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Time as an Independent Variable: A Tool to Drive Cost Out of and Efficiency Into Major Acquisition Programs

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Time as an Independent Variable: A Tool to Drive Cost Out of and Efficiency Into Major Acquisition Programs

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ACQUISITION RESEARCH PROGRAM
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Preface & Acknowledgements

Welcome to our Tenth Annual Acquisition Research Symposium! We regret that this year it will be a "paper only" event. The double whammy of sequestration and a continuing resolution, with the attendant restrictions on travel and conferences, created too much uncertainty to properly stage the event. We will miss the dialogue with our acquisition colleagues and the opportunity for all our researchers to present their work. However, we intend to simulate the symposium as best we can, and these *Proceedings* present an opportunity for the papers to be published just as if they had been delivered. In any case, we will have a rich store of papers to draw from for next year's event scheduled for May 14–15, 2014!

Despite these temporary setbacks, our Acquisition Research Program (ARP) here at the Naval Postgraduate School (NPS) continues at a normal pace. Since the ARP's founding in 2003, over 1,200 original research reports have been added to the acquisition body of knowledge. We continue to add to that library, located online at www.acquisitionresearch.net, at a rate of roughly 140 reports per year. This activity has engaged researchers at over 70 universities and other institutions, greatly enhancing the diversity of thought brought to bear on the business activities of the DoD.

We generate this level of activity in three ways. First, we solicit research topics from academia and other institutions through an annual Broad Agency Announcement, sponsored by the USD(AT&L). Second, we issue an annual internal call for proposals to seek NPS faculty research supporting the interests of our program sponsors. Finally, we serve as a "broker" to market specific research topics identified by our sponsors to NPS graduate students. This three-pronged approach provides for a rich and broad diversity of scholarly rigor mixed with a good blend of practitioner experience in the field of acquisition. We are grateful to those of you who have contributed to our research program in the past and encourage your future participation.

Unfortunately, what will be missing this year is the active participation and networking that has been the hallmark of previous symposia. By purposely limiting attendance to 350 people, we encourage just that. This forum remains unique in its effort to bring scholars and practitioners together around acquisition research that is both relevant in application and rigorous in method. It provides the opportunity to interact with many top DoD acquisition officials and acquisition researchers. We encourage dialogue both in the formal panel sessions and in the many opportunities we make available at meals, breaks, and the day-ending socials. Many of our researchers use these occasions to establish new teaming arrangements for future research work. Despite the fact that we will not be gathered together to reap the above-listed benefits, the ARP will endeavor to stimulate this dialogue through various means throughout the year as we interact with our researchers and DoD officials.

Affordability remains a major focus in the DoD acquisition world and will no doubt get even more attention as the sequestration outcomes unfold. It is a central tenet of the DoD's Better Buying Power initiatives, which continue to evolve as the DoD finds which of them work and which do not. This suggests that research with a focus on affordability will be of great interest to the DoD leadership in the year to come. Whether you're a practitioner or scholar, we invite you to participate in that research.

We gratefully acknowledge the ongoing support and leadership of our sponsors, whose foresight and vision have assured the continuing success of the ARP:

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- Program Executive Officer, SHIPS
- Commander, Naval Sea Systems Command
- Program Executive Officer, Integrated Warfare Systems
- Army Contracting Command, U.S. Army Materiel Command
- Office of the Assistant Secretary of the Air Force (Acquisition)
- Office of the Assistant Secretary of the Army (Acquisition, Logistics, & Technology)
- Deputy Director, Acquisition Career Management, U.S. Army
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Naval Ship Maintenance: An Analysis of the Dutch Shipbuilding Industry Using the Knowledge Value Added, Systems Dynamics, and Integrated Risk Management Methodologies

David N. Ford, Thomas J. Housel, and Johnathan C. Mun
Naval Postgraduate School

Time as an Independent Variable: A Tool to Drive Cost Out of and Efficiency Into Major Acquisition Programs

J. David Patterson
National Defense Business Institute, University of Tennessee

The Impact of Globalization on the U.S. Defense Industry

Jacques S. Gansler and William Lucyshyn
University of Maryland

Bottleneck Analysis on the DoD Pre-Milestone B Acquisition Processes

Danielle Worger and Teresa Wu, *Arizona State University*
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Christopher Auger, Lars Baldus, Brian Yoshimoto, J. Robert Wirthlin, and John Colombi, *The Air Force Institute of Technology*

Software Acquisition Patterns of Failure and How to Recognize Them

Lisa Brownsword, Cecilia Albert, Patrick Place, and David Carney
Carnegie Mellon University

Fewer Mistakes on the First Day: Architectural Strategies and Their Impacts on Acquisition Outcomes

Linda McCabe and Anthony Wicht
Massachusetts Institute of Technology

The Joint Program Dilemma: Analyzing the Pervasive Role That Social Dilemmas Play in Undermining Acquisition Success

Andrew P. Moore, William E. Novak, Julie B. Cohen, Jay D. Marchetti, and Matthew L. Collins
Software Engineering Institute, Carnegie Mellon University

Acquisition Risks in a World of Joint Capabilities: A Study of Interdependency Complexity

Mary Maureen Brown
University of North Carolina Charlotte

Leveraging Structural Characteristics of Interdependent Networks to Model Non-Linear Cascading Risks

Anita Raja, Mohammad Rashedul Hasan, and Shalini Rajanna
University of North Carolina at Charlotte
Ansaf Salleb-Aoussi, *Columbia University, Center for Computational Learning Systems*

Lexical Link Analysis Application: Improving Web Service to Acquisition Visibility Portal

Ying Zhao, Shelley Gallup, and Douglas MacKinnon
Naval Postgraduate School

Capturing Creative Program Management Best Practices

Brandon Keller and J. Robert Wirthlin
Air Force Institute of Technology

The RITE Approach to Agile Acquisition

Timothy Boyce, Iva Sherman, and Nicholas Roussel
Space and Naval Warfare Systems Center Pacific

Challenge-Based Acquisition: Stimulating Innovative Solutions Faster and Cheaper by Asking the Right Questions

Richard Weatherly, Virginia Wydler, Matthew D. Way, Scott Anderson, and Michael Arendt
MITRE Corporation

Defense Acquisition and the Case of the Joint Capabilities Technology Demonstration Office: Ad Hoc Problem Solving as a Mechanism for Adaptive Change

Kathryn Aten and John T. Dillard
Naval Postgraduate School

A Comparative Assessment of the Navy's Future Naval Capabilities (FNC) Process and Joint Staff Capability Gap Assessment Process as Related to Pacific Command's (PACOM) Integrated Priority List Submission

Jaime Frittman, Sibel McGee, and John Yuhas, *Analytic Services, Inc.*
Ansaf Salleb-Aoussi, *Columbia University*

Enabling Design for Affordability: An Epoch-Era Analysis Approach

Michael A. Schaffner, Marcus Wu Shihong, Adam M. Ross, and Donna H. Rhodes
Massachusetts Institute of Technology

Measuring Dynamic Knowledge and Performance at the Tactical Edges of Organizations: Assessing Acquisition Workforce Quality

Mark E. Nissen
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Outcome-Focused Market Intelligence: Extracting Better Value and Effectiveness From Strategic Sourcing

Timothy G. Hawkins, *Naval Postgraduate School*
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Time as an Independent Variable: A Tool to Drive Cost Out of and Efficiency Into Major Acquisition Programs

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Abstract

With few exceptions, studies on improving the acquisition of weapon systems and services within the DoD observe that the process takes too long. A 2010 report of a study led by former Secretary of Defense William Perry and former Assistant to the President for National Security Affairs Stephen Hadley entitled *The QDR in Perspective: Meeting America's National Security Needs in the 21st Century: The Final Report of the Quadrennial Defense Review Independent Panel* supported this point of view, asserting that no defense program should exceed seven years. In a September 14, 2010, memorandum, the Under Secretary of Defense for Acquisition, Technology, and Logistics called for the DoD acquisition community to "set shorter program timelines and manage to them." But what is the right timeline for a given defense program? The author offers a methodology for making that determination through a process using time as an independent variable (TAIV™)[1] in a way similar to using cost as an independent variable (CAIV). Using TAIV™ establishes a credible way of reconciling cost, capability, and the time required to field a needed capability.

Introduction

Although the work done in assessing the value of using time as an independent variable (TAIV™) is not a panacea, there are clearly acquisition programs where cost and performance should vary with program management conditions that recommend accepting more performance at an increase in cost. What the National Defense Business Institute (NDBI) has found is that assessing a capability relative to the time necessary to achieve that capability is a useful effort. TAIV™ can be a valuable tool to that end.

From the end of the Korean War to the present, the length of time required to field a Major Defense Acquisition Program (MDAP) has persistently grown as a common practice. In their assessment *Streamlining DoD Acquisition: Balancing Schedule With Complexity*, James Rothenflue and Marsh Kwolek (2010) put it more bluntly:

> Since at least the late 1960s, the Department of Defense has been trapped in an escalating cycle of cost overruns and schedule delays on large acquisition programs. In particular, state-of-the-art aircraft programs have ballooned from one to five year sprints during and immediately after World War II to the 25-year marathons of the present day.

With the ever-increasing length of time taken to field weapon systems, total program costs have risen as well.

[1]TAIV™ is an acronym trademarked by Monitor Government Venture Service, LLC, during the course of their research and analysis of the use of time as an independent variable, sponsored by the Office of the Deputy Secretary of Defense.

Analysis over time shows that acquisition programs generally grow about 50% in cost (Younossi et al., 2006), and of course larger defense programs have higher stakes owing to the sums of money involved compared with programs managed by other federal agencies. Programs with longer timeframes for engineering, manufacturing, and development also experience greater cost growth (Younossi et al., 2006). Furthermore, almost all acquisition strategies lack the analysis as to what time does, as an independent variable, to the trade space defined by the minimum and optimum performance and cost.

Two recent commentaries on the crucial nature of time as a key element in acquiring weapons and military equipment come from different quarters, but they agree on the way forward. In a 2010 study, two former senior government officials argued that study, which was led by former Secretary of Defense William Perry and former Assistant to the President for National Security Affairs Stephen Hadley entitled *The QDR in Perspective: Meeting America's National Security Needs In the 21st Century: The Final Report of the Quadrennial Defense Review Independent Panel.* Hadley and Perry (2010) were quite clear in their recommendation, explaining,

> Permitting delivery times longer than a reasonably achievable standard is counterproductive to both the demand for responsiveness to current needs and tomorrow's challenges. For major programs for future forces, useful increments of military capability should be defined as what can be delivered within 5 to 7 years with no more than moderate risk.

Under Secretary of Defense for Acquisition, Technology, and Logistics, Dr. Ashton Carter, also addressed the issue of time in a 2010 memorandum to acquisition professionals titled *Better Buying Power: Guidance for Obtaining Greater Efficiency and Productivity in Defense Spending.* As one of his 23 principal actions "to improve efficiency" in the DoD acquisition efforts, Dr. Carter mandated, "Set shorter program timelines and manage to them."

The significance of time to more efficient acquisition of military weapons and equipment is not new. The Special Assistant to the Deputy Secretary of Defense in 2004 asked the Monitor Group (Monitor Company Group LP, 2003) to look at the value of establishing time as a boundary condition or driver in determining the desired timeframe between Milestone B and initial operating capability. Time should be considered an independent variable (TAIV™), especially when it is critical to field a capability on a specific point in the future to have a positive impact on a threat or in the course of ongoing combat. Because there is little direct research on TAIV™ specifically, the Monitor Group work done for the Office of the Deputy Secretary of Defense and subsequent analyses completed for the Under Secretary of Defense for Acquisition, Technology, and Logistics (2006) establishes most of the foundational thinking on using time to establish time as a structured way to determine the limits or boundaries of acquisition programs. However, it is equally important that there be a reliable, valid process for the DoD to "evaluate, acquire and deploy" the most current and effective technology for "long-term performance and mission accomplishment" (Sherman & Rhoades, 2010).

Unfortunately, the idea did not gain traction in 2004, for two related reasons. Among the acquisition community, there is a pervasive belief that a capability is selected to address a requirement that then takes as long as it takes. Such an attitude carries with it no discipline or structure and allows for program success to be dependent on yet-to-be-realized inventions and even miracles. That lack of discipline creates a work environment governed by manufactured job security rather than efficiency. By allowing programs to be temporally

indeterminate, government employees and contractors have no incentive to bring projects to closure, allowing programs to drag out for longer periods of time.

Times have changed, and the pressure is intense to reduce the time it takes to put weapon systems and equipment in the field and simultaneously reduce the costs that attend prolonged and stretched programs. The time is opportune for applying the TAIV™ tool for new acquisition programs, as well as to block upgrades to existing programs.

Applying TAIV™

How should TAIV™ work in a practical sense? When the Monitor Group in 2004 attempted to use time to drive discipline and structure into the acquisition system, the idea was to use TAIV™ to enable the DoD's transformation initiatives as a supporting acquisition framework. There was sense of urgency in getting needed weapon systems and equipment to the warfighters in both Iraq and Afghanistan.

If TAIV™ is to be used and applied to the full program life-cycle, then the TAIV™ analysis must start early in the acquisition program concept development and acquisition process. TAIV™ must be an essential part of the acquisition strategy, solicitation process, and contract development activities.

The DoD generally pursues one of three approaches when acquiring a weapon system or piece of equipment: single step to full capability, incremental development, or spiral development. Incremental and spiral development are grouped under the category of evolutionary acquisition strategy (DoD, 2011). The acquisition approach must consider what the desired end state of the program is to be and determine the appropriateness TAIV™. Single-step to full capability can apply TAIV™ successfully when the end-state requirements are known and can be used to set program length, program milestones, and incentivize compliance. Additionally, the technology must be mature. Commodity parts and immediately available capability would fit the single-step to full-capability category.

Applying TAIV™ to an incremental development approach fits when the end-state requirements are understood and when multiple development cycles are anticipated. Again, mature technologies are required, as well as threats that can be addressed with minimum rather than assured operating capability. TAIV™ would be used to set the increment duration and would be useful as an incentive to drive compliance.

The last acquisition approach, spiral development, is most appropriate when multiple development cycles are anticipated and the acquisition program will produce interim outputs. End-state requirements may not be certain. Programs in this category may have some level of exploratory development, but with mature technology. To address threats effectively, sufficient capability is required sooner, rather than assured or objective performance capability later.

Generally, when time is the subject of research, it is used in terms of reducing cycle time for acquiring systems and equipment, or in other words, looking at the time from program start to delivery from the top down. The intent is to simply compress or streamline the acquisition process and drive time out with "levers for reducing cycle time" (Sherman & Rhoades, 2010). The traditional approach emphasizes ways to reduce time spent on activities or events that are in progress. TAIV™ takes an alternative approach by establishing, from the outset, what performance or capability is possible based on the time-defined construct, or when the weapon system or equipment must be in the field. Once the capability available to the time-defined limit is determined, then the program will be driven to that boundary.

The green line in Figure 1 represents the sequence of technology maturation over time. The TAIV™ process looks at the maturity and relevance of a necessary technology that provides a warfighting capability starting at the beginning of the technology maturation line (point 1). The distance between points 1 and 2 represents the time necessary to develop, adapt, or exploit a maturing technology and turn it into a capability. Point 2 is the best time-to-field versus capability increase. It is at this point that the maximum amount of capability for the technology available is realized. The timeframe represented by point 3 allows for fielding and follow-on production of a capability. Taking additional time to develop a particular technology will not provide marginally greater capability until point 4, when there is another technology breakthrough. As demonstrated, TAIV™ puts the emphasis on fielding capability when the technology supporting the capability has its greatest value. That value is defined by the lack of an equal alternative technology that meets the time-defined capability.

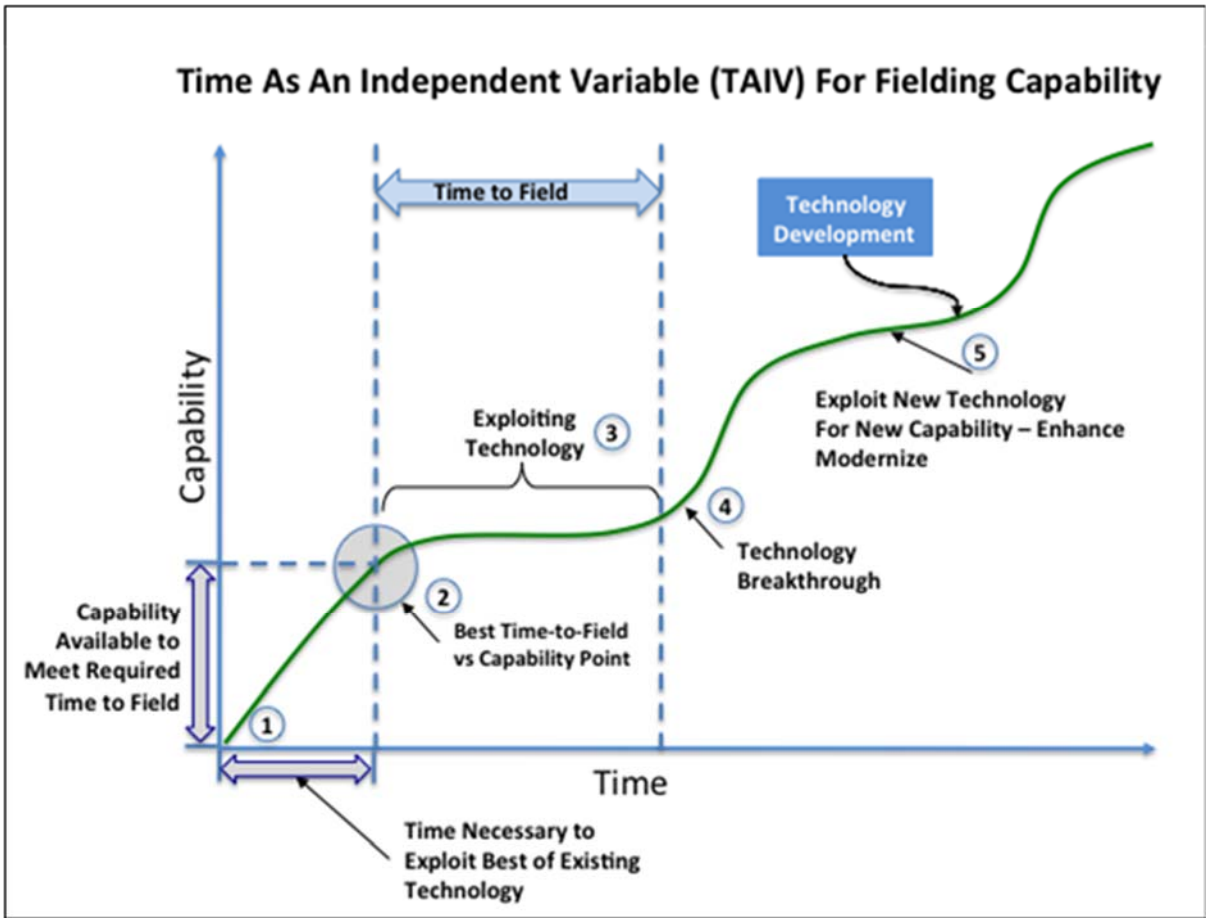

Figure 1. Time as an Independent Variable (TAIV™) for Fielding Capability

Note. Identifying the "Critical Time vs. Capability Point" where extending the time does not achieve a marginally greater degree of capability is the analytic value of TAIV™.

Coincidentally, the technologies that underpin the capabilities that might be needed in the future continue to mature. Over time, significant breakthroughs occur, increasing the potential for ever-greater capability, but only after a capability has been fielded. When additional time spent on development of technology no longer increases the level of capability, that is the critical time to field a capability. The existing technology should be exploited from that point until there is another technology breakthrough or dramatic technology increase.

Should the need for a capability be more urgent because of a more near-term threat, the level of technology may have to be less capable. In such a case, an appropriate strategy would be single-step to full capability. Commercial off-the-shelf (COTS) technology provides a solution with little or no need for integration or development time and would aid in putting a capability in the field in the least amount of time. The concept of using time to drive the level of technology that defines a capability can be used to assess the appropriate capability and performance trades.

The challenge for the acquisition community is twofold. First, the point in time must be established at which a weapon system should be fielded. Second, the available COTS capability must be determined in terms of what can be most easily developed. As Figure 1 shows, getting greater capability to the field earlier relies on exploiting what is available that requires little or no development. The ideal condition achieves operational capability at the point where additional time does not gain appreciably greater capability—the critical time versus capability point, or the knee in the TAIV™ curve.

The crux of the TAIV™ tool's value comes from its ability to reveal the amount of time necessary to meet a required fielding date with the most capability.

As depicted in Figure 1, the TAIV™ process satisfies all three of the acquisition approaches described previously. Single-step to full capability can be achieved when the end-state requirements are certain; incremental development using TAIV™ when both end-state requirements and multiple development cycles are criteria; and a spiral development approach would benefit from TAIV™ when multiple development cycles and interim outputs are anticipated.

Figure 2 represents how threshold and objective performance parameters can frame the trade space for achieving the target delivery of a capability. Again, time establishes the boundaries.

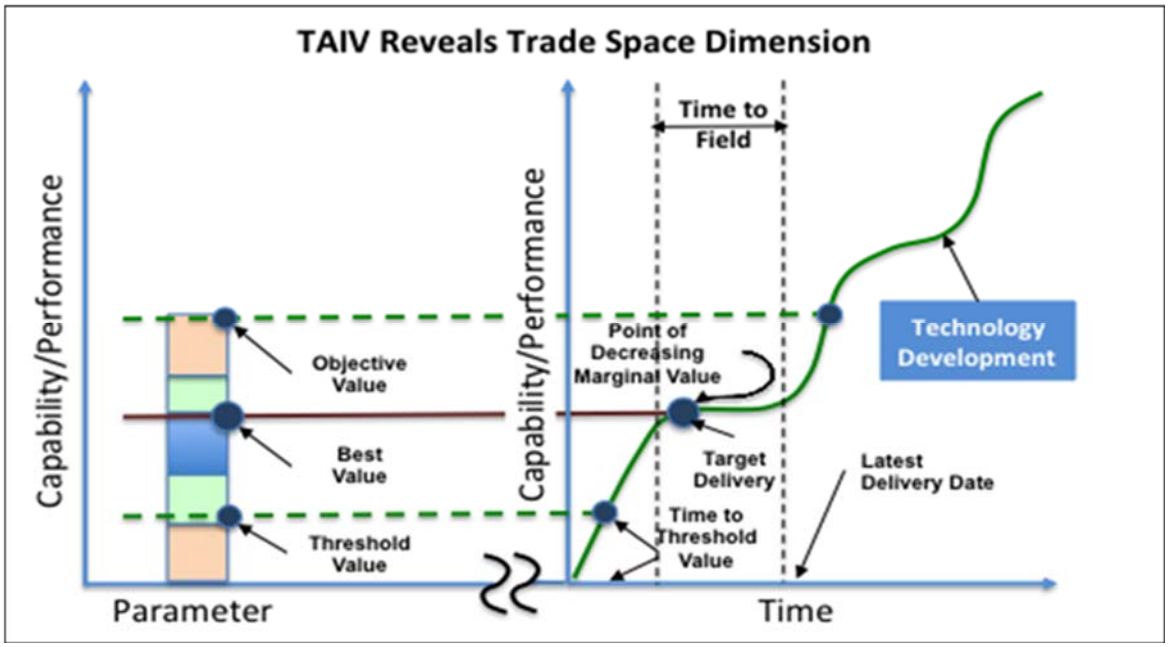

Figure 2. TAIV™ Reveals Trade Space Dimension
(adapted from 2004 Monitor Group briefing)
Note. TAIV™ provides a means of identifying the best value performance solution to field an effective capability at a target delivery time.

Establishing capability and the desired performance with objective performance value and minimum acceptable or threshold performance value frame the capability performance necessary to meet a requirement and address a threat. The trade space becomes the time between the earliest that the threshold performance can be met and the latest delivery date before the risk of significant damage. Again, the target delivery date is defined as that point in time where the most capability or performance can be achieved, after which continued pursuit of "better" performance has little or no increase in capability before the latest delivery.

The target delivery date is also the point in the future when the best capability over time can be achieved at the best value.

It is a reasonable assumption that acquisition programs, guided by earliest and latest acceptable time-to-field, possess a credible understanding of the threat to be addressed by the capability. Here again, having TAIV™ as a tool lends credibility to the argument advocating for a particular capability being fielded at a particular point in future.

TAIV™ Integrates Threat Assessment, Time-to-Field With Available Technology

TAIV™ is useful in helping determine the greatest capability over the least amount of time, but some forcing function must be present to actually define the "least amount of time."

At minimum there must be some understanding of the driving requirement that addresses an understood national security threat. Then "the least amount of time" becomes the time to field the weapon systems or piece of equipment.

Figure 3 illustrates the relationship among time, capability, and technology progress when compared to the window of understanding represented by the threat a potential enemy. Over time, there is less fidelity in the understanding of threat in terms of the lower and upper limits of the capability necessary to meet a requirement to address the threat. The clearest and most credible understanding of the threat has the most fidelity in the near term. Understanding of the threat declines as the assessment of that threat is pushed further into the future.

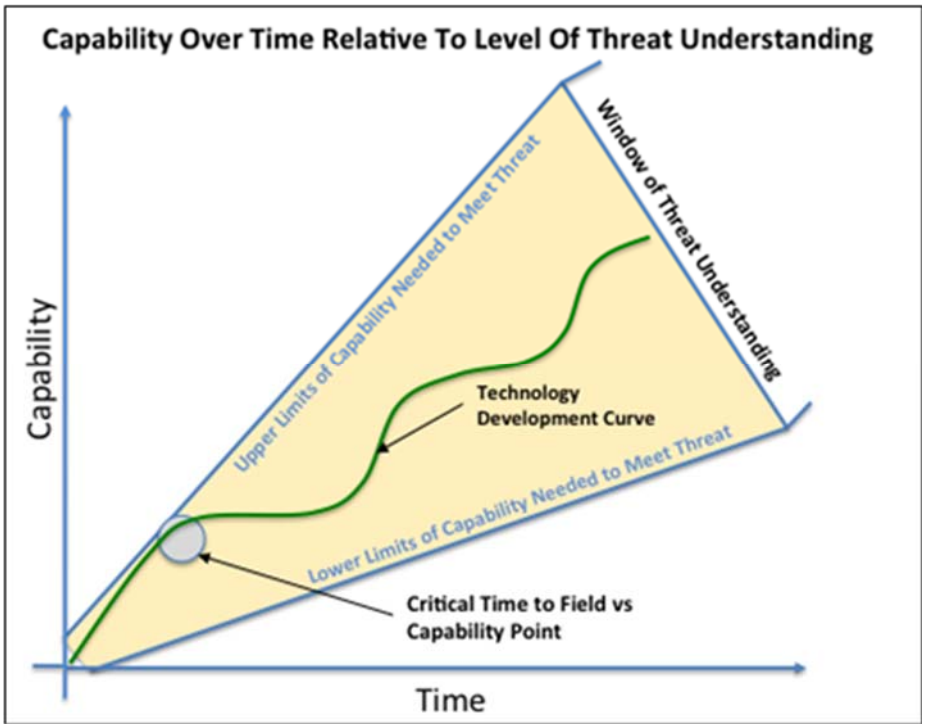

Figure 3. Capability Over Time Relative to Level of Threat Understanding
(adapted from 2004 Monitor Group briefing)
Note. As planners attempt to assess the threat to national security, there is less fidelity and accuracy possible the further into the future the assessment is made.

Additionally, as Figure 3 suggests, using TAIV™, it is more likely that the capability possible in the near term (and more in line with the critical time-to-field) will be more appropriate to meeting the requirement to address a threat.

When TAIV™ is applied to the development of an acquisition program, the importance of time in developing and defining the technology, as well as its design and production, is more dominant in the analysis of cost, schedule, and achieving the desired performance. *Time-defined* in this instance, however, is not synonymous with schedule.

Though a 2009 GAO report points out that a DAPA report recommends that schedule be a key performance parameter (KPP), this paper looks at the time between the beginning of a program and the point at which a weapon system is operational as a time-defined period. By that definition, the specific length of *time*, and not schedule, is a KPP.

Schedule is the sequential distribution of program events when, on completion, they have a timeframe associated with them. We measure schedule with milestones accomplished. TAIV™, on the other hand, is the analytic construct that identifies which performance capabilities are important and must be achieved, and conversely, which are of marginal value when considering the time from development to incorporation into the weapon system to fielding to consideration for future block upgrades. The time-defined period is established with the results of the TAIV™ analysis.

Various recommendations exist for the timeframe for development and fielding: Hadley and Perry (2010) suggested five years for fighter type aircraft and eight years for ships, and five to seven years for all programs; in a DAPA report, Kadish (2006) recommended “nominally no more than six years for major platforms from Milestone A” to

fielding. Without a way to appropriately evaluate time, acquisition programs will continue to take “as long as they take.”

Although a 2009 GAO report points out that the DAPA report (Kadish, 2006) recommended that *schedule* be a KPP, this paper looks at the time between the beginning of a program and the point at which a weapon system is operational as a time-defined period and that specific length of *time* be a key performance parameter, not schedule.

The reason for distinguishing between time and schedule is to give precedence to the time-to-field as a weapon system or piece of equipment that should take precedence over a particular sequence of program events or activities. The integrated master schedule (IMS) can be modified during the course of program duration without doing violence to an established critical time to field the weapon system or piece of equipment. Establishing a program schedule as a KPP would suggest that to modify the schedule while not changing cost and performance or the time-to-field would constitute a failure to meet a KPP, but that would not necessarily hold true. Making schedule a KPP simply adds a level of complexity to the concept of TAIV™ without corresponding value.

Urgency for fielding a particular desired capability, then, has a context that can be used to describe what needs to be fielded or deployed and when. Again, Kadish (2006) fortified this line of thinking, saying, “Once the time-to-need and the current technology risk level are determined the program should be time-constrained.”

The TAIV™ curve conjures the “cost as an independent variable” curve owing to the analogous relationship that results from the adage “time is money.” But there is a clear distinction: cost may vary with time, but not directly. Many variables that include quantity and quality determine cost, but time is immutable. Just as, at a certain point, increasing dollars spent on a program will not produce a corresponding increase in capability, increasing time spent will also not produce a corresponding and direct increase in capability. Technology and innovation must come into play. Rene Cordero made this point in a 1991 discussion of “managing speed” in getting products to market to avoid obsolescence: “Finally, the natural limits of the technology are reached and only small improvements of the product are possible.” That point in Figure 1 is the best time-to-field versus capability point.

Similar to a time-to-market requirement, the unified command’s assessment of when a capability must be fielded becomes a crucial factor in evaluating the amount of time to devote to fielding a new weapons program (see Figure 4). Timing plays a crucial role when introducing a new product and maximizing market share; similarly, weapons must be in the hands of warfighters at the optimum moment on the battlefield.

Figure 4. Market Pressures Analogous to Meeting National Security Threats

Note. As the competitive environment for commercial goods and services drives the necessary time-to-market to have a market edge, the understanding and certainty of the emergence of a threat to national security drives the required time-to-field weapon systems and military equipment.

Just as there is an optimum time for a new product to be introduced in order to capture the most market share, there must be some idea of when a weapon must in the hands of the warfighters to achieve the desired effect on the battlefield. The time-to-market drives new product development in the same way that battlefield requirements to address a threat drive weapons acquisition programs. Consequently, the time-to-market demand will be a surrogate for the time-to-field requirement for weapon systems.

For the purpose of this paper, the competitive market pressures driving critical time-to-market decisions are analogues to identifying military threats that drive the critical time-to-field. Competitive pressures in business have caused product life cycles to compress, and subsequently, companies have taken measures to shorten their development cycles, thereby getting products to market faster (Griffin, 1993). Getting to the fight with the right equipment in time to make a difference against the threat is a DoD priority.

Value of TAIV™ Throughout Acquisition Program

When TAIV™ is applied, there are several benefits that result. The obvious advantage is that an effective capability is fielded sooner and at less cost to the government. The capability may be minimally sufficient, but it is sufficient. Additionally, TAIV™ has the potential to modify behaviors that have the potential to be costly, disrupt schedule, and threaten system performance. Figure 5 lists some of the behaviors that TAIV™ can influence positively.

When the duration of an acquisition program is constrained by specific timeframes with the threat of cancellation for exceeding those limits, events like milestones and reviews will be viewed with greater significance. Developmental engineering, systems engineering, and sustaining engineering will approach engineering tasks constrained by time as engineering challenges to be met as they would any other engineering tasks. To establish the importance of TAIV™ as a legitimate and critical program management tool, DoD acquisition management leadership should conclude that mandating a policy that threatens program cancellation for missing time-defined milestones is necessary for establishing and maintaining program internal control.

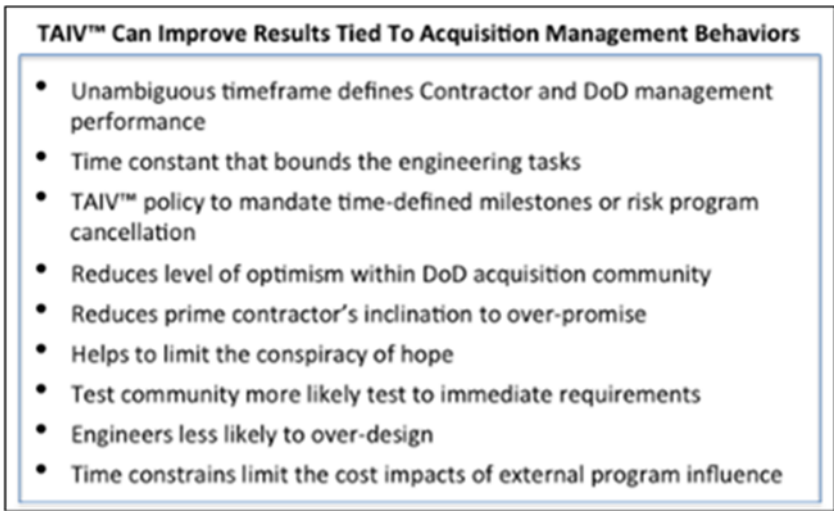

Figure 5. TAIV™ Can Improve Results Tied to Acquisition Management Behaviors

Note. When acquisition program duration has no time constraints, unintended and negative program management behaviors result. TAIV™ helps to establish constraints of undesired behaviors.

Programs so often fall prey to a misplaced sense of optimism by program managers prone to believe that success is inevitable, despite evidence to the contrary. The constant

imposition of time constraints reduces that inclination toward optimism. An equally insidious and destructive behavior that grows with the government's optimism is the contractor's desire to please the customer, which leads to over-promising. The result, according to Kadish (2006), was that "the culture of the Department [of Defense] is to strive initially for the 100 percent solution in the first article delivered to the field." Kadish (2006) went on to say, "Further, the 'Conspiracy of Hope' causes the Department to consistently underestimate what it would cost to get the 100 percent solution. Therefore, products take tens of years to deliver and cost far more than originally estimated."

The test and evaluation community must be disciplined by the same time constraints as the rest of the program management. That means the Test and Evaluation Master Plan is constrained and managed to operate within the program time limits. With a mature technology necessary for TAIV™ to be appropriate, the challenges of the test community will be correspondingly reduced to live within the TAIV™-established timeframe.

Time constraints will by design lead to shorter time cycles, and with those shorter time cycles the tendency to "future-proof" the weapon system or equipment. Consequently, over-designing will be discouraged, and the temptation to try and anticipate a future design requirement will be less likely.

Lastly, one of the most disruptive and intrusive influences comes from external sources. Whether it is Congress, agencies in the executive branch, or the grass roots activities of other suppliers, with limited time for program execution comes limited time for these external actors to influence the program execution, causing delays, increased cost, and potential reduced program performance.

There is a value to TAIV™ that is not immediately apparent; but when evaluating the challenges of developing an acquisition strategy that drives desired contractor behaviors, it should be considered. As part of an in-depth look at "Evaluating MDAP [Major Defense Acquisition Program] Contractor Incentives," a research study conducted by the NDBI for the Director, Performance Assessment, and Root Cause Analysis Directorate, the NDBI found that for contractor incentives to be effective, they had to be "focused, clear and specific, measurable and achievable as well as motivating." An analysis of TAIV™ in this context is revealing.

Figure 6 represents a comparison between total acquisition program cost on the y axis and program duration (time) on the x axis. As time or program duration increases, so does the total cost of the program. From Figure 2, the goal or objective time is plotted against the target delivery time and the threshold time to field. In this case, the threshold becomes the longest program duration after which the rise in cost (maximum cost) makes the program of "questionable value to continue." Ideally, the target cost (best value) and target delivery or fielding date are synchronized, once TAIV™ is exercised.

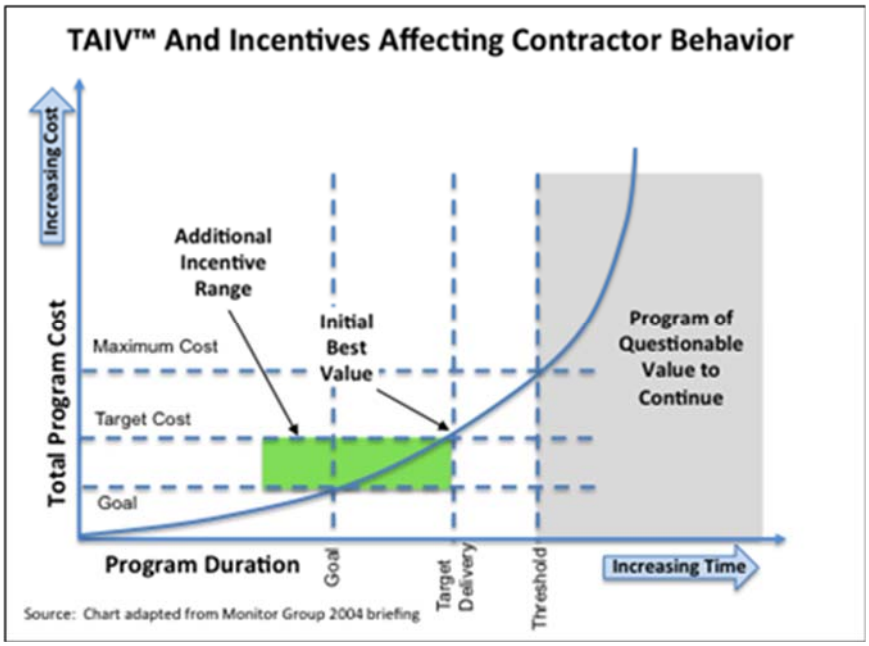

Figure 6. TAIV™ and Incentives Affecting Contractor Behavior
(adapted from 2004 Monitor Group briefing)

Note. TAIV™ can be used in trade studies that reveal where to offer incentives to prompt contractor behavior that increases value to the government. Larger incentives could be considered to move program delivery into the "Additional Delivery" range for early delivery.

The contractor would be incentivized to strive to perform in the green shaded area. This is the area where the contractor can work to lower program cost by delivering a quality product earlier. The lowering of the program cost is achieved by reducing the time to deliver the weapon system to the field.

Larger incentives can be achieved by reducing the time to deliver into the "additional incentive range." Using TAIV™ creates the trade space to fulfill the criteria for an incentive to be effective. The incentive is focused on the performance parameter of fielding the weapon system sooner than the target delivery time and at lower cost as a result.

The incentive is clear and specific since establishing a time-defined target delivery point in the duration of the program execution. The contractor meets the target delivery point, achieves an earlier delivery, or misses the delivery target. Contract terms and conditions can be crafted to provide a penalty for missing the target delivery as a disincentive.

TAIV™ allows for the criteria for incentives to be measurable and achievable because, again, the program deliverables either are early, meet the target date, or are late. The analysis that accompanies the TAIV™ analysis will take into consideration the level of technology maturity in determining the target delivery.

The incentive must be motivating. If the previous three criteria are met, creating an incentive with a magnitude of value to the contractor becomes a matter of negotiation. The terms and conditions of the contract establish the value of the incentive, but with TAIV™ there is much less ambiguity around establishing the incentive value.

Conclusion

With the emphasis on greater efficiency in acquiring weapon systems and equipment, better buying power and the more timely fielding of weapons can benefit from a

more disciplined and structured approach to the process. Eliminating unproductive processes and bureaucracy by reducing "cycle times while ensuring sound investment decisions" (Kendall, 2012) would benefit from implanting TAIV™ in some form or fashion.

Budget pressures are more intense now than they have been in nearly five decades. Inefficient use of scarce resources simply cannot be normal order. TAIV™ provides a disciplined and structured process for achieving the most capability and best-value cost in the least amount of time to be effective. TAIV™ eschews the one-size-fits-all downside of other approaches to reconcile threat, time-to-field, and cost. Rather, TAIV™ is self-tailoring to prompt an appreciation of how using time to establish boundaries can drive efficient acquisition program execution.

The historical record of acquisition reform reports and recommendations is almost unanimous in its view that, as Kadish (2006) put it, "The acquisition process is slow, overly complex and incompatible with meeting the needs of multiple, competing, departmental demands, in a diverse marketplace." TAIV™ has the potential to expedite the process to field the best value defense product with a level of complexity consistent with the requirement to meet the understood threat. The resulting fielded capability will meet the demands of the only customer of importance—the warfighter.

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