The Business of Metrics—Measuring the Product of the Plan

How Do You Know What You Know?

REAR ADM. DAVE ANTANITUS, USN

Your first impression of the title of this article may be that it is written primarily for acquisition professionals (APs) or for "budget weenies." You are right. However, I would submit that for any of us who control money, whether that be an ACAT I program manager developing the latest weapons system or a division officer managing a portion of ship's OPTAR (Operating Target), we are all at least part AP, and if we are not all "budget weenies," we probably should be (that is, unless, you have an unlimited budget!).

Developing Metrics

This article addresses the process of developing metrics, the objective sets of data we use to measure how we are doing relative to goals, and how we are improving, declining, and the reasons for both. If you control any amount of money, are part of or own a process, have people working for you, or work for somebody who imposes goals and standards, this article is for you. I guarantee you that you are not measuring everything you should.

Why Develop Metrics at All?

The first question to ask is, "Why develop metrics at all?" The answer is simply to improve your performance. You think you know how you are doing, but how do you really know unless you have the objective quality evidence to prove it? Put another way, "how do you know what you know?" In the case of Space & Naval Warfare Systems Command (SPAWAR), as we started fielding IT-21 (Information Technology for the 21st Century)—the U.S. Navy's IT program to improve shipboard communications and computing capability—our customers voiced significant dissatisfaction in our ability to field systems that worked, were cost effective, and could be delivered on schedule.

We "knew" we were not as bad as our customer was telling us. We were good people, working hard to deliver the best products and services we could to the

Fleet. Yet, our reputation was in the toilet. We had no substantive data, no metrics, to document where our money was spent, why it was spent the way it was, and why some systems were troubled. We wanted to be the premier provider of IT systems for Navy, but the truth was our processes really were broken, and we were not measuring anything to develop the knowledge to make our processes better.

You develop metrics, then, to measure your processes. Your analysis of your metrics then provides knowledge, which is fed directly back into your processes. The result should be improvement in your processes, which will be borne out by your subsequent metrics. Much like a systems engineering approach, this is a recursive and iterative process for improvement in your processes, and ultimately in your performance.

Why develop metrics at all? The answer is simply to improve your performance. You think you know how you are doing, but how do you really know unless you have the objective quality evidence to prove it? Put another way, "how do you know what you know?"

In SPAWAR, we had plenty of incentive to embark on process improvement, and today's metrics show where performance has substantially improved as well as areas that still need the work. The difference between now and three years ago is that we now understand our processes, we know what drives them, and we are measuring them. How do we know this? Our customers have told us.

Where Do We Start?

We all have things we should be measuring, but for whatever reason, we do not. Given this situation, and the knowledge that we do need to improve our performance and do need to develop metrics, where do we start? Well, we could just start measuring anything and everything and see what falls out. We could hire an outside contractor to come into our organization and do this work for us. There are several very professional contractors out there willing to do this work for us, but if we a looking to "buy a miracle" from a contractor, what will we have learned in the long run?

A better approach is to do the work ourselves. Think about this for a while. If you hire a contractor, don't they come in and learn what it is you do for the first few weeks? The point may very well be that you do not understand what it is that you do or do not understand about the processes you use to do your job. If this is an honest assessment of your starting point, why would you hire someone else to figure it out for you?

A good way to start on your metrics development journey is to map out your core competencies (what it is that you do) by organization, department, division, and so on down to the desired level. When you have defined and agreed upon your core competencies, the next step is to map the processes you use to execute your mission to the core competencies. This again, is not easy. In SPAWAR, it took us several meetings before we reached consensus on these first two steps, and we are still refining these areas as missions and tasks change or evolve. The last step is to identify metrics (things you would like to measure) to assess how well you execute your processes. Yes, a contractor could do this for you, but I contend the best product is generated internally.

What Makes a Good Metric?

First and foremost, a good metric is measurable. Examples include cost, performance, reliability, schedule, or anything else that has numbers readily associated with it. (Be careful here—just because you can measure something does not mean it is a useful metric!) Secondly, a good metric is one that maps directly to a strategic goal or has a tactical focus. A strategic goal may take the form of the CNO (Chief of Naval Operations) objectives, Type Commander strategic goals, or even the goals of a Battle Group for a given deployment. Metrics with a tactical focus would be a level or more below the organizational or corporate level, but would be similar in content and would map to higher-level goals or objectives.

Measure the Right Things

The metrics you develop and track need to be part of your everyday job. If you are tracking metrics just to maintain data, you are measuring the wrong things. Do not hesitate to discard metrics that you find you are not using on a day-to-day basis. You need to focus your attention on things that make a difference. If you are measuring the right things, your metrics provide knowledge to improve your processes, are important to your boss, are important to your customer, and in a sense, "tell your story" for you.

Share your data and your conclusions with your customers frequently. They will tell you if you are measuring the right things. Have open books, build trust with your customers and stakeholders, and keep feeding the metrics

DAVID J. ANTANITUS
REAR ADMIRAL (LOWER), USN

Director, Installations & Logistics (SPAWAR 04)
Space & Naval Warfare Systems Command

Rear Admiral David Joseph "Dave" Antanitus is a native of La Salle, Ill. He graduated from the United States Naval Academy in 1974 with a Bachelor of Science degree in Mathematics.

A member of the acquisition professional community, Antanitus is currently serving as the Director for Installations and Logistics in the Space and Naval Warfare Systems Command. His previous acquisition assignments include serving as a major program manager in the Naval Sea Systems Command's Deep Submergence Program (NAVSEA PMS-395) and Major Program Manager in SPAWAR's Fixed Undersea Surveillance Program (PMW-181).

Antanitus entered the Submarine Service upon graduation from the Naval Academy, and his initial sea tour was aboard the nuclear-powered attack submarine *USS Parche* (SSN 683). He went on to serve as Engineer Officer of the fleet ballistic missile submarine *USS Ulysses S. Grant* (SSBN 631) and Executive Officer of *USS Boston* (SSN 703).

His shore tours included duty on the staff of Submarine Squadron 14 in Holy Loch, Scotland, and Weapons Systems Analyst for the Chief of Naval Operations Office for Naval Warfare (CNO OP-07).

Antanitus assumed command of the pre-commissioning unit for the Los Angeles class attack submarine *Hampton* (SSN 767) Aug. 12, 1991. He took the ship through commissioning, initial sea trials and fitting out, and commissioned it *USS Hampton* Nov. 6, 1993.

Antanitus' personal awards include the Legion of Merit with gold star, the Meritorious Service Medal, and the Navy Commendation with four gold stars.

In SPAWAR, we have found that with everything working perfectly, you can get a contract awarded up to 100 days...In many cases, early contract award has resulted in installation cost savings of up to 30 percent, and the metrics show how and why.

back into your processes to improve your performance. This approach really does work, and once you get it going, it is just part of your daily routine.

Fleet Modernization and the D-30 Process

To illustrate how metrics really do make a difference in becoming more efficient, let's look at how we do Fleet modernization. Again, this is a SPAWAR point of view, but the processes involved and metrics measured could be used by any organization.

The chart on p. 13 shows the timeline for the D-30 process, which is mandated by the Fleet for modernization. Taking a look at the first 6 months of the timeline, you can see that Battlegroup (BG) composition should be identified at D-30, the first planning conference held at D-28, a final planning conference at D-25, and the final baseline for the BG established at D-24.

At SPAWAR, we keep track of, or measure the dates of these meetings and conferences. While the exact dates for these milestones may not be critical, planning meetings and conferences that take place on schedule provide good "leading" or predictive metrics for how successful we will be in providing cost-effective modernization for the BG. Specifically, the final baseline must be established on or before D-24 (or 1 month prior to BG deployment). This allows the planning yards to ship check individual ships for the new systems they will receive in their post-deployment CNO availability before they get underway for their near-term deployment. This then allows the planning yards to develop integrated System Installation Drawings (SIDs) while the ships are deployed.

Similarly, with completed SIDs, funding put in place, Government Furnished Equipment (GFE) received, and installation contracts let prior to return from deployment, the installation contractor has ample time to plan for modernization before the ship returns and hit the ground sprinting once the CNO availability starts.

The planning phase of modernization discussed here is a process with numerous metrics mapped back to it. In addition to dates, other metrics include ship check completion, SID completion, ShipAlt Record (SAR) approval, installation funding, GFE delivery, and Integrated Logistics Support (ILS) certification and many, many more. All of these metrics roll up into contract award for a consolidated installation package. In SPAWAR, we have found that with everything working perfectly, you can get a contract awarded up to 100 days prior to the start of a CNO availability. In many cases, early contract award has resulted in installation cost savings of up to 30 percent, and the metrics show how and why.

As with most things in life, however, the planning and execution of modernization rarely goes perfectly. Poor ship checks spawn errors, SIDs are inaccurate or incomplete, or GFE is not properly kitted for an optimum installation. So, once your high-level metrics have identified areas of concern, you have to develop and analyze lower-level metrics to really get at the root cause of your problem. In the case of drawing errors, we found that we were spending millions of dollars every year in rework due to inaccurate SIDs. Armed with this data (or metrics), we were able to go back to the individual planning yards and discuss process improvements they needed to implement to provide us, the customer, with a more cost-effective product.

Interestingly, most of the yards kept no metrics on their performance with respect to drawings. They just assumed they were doing fine, not knowing how well they really could do. Once they started tracking the right metrics and started feeding them back into their processes, we saw error rates drop by as much as 50 percent! This is one of many examples where our metrics were used to make a process more efficient. Put another way, *metrics modify behavior*.

For every step in planning and execution of modernization, we found many things we could measure and many areas we could improve. We continue

If you control any amount of money, are part of or own a process, have people working for you, or work for somebody who imposes goals and standards...I guarantee you that you are not measuring everything you should.

to work on these areas for every ship we modernize. We also found that when measuring our cost effectiveness in delivering the end product, there were events that we could not control, and some of these were real cost drivers.

Baselining (that is, establishing a modernization installations package) a BG two years before deployment is somewhat of a crystal ball exercise. We all do the best we can in predicting composition and requirements for individual units, but over the course of two years, "stuff happens." Ships' schedules change, units in BGs are swapped for operational and maintenance reasons, and world events can alter dramatically. All of these reasons lead to changes in BG composition and ship requirements after the D-24 baseline is set.

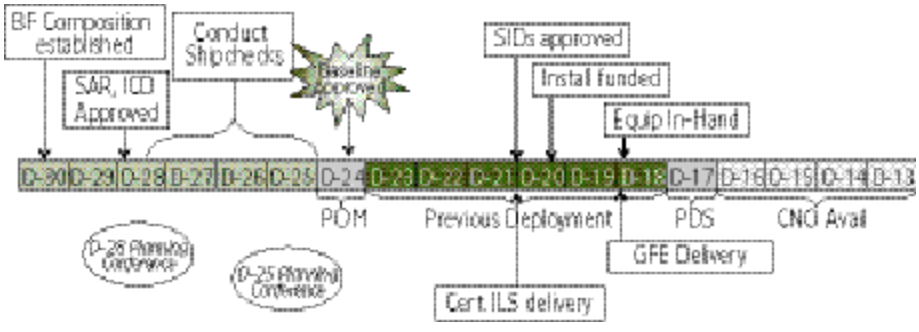
Consider the scenario where at D-20 on the nominal timeline, Cruiser A is swapped out for Cruiser B for the subsequent deployment. The immediate effect is that the money spent to ship check and complete SIDs for Cruiser A is lost, and new funds have to be identified to ship check and complete drawings for Cruiser B. Additionally, if Cruiser B is deployed, we may have to expend additional travel and Per Diem expenses to ship check at sea, and we may have to pay the planning yard additional funds to expedite drawing development to support a CNO availability on an earlier timeline than planned.

There is no free lunch here, and operational failure is not an option, but responsiveness has a price tag attached. We always get the job done, but the later in the cycle an installation is turned on or a change is made, the more it costs. It is important to measure this cost of responsiveness and share it with the customer. They need to understand how they are driving costs so they can make sound business decisions as well as operational ones. The metrics in this case help both the provider and customer optimize their processes.

Execution—Where the Rubber Meets the Road

While the planning metrics provide all the leading indicators for success, the

D-30 Process (Deployment – 30 Months)



rubber meets the road in execution. The final cost, schedule, and performance measure the total product of the plan.

- For *cost* performance, there is no approach better than the Earned Value Management (EVM) system. (EVM is a system that uses work completed vs. funds expended to develop cost and schedule performance indexes. It develops a Cost Performance Index [CPI] and Schedule Performance Index [SPI] to assess work efficiency as it is being performed. Courses in EVM are taught by the Defense Acquisition University [DAU] and are also offered online.)
- *Schedule* is measured directly in time to accomplish work.
- *Performance* is measured in a variety of methods, from CASREP (Casualty Report) free time to performance vs. advertised standards. Again, metrics shared between the provider and the customer provide a common reference for the success of the modernization performed.

Good Metrics Evolve

The modernization example demonstrates how we started by identifying a core competency, mapped our processes to it, and developed metrics to measure the process. Actually, the example given discussed only a small fraction of the metrics we measure on a daily basis. There are many more at several different levels required to fully understand what is driving our cost, schedule, and performance and ultimately to provide the objective evidence to let us "know what we know." Good metrics also evolve, and by continually measuring the same things, you may be missing new opportunities to improve.

Set Goals

When you start measuring your processes, set goals. When you achieve your goals, raise the bar and keep measuring. Push your metrics to your customers and show your customers how they can contribute to process efficiency. You really are what you measure, and measuring the product of the plan needs to be part of doing business every single day.

Think you are doing fine?——Show me the metrics!

Editor's Note: The author welcomes questions or comments on this article. Contact him at david.antanitus@navy.mil.

DAU South Region Signs MOA with U.S. Army Space & Missile Defense Command & Acquisition Support Center, Southern & Western Regions

On Feb. 5, 2003, the Defense Acquisition University South Region (DAU South), located in Huntsville, Ala., and representatives from the U.S. Army Space and Missile Defense Command (SMDC) and the Acquisition Support Center (ASC), Southern and Western Regions, signed a Memorandum of Agreement (MOA) establishing and entering into an educational and strategic partnership. Their partnership will seek to leverage mutual learning opportunities.

Signatories of the MOA were from left: Maxine Maples Kilgore, Director, ASC Southern and Western Regions; Mark Lumer, Principal Assistant Responsible for Contracting, U.S. Army SMDC; and Jim McCullough, Dean, DAU South Region.

For more information on DAU Strategic Partnerships, contact Wayne Glass at wayne.glass@dau.mil.

Photo by Debra Valine