9. Develop the Solution

This chapter explains how the partnership approach affects program management and details our new approach to moving from a contract award to a test item.

In particular, this chapter covers the following topics:

- Understanding the new process
- Understanding the key insights and redesign ideas
- The step-by-step process

Each section provides a greater level of detail about the Partnership approach to developing a solution.

9.1 Understanding the New Process

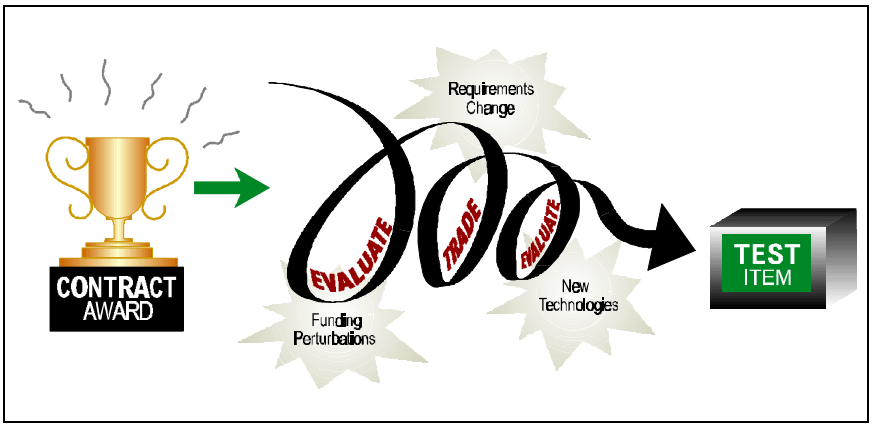


Figure 9-1. Converging on the Optimal Solution. *As this graphic suggests, the system development stage demands that we respond to perturbations as we converge on a preferred solution.*

The Partnership Process demands quantification of military worth at each stage of the acquisition process. Our new tools and approaches to system development help ensure that the rigor of earlier acquisition stages are carried forward through the creation of a weapon system. This chapter describes the improved acquisition process from the award of a contract through the delivery of a test item.

9.1.1 Converging on the Optimal Solution

Regardless of the acquisition phase, the purpose of the solution activity is to reduce risk, refine design, and provide information for informed evaluation and decision making.

For each of these aspects, the Partnership has developed tools and provides guidance that ensure we meet the goals of this stage of the acquisition process in the most efficient, cost-effective way, while providing the greatest benefit to the warfighter.

As an acquisition progresses through the development stage, we want to converge on the optimal solution to the warfighter's needs. This optimal solution provides a quantifiable level of military worth and is achieved within the multidimensional requirements space. We expect program managers to constantly evaluate the military worth of the developing system and make informed decisions regarding military worth, cost, schedule, and risk.

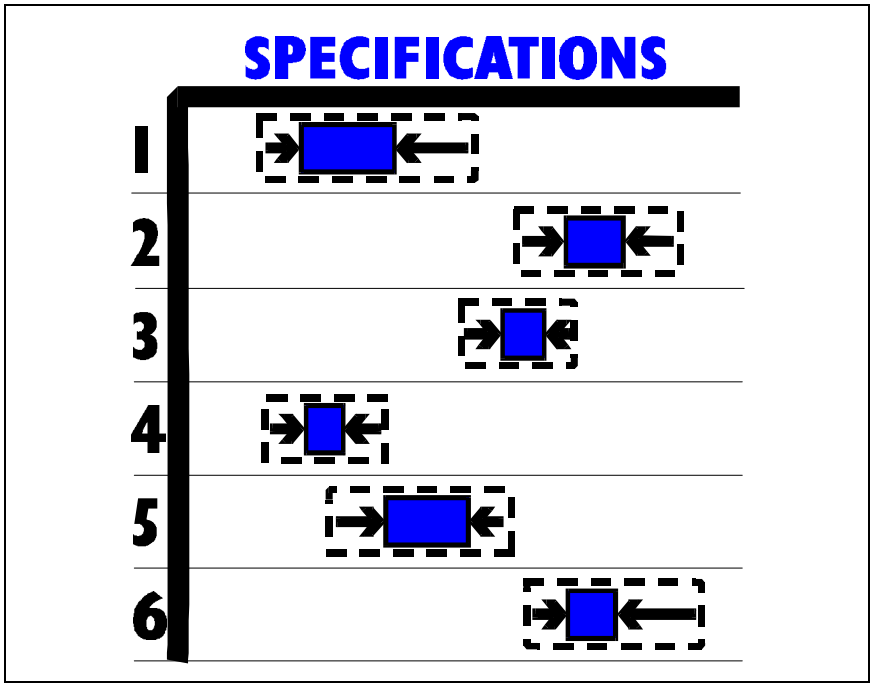


Figure 9-2. Converging on Optimal Specifications. *As system development progresses, specifications will evolve and the range of acceptable specifications will reduce.*

Participants in an acquisition during this stage must also respond to changes in the technological, military, and budgetary environment. These changes could affect the nature of the warfighter's needs, change the capabilities of the system, or enhance our understanding of the threat. Whenever new information becomes available,

program managers need to understand the new situation to ensure that the system still delivers the greatest possible military worth within reasonable cost and schedule parameters.

See Section 3.3.4, We Will Work Within Our Core Competencies.

Perhaps the most significant change in this stage of the acquisition is how we hand off responsibility to our industry partners. We do this to take advantage of the participants' core competencies. We acknowledge that contractors are best suited to develop the technical attributes of a system.

Accordingly, the government refrains to the greatest extent possible from overseeing how industry executes its responsibilities. Instead, it concentrates on gaining insight into industry's activities to ensure they can respond to the requirements levied on them. This clear division of responsibilities requires that industry be responsible for total system effectiveness.

9.1.2 Understanding Solution Development by DoD 5000 Phase

Solution development happens during every phase of an acquisition, from concept exploration through production. The following table indicates the tasks that are specific to each phase. The principles we discuss in this chapter provide guidance for participants in every phase.

DoD 5000 Phase	Distinguishing Features of Each Phase
Phase 0: Concept Exploration	Define preferred system concept(s) Identify needed technology advancements Use modeling and simulation to explore concepts
Phase I: Program Definition and Risk Reduction	Define system architecture Identify and mature highest risk elements Use modeling and simulation to conduct system level trades Fill in specification "gaps"
Phase II: Engineering and Manufacturing Development	Define all design elements Identify and mature manufacturing risk elements Use modeling and simulation to conduct "build to" trades

DoD 5000 Phase	Distinguishing Features of Each Phase
Phase III: Production, Fielding/Deployment, and Operational Support	Use quality tenets to ensure specs are met Engage in trades to optimize processes Explore modifications and upgrades to enhance product Use modeling and simulation to assess currency

Figure 9-3. Solution Development by DoD 5000 Phase. *The specific activities entailed by developing the solution vary depending on the phase of the acquisition, but the purpose of and approach toward development should be consistent.*

9.2 Understanding the Key Insights and Redesign Ideas

Key Insights and Redesign Ideas	
	• Use the Acquisition ICT/IPT. • Apply the common M&S toolset and update it as better data becomes available. • Make evaluations and trades based on the concept of the requirements space. • Implement the contractor's insight plan.

9.2.1 Use the Acquisition ICT/IPT

The Acquisition Integrated Concept Team (ICT) or Integrated Product Team (IPT), formed early in the acquisition process, continues to guide the acquisition and assist all participants. During the mission needs determination and concept exploration, this team is led by the warfighter—in particular, by a representative from the MAJCOM requirements staff—and we call it an ICT to reflect the fact that no product is yet being acquired.

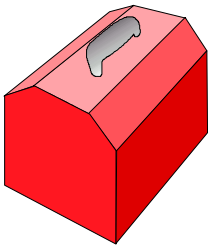
After Phase I has commenced, the team is called an Integrated Product Team, and leadership of the team will probably shift to the program manager. Especially during this development stage, the Acquisition IPT must ensure that the voice of the warfighter is kept at full volume.

While the System Program Office (SPO) is primarily responsible for the activities of this stage, and for the quality of the test item that is its final product, the Acquisition IPT must provide leadership, offer

assistance with technical details, and provide a means for communication between all functional groups.

The representation of the Acquisition IPT should remain as stable as possible throughout the acquisition of a system, even though the leader will probably change based on the particular stage of the acquisition. In particular, at this stage the Acquisition IPT is probably led by a representative from the SPO.

9.2.2 Apply the Common Modeling and Simulation Toolset and Update as Better Data Become Available

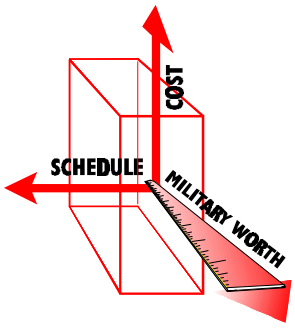


The modeling and simulation toolset is used throughout the acquisition process to ensure common measures as well as verifiable and consistent data analysis. As discussed in Chapter 6, Establish the Requirements, the modeling and simulation toolset provides an integrated and standardized set of tools to help program managers explore the relationships and tradeoffs between alternatives.

During the development stage, the modeling and simulation toolset is applied whenever a program manager must make a decision about the design of a system or component. The information provided by the models and simulations should help the decision maker assess the effect of the change on the total military worth of the system and guide the system toward its optimal configuration.

In addition, the data derived from testing during the development stage should allow us to improve the accuracy of the models and help them to more effectively predict the contribution of any system to campaign effectiveness.

9.2.3 Make Evaluations and Trades Based on the Concept of the Requirements Space



The same requirements space matrix that helped narrow the range of solutions during requirements definition and provided the foundation for decision making during source selection provides the basis for the evaluations and trades during the solution development stage. In particular, we employ an analysis of the three dimensions of the requirements trade space to react to new or changed constraints in the environment.

This disciplined approach allows us to accurately characterize and insightfully respond to changes in the estimated military worth of a system. Because we have quantified the requirement in a way that is directly linked to the warfighter's needs and we possess a clear understanding of cost and schedule parameters, we can make trades among these variables that ensure the optimal solution.

9.2.4 Implement the Contractor's Insight Plan

As discussed in Chapter 8, Select the Source, contractors submit an Insight Plan along with their proposals. The Insight Plan contains the contractor's estimate of the information the government will need to manage the program, how often and in what form that information will be communicated, and identifies the key specifications that should be used to assess development progress.

This Insight Plan does not reduce the government's ability to observe and understand the development process. It provides a working agreement about how best to manage development and ensure that the contractor delivers the item that was promised in the proposal.

9.3 The Step-by-Step Process

The process during the solution development stage is less linear than other stages, with participants performing the same activities in an iterative manner, continually refining the system, and moving toward converging on the optimal solution.

The process of developing a solution involves the following steps:

- Performing key activities during system development
- Exploring and focusing the requirements space
- Using insight rather than oversight
- Instituting EW best practices
- Accepting responsibility for total system effectiveness
- Testing to inform

9.3.1 Performing Key Activities During System Development

The activities that occur during this stage often happen concurrently and must be performed iteratively as the system develops. In particular, during the solution-development stage, we must accomplish the following tasks:

- Translate the quantified requirement into a solution.
- Attain the desired level of military worth within the bounded requirements space.
- Apply functional analysis to link lower-level choices with higher-level tasks.
- Ensure linkages through each level of the military worth pyramid.
- Test system components to validate the system's military worth.
- Validate and update the digital system model (DSM) with test data.

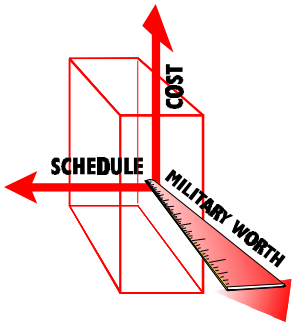
Translating Requirements Into a Solution

Industry must take the initiative throughout this stage. The contractor or contractors who won the contract award must translate the quantified requirement into a solution. We hand off responsibility at this point because it is where we move from the military's core competency (translating the warfighter's need into an operational requirement) to industry's core competency (translating system level requirements into physical products).

The success of this handoff depends on all of the work we have done earlier in the process to ensure that industry understands the requirement and has full access to the military's analysis of the possible solutions.

The military stays involved in this process by maintaining insight into the system, providing guidance to the contract award winner about the warfighter's needs, and ensuring that the system provides the military worth proposed by the contractor. Maintaining the government/industry partnership at this stage is crucial—we must mutually decide on the important factors and establish a level of interaction that can respond to unanticipated events when they occur.

Attaining Military Worth Within a Bounded Requirements Space



Though industry is primarily responsible for this stage, the program manager needs to stay involved to gain insight into the progress of system development. The program manager must ensure that, as we converge on a system solution, the focus remains on attaining the desired level of military worth within the constraints of the requirements space.

In the past, government assumed the responsibility for making the translation from operational requirements to specifications. In our new process, the baton pass occurs earlier in the development cycle. The government keeps its focus on performance while industry is free to negotiate the possible solution space.

Applying Functional Analysis

Industry, like government during the requirements development stage, rigorously applies functional analysis to ensure that all design choices made at lower levels link to higher-level tasks in the military worth pyramid. When we have developed a fully mature model for quantifying military worth, we hope to understand how the lowest-level design choices impact the high-level assessment of military worth.

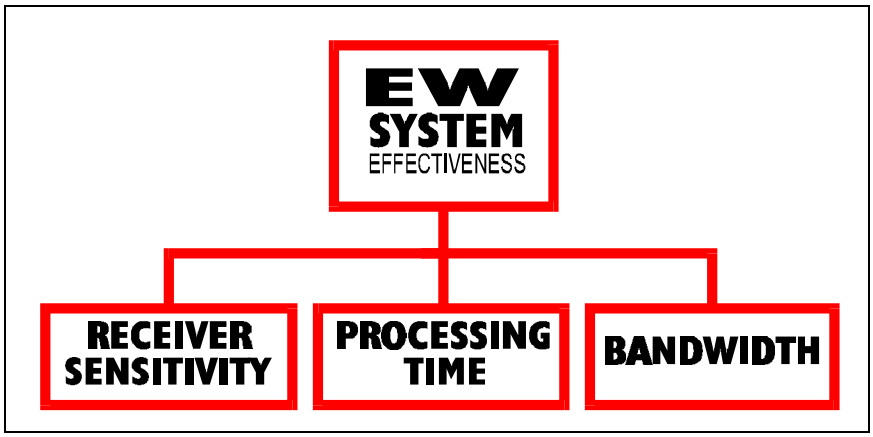
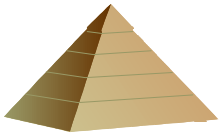


Figure 9-4. Functional Analysis. *During this stage, we must perform functional breakdown analysis to ensure that lower-level design choices support higher-level functions.*

Ensuring Linkages Among the Levels of the Military Worth Pyramid



Linkages between the various levels of the military worth pyramid are also critical because analysis has to happen more frequently than in the past. In addition to answering the many technical and managerial questions directed at the SPO, frequent analysis during this stage allows warfighters to gain insight into the constraints and trades necessary to arrive at a solution that best meets their needs. Thus, the voice of the warfighter is kept at a high volume.

Testing to Evaluate Military Worth

Testing during the development stage should provide information about the expected military worth of the system and provide insight for design choices, especially for lower-level trades in system specifications. Tests at this point provide valuable feedback about the maturity of the technology used in the system and allow operational testers to plan valid and useful tests of the final system's capabilities.

Validating and Updating the Digital System Model

In addition to providing insight for decision making, the test data should validate the models used to gauge military worth and provide information that improves the accuracy of the models. Modeling and simulation tools should reflect the best information we have about the threat, the plans to fight the mission, and the performance of the developing system. In this way, we can ensure that the solution will help us satisfy the warfighter's need.

For more information about DSMs, see Section 8.2.3, Communicate Information to Government Using a Digital System Model.

Digital System Models (DSMs) are a mathematical representation of a particular solution. We expect contractors to submit DSMs as part of their proposals during source selection and we will continue to use DSMs to validate the worth of the system during development. The DSM of a solution will reflect the warfighter's operational plans and interact with a mathematical representation of a threat and another mathematical representation of the environment to produce P_k grids.

During system development, the DSM of a system should be updated to reflect changes in the system's capabilities or key specifications. Preliminary test data should also be used to update and validate the accuracy of the DSM. The DSM will become more formal at this point, because it is a contractual requirement instead of a part of the contractor's proposal.

9.3.2 Exploring and Focusing the Requirements Space

When an acquisition reaches the development stage, requirements have been quantified, established, and conveyed to industry. In turn, industry has provided possible solutions to the requirement and a contract award has been granted to one or more contractors. Participants in this stage of the acquisition must now guide the system toward its optimal configuration given military worth, cost, schedule, and risk considerations.

Continually Reassessing Military Worth

The most important activity during this stage is the continual reassessment of the military worth of the system. As the proposed system matures, we should gain insight into its capabilities. This understanding allows us to make more accurate calculations of the system's military worth.

During this process, we repeatedly validate the links between a system's technical specifications and its contribution to campaign objectives, as illustrated in Figure 9-5.

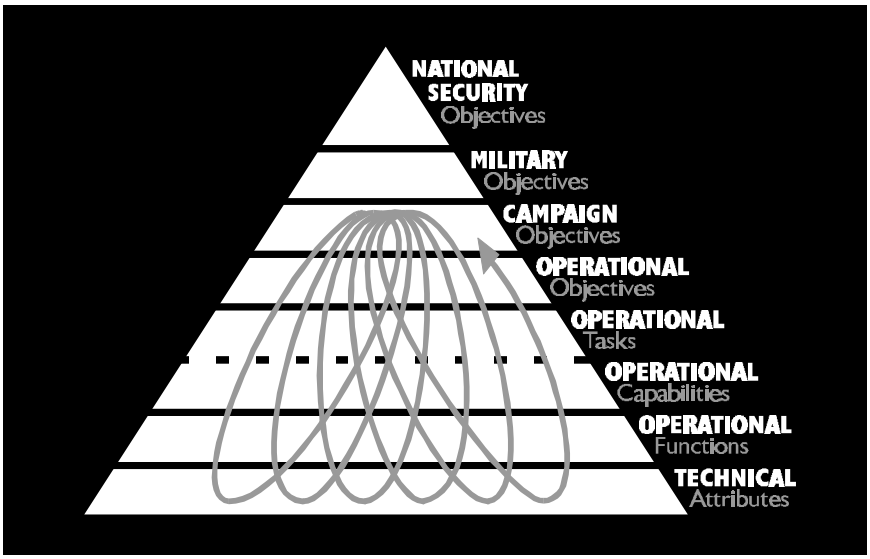


Figure 9-5. Validating the Links in the Military Worth Pyramid. *As the system develops, and we move across the bottom of the military worth pyramid, we continually validate the links between technical attributes and campaign objectives.*

This increasing understanding of a system permits us to explore and focus the requirements space, which consists of military worth, cost, schedule, and risk. Notice that, as we enter the development stage, the requirements space has not been replaced by exact, government-levied specifications. Instead, the program manager works within a requirements space and makes appropriate and disciplined evaluations and trades.

As we move toward the final design of the system solution, the range of estimated military worth and the trade space available to achieve it will contract. This process is depicted in the notional requirements correlation matrix in Figure 9-6.

MOP/MOE Parameter	Original Specification Range	First Update: 1Q97	Second Update: 3Q97	Final Update
Receiver Sensitivity (db)	10 ± 3	9 ±1	8.5 ±0.25	8.5
Processing Time (ms)	300 ±50	280 ±15	275 ±5	278
Bandwidth (MHz)	200 ±75	180 ±50	190 ±20	185
Targets at Risk (%)	Threshold = 45 0bjective = 70 Estimate = 55	E = 60	E = 62	E = 65

Figure 9-6. Notional Requirements Correlation Matrix. *As the development of a system proceeds, the range of possible specifications decreases, as indicated in this notional requirements correlation matrix. At the final update, we arrive at the final, optimal specifications.*

As this table indicates, during the iterative trades and evaluations that characterize the design process, we should gradually see a convergence toward a preferred approach. This process involves reducing the ranges of performance levels that we specify for various technical attributes. Accordingly, specification levels become more refined and precise.

As requirements become more defined, we continue to apply the military worth measure and indicate how trades at the specification level affect the expected military worth of a system. As shown in the last row of the table, the various specifications can be aggregated to calculate the estimated military worth, expressed as a percentage of targets at risk. At the start of solution development, we have a wide range between threshold and objective. As the solution matures, we can make more precise estimates of targets at risk and more accurately gauge the military worth of the system.

Another way to represent the convergence on preferred technical specifications is through the technical performance management tool. This tool provides a graphical representation of a narrowing range of tolerance as a solution is developed.

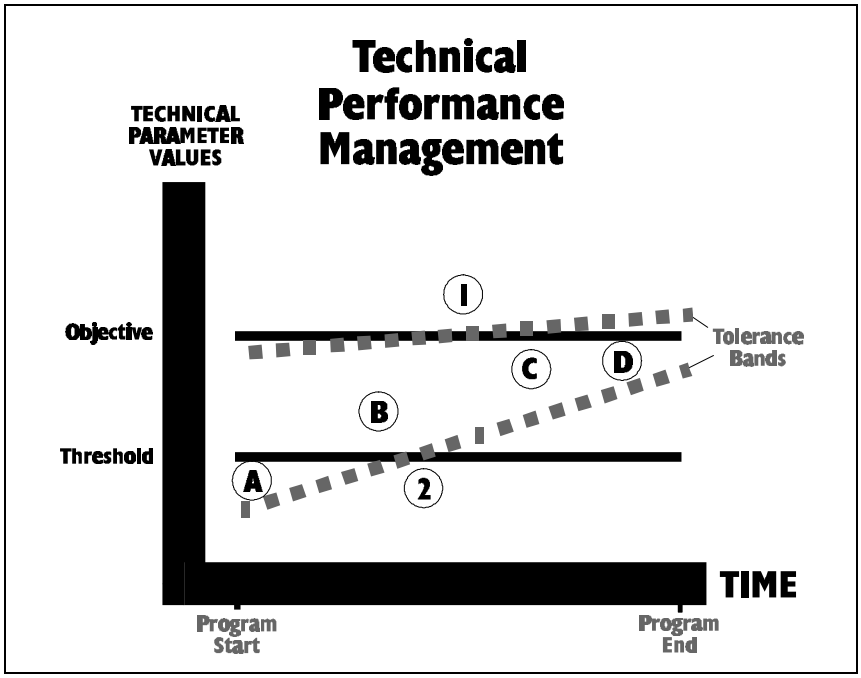


Figure 9-7. Technical Performance Management. *The technical performance management graph indicates the narrowing range of tolerance during system development.*

As indicated in this graph, the range of tolerance for a particular technical parameter value decreases from program start to program end. For a system that is developing according to plan, the value will increase over time until the final value approximates the desired or predicted value, as in the points labeled A, B, C, and D.

Data points that fall outside the tolerance bands, such as points 1 and 2, suggest that something has gone wrong. For example, in the case of a data point that falls below the tolerance band, the technology is not advancing as quickly as originally estimated. When a point exceeds the tolerance band, we should investigate to determine whether the original estimate was accurate and, if so, explain the reasons behind the unexpected advance in technology.

Performing Quick-Turn Analyses

For continual analysis of the military worth of a system, program managers need tools that allow frequent and rapid calculations of military worth.

The frequency of these analyses will depend on the maturity of the technology and the stage of development. Early in the process, a quarterly review of the estimated military worth of the system may be sufficient. As the system nears the end of a completed phase, more frequent assessments are required. In general, program managers should perform an analysis when the results may provide insight into a design choice.

A quick-turn analysis is an incremental analysis of alternatives. With a quick-turn analysis, we assesses the effect of changes in an aggregate number of parameters on the performance of the entire system. We look at an aggregate number of parameters because, depending on how critical it is to system performance, a change in a single parameter may or may not have high-level effects on the military worth measure. Changes in the aggregate, however, almost certainly will. These analyses permit us to make informed decisions about whether the change justifies a cost or schedule adjustment.

As our understanding of the military worth of EW systems increases, we will develop even more accurate tools for performing these quick-turn analyses.

Responding to Changes in the External Environment

As our understanding of the military worth of a system evolves, we must also stay informed of, and be responsive to, changes in the external environment. These changes can affect the requirements trade space by indicating, for example, the need for greater military worth, lower cost, or an accelerated schedule. Changes may occur in any of the following areas:

- Requirements
- Funding levels
- Scenarios and threats
- Technology
- Models and simulations

Any change in these areas could affect the design of a system. Program managers and contractors should be ready to make modifications throughout the development activity to ensure the that system best satisfies the warfighter's needs.

Now, both the government and industry will have effective tools for managing change.

Whenever a change in these constraints occurs, the program manager must evaluate the effect of this change and, if necessary, consult with the warfighter to determine the appropriate trade among performance, cost, schedule, and risk. Of course, responding to change has always been part of the program

manager's job. What is new about the Partnership Process is that both the government and industry will have effective tools for managing change.

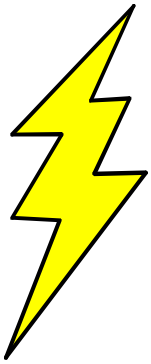
For example, consider a situation in which an EW system is well into development and we find that a threat's capabilities are greater than original intelligence estimates indicated. We could recalculate the anticipated military worth of the system in the context of the new threat information and, if our calculation showed a decline in the projected military worth, investigate alternative courses of action.

In another example, a program manager discovers that one element of the system's technology will be 20% more expensive than planned, but for the same price the manager can acquire a similar capability with 15% less performance. In the past, this decision would probably have been driven by the amount of money available in the budget. With a consistent measure of military worth, however, the program manager and the warfighter can make the choice based on a disciplined approach to the trade between cost and performance.

In every case, we are better able to respond to changes in the environment and can apply real insight into how to proceed. Our standard measure of military worth, and the tools we have available to do quick-turn analyses, allow acquisition personnel to make an informed decision when environmental pressures force changes from the planned strategy.

The tradeoffs among cost, schedule, and technical impacts can be assessed against any benefits a change in course might provide. These standard tools permit continuous analysis of the impact of changes in design and enable continuous assessment of environmental shifts.

9.3.3 Using Insight Rather Than Oversight



Using insight rather than oversight is an integral part of our attempt to change the way solutions are developed. This practice is an important condition for successful implementation of SAF/AQ's Lightning Bolt #3. This Lightning Bolt calls for the development of a new personnel model for SPOs, adopting the tenet of insight rather than oversight established in the management of classified/SAR-level programs.

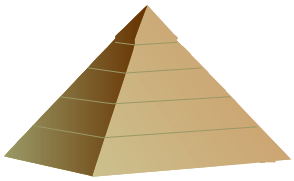
The Partnership has sought to provide additional tools and guidance to program managers who want to implement the ideas encompassed by this Lightning Bolt.

See Section 7.2.1 for more information about how the Partnership approaches implementation of Lightning Bolt #3.

The topic of insight rather than oversight is discussed in the following order:

- Encouraging insight by quantifying military worth
- Encouraging insight through a disciplined approach to trades
- Encouraging insight by reducing SPO size
- Encouraging insight by eliminating unnecessary reporting
- Encouraging insight through common databases

Encouraging Insight by Quantifying Military Worth



The military worth tools developed by the Partnership Process enable us to truly apply the principle of insight rather than oversight. The primary task of the program manager during this stage is determining the overall military worth of a system, arriving at more and more accurate calculations of the benefit provided by a system, and guiding the system toward an optimal solution.

Because calculations are more accurate, we can make informed decisions about changes in design. These decisions reflect the same insight and discipline that guided us through the earlier stages of requirements definition and source selection. In particular, our use of the Military Worth Method during development allows us to continue to implement cost as an independent variable.

In the past, development decisions were primarily made by considering whether the system met the specifications indicated in the Operational Requirements Document (ORD). This method forced the program manager to exercise extreme oversight, enforcing technical-level specifications regardless of their effect on the total military worth of the system.

Under the new process, detailed specifications are no longer included in the ORD. Consequently, program managers and contractors have a wider range of latitude in system design. They will no longer focus on whether a particular specification has been met, but on the total effectiveness of a system.

Specifications, of course, continue to be important, but we are no longer bound to them from the beginning of the process. Instead, we converge on optimal specifications that our industry partner must justify as we proceed through the iterative process of evaluations and trades. Both industry and government will be guided by the contractor's Insight Plan, which identifies the types of specifications that are most crucial to the system's development.

Encouraging Insight Through a Disciplined Approach to Trades

Making trades among a variety of options and considering several variables has always been a critical focus of any SPO, which must make decisions about design, budget, and schedule in a constantly changing environment. In the past, the decision to make a particular trade frequently depended on:

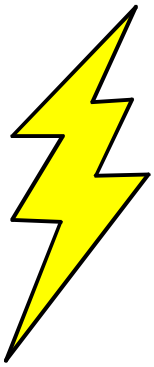
- Contractual status of the program
- Source of change
- Funding
- Visibility

Even when trades were based on performance, program managers had no consistent measure of the military worth of systems and so could not reliably assess the impact of a trade on the ultimate effectiveness of the system.

In the redesigned SPO, a consistent discipline and a standard set of tools are provided so that a program manager can understand the impact of a trade on all axes of the trade space. As a result, we can expect evaluations and trades to be performed in a more rigorous manner and to reflect the best interests of the warfighter.

Because we have developed this new approach to trades, we can continue to involve the warfighter in the decision-making process. In the past, the program manager was constrained by the detailed specifications contained in the ORD. Today, with decision making based on a rigorous approach to the trade space of military worth, cost, and schedule, we can seek out the warfighter's guidance when decisions that affect any of these variables must be made.

In our view, the program manager is responsible for gathering and understanding information about possible changes to the parameters of the trade space and working with the warfighter to make decisions. Because of this new responsibility, we need to educate the warfighter in our approach to the trade space.



Throughout an acquisition, we will work according to our principles of trust and partnership.

Encouraging Insight by Reducing SPO Size

The SPO responsible for program management today is much smaller than the SPOs for similar programs in the past. This reduction in SPO size is driven by Lightning Bolt #3, a policy that the Partnership Process has embraced and has worked to implement.

A smaller SPO automatically constrains the kinds of activities a program manager might perform. Ultimately, SPO size will be reduced so much that it cannot perform oversight duties and is forced to perform only tasks related to insight.

The primary job of the SPO is to ensure that the system progresses toward the test and evaluation stage in the most successful, cost- and time-effective manner. In this role, the SPO must ensure that a contractor who was awarded the contract follows through with the promises made in the proposal. This responsibility entails some degree of quality control and inspection. However, we put much more emphasis on our principles of trust and partnership throughout an acquisition. As a result, the SPO will avoid any unnecessary inspections and refrain from asking the contractor to perform tasks that do not add value.

In addition to reducing or eliminating oversight activities, a smaller SPO also requires the organization to decline external demands that detract from its primary responsibilities. For example, individual SPOs have often independently developed infrastructure elements, such as modeling and simulation tools. With fewer personnel, SPOs will need to rely on common efforts to develop these elements and focus their efforts on the specific activities needed for program success.

Encouraging Insight by Eliminating Unnecessary Reporting

In the new process, the kind of information the government demands from contractors has changed. Government should require only the information it needs to ensure the program is on track to meet its cost, schedule, and performance goals. The level of government involvement will be detailed in the contractor's Insight Plan, which the government will have endorsed as part of the contract award.

The adoption of an Insight Plan does not eliminate inspections or controlled processes. Rather, the quality standards we adopt will be tailored for the specific program and agreed to by government and industry. Industry will identify what quality standards it will employ, and the government will help industry refine those standards, use these measures as part of evaluation criteria, and manage the program according to these measures.

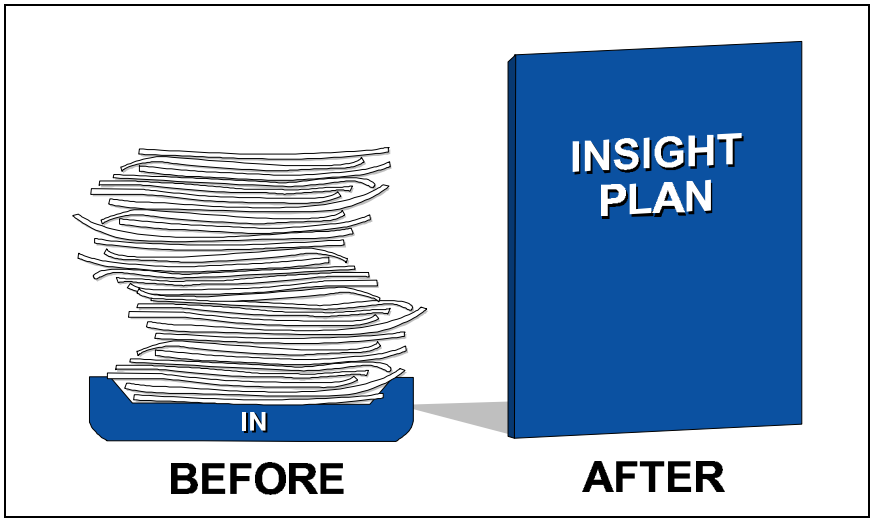


Figure 9-8. Insight Plan. *We will streamline reporting so that participants in the acquisition process request and receive only the information necessary to make insightful decisions.*

Any information of finer detail should be limited to problem areas. This information should allow the program manager to help the contractor understand and address the problem. All unnecessary transfer of information, which constitutes a burden on the contractor and encourages oversight rather than insight, should be eliminated.

Encouraging Insight Through Common Databases

Though we are reducing the burden for formal reporting and eliminating unnecessary demands for information from contractors, we are increasing and improving the communication between the contractor and the program manager by creating common databases. These databases should be fully available to both appropriate government personnel and contractors.

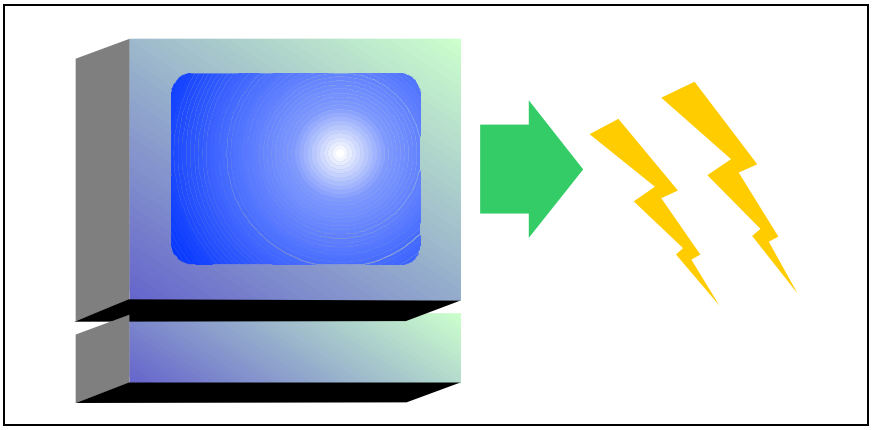


Figure 9-9. Common Databases. *Common and freely available databases enable us to communicate more effectively.*

We believe that using common databases will provide the following benefits:

- Reduced formality in information flows
- Instant update accessibility
- Greater insight
- Better communication among program personnel

These benefits will allow the SPO to continue its traditional function (guiding the favored solution to the point of being fielded and supported) while reducing or eliminating tasks that do not add value.

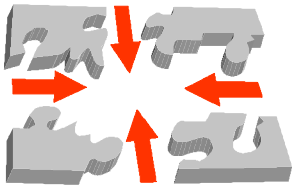
To use these common databases to our full advantage, we must also make the maximum use of modern electronic communications technologies, such as e-mail, shared database applications, and electronic conferencing. In this vein, we should accept the contractor's format for documents, rather than impose government standards that introduce costs that do not add value. In sum, we need information, not standardization.

9.3.4 Instituting EW Best Practices

As we develop a solution, we will continue to refine and build on some of the ideas we pursued in earlier stages of the acquisition, including:

- Creating and implementing a solid integration plan
- Ensuring fair consideration of commodity approaches

Creating and Implementing a Solid Integration Plan



The program manager is responsible for following through with the integration plan developed when requirements were established. (See Chapter 6, Establish the Requirements.) The redesigned acquisition process addresses integration issues early in the process and ensures that integration is performed by the contractor who is best qualified. At the development stage, the program manager must coordinate the efforts of the various contractors involved, including the aircraft prime contractor, the contractor developing the EW system, and a separate contractor who may be responsible for integration.

Ensuring Fair Consideration of Commodity Approaches

As with our approach to integration issues, the program manager must ensure that any decisions about commodity approaches to EW solutions are carried through in the development stage. This responsibility entails a shift in philosophy and demands that program managers understand their activities and the systems they develop within a broader framework. A willingness to take a corporate view of the benefits of commodity solutions is critical to understanding the benefits of this approach.

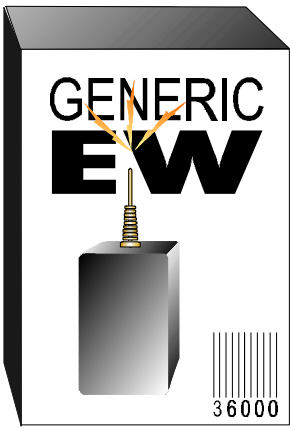


Figure 9-10. Commodity Solutions. *Commodity solutions can provide greater value to the warfighter while reducing acquisition cycle time, logistics trails, and overall costs to the government.*

The program manager needs to be willing to accommodate commodity solutions and make allowances and compromises to ensure that the warfighter gets a solution that satisfies requirements for a variety of platforms and gets the greatest value from the broadest perspective.

In particular, the Acquisition ICT/IPT should take an active role in addressing any issues that result from using a commodity solution. We expect Acquisition ICT/IPT representatives to mediate any disputes that may arise between program managers for different platforms and to keep the focus on the overarching needs of the warfighter, rather than advocating the interests of a particular platform.

9.3.5 Accepting Responsibility for Total System Effectiveness

Clearly, allowing the contractor to lead the acquisition effort at this stage represents an opportunity, but it also entails new responsibilities for our industry partners. In particular, the contractor must understand, acknowledge, and accept the responsibility for installed system effectiveness.

Perhaps the single most important factor in system effectiveness is the contractor who integrates the system onto a platform. As discussed in the previous subsection, we must ensure that integration issues are handled effectively throughout system development.

9.3.6 Testing to Inform

A focus of the Partnership has been to enhance the role of testing during the development stage. In the past, testing during development determined whether the technical attributes of a system or its subcomponents conformed to detailed specifications. Now, we will use early test data—including data derived from breadboard, brassboard, system integration lab, and hardware in the loop tests—to validate and assess the military worth of a system.

Throughout the development stage, both developmental and operational testers will be involved, allowing them to gain insight into the system, design tests that are appropriate for the system, and perform tests on system components as early as possible.

Because we develop specifications within the military worth framework, even low-level component performance can be linked to higher levels of the military worth pyramid. As a result, testing these components should provide insight into operational capabilities.

We recognize that, for some systems, there are points during development when an operational tester may not be able to gain much insight because the tests examine a very low level of technical detail. As development proceeds, however, the fidelity of these tests will improve and their scope will increase. At some point during development, operational testers will become fully involved and will be able to use what they learn from these tests earlier in the process.

The results of these developmental tests are folded into the modeling and simulation toolset. This updated toolset will provide the basis for interpreting the data acquired during the open-air range testing described in Chapter 10, Evaluate the Result.

Additionally, because we continually refine the accuracy of the modeling and simulation toolset, it can be used to characterize system performance where testing cannot be performed due to cost or safety constraints. The ultimate goal is to improve confidence in modeling and simulation results so they can be used to predict the military worth of the resulting system.

Eventually, after evaluating, trading, designing, and analyzing—all of which reduce risk and provide insight—we complete this stage of the acquisition process with some representation of what our solution will be. This result may be a prototype or a production-representative item. Once we have this item in hand, we are ready to move to the next stage, evaluating the result.

Summary

This chapter discussed the Partnership approach to developing a solution. The Partnership has developed and adopted methods that help us to converge on an optimal solution to warfighter deficiencies. In the next chapter, we will discuss how evaluating the result of this development helps us to ensure that we have created a solution that satisfies the original needs.