system design for support.

Popup Text

Policy

The PM, as the life-cycle manager, is responsible for accomplishing program objectives across the life cycle, including the operating & support (O&S) phase. Employing performance-based life-cycle product support tied to sustainment metrics is the overarching Department of Defense (DoD) concept for providing materiel readiness to the user.

Source: Defense Acquisition Guidebook, Chapter 5, paragraph 5.0.1, available at <https://acc.dau.mil/dagch5>

Objectives

Upon completion of this lesson, you should be able to:

- Identify the three key attributes that sustainment metrics should possess
- Identify the system level sustainment metrics mandated by DoD policy
- Identify in which key program documents produced at the end of the Materiel Solution Analysis phase sustainment metrics should be included

Life Cycle Sustainment

Recall that under the Life Cycle Management ([LCM](#)) concept, the PM is vested with the responsibility for acquiring, delivering, and sustaining affordable and supportable weapon systems that meet the warfighter's performance requirements. Not only does this include designing and developing the weapon system, but also the product support capabilities necessary to maintain and sustain the system. The task of the LCL is to identify those product support capability needs and the measure of success, i.e., metrics, which will be used to track its performance. To do this, the LCL must first understand what goes into making a 'good' metric.



Popup Text

LCM

E1.1.29. Total Systems Approach. The PM shall be the single point of accountability for accomplishing program objectives for life-cycle management, including sustainment. The PM shall apply human systems integration to optimize total system performance (hardware, software, and human), operational effectiveness, and suitability, survivability, safety, and affordability. PMs shall consider supportability, life cycle costs, performance, and schedule comparable in making program decisions. Planning for Operation and Support and the estimation of total ownership costs shall begin as early as possible. Supportability, a key component of performance, shall be considered throughout the system life cycle.

Source: DoDD 5000.01, The Defense Acquisition System, available at <http://www.dtic.mil/whs/directives/corres/pdf/500001p.pdf>. More information on LCM is available from DAU at <https://acc.dau.mil/CommunityBrowser.aspx?id=32741>.

Sustainment Metrics Attributes

At the basic level, metrics are used to measure something. In performance based life cycle product support, sustainment metrics are used to measure the effectiveness of the product support infrastructure in meeting the warfighter's supportability needs. While there are literally thousands of things that could be measured, how many of them will really tell you what you want and need to know?

To ensure that you are measuring the right things the right way, you must first know what a 'good' metric is. The LCL needs to understand and apply three basic attributes in developing sustainment metrics:

1. **Traceable to User Requirements.** User (warfighter) performance and supportability requirements are identified in requirements documents (Initial Capabilities Document, Capability Develop Document, Capability Production Document) and various program acquisition documents (e.g., Acquisition Strategy, Life Cycle Sustainment Plan). Product support metrics should be directly traceable to, and support achievement of, top level warfighter performance and supportability outcomes.
2. **Achievable and Verifiable.** Just as unrealistic system performance requirements will ultimately cause delays during development and increases in acquisition and sustainment costs, so too will unrealistic sustainment performance requirements. Additionally, if you cannot easily obtain and interpret the data related to your metrics you will waste resources (time and money) and may never get what you need.
3. **Minimum Reporting.** While the old saying, "What gets measured gets done" is true, it is important to identify the key operational and sustainment performance outcomes you want to measure. Once you have done that, you should develop the minimum number of metrics required to measure that performance and not only influence system design decision, but also drive desired support provider behavior.

Life Cycle Sustainment Metrics

At the system level, operational and sustainment metrics at a minimum should address four interrelated program goals:

- Achieving and sustaining operating tempo (an outcome metric)
- Weapon system quality (a materiel metric)
- Logistics support system quality (a response metric)
- Affordability (a cost metric)

You may recall that at the system level, [DoD](#) has identified mandatory sustainment metrics in the form of a Sustainment [Key Performance Parameter](#) (KPP) and two supporting [Key System Attributes](#) (KSA). The Sustainment KPP and KSAs are:

- Availability (KPP). The Availability KPP has two components, Materiel Availability and Operational Availability, that provide system availability percentages from a corporate level (total Fleet) and individual operating unit level.
- Reliability (KSA). Reliability is a measure of the probability that the system will perform without failure over a specific interval. Reliability must be sufficient to support the warfighting capability needed. Considerations of reliability must support both Availability metrics.
- Operating and Support Cost (KSA). Operating and Support Cost provides balance to the sustainment solution by ensuring that the operating and support (O&S) costs associated with Availability are considered in making decisions.

[Click here to read more about the Sustainment KPP and KSAs.](#) You will be directed to the directed to Appendix E to Enclosure (B), page B-E-1 of the interactive Manual for the Operation of the Joint Capabilities Integration and Development System (CJCSM 3170.01)

Popup Text**Key Performance Parameter**

Those attributes or characteristics of a system that are considered critical or essential to the development of an effective military capability and those attributes that make a significant contribution to the characteristics of the future joint force as defined in the Capstone Concept for Joint Operations (CJCSI 3170.01H)

Key System Attributes

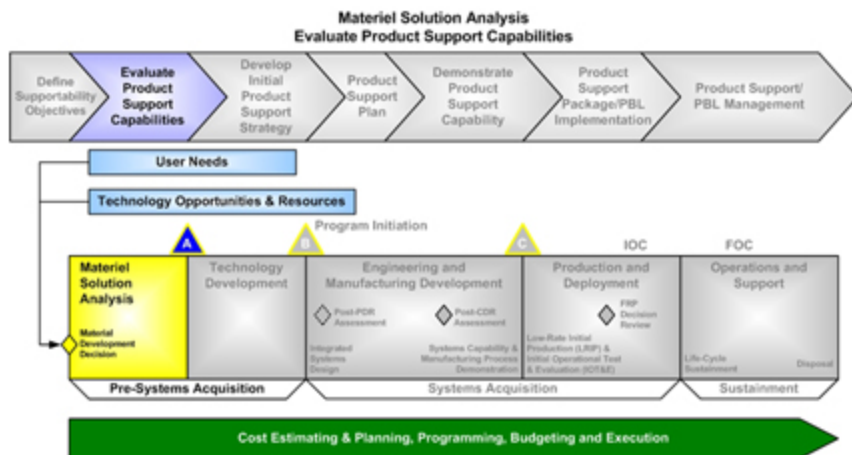
An attribute or characteristic considered crucial to achieving a balanced solution/approach to a system, but not critical enough to be designated a KPP. KSAs provide decision makers with an additional level of capability performance characteristics below the KPP level. (CJCSM 3170.01)

Life Cycle Sustainment Metrics, Cont.

What do the mandatory sustainment KPP and KSAs mean to you as an LCL?

Life cycle product support capability concepts, requirements, and outcomes are identified and developed early in the life cycle. Supportability requirements that are included in system design activities are then measured during testing and operations, eventually becoming the basis for actions to achieve materiel readiness. Sustainment metrics, including the Sustainment KPP and supporting KSAs, provide the common thread to integrate the logistics elements and align the behaviors required to achieve the desired materiel readiness outcome across the entire enterprise. The goal is to use consistent outcome metrics as the basis for actions to provide and sustain affordable materiel readiness across the entire life cycle.

[Click here to view an enlarged image.](#)



Knowledge Review

Fill in the blank: The three basic attributes of a 'good' metric are _____, _____ and _____.

- ☐ traceable to user requirements, reliability, key system attributes
- ☐ achievable and verifiable, key performance parameters, availability
- ☒ traceable to user requirements, achievable and verifiable, minimum reporting
- ☐ availability, reliability, key ownership cost

Check Answer



The three basic attributes of a 'good' metric are **traceable to user requirements**, **achievable and verifiable**, and **minimal reporting**.

Knowledge Review

The two components of the mandatory Sustainment KPP are Reliability and Operating and Support Cost.

☐ True

☒ False



Check Answer

The statement is **false**. Materiel Availability and Operational Availability are the two components of the mandatory Sustainment KPP – Availability.

Documenting Life Cycle Sustainment Metrics

Recall that one of the key activities during the Materiel Solution Analysis phase is the [Analysis of Alternatives \(AoA\)](#). In addition to evaluating potential materiel solutions, the AoA uses relevant sustainment criteria and alternatives addressed in the [Initial Capabilities Document \(ICD\)](#) not only to evaluate alternative sustainment solutions, but also to collect data on the required product support capabilities to define and analyze metrics. This analysis and evaluation forms the foundation for developing the the mandatory Sustainment KPP and KSAs along with other, lower level product support metrics. A rough plan of how they will be measured should be developed.

Now that you know what makes a good metric and have enough information to begin development of the mandatory Sustainment KPP, KSAs and other product support metrics, what do you do with this information?

Popup Text

Analysis of Alternatives (AoA)

The Analysis of Alternatives (AoA) is an important element of the defense acquisition process. An AoA is an analytical comparison of the operational effectiveness, suitability, and life-cycle cost (or total ownership cost (see section 3.1.5), if applicable) of alternatives that satisfy established capability needs. (Defense Acquisition Guidebook, Chapter 3.3.1)

Initial Capabilities Document (ICD)

Summarizes a Capabilities-Based Assessment and justifies the requirement for a materiel or non-materiel approach, or an approach that is a combination of materiel and non-materiel, to satisfy specific capability gap(s). It identifies required capabilities and defines the capability gap(s) in terms of the functional area, the relevant range of military operations, desired effects, time and doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) and policy implications and constraints.

The ICD summarizes the results of the DOTMLPF and policy analysis and the DOTMLPF approaches (materiel and non-materiel) that may deliver the required capability. The outcome of an ICD could be one or more joint [DOTMLPF Change Requests] or recommendations to pursue materiel solutions. (CJCSI 3170.01H)

Documenting Life Cycle Sustainment Metrics, Cont.

Remember that the focus of the Materiel Solution Analysis phase is "on identifying the initial concept and any critical product support capability requirements. Affordable operational effectiveness is the overarching sustainment objective that should be considered during the JCIDS process." (Defense Acquisition Guidebook, Chapter 5.4.1.3). During this phase, the LCL should have identified, collected, and analyzed data in sufficient detail to develop the initial sustainment strategy and associated metrics. Key program documents where these metrics should be identified include:

- **ICD/Draft Capability Development Document** - the description of the specific enabling technology capabilities required to achieve the drivers and/or to reduce risks in achieving the sustainment metrics (mandatory KPP and KSAs) values required to meet the operational requirements. The same should be done for each of the corresponding enabling technologies.
- **Technology Development Strategy** - the approach for achieving the required enabling sustainment technologies (including design criteria in the Preliminary Design Specification for each of the sustainment drivers). It should also identify the required associated performance metrics and their values.
- **Test and Evaluation Strategy** - the identification of the metrics to be evaluated in subsequent phases and the general approach for evaluating the likely achievement of each
- **Acquisition Strategy** - the overall strategy for achieving the Sustainment Strategy with a focus on how the drivers will be acquired.
- **Initial Support & Maintenance Concepts** - an overview including the supply chain concept and the extent to which the program is taking advantage of existing supply chain processes and maintenance capabilities.

Knowledge Review

Which document provides a plan to mature critical technologies and is a precursor to the Acquisition Strategy?

- ☐ Life Cycle Sustainment Plan
- ☒ Technology Development Strategy
- ☐ Test and Evaluation Master Plan
- ☐ Analysis of Alternatives Plan

Check Answer



Technology Development Strategy provides a plan to mature critical technologies and is a precursor to the Acquisition Strategy.

Metrics Summary

Congratulations, you have completed the Metrics lesson and should now be able to:

- Identify the three key attributes that sustainment metrics should possess
- Identify the system level sustainment metrics mandated by DoD policy
- Identify in which key program documents produced at the end of the Materiel Solution Analysis phase sustainment metrics should be included

Lesson Completion

You have completed the content for this lesson.

To continue, select another lesson from the Table of Contents on the left.

If you have closed or hidden the Table of Contents, click the Show TOC button at the top in the Atlas navigation bar.