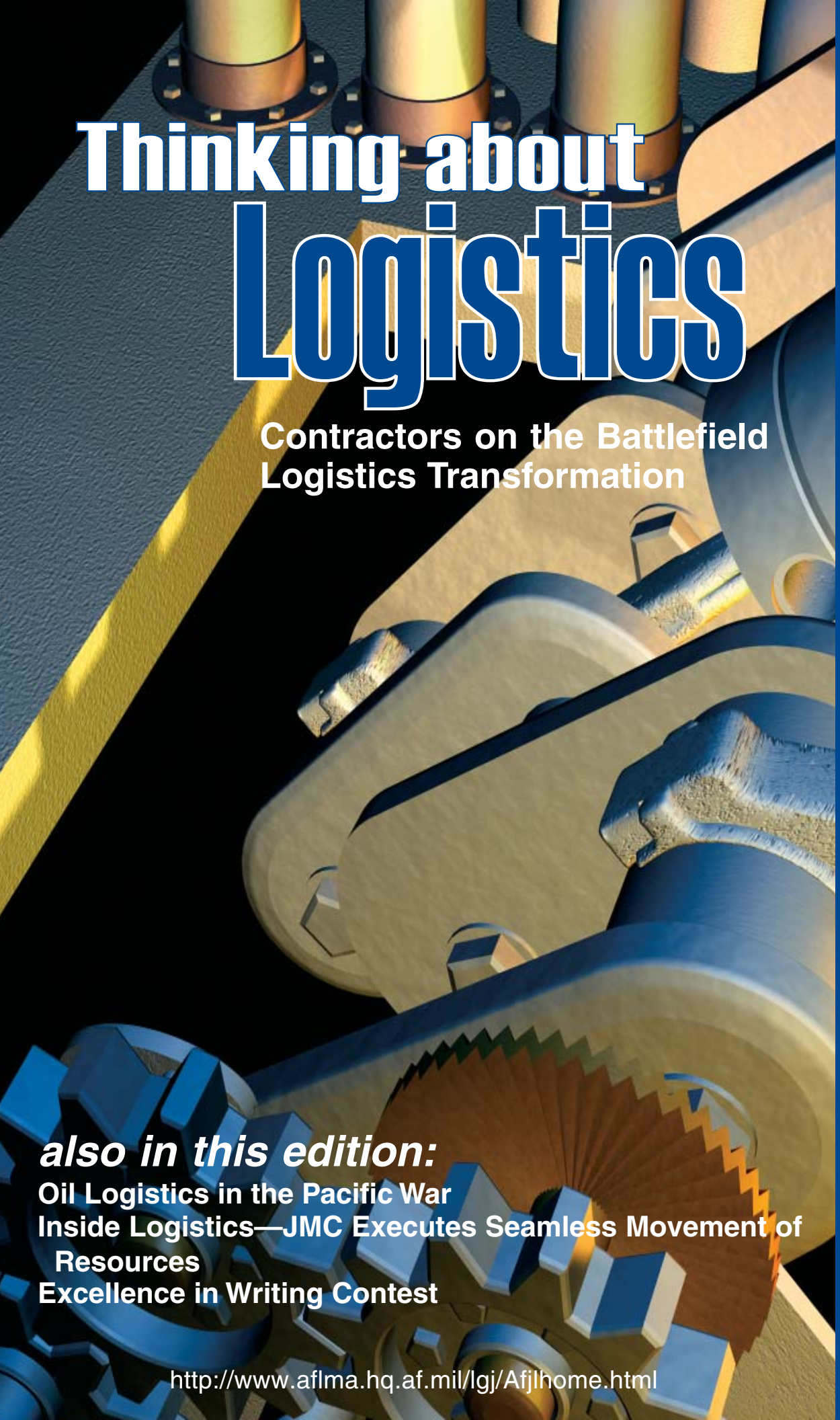

Thinking about Logistics

Contractors on the Battlefield
Logistics Transformation

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JL

AIR FORCE JOURNAL of LOGISTICS

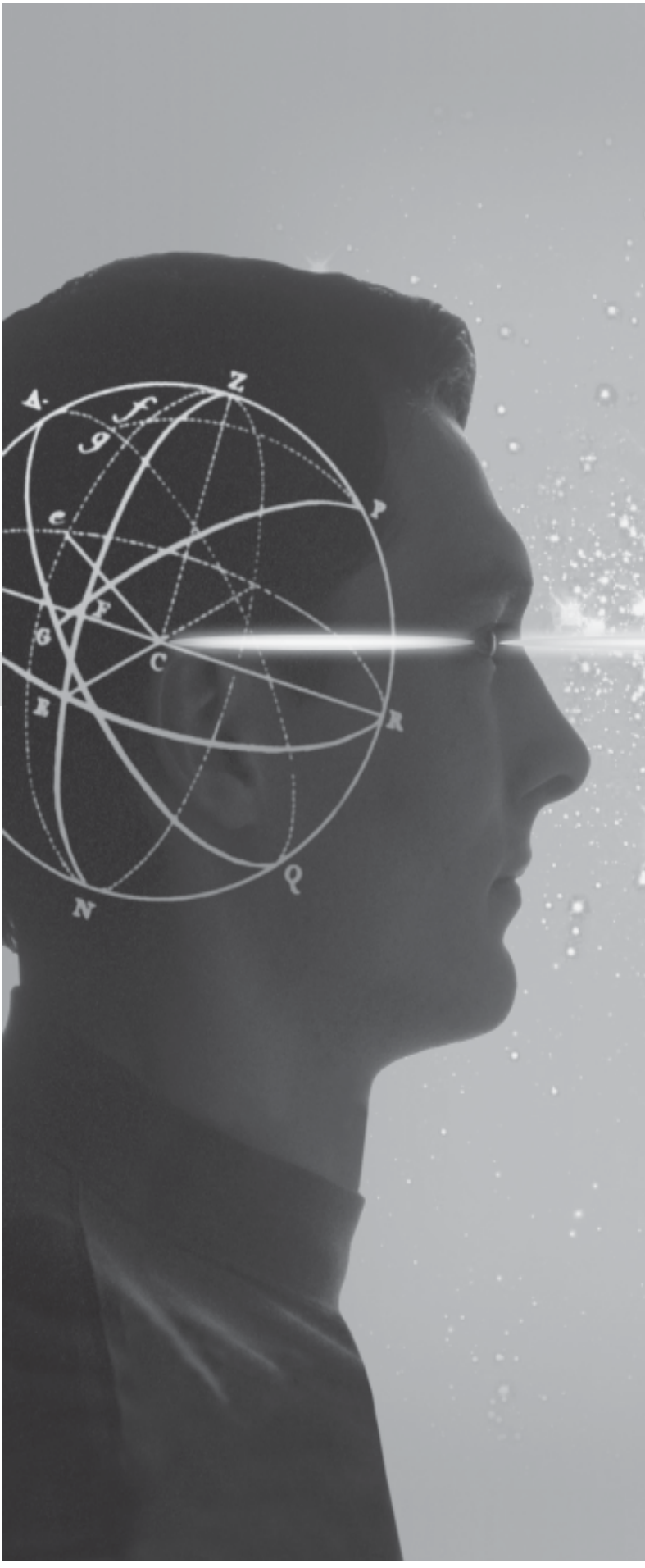
Volume XXVIII,
Number 1
Spring 2004

Introduction

Special Feature

One of the favorite buzz words for the last several years has been the idea of *transformation*. The term has found its way into every major Department of Defense (DoD) planning document and continues to receive more than its share of air time in virtually every periodical that is even remotely associated with the military.

> Transformation is a process by which the military achieves and maintains advantage through changes in operational concepts, organizational structure, and/or technologies that significantly improve its warfighting capabilities or ability to meet the demands of a changing security environment.[1]



This definition gives the reader a basic understanding of the concept. It explains that transformation has a purpose, to *achieve advantage*. It has a method, *change.* And it is intended to result in *improved warfighting capability*. This is the proverbial *big picture* leaders are often looking for. To put it another way:

> Transformation refers to fundamental change in the way an organization achieves its purpose. It means changing the way we work, interact, participate, and even think about how we get things done. It means bringing new methods and technology to bear, as well as changing our processes.[2]

The DoD is seeking new and innovative ways to achieve real transformation to include the possibility of adopting commercial industry *best practices*.

As one can imagine, the term transformation can have many different meanings, depending on the individual point of view and area of expertise. The logistics transformation initiative, as described in the Focused Logistics Campaign Plan, provides real-time logistics situational awareness; instills warfighter confidence by optimizing logistics business processes, transitioning to a logistics system open architecture that provides interoperable and actionable logistics information; and finally, enhances logistics response to the joint warfighter.[3] In general, defense logistics is a complex combination of support elements designed to provide maximum support to the warfighter. Logistics transformation challenges each logistician to provide new and innovative ways to improve logistics support and transform the current logistics infrastructure into the most efficient support system possible. Commercial industry best practices in the areas of supply support and acquisition may be the key to achieving real and lasting logistics transformation.

Logistics Transformation

Does Industry Have the Answer?

Lieutenant Colonel Keith D. Frede, USAF

Supply Support

Background

For the last several years, commercial industry has sought to improve profitability through effective management of the supply chain.

> There are many reasons for the popularity of the concept. Specific drivers may be traced to trends in global sourcing, an emphasis on time and quality-based competition, and their respective contributions to greater environmental uncertainty. Corporations have turned to global sources for their supplies. This globalization of supply has forced companies to look for more effective ways to coordinate the flow of materials into and out of the company. Key to such coordination is an orientation toward closer relationships with suppliers. Further, companies, in particular, and supply chains, in general, compete more today on the basis of time and quality. Getting a defect-free product to the customer faster, more reliably than the competition no longer is seen as a competitive advantage but simply a requirement to be in the market. Customers are demanding products be delivered consistently faster, exactly on time, and with no damage. Each of these necessitates closer coordination with suppliers and distributors. This global orientation and increased performance-based competition, combined with rapidly changing technology and economic conditions, all contribute to marketplace uncertainty. This uncertainty requires greater flexibility on the part of individual companies and supply chains, which, in turn, demands more flexibility in supply chain relationships.[4]

Additionally:

> …in an effort to reduce costs associated with managing and maintaining large inventories, many companies are seeking to improve their stock replenishment turn times. Simply put, large inventories tie up company capital/assets, and firms are seeking to free up those dollars for other investment opportunities. This is especially true in today's competitive market.[5]

Before we can understand the concept of managing the supply chain, known throughout industry as Supply Chain Management (SCM), a quick review of the elements that make up a supply chain is in order (Figure 1).

> A supply chain is made up of all the manufacturers and suppliers who provide the parts that make up a particular product. It includes production, storage, and distribution activities that procure materials, transform the materials into intermediate and finished products, and distribute the finished products to the customer.[6]
>
> Within the DoD, this definition is further expanded to include the return of failed components after use by the customer for rework, repair, or remanufacture. The DoD supply system is largely depended on its in-house repair process to keep needed parts available to the customer. Improving return and repair times of these components can positively affect the entire supply chain.[7]

SCM is best described as the:

> …systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across business within the supply chain, for the purpose of improving the long-term performance on the individual companies and the supply chain as a whole.[8]

This definition provides a great deal of insight for the logistician. First, the addition of the term *management* illustrates that this is an active process. In the last several years, commercial industry has come to realize that the elements of a supply chain are not independent variables. By that, they cannot and should not be looked at as individual actions but must be scrutinized (managed) as a process. Each individual element is affected by and affects the supply chain as a whole. Additionally, management is no longer thought of as simply the act of supervising or controlling. In today's context, management implies the use of tools, technology, and techniques for the explicit purpose of creating an environment of continuous improvement. It is no longer acceptable to manage the existing process; all logisticians must seek continuous improvement. This definition includes the strategic coordination of the traditional business functions (what companies do and produce), as well as the tactics (operating procedures) used to specify elements of the supply chain. This is very important because it illustrates that SCM may require adjusting or changing the fundamental operations of a particular company, if that change will improve the overall health of the supply chain. An example of this might include a firm's decision to develop the capability to make or manufacture a particular component in house, even if it is not a focus area for the firm, if by doing so the supply chain as a whole will be improved. These *make or buy decisions* are critical to the process.

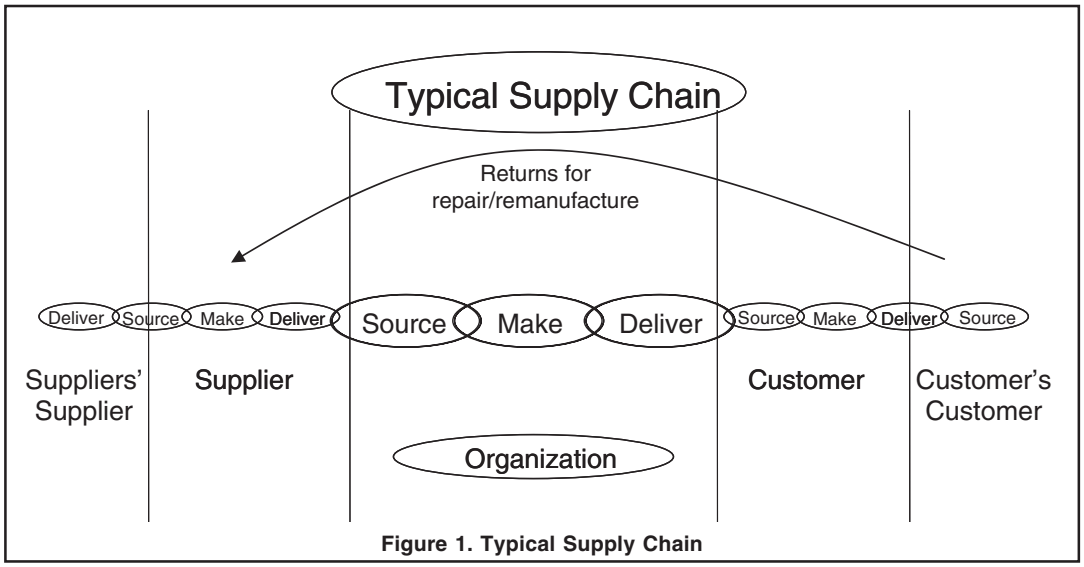


Figure 1. Typical Supply Chain

The supply chain is made up of all suppliers for a particular activity or manufacturing process, to include bit piece parts, subassemblies, and finished products. It includes the warehousing, transporting, and delivery of the products throughout the supply chain, to include the return of assets from the customer that require repair after use. SCM controls or adjusts the business process throughout the supply chain for the explicit purpose of improving the overall supply chain. As can be imagined, this is a

monumental task. In a complex operation like the building of a major weapon system, the chain might include thousands of suppliers, subsupplies, manufacturing, transportation, and warehousing functions. An example within the DoD would be the Air Force supply chain, which would include, as a minimum, commercial vendors, suppliers, the Defense Logistics Agency (DLA), air logistics centers, regional supply organizations, base-level supply units, and all organizations in place to store and transport assets for the customer. "From an Air Force perspective when analyzing best supply chain practices of industry, the key difference in the process is a shift from 'managing items' to managing supplier and customer relationships. Linked to this is focusing and managing performance outcomes along the supply chain."

Analysis

The essence of SCM as a commercial best practice can be summed up in a simple word—collaboration. To achieve the highest level of efficiency for the good of the supply chain as a whole, every participant in the supply chain must act as if it is a part of a unit.

> Previous research has suggested various activities necessary to successfully implement an SCM philosophy include integrated behavior; mutually sharing of information; mutually sharing of risk and rewards; cooperation; having the same goal of serving customers; integration of process; and finally, partners that build and maintain long-term relationships.[10]

A good example of the collaborative efforts is Boeing Commercial Airplanes' efforts to improve its supply chain. When interviewed for the article "Quest for the Ideal Supply Chain," Saundra Cope, Boeing Commercial Airplanes acting vice president and general manager, had this to say about efforts to streamline the supply chain:

> Ultimately, we need suppliers who can adopt and embrace change with us, engineer their products for the greatest value, implement lean manufacturing technologies in their plants to improve material flow and product flexibility, and continue to reduce costs and processes so we both benefit.[11]

In addition, Boeing Commercial Airplanes has come up with a unique method of collaborating supplier and manufacturing efforts. The article goes on to state:

> Supplier councils have been meeting and sharing ideas and working together since 1999. The councils centered in Europe, North Africa, and Asia are made up of eight to ten Boeing suppliers on each council and four Boeing representatives. They meet regularly around the world, and the meetings serve as forums for the open exchange of ideas. Council meetings address technical and process issues and help identify best practices, while allowing Supply Management and Procurement leaders to learn from suppliers how its own initiatives and policy decisions are received by members for the supply base. Councils are balanced to include representatives of the entire value chain. From raw materials, standards, interiors and payloads, structures, and systems.[12]

One of the most significant hurdles when transitioning a company to an SCM philosophy is developing effective measurement tools to assess the performance of the entire supply chain. Most, if not all, industries have long-established standards for delivery performance, fill rates, supply response time (reorder response time), costs of goods, warranty and return costs or rates, and new order lead time.

Article Highlights

Transformation refers to fundamental change in the way an organization achieves its purpose. It means changing the way we work, interact, participate, and even think about how we get things done. It means bringing new methods and technology to bear, as well as changing our processes. The DoD is seeking new and innovative ways to achieve real transformation, to include the possibility of adopting commercial industry best practices. This article outlines newly developed commercial best practices and innovative commercial support processes in the areas of supply support (supply-chain management), and acquisition. Selected industry best practices are analyzed in an effort to answer the question, "Are commercial industry best practices in the areas of supply support and acquisition applicable to the DoD transformation efforts?" This review is organized by focus area (supply support and acquisition) and includes background, analysis, and recommendations concerning the application of these new techniques within DoD. In addition, the article provides insight as to how these new and innovative approaches might be used as a springboard for the eventual transformation of the DoD support processes.

> A more innovative approach to performance measurement grew out of a study group comprised of executives from companies like Apple Computer, Bell South, CIGNA, DuPont, and General Electric. This group developed a balanced scorecard that presents a holistic view of performance metrics that must be assessed together in a way that will ensure a collaborative enterprise solution. Viewed individually, supply chain components may deliver optimal performance. However, viewed holistically, their collective performance may impact quality, productivity, finances, and human costs that affect the bottom line.[13]

The benefits of applying the balanced scorecard as a best practice include:

> ...helping to align key performance measures with strategy, provides management with a comprehensive picture of business operations, facilitates communication and understanding of business goals and strategies at all levels of an organization, and provides strategic feedback and learning.[14]

The balanced scorecard will give logisticians a comprehensive method for tracking performance of the supply chain as adjustments in company functions and tactics are made to improve efficiency.

So far, this article has provided an indepth look at the elements of the supply chain, defined SCM, and suggested various activities that are inherent in a successful supply chain such as integrating activities; sharing information; risk and rewards; building long-term relationships; and finally, always keeping the needs of the customer as the ultimate goal. While all these are useful best practices, the description alone will not facilitate DoD's transformation into a more efficient warfighting capability. The missing piece is a review of the best practice tools and techniques used by industry to transition companies to an SCM philosophy.

Supply Chain Excellence, a Handbook for Dramatic Improvement Using the Supply Chain Operations Reference Model (SCOR) outlines several steps or best practices successful companies have taken during the transition to a supply chain orientation. Of course, the first step requires leadership to build organizational support for supply chain improvement *(*best practice*)*. This step should include active executive sponsorship, education, and training, as well as buy-in from key leadership team members.

SCOR combines elements of business process engineering, benchmarking, and leading practices into a single framework *(*best practice).

The SCOR Project Roadmap separates the process into four distinct segments, addressing operational strategy, material flow, work work, and information flow. The segments include analyzing the basis of competition, which focuses on supply chain metrics and operational strategy; configuring the supply chain material flow; aligning performance levels; practices and systems; and finally, implementing the supply chain changes to improve performance *(*best practice*)*.

Each segment is comprised of deliverables that help a company understand and improve a specific dimension of supply chain performance. The first segment develops an understanding of how many supply chains a company has and how those chains perform. The second segment helps optimize material flow efficiency. The third helps optimize transactional productivity. And the fourth helps plan and implement supply chain improvements.[16]

The SCOR model is just one of several techniques companies are using to adopt an SCM focus and begin reaping the rewards of this proven concept by improving the efficiency of the supply chain. These last few paragraphs show that, although the concept works, it is not adopted without considerable effort on the part of all organizations involved in the supply chain.

Recommendations and Implications for DoD Logistics Transformation—Supply Support

The analysis thus far has provided a basic understanding of SCM and described how industry is using this approach to increase profitability. Companies across America and, for that matter, the world are adopting this new approach, and it is working. As individual elements of industry supply chains begin to collaborate, the supply chain, as a whole, becomes more efficient, which results in increased profits for shareholders and company owners. While the DoD may not be concerned with the profitability of any particular logistics segment, managers have a responsibility to increase the efficiency of their organizations and, wherever possible, reduce costs. As such, the DoD should adopt SCM as a new and innovative way of providing the best support to the warfighter. Of course, the next step must be to answer the question, "How can the DoD go about implementation?" The first step must be to assign responsibility for implementation to major commands within each service. As an example, within the Air Force, this responsibility would fall to the Air Force Materiel Command (AFMC). AFMC would assume responsibility for developing the overarching framework and time lines for implementation of the concept. The framework should include

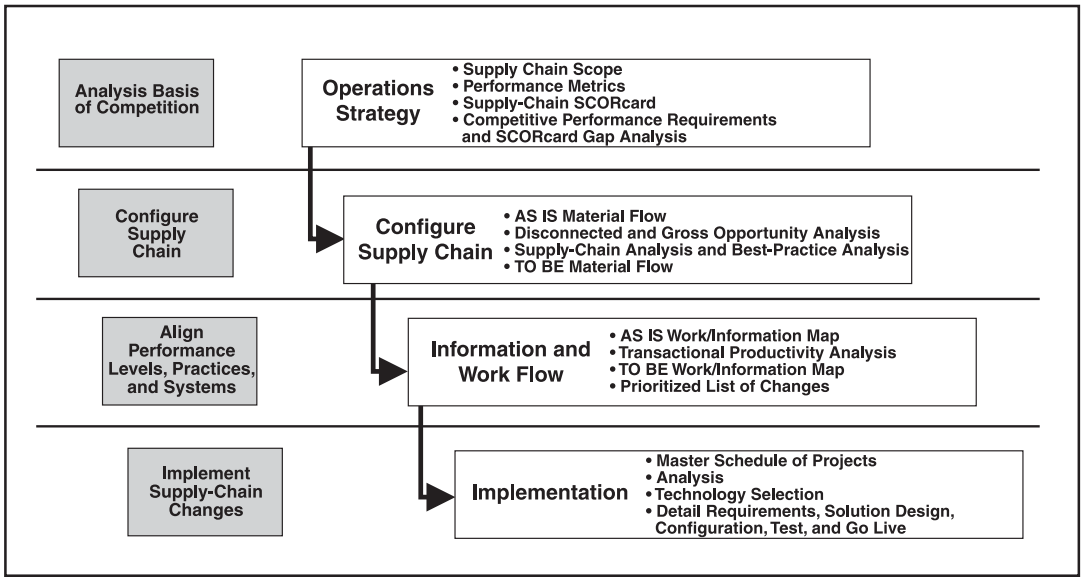


Figure 2. SCOR Project Roadmap[15]

guidance, in sufficient detail, to prevent each subordinate unit from developing country options during the implementation of the process. In addition, AFMC must act as a review authority to ensure subordinate agencies are striving to reap the full benefits of the new philosophy and assist in ensuring the buy-in from other agencies such as DLA. Below major command level, the actual nuts and bolts of the implementation must rest with agencies that own or support a product, from concept to boneyard. Again, for the Air Force, this responsibility would fall to the weapon system program offices (SPO), and in particular, the system program director should be responsible for ensuring the team adopts the new philosophy. Once a clear line of responsibility is established, the next step would be to educate the staff functions within the SPO, as well as the major commands that ultimately receive support. Again, to use an Air Force example, an organization such as the C-17 SPO would work with Air Mobility Command (AMC) staff to ensure a complete understanding of the new approach. They jointly would analyze the current support posture and then develop a balanced scorecard to align key performance measures with the new strategy. The balanced scorecard should provide management with a comprehensive picture of the support posture, especially key elements that are critical to support from the user or warfighter (in this case AMC) perspective. Most important, the balanced scorecard must be tied to warfighter support metrics (aircraft fully mission capable rates, on-time departures, and sortie generation rates), not just supply statistics such as fill rates and reorder times. The final steps would include analysis of the existing supply chain in which managers would seek out opportunities for improvement, development, and test proposals that increase the supply chain efficiency and, finally, the full implementation of new procedures and tactics to support the customer. One example of some *low hanging fruit* would be the elimination of dual supply chains that exist during the initial procurement of major weapon systems. In the past, when production of the new weapon system was taking place, the contractors established supply chains to support production and testing efforts, and the Air Force established supply chains to support newly fielded systems. Oftentimes, both the contractor and the Government compete with each other for the same scarce resources, driving up costs and reducing efficiencies. The development of a single government or contractor supply chain that supports both the assembly line and the fielded weapon systems could, in fact, increase support to the warfighter. This is just one example of how application of the SCM could reduce support costs and, ultimately, provide the best possible support to the warfighter.

> The recent DoD decision to establish the Defense Logistics Executive (DLE), as well as the Defense Logistics Board, to help manage the transformation process within the logistics community is a step in the right direction. One of the first orders of business by the DLE and SECDEF [Secretary of Defense] was the establishment of TRANSCOM [Transportation Command] as the distribution process owner. That key act gave TRANSCOM the responsibility to help lead transformation efforts beyond strategic movement. General Handy's [John W.] staff is already working immediate improvements to theater distribution in OIF [Operation Iraqi Freedom] by establishing Deployed Distribution Operations Centers. Initiatives like these highlight the fact that supply chain improvements are necessary across all the Services and defense agencies if we are to be successful in achieving real logistics transformation.[17]

Acquisition Reform

Background

Accomplishing real and effective acquisition reform will impact every aspect of the logistics transformation process positively. Secretary of Defense Donald Rumsfeld provided the strategy with the following words:

> Another priority element of the Department's corporate transformation strategy is the reform of the acquisition process. The Department is reducing cycle time and aligning acquisitions with a new capabilities-based resource allocation process built around joint operating concepts.[18]

Past acquisition practices have set the stage for very costly and inefficient support structures. An example of this can be seen in large weapon system acquisitions that were completed using sequential engineering and without regard for the complete life-cycle costs associated with design. These practices and many other examples have forced the Government to relook the acquisition process. "Acquisition and logistics reform deals with the modernization dilemma by changing procedures and processes to increase efficiency and effectiveness. Non-value-added effort is eliminated. The goal is to free funds to accomplish needed modernization."[19] Adopting commercial-like practices is one example of recent initiatives for acquisition reform.

The SCOR model is just one of several techniques companies are using to adopt an SCM focus and begin reaping the rewards of this proven concept by improving the efficiency of the supply chain.

> The Joint Direct Attack Munitions (JDAM) program, one of the most successful programs in recent years, instituted several commercial practices to include the following: performance-based requirements with no mandatory specifications; emphasis on price/performance parameters; lean manufacturing techniques; extensive reliance on commercial products; and opportunity for long-term commitment with the contractor.[20]

These initiatives were essential elements of this highly successful program and can be used as examples of how application of best commercial acquisition practices can improve support to the warfighter. While this example is a step in the right direction, it falls short of achieving the measure of acquisition reform required to transform the DoD as outlined by Rumsfeld. If examples of how applying commercial best practices to acquisition programs like the JDAM program are available for DoD contracting officers to use as benchmarks, why do we need

acquisition reform? To start with, the JDAM program was a congressionally mandated defense acquisition pilot program—so many of the techniques used during procurement are not available to other contracting officers.[21] Additionally, applying commercial best practices to a small-scale program like the JDAM is much easier than applying the same techniques to a major weapon system purchase like the F-22.

In the last decade, the military has gone through one of the most dramatic transformations in history. The DoD force structure has been reduced by one-third since 1992, and the drive to reduce uniformed members has given way to an increased reliance on contracted support provided by industry. One example of this new reliance on contracted services was outlined in a 2 January 2001 memo on performance-based services acquisition. Dr Jacques Gansler (former Under Secretary of Defense for Acquisition, Technology, and Logistics) noted, "From 1992 through 1999, DoD procurement of services increased from 39.9 billion to 51.8. In 1999, total dollars spent on service acquisition equaled the amount spent on supplies/systems."[22] While this ever-increasing spending trend might indicate the DoD is well-funded to provide needed support, in reality, major programs needed to improve American warfighting capability go unfunded each and every year. There are many reasons for the shortfall in funding, to include the costs of past, unplanned operations in Bosnia and Kosovo, as well as the enormous costs of current operations such as Enduring and Iraqi Freedom. Another significant cost driver is the age of existing weapon systems and support assets. To be frank, DoD assets are remaining in service much longer than planned, driving support costs associated with maintaining readiness such as modernization modifications and periodic maintenance to never-before-seen heights (Figure 3).

> Jacques Gansler, in *Affording Defense*, observes that acquisition time varies in the range of 11 to 19 years. By assuming a 15-year acquisition time and a 54-year service life, a representative time perspective for defense systems can be defined as approximately 70 years. Some systems, such as the B-52 and C-130, have projected system life cycles of 90 years.[23]

In addition, the costs of unscheduled or unplanned maintenance often will delay much needed modifications to increase capability, as well as reduce support costs. This phenomenon is known throughout the aircraft industry as the aging aircraft *death spiral,* but the principle can be applied to any aging system or subsystem (Figure 4).

In practical terms, the funds programmed to modernize the fleet are siphoned off to pay for unplanned repairs caused by the aging of the weapon system, thus creating a death spiral.[26]

Maintaining near-term readiness at acceptable levels to support current operations has and will continue to take precedence over modifications to increase capability and reduce long-term life-cycle costs. Couple that with the fact that many of the current operations such as Enduring and Iraqi Freedom are putting additional strains on already stretched defense dollars, any logistician can see something has to change. Paul McIlvaine, in "The Evolution of 21st Century Acquisition and Logistics Reform," put it this way:

> One response to this gradual decrease in modernization is to exhort managers to do more with less. But you simply cannot do more with less; you either do more with more or do less with less. The remaining alternative is to change procedures and processes to increase efficiency and effectiveness.[27]

Adopting acquisition commercial practices, procedures, and processes proven to increase efficiency and effectiveness of organizations will free up needed dollars for modernization of current weapon systems, as well as provide funds to replace aging weapon systems and support assets.

Benchmarking off proven best practices is nothing new. In fact, this is a common and acceptable method of change throughout industry. The transformation of the American automobile industry in the early 1990s is a good example. When American automobile companies realized their designs were no longer competitive with imports, they looked to their Japanese competitors and often copied their techniques to produce a more reliable and appealing automobile. The result was a dramatic increase in American automobile sales in the late 1990s.[28] It is logical to assume that the same types of positive results could be achieved if the DoD adopted more commercial business practices in its acquisition contracts.

The key success element in commercial acquisition best practices of major programs was the separation of technology development from product development.

Analysis

Are there acquisition best practices that may be useful to the DoD transformation process? If so, what are they? The Government Accounting Office (GAO) completed a study of acquisition best practices in 1999 and concluded that the use of commercial practices from leading industry could, in fact, improve development of technology and weapon systems in the DoD. The GAO Report GAO/T-NSIAD-99-116, *Best Commercial Practices Can Improve Program Outcomes,* suggested the key success element in commercial acquisition best practices of major programs was the separation of technology development (research and development [R&D]) from product development. As stated in the report, adopting this approach has "put managers in the best position to succeed in developing better products in less time and producing them within estimated costs."[29] The report goes on to state that successful commercial acquisition programs have a high level of knowledge of the product being developed**.** Commercial industry goes to great lengths to understand what the customers want, ensures the technology is available to provide the product, and then focuses its efforts on

gaining efficiencies during production. The concept is quite simple. The greater the level of knowledge, the greater the chances of having a successful program (on schedule and below or on budget.) As the GAO report stated:

> The characteristics of best practices, as we (GAO) have analyzed them, suggest a process for developing new capabilities—whether they are commercial or defense products—that is based on knowledge. It is a process in which technology development and product development are treated differently and managed separately.

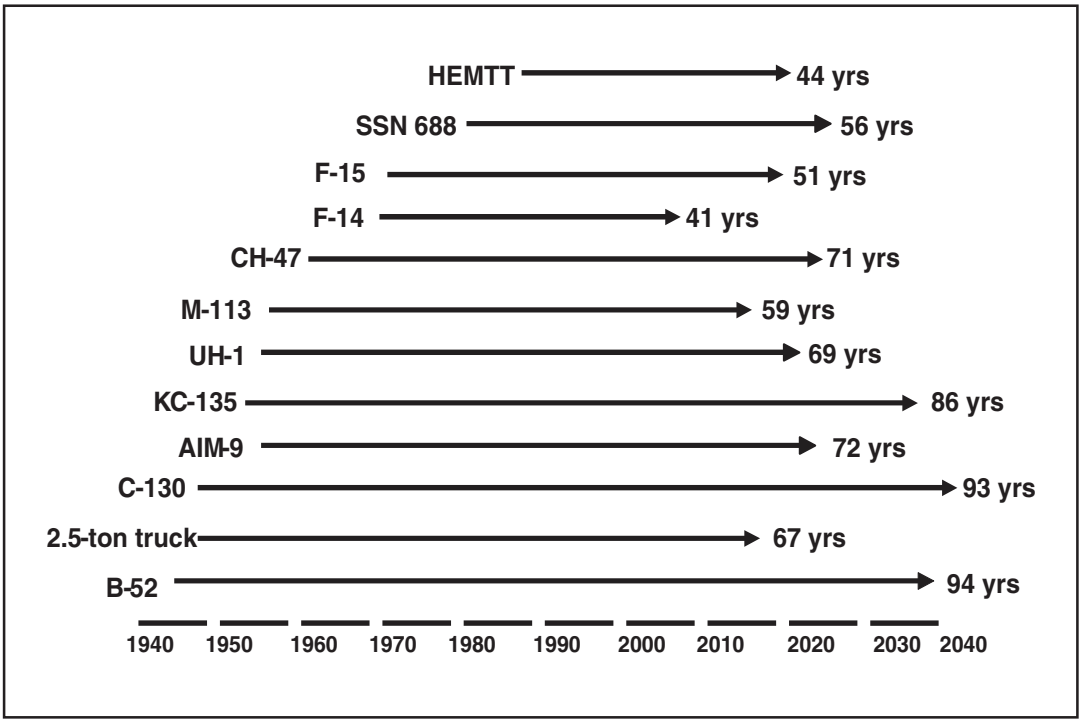


Figure 3: Defense System Life Cycles[24]

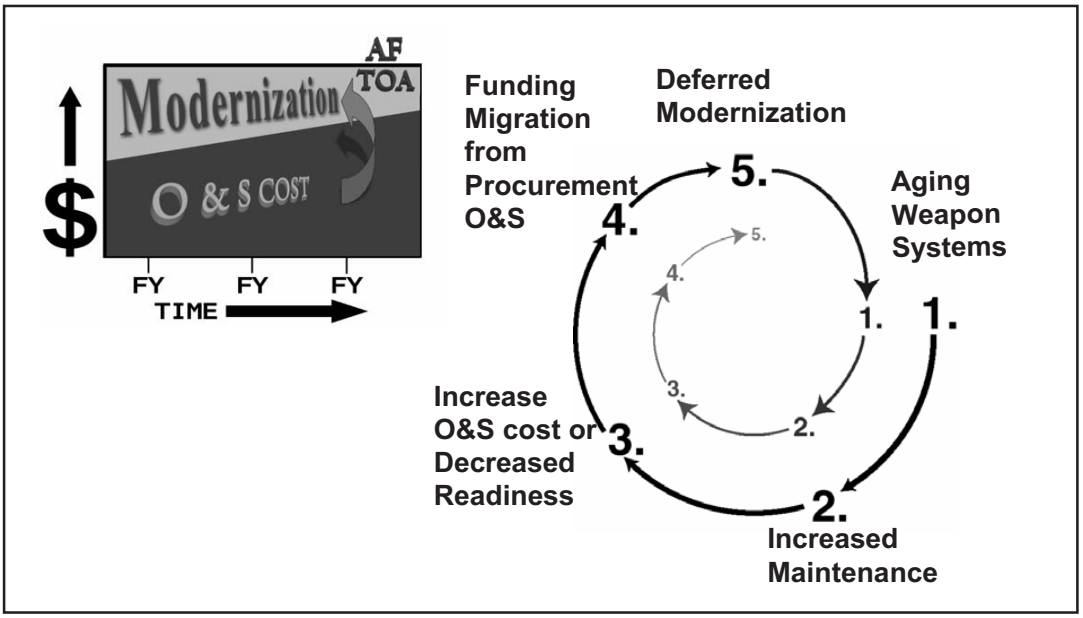


Figure 4. Death Spiral[25]

The report draws a comparison that developing technology, which is culminated in discovery, is quite different from product development, which culminates in delivery. Discovery is weighted with risk, while developing a product gives great weight to design and production and, by its very nature, is a more exact process. Put simply, knowledge is the inverse of risk. As stated in the report, "An important corollary to having a knowledge-based process is that technology development should take place separate from an acquisition program and its related product development process"[30] (Figure 5).

The difference in commercial industry and the DoD acquisition program is that commercial industry has a greater level of knowledge of the product technology, design, and ability to produce much earlier in the acquisition cycle than do the DoD programs. Research and development (discovery of new technologies) is accomplished separate from production. Once the companies attain the appropriate level of knowledge and the technology is on hand, "the firms demand—and receive—specific knowledge about design capability and producibility of the new product before production begins…there is synergy in this process, as the attainment of each successive knowledge point builds on the proceeding one."[32] In contrast, DoD acquisition programs begin product development and often initial production without the appropriate level of knowledge of either the technology or the producibility of the product. Moving ahead with production without the appropriate level of knowledge could lead to cost overruns, which would require major funding adjustments during the production cycle.

The best example to help illustrate the importance of adopting a knowledge-based acquisition philosophy could be found in GAO Report 03-645T, *Best Practices, Better Acquisition Outcomes Are Possible if DoD Can Apply Lessons from F/A-22 Program,* which was released in April 2003. The report explains that the shortcomings in the F/A–22 acquisition program could be traced to failure of the program mangers to adopt knowledge-based acquisition strategy.

The F/A-22 provides an excellent example of what can happen when a major acquisition program is not guided by the principles of evolutionary, knowledge-based acquisition. The program failed to match requirements with resources and made early tradeoffs and took on a number of new unproven technologies. Instead of fielding early capability and then evolving the product to get new capabilities to the warfighter sooner, the Air Force chose a "big bang" product development approach that is now planned to take 19 years. This created a challenging and risky acquisition environment that delayed the warfighter the capabilities expected from this new aircraft. Program leaders did not capture the specific knowledge identified as key for each of the three critical knowledge points in product development. Instead, program managers proceeded through the F/A-22's development without the requisite knowledge necessary for reducing program risks and achieving more successful program outcomes. Now the optimism underlying these decisions has resulted in significant cost increases, schedule delays, tradeoffs—making do with less than half the number of originally desired aircraft—and concerns about the capability to be delivered.[33]

If the DoD were to adopt a true knowledge-based acquisition philosophy, which would separate the risk associated with research and development from the actual production efforts for new systems, the Government would have the ability to better estimate the costs associated with the production of major weapon systems, which would help stabilize the entire budgeting process.

Another significant area of distress for major acquisition programs is how to appropriately estimate costs associated with the risk inherent in R&D and high-tech applications. In theory, the separation of these two tasks (research and development from production), while very important, does not answer the question of how to accurately *cost out* or estimate the price of R&D contracts. As pointed out earlier, these types of contracts are laden with risk, which must somehow be mitigated. For the purposes of this article, a better question might be, "How does commercial industry address this problem?" If they are successful in administering R&D contracts, what are the tactics and techniques *(best practices)* used to mitigate the risk? What can the DoD learn from commercial industry acquisition strategies that might help solve this long-term issue?

A recent study by the Air Force Institute of Technology on behalf of Richard K. Sylvester—Deputy Director, System Acquisition, Office of the Director of Acquisition Initiatives, supporting the Under Secretary of Defense (Acquisition, Technology and Logistics)—addresses this very issue. This study discusses two issues relevant to mitigating risk in R&D contracts.[34]

- How do commercial companies establish fair and reasonable prices in the absence of competition with respect to R&D and high-tech applications?
- How do commercial companies establish and foster cooperative, long-term supplier relationships with respect to R&D and high-tech application contracts?

The study points out that traditionally military-specific contracts have been negotiated as cost-based procurements, which offer little incentive for contractors to reduce any costs since the amount of profit is based on the overall dollars associated with the contract. The study goes on to say, "The DoD has explored alternative approaches such as price-based acquisition, wherein price is established on a variety of conditions."[35] These types of contracts are negotiated utilizing "exceptions and price analysis to determine price instead of certified cost or pricing data."[36] The use of exceptions and price analysis to determine price instead of certified cost or pricing data generally is not supported by most government auditing agencies since certified cost and pricing data are required by law for all government cost-based contracts that are governed by the Truth in Negotiations Act (TINA).[37] "The TINA requires contractors to submit accurate, complete, and current cost or pricing data when negotiating contracts over $550K with the Government."[38] This requirement puts a tremendous paperwork burden on the contractor and has hamstrung DoD contracting agencies for years. In addition, it has chased some contractors, who simply do not want to put up with the administrative burden, out of the government market.

Commercial industry R&D contracts (those associated with discovery of new technologies) are negotiated without regard to TINA. Therein lies the issue for the DoD: "How to ascertain a fair and reasonable price without reliance on certified cost and pricing data?"[39] The study points out that commercial industry uses its expertise and knowledge of the market as a basis for determining fair and reasonable pricing *(*best practice*)*. Commercial firms simply have a better level of sophistication concerning pricing rates, projected milestones, and development timetables that help to make the process much easier to manage. According to a contracting specialist at an established commercial firm:

There is a better understanding of forces that impact price by our buyers than we perceive the average government buyer has. The conduct of market research and indepth understanding of the product

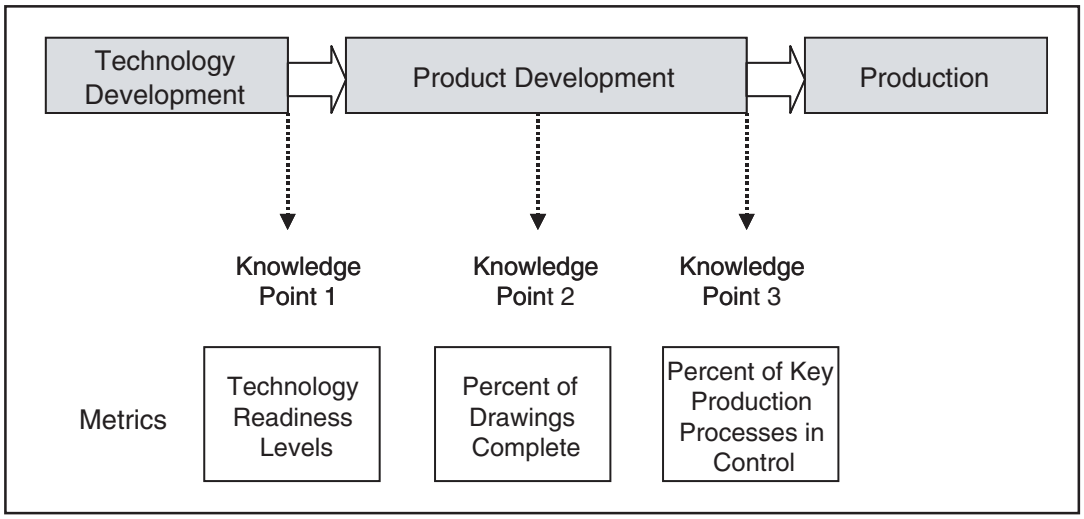


Figure 5. Levels of Knowledge Attained for Developing Technology and Products[31]

and processes help to focus buyers on price reasonableness[40] (best practice).

Determining fair and reasonable compensation for research and development is a difficult task. However, the study points out that "commercial companies across multiple industries claim that judicious market research on the part of the buyer is the only way to secure a fair price."[41] The bottom line is that the DoD must invest the time and energy in market research, and contract negotiators must become savvy experts in the fields being negotiated to ascertain a fair and reasonable price without reliance on certified cost and pricing data (best practice). This step will quiet the auditors' concerns and relieve contractors of the bureaucratic paperwork required under TINA.

The study makes several recommendations to address how to determine a fair and reasonable price in the absence of competition with respect to research and development. It also answers the question of how to foster cooperative, long-term relationships with respect to R&D contracts, to include the following:[42]

- Develop expertise with regard to the pricing nature of research and development and train a cadre of negotiating experts, which can represent the Government (best practice).
- Build strategic partnerships by establishing advisory councils holding conferences to exchange communication, and set up problem-solving teams to address contractor concerns (best practice).

These recommendations, if adopted, will go a long way in establishing real acquisition reform and, in the end, have a positive effect on the DoD transformation process and, ultimately, improve warfighter support.

DoD must invest the time and energy in market research, and contract negotiators must become savvy experts in the fields being negotiated to ascertain a fair and reasonable price.

Recommendations and Implications for DoD Logistics Transformation—Acquisition Reform

The need for acquisition reform has never been higher. The Government is relying on commercial contracts to provide an ever-increasing list of supplies and services to the warfighter. In addition, "despite current budgetary increases and focused emphasis on readiness, the US military recently experienced a 13-year-long trend of real defense spending decline, marking a 38-percent real reduction in spending from defense budgets in the mid-1980s."[43] At the same time, the operations tempo has risen to unprecedented heights. These two facts highlight the need for a more efficient and effective DoD acquisition strategy.

This section introduced and provided an indepth analysis of commercial industry acquisition best practices in an effort to answer the question of whether these concepts can be applied to the DoD acquisition programs. The first commercial industry best practice reviewed included adopting a knowledge-based acquisition strategy, which would separate R&D (acquiring new technologies) contracts from the actual production efforts for major weapon systems. By doing so, the Government would be able to stabilize large weapon system acquisitions since more knowledge would be available before key contract decisions are made. The Government should adopt this best practice immediately for all major weapon system acquisition contracts. This concept has been supported by at least two GAO reports to Congress and would be well received by contracting agencies and, more important, ultimately provide the best possible support to the joint warfighter.

The second commercial industry best practice reviewed outlined how industry mitigates the risk associated with R&D contracts (those associated with discovery of new technologies). The main point of this discussion centered on the fact that R&D contracts are inherently risk laden, and as such, stabilizing contract costs is a major challenge for contracting agencies. In addition, the analysis pointed out government contracts are required by law (unless special waivers are authorized) to utilize certified cost or pricing data in accordance with the TINA. Commercial industry, on the other hand, negotiates R&D contracts without regard to TINA. They utilize their expertise and knowledge of the market as a basis for determining fair and reasonable pricing. This method not only provides a good value of their investment dollars but also stabilizes R&D contract costs, negating the need for major adjustments in funding requirements as seen in government contracts.

Here again, the Government immediately should take steps to adopt this commercial industry best practice. The Government should develop expertise with regard to the pricing nature of research and development, to include market research and market analysis and training of its contracting officers. Once established, expertise in this area would give the Government an ability to negotiate for a fair and reasonable price in the absence of competition with respect to R&D contracts and, at the same time, stabilize the costs of these very expensive programs. This recommendation is supported by the Federal Acquisition Regulation (FAR) 12.1, *Acquisition of Commercial Items,* policy, which reads:

> Market research is an essential element of building an effective strategy for acquisition of commercial items and established the foundation for the agency description of need, the solicitation, and resulting contract.[44]

If adopted, the application of these acquisition commercial best practices can be used as a springboard for the eventual transformation of the DoD acquisition process; however, these issues alone will not transform the DoD acquisition process to the level envisioned by Rumsfeld. Much more must be done. The Government must seek internal changes in the way it budgets,

manages, and administers contracts before real acquisition reform can take place.

Additional acquisition reform enablers were highlighted in McIlvaine's article "The Evolution of 21st Century Acquisition and Logistics Reform." His most compelling recommendations include:

> Changing government contracting tools to reflect a new reality, long-term, life-cycle contractor support requires innovative multiyear service contract arrangements, possible statutory changes, and logistics contractual strategies that encompass longer defense service lives; second, a long-term financial perspective is necessary, the Planning, Programming, and Budgeting System (PPBS) does not look far enough into the future, and thus, government financial reform has not kept pace with acquisition reform; third, government program managers who can obtain great return on investment of upfront RDT&E monies to significantly reduce downstream costs are still thwarted in the attempt to make serious tradeoff decisions. Colors of money and the intractability of the current PPBS may defeat a compelling government business case analysis for upfront investment. A commercial producer would readily adopt this same business case. Procedures that allow program managers to retain and reinvest savings in their programs are needed.[45]

The application of acquisition commercial best practices singularly will not provide the framework necessary to transform the DoD acquisition process. These commercial practices must be adopted in concert with solutions for the myriad of issues outlined above, such as the adoption of multiyear contract provisions; changes in the PPBS; changes to establish a greater return on investment for R&D contracts; and finally, give program managers procedures that allow them to retain and reinvest savings in their programs.

> Another area industry does better than the Government is in spend analysis and leveraging their buying power. The good news is the Air Force SCM implementation team is now doing spend analysis and helping implement commodity councils to better leverage government buying power. The government procurement system currently has a small percentage of buys under any sort of strategic contract/relationship; 25 percent of buys are given to procurements inside lead times and a large percentage of contracts and dollars on sole source requirements….so this area is a target for improvement. The Air Force is currently prototyping this new process at three air logistics centers.[46]

Conclusions

DoD has embraced the concept of transformation with good reason: to achieve an advantage, through change, that ultimately will improve our warfighting capability.

> Transformation refers to fundamental change in the way an organization achieves its purpose. It means changing the way we work, interact, participate, and even think about how we get things done. It means bringing new methods and technology to bear, as well as changing our processes.[47]

Transformation has a purpose: to achieve advantage. It has a method: change. And it is intended to result in improved warfighing capability. Logistics transformation is an integral part of the process, for without transforming logistics, the warfighter will not be supported optimally. DoD is seeking new and innovative ways to achieve real transformation, to include the possibility of adopting commercial industry best practices. This article outlined newly developed commercial best practices and innovative commercial support processes in the areas of supply support (SCM) and acquisition. Selected industry best practices were analyzed in an effort to answer the question, Are commercial industry best practices in the areas of supply support and acquisition applicable to the DoD transformation efforts?

The first commercial best practice analyzed was the concept of SCM, which, for the last several years, has been adopted by commercial industry to improve profitability through effective management of the supply chain. SCM is described as the:

> …systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across business within the supply chain for the purpose of improving the long-term performance on the individual companies and the supply chain as a whole.[48]

Transformation has a purpose: to achieve advantage. It has a method: change. And it is intended to result in improved warfighing capability. Logistics transformation is an integral part of the process.

SCM includes strategic coordination of traditional business functions (what companies do or produce) as well as the tactics (operating procedures) used to specify elements of the supply chain. The importance of this concept cannot be overemphasized; it illustrates that SCM may include adjusting or changing the fundamental operations of a particular company, if that change will improve the overall health of the supply chain. The essence of SCM as a commercial best practice can be summed up as collaboration among all participants of the supply chain for the common good of the supply chain.

One of the most significant hurdles of transitioning a company to an SCM philosophy is the development of effective measurement tools to assess the performance of the entire supply chain. Most, if not all, industries have long-established standards for delivery performance, fill rate, supply response time (reorder response time), cost of goods, warranty and return costs, and rates, and new order lead time. "A more innovative approach to performance measurement is the concept of a balanced scorecard, which presents a holistic view of performance metrics that must be assessed together in a way that will ensure a collaborative enterprise solution."[49] The balanced scorecard will give logisticians a comprehensive method for tracking performance of the supply chain as adjustments in company functions and tactics are made to improve efficiency.

Of course, with any new concept, the transition from old procedures to a new orientation and focus presents new challenges

for all involved. *Supply Chain Excellence, a Handbook for Dramatic Improvement Using the Supply Chain Operations Reference Model* outlines several key steps or best practices successful companies have taken during the transition to a supply chain orientation. The first step requires leadership to build organizational support for supply chain improvement. This should include active executive sponsorship, education, and training, as well as buy-in from key leadership team members. In addition, the SCOR Project Roadmap breaks the process down into four distinct segments, addressing operational strategy, material, work, and information flow. The segments include analysis of the basis of competition, which focuses on supply chain metrics and operational strategy; configuring the supply chain material flow; aligning performance levels, practices, and systems; and finally, implementing the supply chain changes to improve performance.[50]

Analyses have shown companies across America and, for that matter, the world are adopting an SCM focus, and this new approach is working. As individual elements of the supply chain begin to collaborate their efforts, the supply chain, as a whole, becomes more efficient, which results in increased profits for the shareholders and company owners. It is clear the potential benefits of the new approach for the DoD are significant. As such, the DoD should adopt the industry best practice of SMC as a new and innovative way of providing the best support to the warfighter.

The second focus area for this article centered on applying commercial best practices in acquisition to improve DoD acquisition process. Past acquisition practices, such as *lowest bid c*ontracts and major weapon system development programs that did not consider life-cycle cost impacts of design, set the stage for very costly and inefficient support structures. These practices and many other examples have forced the Government to relook the acquisition process. "Acquisition and logistics reform deals with the modernization dilemma by changing procedures and processes to increase efficiency and effectiveness. Non-value-added effort is eliminated. The goal is to free funds to accomplish needed modernization."[51] Adopting commercial-like practices is one example of recent initiatives for acquisition reform.

Research has shown there are commercial industry best practices that may be useful to the DoD acquisition transformation process. The GAO completed a study in 1999 of acquisition *best practices* and concluded that the use of commercial practices from leading industry could, in fact, improve development of technology and weapon systems in the DoD. *Best Commercial Practices Can Improve Program Outcomes* suggested the key success element in commercial acquisition best practices of major programs was the separation of technology development from product development. The report draws a comparison that developing technology, which is culminated in discovery, is quite different from product development, which culminates in delivery. One of the major differences in commercial industry and the DoD acquisition program is that commercial industry has a greater level of knowledge of the product technology, design, and ability to produce much earlier in the acquisition cycle than do the DoD programs. Research and development is accomplished separate from production. In contrast, DoD acquisition programs begin product development and often even initial production without the appropriate level of knowledge of either the technology or the producibility of the product.

The final focus area sought to answer the question of how to appropriately estimate costs associated with R&D and high-tech application contracts. Oftentimes, government estimates are not accurate, which results in budgeting shortfalls and administrative adjustments to the contract. Simply stated, the problem stems from the Government's inability to determine dependable cost estimates for R&D contracts. Here again, commercial industry *best practices* have been developed to deal with this issue. Industry uses its expertise and knowledge of the market as a basis for determining fair and reasonable pricing. This method not only provides a *good value* of their investment dollars but also stabilizes R&D contract costs, negating the need for major adjustments in funding requirements as seen in government contracts.

The Government should take immediate steps to adopt commercial industry best practices to assist in the DoD transformation process. By adopting a knowledge-based acquisition strategy, which separates technology development (research and development) from product development, the Government would be able to stabilize large weapon system acquisitions. In addition, the Government should develop expertise with regard to the pricing nature of R&D contracts, to include market research and market analysis, and the training of its contracting officers. Once established, expertise in this area would give the Government an ability to negotiate for a fair and reasonable price in the absence of competition with respect to R&D contracts and, at the same time, stabilize the costs of these very expensive programs.

It is clear commercial industry best practices in the areas of supply support and acquisition can be utilized as a springboard for the eventual transformation of the DoD support processes.

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At the time of the writing of this article, Lieutenant Colonel Frede was a student at the Air War College

(*JMC Exercises Seamless Movement of Resources* continued from page 28)

operation. It also provides useful information for tracking mission progress and force closure and gives a summary of force flow for future planning.

The JMC currently operates the Logistics Sustainment Cell (LSC) at Incirlik. The LSC's primary mission is to coordinate and monitor the movement of sustainment to US forces and humanitarian efforts in northern Iraq. From April 2003 through January 2004, the LSC coordinated the delivery of more than 62 million liters of water, 3 million pounds of fresh fruit and vegetables, 447 million liters of fuel, 276 measurement tons of liquid propane gas, 1.3 billion liters of benzene and kerosene, and 12 million short tons of miscellaneous cargo. Commercial trucks moved all this into Iraq via ground lines of communication from several locations in Germany and Turkey. This line of communication averages more than 5,000 trucks in the transportation system on a daily basis. It extends from central Germany, south through Turkey, and crosses into northern Iraq through the only crossing point—Habur Gate at the Turkey-Iraq border. This vital supply route significantly reduces airlift and sealift cost. In addition to ground resupply, approximately three strategic airlift channels from Ramstein AB, Germany, and Moron AB, Spain, deliver equipment and sustainment into northern Iraq each week.

Figure 2. Trucks Awaiting Passage into Northern Iraq Through Harbur Gate

The JMC also manages transportation in numerous other countries throughout the theater, ranging from Africa to Russia and the Middle East. Some other major operations the JMC supports are the Stabilization Force in Bosnia and Herzegovina, Kosovo Forces (KFOR), humanitarian assistance in Africa, North Atlantic Treaty Organization (NATO) member support for participation in multinational exercises, Georgia Train and Equip Program, and exercise-related construction programs in the West African states. Sustainment into the Balkans includes more than 55 trucks daily, 2 trains per month, and 6 C-130 flights per week. The ground movement crosses eight countries (some trips lasting more than 3 weeks) to arrive at their destination. Another elongated movement is delivering cargo and sustainment to Enduring Freedom in Afghanistan. In addition to C-17 channels, trains move through Germany, Poland, the Ukraine, Russia, Uzbekistan, and Kazakhstan to Bishkek, Kyrgyzstan. Ships carrying cargo to Enduring Freedom sail through the Mediterranean Sea through the Suez Canal to Karachi, Pakistan, then via truck into Afghanistan.

Most notable of these smaller but significant operations was the role played by the EUCOM JMC in the Joint Task Force (JTF) Liberia Operation. The JMC deployed personnel to the joint task force and assisted in the development and execution of a JTF Liberia JMC in support of the humanitarian assistance and stability operation in Liberia, Africa.

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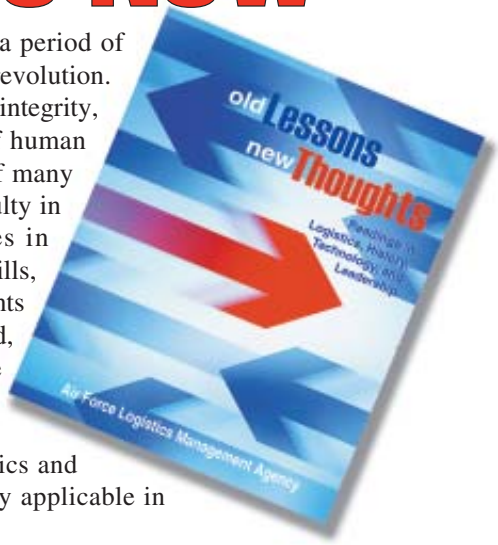

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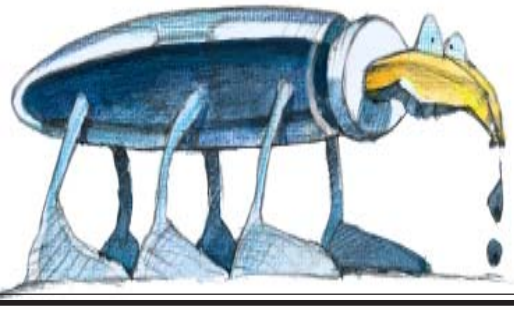

The Editorial Advisory Board selected "Time-Based Acquisition"—written by Major Kevin J. Schields—as the most significant article to appear in Vol XXVII, No 4 of the *Air Force Journal of Logistics*.