

Measuring Performance to Drive Risk Management

We Need a New Yardstick—Objectives and Thresholds Aren't Good Enough

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Although the performance of many acquisition programs has improved over the last few years, the fact is we still need to deliver useful capability to the warfighter faster and cheaper. How do we make this happen? By doing a better job of identifying, planning for, and managing the uncertainty that's inherent in every project. One way of doing this is to increase the use of risk management in DoD acquisition programs.

It seems we've been teaching risk management and emphasizing it within DoD for centuries. So how do we actually increase its use in our acquisition programs? Perhaps we should start by recognizing the wisdom in the age-old adage, "Tell me how you measure me, and I'll tell you how I behave." One way to create a behavior is to measure it. But how in the world do we measure a Program Manager's use of risk management in his or her program?

Program Performance

Let's start with how we measure the performance of programs today. What tool do we use to measure progress? Currently, we compare a program's cost, schedule, and technical performance to the threshold and objectives in the acquisition program baseline. That's the "yardstick" we use to measure a program's performance, and by extrapolation, the Program Manager's performance.

What if in addition to, or perhaps even instead of requiring Program Managers to establish objectives and thresholds for cost, schedule, and performance, we asked them to determine the Worst Case, Best Case, and Most Likely Case for cost, schedule, and technical performance as shown below in Figure 1? What if we put those estimates into the baseline, and used them as the yardstick to measure a program's performance?

How is this going to help? Why should we abandon thresholds and objectives? Perhaps we shouldn't. However, it's worth looking at how the thresholds

and objectives are set. Do they actually bound the most likely case as shown at the top of Figure 2? How do we know? Without identifying and analyzing the risks, we can't be sure that in actuality the threshold and objective aren't located as shown in the bottom of Figure 2. Obviously, the risks depicted by these two pictures are not the same. What's needed is to determine the actual risks on the program.

Now, think about this for a moment—what does a Program Manager have to do to determine the Worst Case, Best Case, and Most Likely Case for cost,

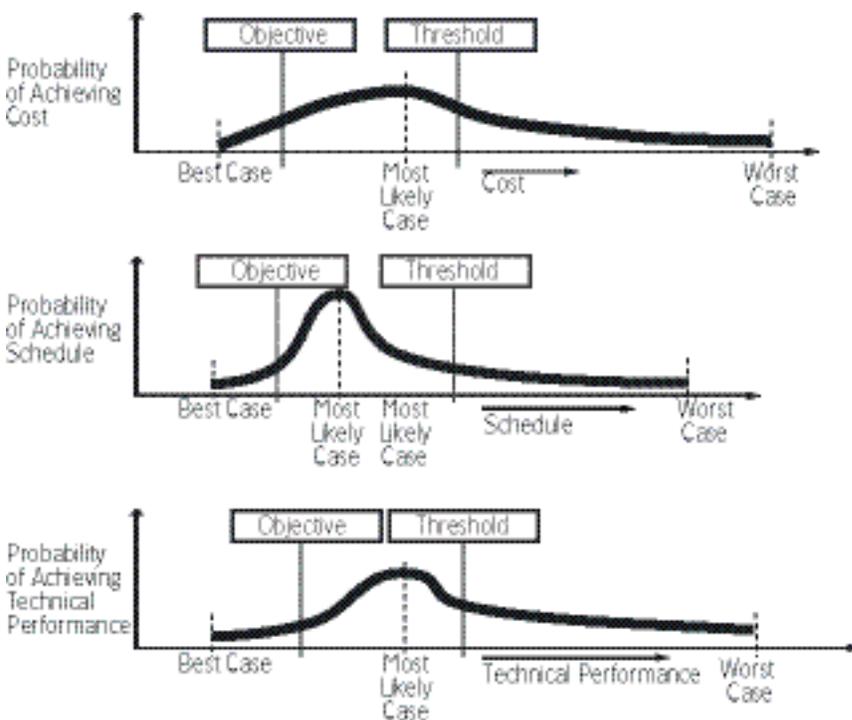


FIGURE 1. Cost, Schedule, and Technical Performance Estimates at Milestone A

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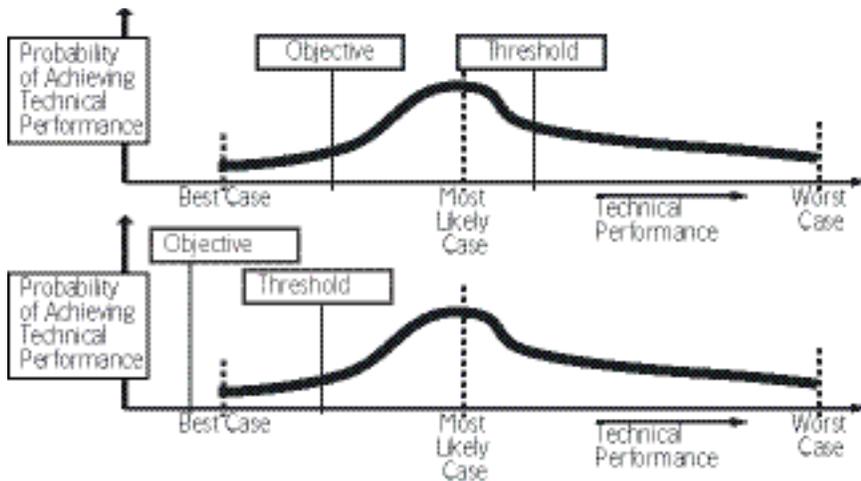


FIGURE 2. Setting Thresholds & Objectives—What is Reality?

schedule, and technical performance on his or her program? Can this be done without identifying and analyzing the risks on the program? Shouldn't the knowledge gained from determining these estimates give us the insight needed to better determine the risks on a program?

You see, by putting these estimates in the acquisition program baseline and using them as the yardstick to evaluate a program's performance, we drive exactly the behaviors we desire in our Program Managers. They will have to identify and analyze the cost, schedule, and technical performance risks on their programs using at least three different sets of assumptions. If we follow through by asking them to explain the assumptions behind each case, we'll see better estimates and better use of risk management in our acquisition programs.

Making it Work

Let's explore this further. How do we actually make it work? We start with the three estimates—Best Case, Worst Case, and Most Likely Case—for cost, schedule, and technical performance. For illustrative purposes, let's look at cost. Given the three sets of cost estimates shown in Figure 3, we then plot the program's current funding level relative to our estimates. From this information, we can assess the program's probability of success from the perspective of cost. To fully evaluate the program, we also need to determine the probability of suc-

cess from the perspectives of schedule and technical performance. We can do this by applying a similar process for both schedule and technical performance.

It's worth noting here that when we develop our Worst Case estimates, we're not talking about catastrophic headline events such as, "Alien Spacecraft Crashes into Shipyard—Will Take 100 Years to Rebuild." Rather, we want our Program Managers to capture realistic events, which, if they occur, will have severe consequences on the program.

Likewise, we wouldn't expect the Best Case estimate of technical performance to be based on the expectation that the Program Manager's nephew will successfully develop a workable application of cold fusion next year during his studies at Stanford. What's needed here are realistic estimates of both the risks and opportunities of the program.

In today's environment, it's not enough to just address risk—we also need to create and capitalize on opportunities. Can we double the technical performance by accepting a six-month schedule slip to integrate a new processor? Will \$680K spent up front on long-lead items allow us to get to IOC [Initial Operational Capability] 14 months sooner? There are many such opportunities on every program. We need our Program Managers to aggressively search

them out so we can better satisfy the warfighters.

Figure 4 presents a method to evaluate not just the investment needed, but also the potential return on our investment. Program risk is evaluated by analyzing changes in the Worst Case estimates of cost, schedule, and technical performance, as well as changes in the probabilities associated with those estimates. This is a direct application of risk analysis—what's the probability of an event

To drive the increased use of risk management in DoD acquisition programs, we should begin requiring our Program Managers to determine the Worst Case, Best Case, and Most Likely Case for cost, schedule, and technical performance on their programs.

occurring, and what's the consequence if it does?

The same approach is taken to evaluate opportunity—the potential return on our acquisition investment. How have the Best Case estimates changed over time? What are the assumptions behind the estimates for cost, schedule, and technical performance? What's our con-

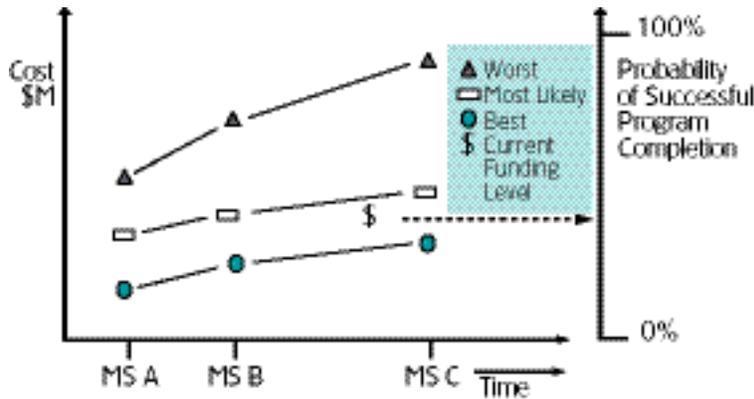


FIGURE 3. Tracking Cost from Another Perspective

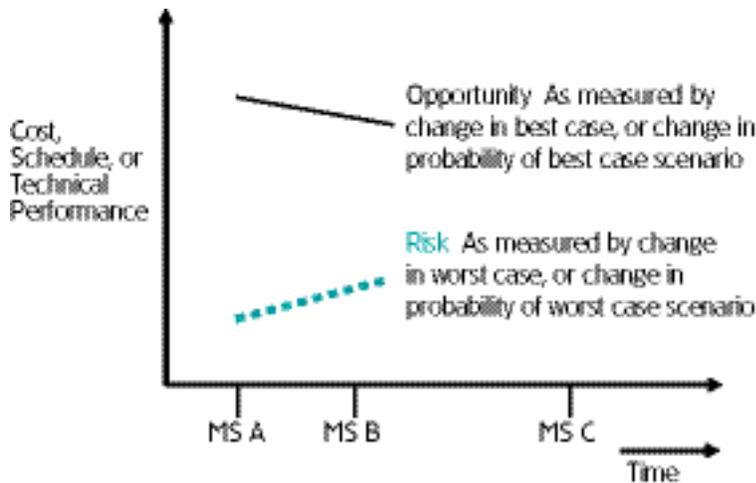


FIGURE 4. Risk vs. Opportunity

confidence level in these estimates? By evaluating the changes in the Best Case estimates and any changes in the probability of achieving those Best Case estimates, we gain a better perspective of the opportunities remaining in a program.

For a balanced perspective, we need to be sure to evaluate both risk and opportunity. The way to make sure our Program Managers assess risk and create and capitalize on opportunities is to put Worst Case, Best Case, and Most Likely Case estimates for cost, schedule, and technical performance in the acquisition program baseline, and use them as yardsticks to measure program performance.

Let's return for a moment to the idea of measuring a program's probability of success. We want to do more than just measure it; we want to drive behaviors that increase it. So what question should

our measurement answer? As shown in Figure 5, when Program Managers brief the status of their programs we want them to answer the question, "What specific actions are you going to take to increase the probability of success?"

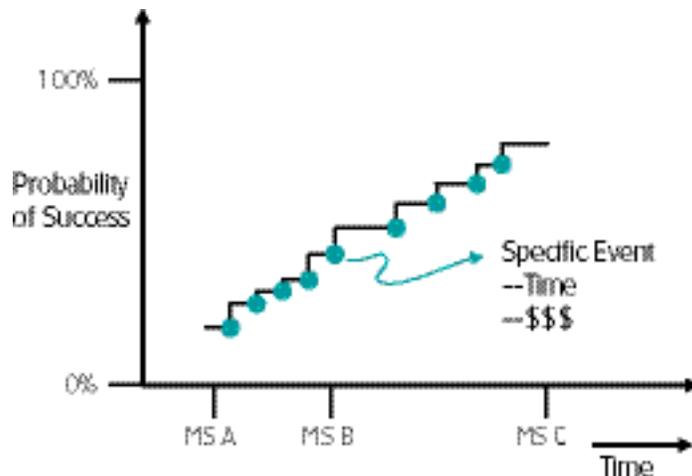


FIGURE 5. What is Required for Success?

It's important to recognize that each of the specific events shown in the stair-step diagram (Figure 5) comes at a cost in both time and dollars. However, after doing the risk analysis and building this information into the baseline, when budgets are squeezed and program funding has to be cut, using the stair-step diagram allows us to make smarter investment decisions about how best to provide capability to the warfighters.

That's the bottom line. We can't make wise investment decisions unless we fully understand the risks and opportunities. To gain this understanding our Program Managers must continually identify and analyze the risks and opportunities on their programs, and include the results of those analyses when they report the performance of their programs. To drive the increased use of risk management in DoD acquisition programs, we should begin requiring our Program Managers to determine the Worst Case, Best Case, and Most Likely Case for cost, schedule, and technical performance on their programs. By changing the yardstick, we'll change the behavior, and that's a positive step in moving the acquisition community toward better support of the warfighters.

Editor's Note: The author welcomes questions or comments on this article. Contact Patnode at Norman.patnode@dau.mil.