

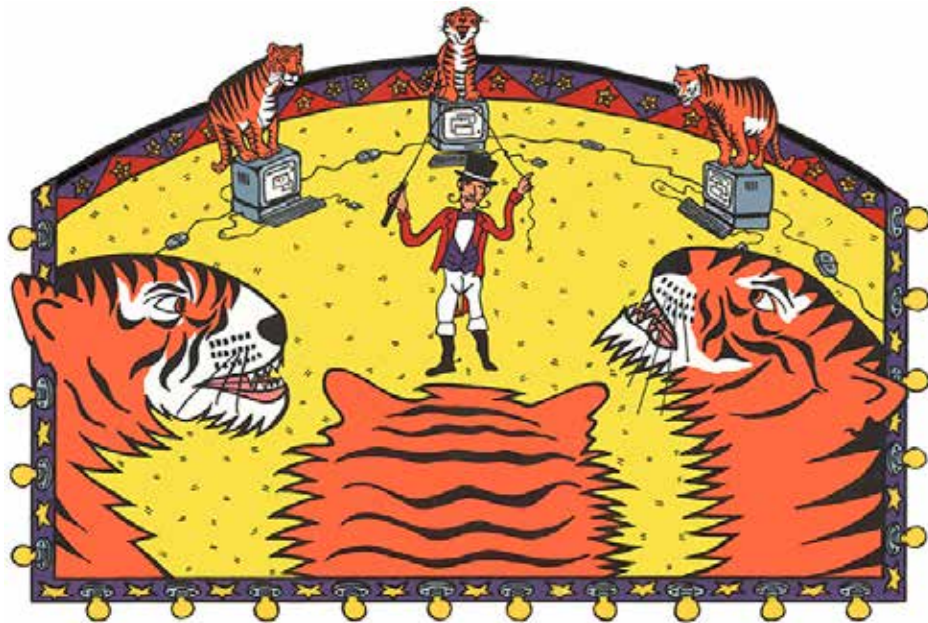


Taming the Tigers

Recapturing the Acquisition Excellence of Our Planning, Programming, and Acquisition Three-Ring Circus

Maj Gen Robert Kane, USAF*

Lt Col Jason Bartolomei, PhD, USAF



We in the Air Force have adopted an approach that suboptimizes our Big “A” acquisition triad of requirements, budget, and acquisition processes and that lacks a sufficient “trade space” analysis to maximize the benefit of our dollars. *Trade space*, which combines the terms *trade-off* and *play space*, refers to the lead-

Illustration reprinted by permission of Michael Brewer, www.michaelbrewerart.com.

*The authors would like to thank the following individuals for their incisive thinking and constructive edits: Gen Jim McCarthy (retired), Prof. Dan Hastings, Prof. Richard de Neufville, Prof. Gautam Mukunda, Col Glenn Downing, Col Chris Garrett, Col Jim Lovell, Col Troy Thomas, Bill Castle, Mike Kalna, Carl Rehberg, Nic Wilson, Lt Col Darren Cochran, Lt Col Luke Cropsey, Lt Col Vinnie Dabrowski, Lt Col Rick Holifield, Lt Col Pete Sandness, Lt Col Mike Warner, Maj Nate Campbell, Maj Jens Lyndrup, Maj Dan Mollis, Maj Dan Pupich, Maj Jon Seal, Dr. Kevin Sweeney, Dr. Matt Richards, Dr. Donna Rhodes, Dr. Adam Ross, Dr. Nirav Shah, Dr. Tom Speller, Paul Bess, Frank Finelli, Marcus Friesen, and Matt Jensen.

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE APR 2013		2. REPORT TYPE		3. DATES COVERED 00-00-2013 to 00-00-2013	
4. TITLE AND SUBTITLE Taming the Tigers: Recapturing the Acquisition Excellence of Our Planning, Programming, and Acquisition Three-Ring Circus				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Research Institute (AFRI),155 N. Twining Street,Maxwell AFB,AL,36112-6026				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



er's options and the consideration of the advantages and disadvantages of those choices. The objective of considering the trade space is to expand the envelope of potential options to identify the best alternative. Failures to develop our trade space have diluted the quality and timeliness of decision making by the secretary of the Air Force and the chief of staff. Our core problem involves a systemic failure to create trade spaces that integrate the information used in our separate planning, budgeting, and acquisition processes to holistically inform the Air Force's decisions. The inability to successfully integrate these processes creates programmatic instabilities that lead to cost and schedule overruns, reinforces political vulnerabilities which undermine our ability to implement a path forward, and, ultimately, limits our capacity to maximize delivery of war-fighting value.

This situation is of particular concern as we face a significant budget crisis and imminent reductions in defense spending. Figure 1 illustrates this point by presenting a notional "benefit versus cost" chart that defines value as benefit at cost. Our fear is that, for the amount of money we spend on our Air Force, we are not maximizing the benefit. If we continue on our current path, we run the risk of diminishing our capabilities at a time when we face increasingly compelling and diverse security issues that will undoubtedly require a full range of leading-edge air, space, and cyber capabilities.¹ Reversing these effects demands new thinking and a new approach.

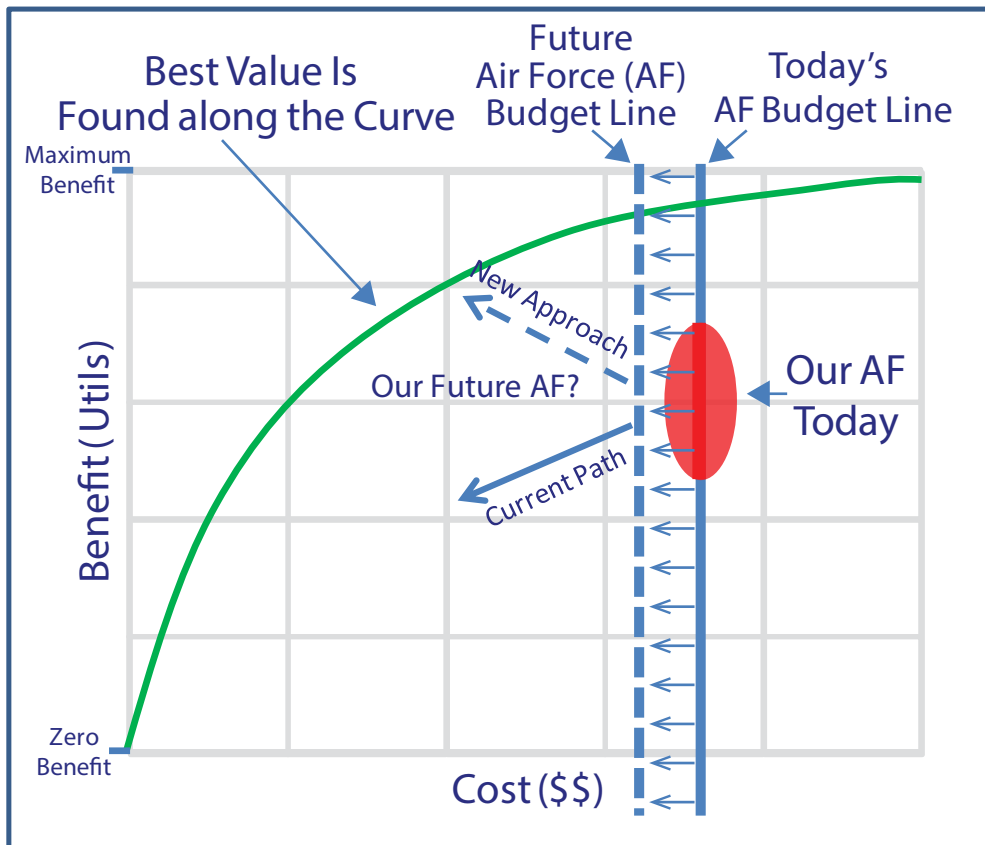


Figure 1. Value chart (benefit versus cost)

A more effective option entails a holistic, value-focused approach that expands visibility into our decision trade space by identifying alternatives that maximize our capabilities and budgets while capitalizing on the strengths of our established processes. This new approach would take advantage of the best information available in our planning, budgeting, and acquisition processes and allow Air Force leaders to simultaneously assess the assumptions, costs, benefits, and alternatives of decisions and expand the trade-off between benefit and cost. We can use this scalable approach to explore strategic-level trade-offs at the capabilities or mission-requirements level of analysis, as well as trade-offs for particular systems and programs. Furthermore, this approach enables necessary justification and means for demonstrating to



the Office of the Secretary of Defense and the congressional staffs the clear basis for Air Force investments. Toward that end, this article first reviews the Air Force's current Big "A" acquisition process and then compares it to how other large organizations have successfully addressed similar challenges involving prioritization and trade-space analysis. In conclusion it presents a new, value-driven approach tailored to integrate our processes and improve our ability to deliver value-maximizing solutions.

The Current Air Force Process: Our Tigers and the Three Rings

The Air Force's Big "A" acquisition processes, like the Department of Defense's (DOD), consists of three "interlocking" decision support systems (fig. 2), including the following:

- Core function lead integrators (CFLI), led by commanders of the major commands (MAJCOM), are responsible for identifying, assessing, and prioritizing the Air Force's capability needs. CFLIs, along with the Air Force-level requirements process, define and transform war-fighting needs for the 12 Air Force core functions (soon to be 13 with the addition of education and training) into prioritized investment, sustainment, and divesture recommendations for the Air Force corporate structure (AFCS). The role of the CFLI continues to evolve.
- The AFCS, which executes the Planning, Programming, Budgeting, and Execution (PPBE) process, consists of three distinct but inter-related phases: (1) planning, which produces Air Force planning guidance; (2) programming, which produces the service's program objective memorandum (POM); and (3) budgeting, which produces the Air Force's portion of the president's budget.² The AFCS is chaired and led by the undersecretary of the Air Force / vice chief of staff of the Air Force and managed by the Directorate of Strategic Plans and Programs. The AFCS transforms the CFLIs' invest-

ment and the MAJCOMs' inputs regarding operation and maintenance, as well as programmatic data provided by the Air Force Acquisition System, into a recommended POM submission for consideration by and approval of the secretary and chief of staff. Once approved, the POM becomes the service's budget input.

- The Air Force Acquisition System executes the Defense Acquisition System (DAS) process to acquire systems to support war-fighter requirements through engaging with appropriate industry partners and determining responsive business solutions. The service acquisition executive leads the system, which is executed through the program executive officer structure and organized, trained, and equipped by Air Force Materiel Command's organizational structure. The system transforms requirements defined by the Joint Capabilities Integration and Development System (JCIDS) and budget allocated by the PPBE system into materiel for the war fighter. Most importantly, in conjunction with the requirements owners and processes, the service acquisition executive and the acquisition process—in transparent and open communication with industry partners—are best positioned to fully explore, develop, and communicate the potential trade-space options available to the secretary and chief of staff for modernization and recapitalization, including the impacts over total life-cycle costs.

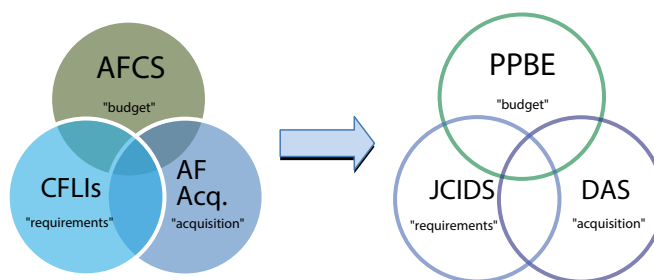


Figure 2. The Air Force's acquisition decision support systems (left) mirror those of the Department of Defense (right).

Organizationally, responsibilities are distributed across the Air Force enterprise (fig. 3). Each organization converts information, dollars, and/or material into products used by the other organizations. The article briefly examines each system in turn.

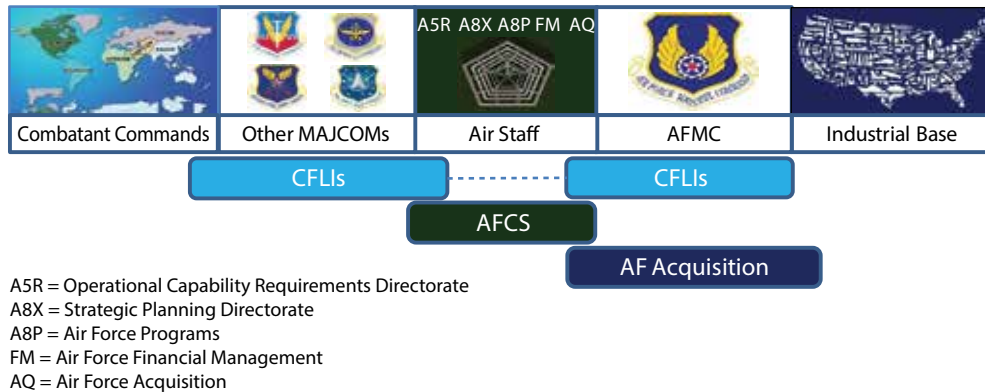


Figure 3. The Air Force's acquisition enterprise

Figure 4 illustrates how information, money, and materiel currently flow across each system. CFLIs (top left) provide a prioritized list of requirements for each of the Air Force core functions. Moreover, CFLIs must formulate requirements and formally present them by means of the JCIDS process to the Air Force Acquisition System in the form of requirements documentation. The AFCS prioritizes the CFLIs' requirements lists along with programmatic data provided by the acquisition system and develops the Air Force POM, which ultimately becomes the president's budget. After Congress approves the budget, the acquisition system executes it through obtaining weapon systems that meet requirements recommended by the CFLI and approved by the secretary and chief of staff.

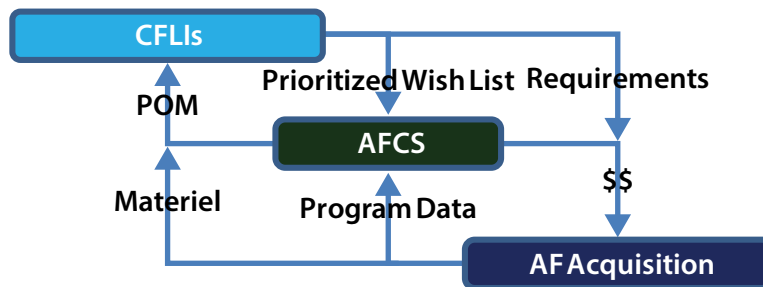


Figure 4. Interactions across the Air Force’s acquisition decision support systems

For the Air Force, maximizing value is difficult because of the absence of a shared common value proposition and the fragmentation of elements for calculating value across these processes. Each process is locally optimized to generate its desired products/capability and does not effectively communicate in ways that necessarily maximize value or create options for both the service and the war fighter. This situation occurs because the ingredients for determining value (e.g., the formation of alternatives, assessment of benefit, calculation of costs, and characterization of constraints) occur in different systems and are driven by different incentives. Each system operates with its own set of assumptions and constraints, producing isolated, unintegrated communication documents not timed to affect each other’s decision process. The sections below synthesize our findings.

Developing Alternatives

CFLIs, the AFCS, and Air Force Acquisition discuss alternatives in different terms. Planners think in terms of solution systems (system A versus system B). Acquisition thinks in terms of designs, production rates, contract types, and modification options. Programmers think in terms of dollar amounts. Leaders at all levels of the Air Force have an insufficient trade space of alternatives for most decisions. The norm usually consists of sets of three alternatives: (1) an overly optimistic solution, (2) an overly pessimistic solution, and (3) a solution that the staff wants the boss to choose. Each process produces an indepen-



dently developed list of alternatives that are rarely exhaustive or coordinated across the other decision support systems. Furthermore, these alternatives are usually presented too late in the process, with weak business case analyses, and frequently in a binary decision form. Often this means that suboptimal decisions remain vulnerable to politics or other pressure which influences or redirects Air Force decisions.

Assessing Benefit

Each process calculates benefit differently. CFLIs must “watch over” the service core functions and assess benefit in accordance with the core function master plans. CFLIs measure success in terms of securing the percentage of total obligation authority necessary to fulfill the master plans with the lowest risk sought by the MAJCOM. After defining the operational requirement and signing the acquisition decision memorandum, Air Force Acquisition measures success in terms of its ability to execute the program and spend all of the budget. Program managers have virtually no incentive to support trade-offs between platforms outside their portfolio or embark upon moves to cut or cancel ill-fated programs under their control. Moreover, thousands of acquisition man-hours are devoted to assessing program execution, moving unobligated funds, and obligating funds to ensure that every dollar is spent.³ This occurs with a focused lens on the original (often dated) operational requirements and limited attention to current or emerging military needs. Success in the AFCS comes from balancing the books and maximizing the Air Force’s total obligation authority necessary to conduct the mission. Collectively this approach can result in costly and detrimental trade-off decisions that affect the development of necessary war-fighting capability in a rapidly changing world, thereby impeding our ability to satisfy the long-term strategic interests and policies of the Air Force, DOD, and nation.



Calculating Cost

The service uses cost (not value) as a primary driver of programmatic decisions. Each process is concerned with cost but uses different methods and sources for different reasons. The Air Force Cost Analysis Agency; acquisition financial-management offices; Office of the Secretary of Defense's Cost Assessment and Program Evaluation; Analyses, Assessments, and Lessons Learned; and Strategic Plans and Programs often develop diverging cost estimates using different costing methods and sources. At present, the CFLIs do not calculate costs in their prioritization of requests. The Air Force Acquisition System supplies cost data to inform both the CFLIs' and the AFCS's decisions. Too often we overemphasize limitations of the Future Years Defense Program as opposed to building internal and external consensus on long-term vision and priorities.

Timing

Each process operates on its own unique decision cycle, not synchronized with other processes. For example, leaders from planning and programming processes have no involvement in acquisition until after acquisition strategies are set and budgets committed. Consequently, expensive programs with questionable or unsupportable strategies can reach key milestones ahead of senior leaders' consensus on the best approach. Planners often define requirements for the most advanced technical solutions without the participation of programmers and acquisition professionals who understand resource constraints and know about lower-risk solutions that might offer better value.

For a systematic process to operate in concert throughout the Air Force, information from these independent processes must share a value proposition and a common means to evaluate benefits and costs. Each decision must begin with a definitive articulation of our stakeholders and the basis for calculating the value that we expect the decision to deliver. Underlying assumptions for calculating both benefit and cost must be integrated and transparent to all parties evaluating



the alternatives. Leaders must have this information at the appropriate times throughout the Air Force's decision cycle. Responsible for the primary mission of the Air Staff and its associated processes, decision makers should receive the broadest set of alternatives and intuitively determine the trade-offs between benefits and cost. In short, our systems and the MAJCOM commanders' recommendations must maximize the secretary's and chief's decision trade space.

How the Other "Big Guys" Do It

The quest for new ideas led us to research how some top-10 *Fortune* 500 corporations and other globally focused, multicable military forces execute a successful process to link and streamline requirements, budgeting, and acquisition. We analyzed each company's annual report to shareholders and conducted interviews with Wall Street analysts as well as leading professors and military-reform experts; we then compared our findings with an analysis of the Air Force process. Despite fundamental differences between the mission of a corporation and a military service, we found many similarities and useful insights to help stimulate our thinking.

The large corporations that we analyzed reflected an organizational scheme similar to that of the Air Force. Each one had hierarchical management structures consisting of a corporate staff (like our Air Staff) and major business units (like our MAJCOMs). These corporations sought to maximize value (the perceived and actual benefit at cost) to its stakeholders (those who affect or are affected by the organization's actions). All of the corporations set a central goal of maximizing stakeholder value. As such, the vital linkage between corporate decision making (i.e., selling business units to cut costs, adding or reducing personnel, executing bold initiatives, and allocating budget) and delivering value was paramount to the success of the firm. In each one, we found critical alignment between the localized goals of each business unit and the global goal of the corporation, as well as a careful balance between short-term gain and long-term objectives. This ap-



proach starkly contrasts that of the DOD. Ken Krieg, former undersecretary of defense for acquisition, technology and logistics, explains the difference between industry and the DOD:

In the private sector, if you make a decision to invest capital, particularly a sizeable decision to invest capital, that goes all the way to the chairman and probably to the board if it's a reasonable amount. . . . Everyone within the company—directors of the manufacturing, marketing, sales, finance and other departments—agrees to the decision and commits to making it work.

Not so in the government . . . where a tremendous number of stakeholders often work toward contradictory goals, and year-to-year budget fluctuations can derail an initiative before it's able to bear fruit.⁴

Additionally, we found a common theme concerning the challenge of delivering value over time. Each firm described the uncertainty of the future and its efforts to manage risks and take advantage of opportunities. They cited their use of data, advanced analytics, and forecasts to inform near-term as well as long-term decisions. In many cases, the latter were tied to a well-defined vision and measured in decades. We were particularly impressed with ExxonMobil's approach: "We carefully assess investments over a range of potential market conditions and across time horizons that can span decades. Our approach to investing is to advance only those opportunities that are likely to provide long-term shareholder value."⁵

Corporations possess a clear advantage in one key area—their superior accounting practices and tools.⁶ They use the latter as both management and communication devices that enable them to assess value, align internal interests, communicate decisions internally and externally, and integrate management systems in ways not currently possible in the DOD. Undersecretary Krieg explains that "for-profit companies also have a concrete way to measure their efforts, based on the bottom line. . . . That's not as simple within DoD . . . where effectiveness is measured not by numbers on a spread sheet, but by capability."⁷

Although many differences exist between corporate and government decision making, the need to successfully link and streamline decision support processes remains universally important. Thus, the Air Force



must develop better ways to calculate and communicate stakeholder value and develop a more complete guidance or picture of the “overall and cross-portfolio” trade space.

Taming the Tigers through Trade-Space Exploration

Several management and analytical approaches can support organizational decision making. Economics, marketing, and finance-centric approaches dominate the analytical landscape. However, most of them are tailored for business and cannot be easily imported into government acquisition. The requirement needs include (1) an approach that provides transparency of assumptions and constraints, (2) a method to simultaneously evaluate the costs and benefit of decisions not often measured in dollars, and (3) the means to examine broader sets of alternatives over multiple scenarios and to allow decision makers to visualize and interact with the data that supports their decisions.

The academic world recognizes that the complexity of today’s technology, management, and policy issues calls for new thinking that transcends traditional disciplinary stovepipes in the engineering, management, and policy fields.⁸ Researchers at the Massachusetts Institute of Technology’s Engineering Systems Division are leading the way in developing various new tools and techniques tailored for these vexing problems. These scholars combine the best tools from marketing, finance, political science, and engineering to inform the development of a complex decision-making environment. In particular, a team of researchers has developed an approach that meets our requirement needs—one that allows leaders to simulate the benefits and costs of strategic decisions and to visualize this data over time and across scenarios.⁹ Their approach permits decision makers to evaluate large trade spaces with hundreds, even thousands, of alternatives. This intuitive method, which we can tailor for our purposes, includes the following steps:



1. Define the problem, scenario, or resource decision with corresponding assumptions.
2. Define the stakeholders.
3. Define the assessment of benefits and costs.
4. Develop a set of possible alternatives.
5. Calculate/estimate the cost and benefit for each alternative and explore the trade space.
6. Repeat steps one through five for alternate scenarios or assumptions.

In the DOD, one may consider US Transportation Command (USTRANSCOM) a good example of a highly complex military organization that truly understands maximizing value to the war fighter and the nation. From its inception in the late 1980s and accelerating in the early and mid-1990s, USTRANSCOM has evolved and improved its forces, programs, planning, and operations to optimize transportation capabilities. In doing so, the command ensures that it continues to satisfy its current supporting mission and future contingency plans in a cost-efficient yet wholly effective manner.¹⁰

To illustrate the above-mentioned method, we present a notional case example from USTRANSCOM to examine the operational/military utility and business-case analysis of multimodal transportation decision making in response to a high-priority operational military requirement. This represents an operational-level but not a strategic-level example. Consequently, we have simplified the calculation of benefit, costs, and definition of alternatives. The case study offers a step-by-step procedure illustrating a possible application of our proposed analytical method.

Step 1. Define the Problem, Scenario, or Resource Decision with Corresponding Assumptions

The proposed method begins by identifying the core underlying problem or resource decision that must be made and the corresponding as-



sumptions. In the summer of 2007, the secretary of defense tasked USTRANSCOM's leadership to transport 3,500 of the latest mine-resistant ambush-protected (MRAP) vehicles to Iraq and Afghanistan by year's end. To meet the secretary's intent, those leaders must design a plan that meets this goal within resource constraints.

Step 2. Define the Stakeholders

The key stakeholders in this scenario include, but are not limited to, USTRANSCOM, Air Mobility Command, Military Sealift Command, airlift contractors, sealift contractors, the secretary of defense, and US Central Command.

Step 3. Define the Assessment of Benefits and Costs

Each stakeholder currently possesses its own unique benefit equation and preferences for addressing the proposed problem. In most cases, benefit is neither formally defined nor shared with the other stakeholders. The process of developing a common understanding of benefit drives alignment between the various stakeholders involved in the system. For this scenario, we assume that the stakeholders defined the key criteria (attributes) in the benefit calculation as follows:

- response time: measured in the average number days to deliver an MRAP to an operational unit
- capacity: measured in the number of MRAPs delivered per month
- impact to other operations: qualitative measure based on a five-point scale (0 = minimal impact, 3 = moderate impact on other missions, 5 = disruption of critical higher-priority missions)

Each attribute is weighted based on what the stakeholders perceive as benefiting them. Determining actual weights for the attributes can prove time consuming. The academic literature includes a variety of methodologies available to derive these weights analytically.¹¹ Albeit challenging, the process for determining these weights will pay off in the long run. For simplicity's sake, we assume that the attribute "re-



response time” had a value twice as important as the other criteria. Next, we must specify the assessment of cost—specifically, in this case study, as the average cost to deliver one MRAP.

Step 4. Develop a Set of Possible Alternatives

Development of a robust set of alternatives can present a vexing challenge. Here, such a set would include varying levels of military airlift, commercial airlift, military sealift, commercial sealift, and many combinations for each. To keep things simple, we first consider a set of three possible alternatives—(1) use airlift, (2) use sealift, or (3) use a combination of the two—and then assess the benefits and cost for each (see table).

Table. Assessment of alternatives

	Importance	Airlift	Sealift	Air Lift + Sealift
Response Time (Avg. Days to Delivery)	0.5	1 day	25 days	3 days
Capacity (Number of MRAPs Delivered per Month)	0.25	360	>500	>500
Impact to Other Missions (Low to High)	0.25	Moderate	Low	Low
Cost (Avg. Cost to Deliver 1 MRAP)		\$135K	\$18K	\$50K

Step 5. Calculate/Estimate the Cost and Benefit for Each Alternative and Explore the Trade Space

From the table, we now have the necessary information to analyze the alternatives. In order to perform the calculation, we normalized the variables in the table. We then multiplied these normalized values by the importance column and plotted the sums of these now-weighted values for each alternative in figure 5. Because we have evaluated all of them in terms of the same value metrics, we can perform an “apples to apples” comparison. Due to the risk associated with both the benefit and cost estimations, the data points are really ellipses that represent this uncertainty—the greater the uncertainty, the larger the ellipse.

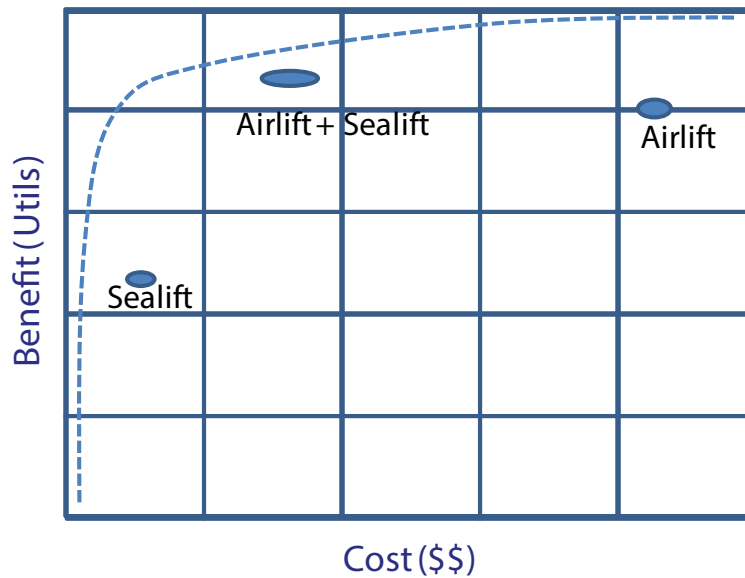


Figure 5. Plotting the benefit versus cost for the alternatives

We see that combining airlift and sealift conveys the best value by delivering significantly more benefit (measured in utils or the weighted average of the benefit criteria) than both the airlift-only and sealift-only alternatives. We now have the making of a trade space of alternatives to compare options and think critically about how best to move forward. The next question is, “Are there even better value alternatives that simultaneously improve operational effectiveness at a lower cost?”

Over the past 20 years, computer modeling and simulation have greatly aided the task of developing alternatives. Figure 6 is an example of a large trade-space product using the approach developed by researchers at MIT. Using their methods, we can generate large sets of alternatives through modeling and simulation. Each alternative is plotted according to its assessed benefit and cost, using the criteria defined above. The “best” alternatives, represented by the dotted line in figures 5 and 6, cannot be improved in one dimension (benefit) without worsening in the other dimension (cost), a phenomenon referred to as the

Pareto efficient frontier. The most interesting region in the trade space, the Pareto frontier represents alternative solutions that provide the “best bang for the buck.” In our case study, the analysis suggests that potentially less expensive options meet the benefit generated by the combination of airlift and sealift. Other solutions below the airlift and sealift alternative are inefficient.

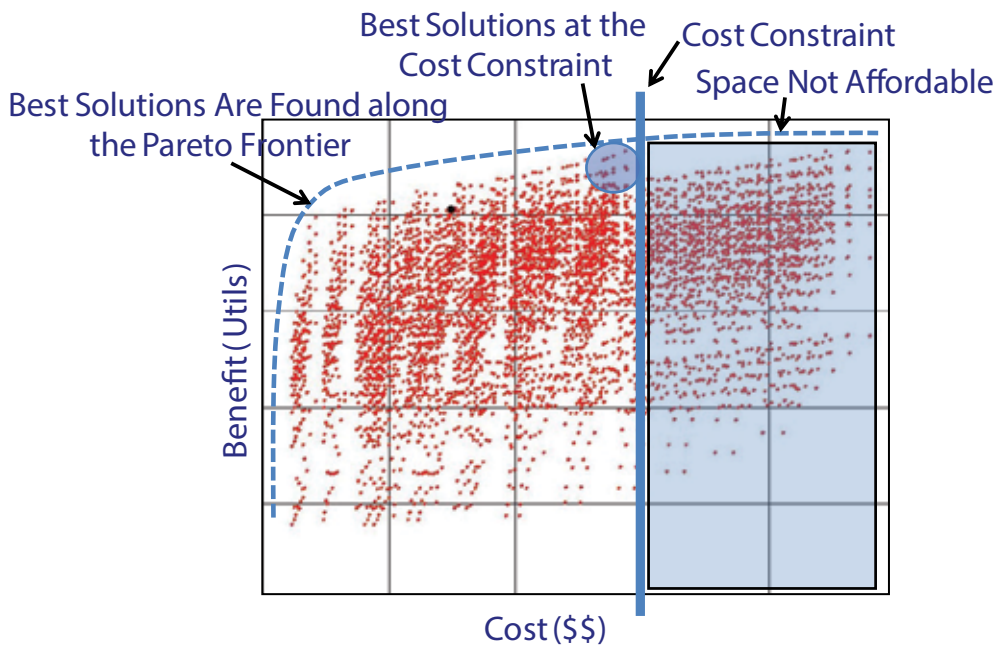


Figure 6. A notional-value trade space with thousands of alternatives

Step 6. Repeat Steps One through Five for Alternate Scenarios or Assumptions

Because the future is uncertain, forecasts are almost always wrong, and participating stakeholders often carry divergent assumptions. Nevertheless, it is possible to examine the same trade spaces of alternatives under different assumptions regarding benefits and costs (e.g., differing customers and alternative futures).¹² For example, what if the secretary of defense updates his guidance or changes his weights for

the criteria? We could easily recalculate the trade space to account for these changes or other alterations to the assumptions. Figure 7 represents a trade space examined by using 16 scenarios with varying sets of assumptions.

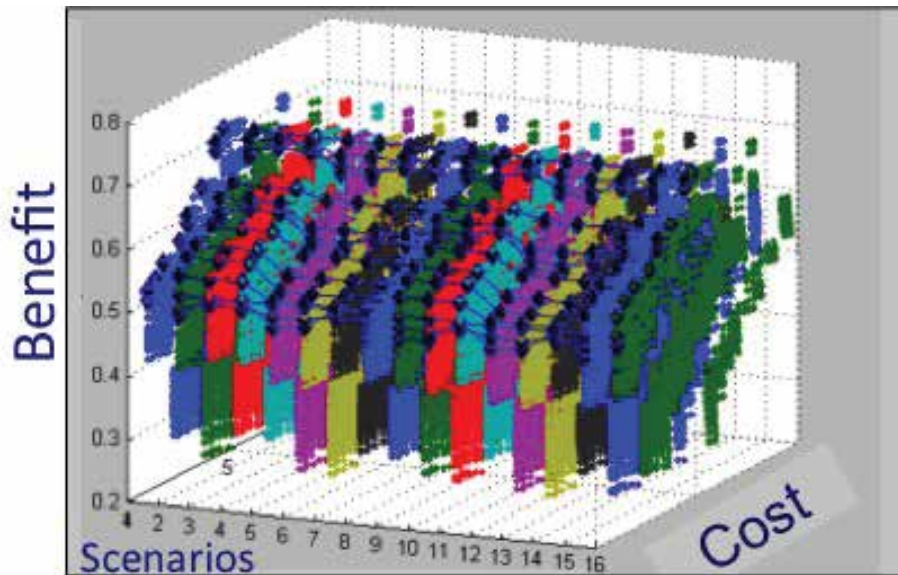


Figure 7. Value trade spaces with varying scenarios

We are particularly interested in alternatives that perform well (located on or near the Pareto frontier) across many scenarios. They are “value robust” because of their insensitivity in benefit per cost to changes across considered scenarios.¹³ In light of the severe uncertainty we face, analytical tools for identifying valuable solutions across alternative scenarios would prove helpful.

In our case study, we presented a representative problem from the war-fighting domain to review the method and demonstrate how to expand the trade space, balance operational necessity with business-case analysis, and translate it into executable public policy. In the MRAP example, we constrained our discussion to the USTRANSCOM commander’s operational/execution trade space. We could have added much



greater complexity with constraints such as geopolitics or natural disasters—factors with which USTRANSCOM also deals frequently and globally. Our point is not to use MRAP as an example of acquisition reform but to highlight how we can use the “tailored” method to determine modernization and operational (doctrine, organization, training, materiel, leadership and education, personnel, and facilities) trade-space alternative solutions by bringing value to the services, capacity to the war fighter, and facilitating the good execution of public policy. The next section examines how this approach can better integrate decision making across our planning, programming, and acquisition processes.

Operational Blueprint to Adopt a Value-Driven Approach

An operational blueprint begins with development of a long-term vision for the Air Force and a clear articulation of value based on US policy and requirements of the combatant command. Leadership must translate these needs into benefit calculation(s) that can evaluate decisions. This is no easy task because it requires our leaders to define and share a collective (within the Air Force, Office of the Secretary of Defense, and Congress) understanding of how benefit will be defined for the Air Force. Then leaders must work together to develop robust, innovative sets of alternatives for consideration. These include alternatives at the Air Force (across core functions), core-function, mission-requirement, and system levels. Finally, our leaders must provide a common framework for calculating and evaluating costs. The process to construct a value-driven trade space demands timely participation and close collaboration between the leaders and staffs of our three rings (fig. 8). The arrows notionally represent the source of the information. Arrows emanating from overlapping circles indicate that leaders and staffs from the respective processes must collaborate to supply the requisite information.

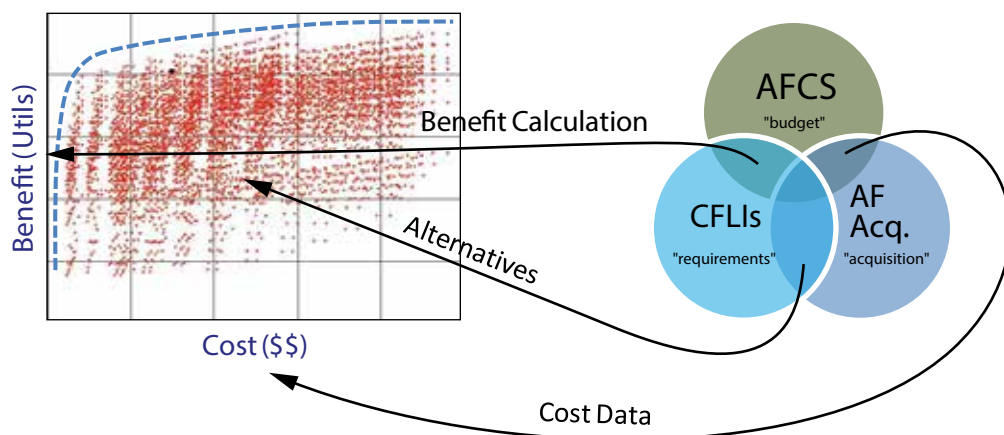


Figure 8. Inputs to the value trade space

Next, we must integrate and synchronize the trade-space analysis within the Air Force's decision cycle, which consists of calendar-driven and process-driven decision-making events. These include the annual four-star-level meetings called CORONAs as well as other meetings that occur in support of planning, programming, and acquisition decisions.

We recommend that an agency such as Air Force Analyses, Assessments, and Lessons Learned serve as an independent agent to gather the data and perform the analysis. It would have responsibility for coordinating and leading analytical efforts to link and streamline analyses to support the milestones for each process, with the goal of providing leaders across the Air Force enterprise a common basis for making decisions. Therefore, during the calendar year when the CFLIs are formulating their prioritizations, when the Air Force acquisition community is contemplating acquisition strategies and programmatic decisions, or when the AFCS is "getting to the bottom line," there will be greater participation, a higher degree of transparency, and better alignment for the service's decision making.

The proposed approach will give Air Force leaders, from the secretary / chief of staff through the MAJCOMs, better decisional knowledge by integrating the best information from each of the service's de-



cision support systems and organizing it in a way that leads to maximizing value and war-fighting capability over the short term and long term. This approach makes assumptions and constraints transparent while offering both a method to simultaneously evaluate the costs and benefit of decisions and the means to examine broader sets of alternatives over multiple scenarios. We consider these elements the basis for developing sound business cases for Air Force decisions—elements that will provide the secretary / chief of staff a better tool kit for communicating and defending decisions to the Office of the Secretary of Defense and Congress.

Limitations of a Value-Driven Approach

Implementing a value-driven approach involves a number of problems. Defining and agreeing on a common definition of value can prove difficult for leaders since some stakeholders have no incentive to participate or may seek ways to manipulate the process. Further, in organizations where one individual does not have dictatorial power, there is currently no unique solution for putting all the stakeholders' utility together. This situation highlights the need to negotiate and find mutually beneficial solutions (i.e., those that fall on mutual Pareto surfaces). The estimations of costs often entail high uncertainty that can make trade spaces difficult to interpret and cause decision makers to reach wrong conclusions. Additionally, the underlying assumptions and planning scenarios necessary to develop trade spaces could often be wrong or inaccurate. Leaders must endeavor to evaluate and, oftentimes, challenge these assumptions to mitigate the danger of arriving at bad conclusions. They must understand these limitations if we wish to adopt this method.

Conclusion

Despite these impediments, we believe that the proposed approach offers a practical pathway to tame the tigers in our three-ring Big "A"



circus. This begins with development of a long-term vision for the Air Force and a clear articulation of value. This definition of the latter will serve as the lens for evaluating the service's decisions and thus will drive alignment within and between the processes of our three rings of planning, budgeting, and acquisition. We believe that now is a perfect time to start implementing a new approach. The Air Force Quadrennial Defense Review office could adopt a value-focused approach in preparation for the next review. If successful, that approach could then become fully integrated into the Air Force's decision cycle, starting with an upcoming CORONA, thereby affecting and shaping our requirements, budget, and acquisition processes. This would include more continuous involvement from the secretary/chief in conjunction with the other four-stars to lay out a vision and foundation of assumptions for the future force. By implementing a value-driven approach, the Air Force will have a better engine for justifying and communicating its decisions. In our experience, value-driven decisions guided by clear strategic vision and supported by rigorous operational and business-case analysis can fulfill national-policy goals in a responsible, efficient, and defensible manner. ★

Notes

1. Michael Meese, "Defense Decision Making under Budget Stringency: Explaining Downsizing in the United States Army" (PhD diss., Woodrow Wilson School of Public and International Affairs, Princeton University, 2000). One of Colonel Meese's key findings is that decisions made in times of budget stringency have disproportionate effects on military services over time. See also Michael Donley, "On the Air Force's Budgetary Balancing Act," AOL Defense, 8 January 2013, <http://defense.aol.com/2013/01/08/sec-donley-on-the-air-forces-budgetary-balancing-act-exclusiv/>; and Secretary of the Air Force James G. Roche and Barry Watts, Op-Ed, "Confronting Threats of Military Modernization," *Politico*, 26 September 2012.
2. Air Force Instruction 16-501, *Control and Documentation of Air Force Programs*, 15 August 2006, http://static.e-publishing.af.mil/production/1/af_a3_5/publication/afi16-501/afi16-501.pdf.
3. Frank Kendall, undersecretary of defense, to defense acquisition workforce, memorandum, subject: Better Buying Power 2.0: Continuing the Pursuit for Greater Efficiency and



Productivity in Defense Spending, 13 November 2012, <http://www.defense.gov/news/BBPWorkforceMemo.pdf>.

4. Donna Miles, "Acquisitions Chief Outlines Streamlined Processes," Army.com, 15 March 2007, <http://www.armyreal.com/news/item/2810>.

5. "Business Model," ExxonMobil, accessed 30 January 2013, <http://ir.exxonmobil.com/phoenix.zhtml?c=115024&p=irol-model>.

6. Lisa Daniel, "Comptroller: Panetta Directive Pushes Audit Readiness," American Forces Press Service, 19 April 2012.

7. Miles, "Acquisitions Chief."

8. Over the past 10 years, several leading universities have created academic programs tailored to address interdisciplinary challenges in the technology, management, and policy domain. Notable programs include MIT's Engineering Systems Division, Stanford's Engineering and Management Science Department, Carnegie-Mellon's Engineering and Public Policy Program, Stevens Institute of Technology's School of Systems and Enterprises, and Johns Hopkins's Systems Institute.

9. Adam M. Ross et al., "Multi-attribute Tradespace Exploration as Front End for Effective Space System Design," *Journal of Spacecraft and Rockets* 41, no. 1 (January–February 2004): 20–28, <http://web.mit.edu/adamross/www/AIAA-9204-452.pdf>.

10. Gen Duncan J. McNabb, "We Measure Success through the Eyes of the War Fighter," *Air and Space Power Journal* 25, no. 4 (Winter 2011): 8–18, http://www.airpower.maxwell.af.mil/airchronicles/apj/2011/2011-4/2011_4.pdf.

11. Ralph L. Keeney and Howard Raiffa, *Decisions with Multiple Objectives: Preferences and Value Tradeoffs* (Cambridge, UK: Cambridge University Press, 1993); and Thomas L. Saaty and Kirti Peniwati, *Group Decision Making: Drawing Out and Reconciling Differences* (Pittsburgh, PA: RWS Publications, 2008).

12. Richard de Neufville and Stefan Scholtes, *Flexibility in Engineering Design* (Cambridge, MA: MIT Press, 2011); Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable*, 2nd ed. (New York: Random House Trade Paperbacks, 2010); and Richard Danzig, *Driving in the Dark: Ten Propositions about Prediction and National Security* (Washington, DC: Center for New American Security, October 2011), http://www.cnas.org/files/documents/publications/CNAS_Prediction_Danzig.pdf.

13. Adam M. Ross, Donna H. Rhodes, and Daniel E. Hastings, "Defining Changeability: Reconciling Flexibility, Adaptability, Scalability, Modifiability, and Robustness for Maintaining System Lifecycle Value," *Systems Engineering* 11, no. 3 (Fall 2008): 246–62.



Maj Gen Robert Kane, USAF

Major General Kane (BS, Grove City College; MS, University of Southern California) is the director of Global Reach Programs, Office of the Assistant Secretary of the Air Force for Acquisition. He is responsible to the Air Force acquisition executive for airlift, air refueling, training, and special operations programs. The general has served in Turkey, Korea, Germany, and Iraq in a wide variety of operational and staff assignments, including commands at the squadron, group, wing, and center levels. As commander of the Kaiserslautern Military Community and 86th Airlift Wing, he was instrumental in leading the Ramstein community to win the 2006 Commander in Chief Annual Award for Installation Excellence. Prior to this assignment, he served as commander of the Spaatz Center for Officer Education and commandant of the Air War College, Maxwell AFB, Alabama. During a 2009 deployment, he was commanding general of the Coalition Air Force Training Team, Baghdad, Iraq, responsible for coalition efforts to rebuild the Iraqi air force. General Kane is a command pilot with more than 4,200 hours in a number of military and commercial derivative aircraft.



Lt Col Jason Bartolomei, PhD, USAF

Lieutenant Colonel Bartolomei (BS, Marquette University; MS, Air Force Institute of Technology; PhD, Massachusetts Institute of Technology) is the deputy of the Program, Budget, and Congressional Division in the Directorate of Global Reach Programs, Assistant Secretary of the Air Force (Acquisition). He supports a \$52 billion weapon-system acquisitions portfolio that includes the Air Force's tankers, airlift, special operations, and trainer fleets. He served as a program element monitor for the KC-46A tanker, an F-22 systems engineer, and an assistant professor of engineering at the US Air Force Academy. A fully qualified joint officer, Lieutenant Colonel Bartolomei led the Joint Warfare Analysis Center's counterterrorism support team during 2007–10. He was a Service Chiefs' Fellow at the Defense Advanced Research Projects Agency in 2010 and a Military Legislative Fellow for Senator Orrin G. Hatch (R-UT) in 2011.

Let us know what you think! Leave a comment!

Distribution A: Approved for public release; distribution unlimited.

Disclaimer

The views and opinions expressed or implied in the *Journal* are those of the authors and should not be construed as carrying the official sanction of the Department of Defense, Air Force, Air Education and Training Command, Air University, or other agencies or departments of the US government.

This article may be reproduced in whole or in part without permission. If it is reproduced, the *Air and Space Power Journal* requests a courtesy line.

<http://www.airpower.au.af.mil>