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PROGRAM *manager*

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ACQUISITION IMPROVEMENT UPDATE



In the last issue of *Program Manager*, I wrote of stability, accountability and trust as fundamental requirements if we are to make significant improvement in our acquisition process. In this issue, I want to focus on micromanagement and integrity.

Perhaps the one word I've heard most frequently since coming to the Pentagon is "micromanagement." It is used, almost exclusively, in a pejorative sense. I've heard it applied to everyone associated with the acquisition process up to and including the Congress. I have concluded that micromanagement is perceived to apply to anyone in the chain who can influence one's program or job.

While micromanagement is considered a negative, responsibility and authority are considered positives. Most people seem convinced that if they were delegated the authority and provided the resources to do their jobs and then left alone, they would be more than happy to be held accountable for the results—and the world would be beautiful.

I couldn't agree more.

There is a small hitch, however. Like it or not, there is a difference between delegation and abdication. No manager can claim immunity from being held accountable for poor performance in his organization because he has delegated responsibility. The funny thing about accountability is that it cannot be shared—nor is it divisible. It cannot be delegated. Everyone in the chain is personally accountable for results of that chain.

The secret to good management is finding the proper balance between micromanagement and the will-

ingness to be held accountable for someone else's performance without being directly involved in that performance. I believe the key is trust. Trust is fragile. It is difficult to achieve but easy to lose.

The key question is: How do you develop the requisite trust to be willing to be held accountable for someone else's actions and decisions? I believe the fundamental requirement for trust is *integrity*.

Important examples of integrity are:

—*Deliver on Your Commitments*

The corollary is: Don't commit to what you can't deliver. If it is a "stretch" commitment, clearly spell out the risks and have a plan to mitigate the risks and a back-up plan if risks develop into problems.

—*Avoid Surprises*

The key is open and full communication. Even with best-laid plans and brilliant execution, problems develop. Few, if any, problems are "born full grown." The first choice is to anticipate and avoid them. The second choice is to recognize problems early when they can still respond to treatment and management. The third and unacceptable choice is to hide problems, hoping they can be solved internally or that they will go away or that they won't surface on your watch. "Problems seldom improve with age." Management's responsibility is to be receptive and balanced in their response to problems. You can't shoot the messenger and expect to get messages.

—*Be Honest—First with Yourself and Then with Everyone with Whom You Come in Contact*

No one benefits from an unrealistic assessment of problems or risks. It

may be "macho" to be a "can do" person, but when that attitude clouds good judgment, a question of integrity arises. This is particularly true when the problems will come to roost on someone else's watch. In my opinion, honesty is absolute—not incremental. Withholding essential information is as dishonest as providing false information.

I believe P. M. Smith, Major General, USAF (Ret.), captured the concept of integrity well when he said:

Let me make some generalizations about *integrity* in large organizations. First of all, there are lots of temptations. There are temptations to fudge the figures to withhold a little bit of information, to tell 95 percent of the story instead of the full story, to try to make your boss look good, to try to make your organization look good, to beat out somebody else who's playing dirty pool. It's particularly important to be honest in military organizations because trust in combat is so essential. Trust in combat is so essential that military institutions must generate a mentality of trust and honesty in peacetime.

Developing the trust required to eliminate micromanagement may be a catch-22. I don't think so, but trust certainly will not develop unless we are all dedicated to making it happen. I submit our obligation to our customers (the men and women in uniform) and our stockholders (the taxpayers) demands that we do our parts to establish the integrity in our acquisition system that is required to eliminate micromanagement and achieve results in which we can all have pride.

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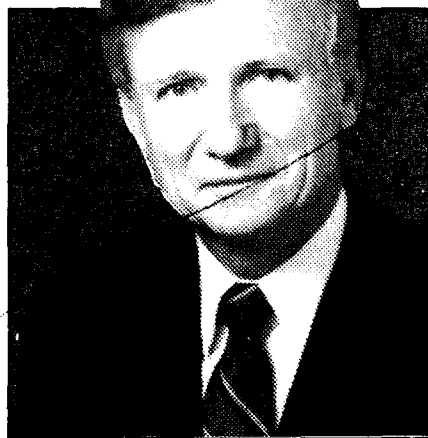
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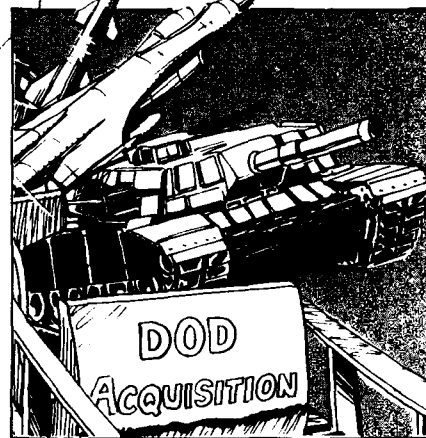


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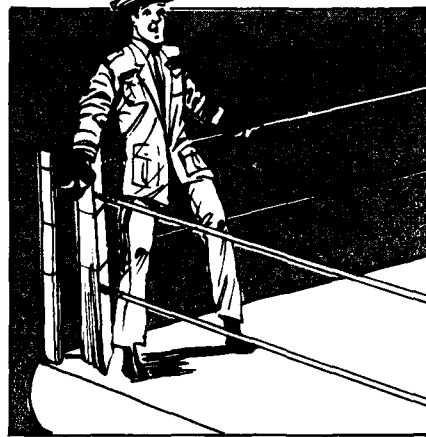


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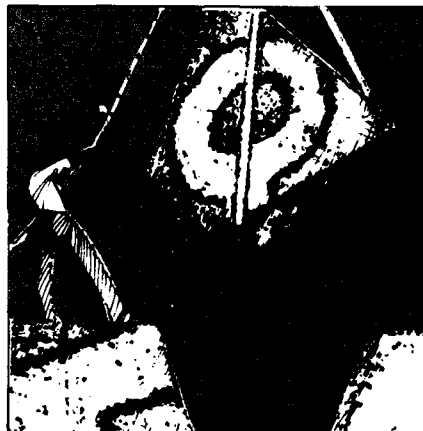


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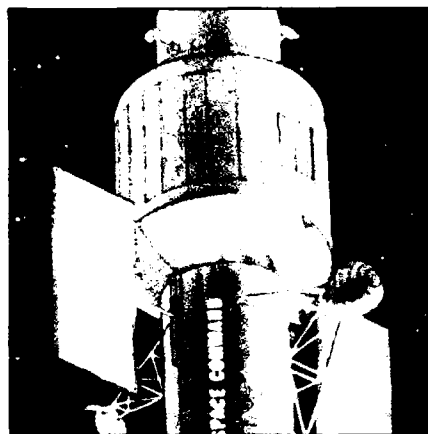
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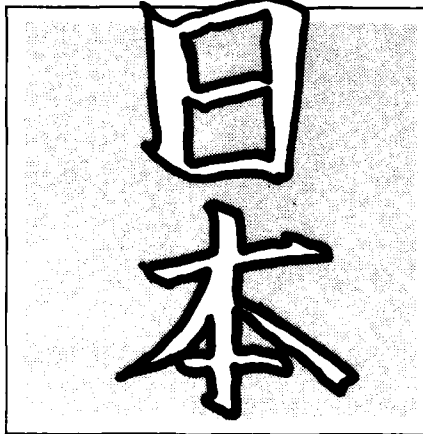


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WHAT'S WRONG WITH ACQUISITION?

Constructing More Stability into Defense Procurement Roller Coaster

Lieutenant Colonel John L. Clay, USAF

As a career acquisition officer, I often am asked what can be done to improve weapon system procurement. Little wonder. We hear about cost growth, stretch-out, goldplating, pork barreling, micromanagement, mismanagement, overpricing and, of course, fraud, waste and abuse. Solving acquisition deficiencies has proved to be a perplexing, long-term challenge. Thus, succinctly answering this well-intentioned question is not easy. Perhaps there is a brief response that captures the majority of opportunities for improvement: create more stability.

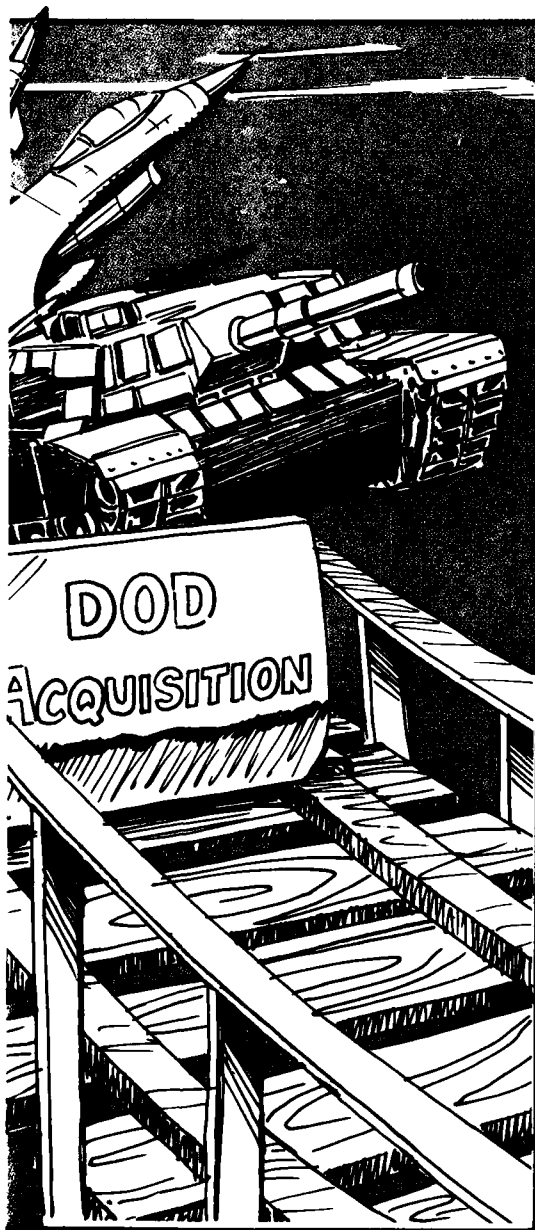
The purpose of this paper is to propose a construct—or logical framework—for understanding basic weapon acquisition problems. The construct's centerpiece is stability or, more specifically, treating deficiencies as products of instability. It is not intended to be a rigorous model for scientific analysis; rather, a practical, simple tool for improving the effectiveness of the weapon-acquisition process.

Lieutenant Colonel (Colonel selectee) Clay received a B.S. degree in engineering mechanics from the USAF Academy in 1971 and an M.B.A. degree from Wright State University in 1973. He has served in five program offices at three Air Force Systems Command product divisions, and was assigned to HQ AFSC as a systems officer and as executive assistant to the Deputy Chief of Staff for Systems. He completed the Defense Systems Management College Program Management Course 89-1.



Why Stability?

More than any single term, "stability" embodies what is most lacking in the current acquisition process. First, however, a definition is needed. Defense-acquisition stability is the fulfillment of planned expectations; that is, weapons are acquired as originally intended. Further, stability can be measured by the degree to which planned objectives—in particular those associated with performance, support, resources, and time—are realized as the weapon is acquired. Note that this definition encompasses more than concerns about DOD "budget stability," itself a well-documented problem.



I suggest five conditions are needed to create an ideal state of stability for acquiring any weapon system.

1. A few, key system objectives, consistent with national military strategy, force objectives and user needs, are correctly identified, understood and held constant.
2. Cost, schedule, and performance estimates are realistic; i.e., the probability of overperforming is roughly equal to the probability of underperforming.
3. Trained and experienced personnel are assigned to the program and direct their energies to achieve program objectives.
4. Resources approved in the planning phase are provided unless the program fails to achieve specified goals.
5. Each commitment to complete an acquisition task is fulfilled.

Fortunately, this lengthy list can be reduced to more fundamental terms. Stability simply requires quality planning and disciplined execution. Note that conditions 1 and 2 are roughly equivalent to quality planning—3, 4, and 5 to disciplined execution. In the construct, a stable program is framed in quality planning and disciplined execution.

The simple notion of instability as the cause, and stability as the solution, can be useful in judging actions and evaluating processes. Of course, the root causes of acquisition problems are more complex; as in all generalizations, exceptions exist. However, focusing on stability (and its two components, quality planning and disciplined execution) helps to identify these causes and find solutions. Instability is the common denominator of the preponderance of defense acquisition problems.

Does stability equate to detailed planning and step-by-step execution? Absolutely not. Stability does not mean rigid, detailed planning; obedient, unquestioning execution; or stagnant, layered organizational structures. In fact, continuous change to process, organization, and internal-resource allocation priorities are virtues of effective acquisition programs. Consider the advice of Tom Peters in *Thriving on Chaos*: "...con-

stant change is thoroughly consistent with pursuing perfection in quality and service.... Yes, it is a paradox: In the face of more change, more stability is essential."¹

I am convinced that few defense programs are stable. Yet attention is diverted from this serious problem by more newsworthy allegations, such as well-publicized coffeemakers, hammers, etc. In my personal experience with five weapon programs, none had problems with corruption or overpricing. Each of the five did, however, experience instabilities like changing requirements, unachieved schedules, and unexpected budget reductions costing millions of dollars. Most experts will agree that corruption and overpricing are not the critical weapon-acquisition problems.²

Finally, a simple analogy illustrates why the defense community should value stability. Halfway into the construction of a new home, no one would tolerate the builder announcing a cost increase, the banker reducing the amount of a loan commitment, or the spouse insisting on changing the floor plan. Such mismanagement would add to the cost and construction time, intolerably impacting family resources and patience. These very problems—optimistic estimates, erratic budgets, and changing requirements—are common in weapon acquisition. The military, the government, and the taxpayer should be motivated to achieve program stability.

A Well-Documented Problem

Instability is generally recognized as a serious acquisition problem. During the 1980s, virtually every major study addressing general defense-acquisition deficiencies, and most weapon-acquisition experts, identified instability as a leading culprit.

Rand Corporation, assessing acquisition policy in the 1970s, was one of the earliest to focus on instability. In 1979, it concluded the weapon-procurement process too often results in frequently changing program budgets and schedules.³

Two years later, the DOD "Carlucci Initiatives" identified 32 actions to improve the acquisition pro-

cess. The fourth action was designed specifically to stabilize programs by linking approved baseline funding and yearly budget recommendations.⁴

In 1983, Air Force Systems Command investigated ways to shorten the acquisition process and procure weapons at lower cost. Called the "Affordable Acquisition Approach," the study reviewed cost and schedule histories of 109 acquisition programs. It concluded "...that program instability (large unplanned changes in program funding and schedule) is the major causative factor of cost and schedule growth."⁵

In 1986, President Ronald Reagan established the Blue Ribbon Commission on Defense Management to recommend improvements to the DOD acquisition process. His motivation largely was due to eroding public confidence in view of "... overpriced spare parts, test deficiencies, and cost and schedule overruns." While the commission found few instances of fraud, it concluded the defense acquisition process has "basic problems that must be corrected."⁶ The commission suggested that DOD "emulate" a management model which incorporates successful features found in "outstanding commercial programs." Stability, identified as one of these features, exists when the manager and the board of directors operate in a disciplined manner. The manager promises to achieve planned program objectives (performance, cost, schedule), and the board of directors commits to providing resources and other support needed for program execution. The manager is motivated to achieve success; so long as progress is satisfactory, the board of directors provides the planned funding and protects the manager's prerogative to exercise authority and control.⁷

In June 1989, Secretary of Defense Richard Cheney released the Defense Management Report (DMR) outlining the current Administration's plans for improving defense acquisition. The DMR says DOD must adopt certain management principles, one being stability in programs. "Reliable planning, funding, and system configuration, and continuity in management personnel, greatly increase the

likelihood that systems will be delivered on time and at projected cost."⁸

Several noted DOD acquisition experts share a concern about program instability.

William A. Long, former Under Secretary of Defense for Research and Engineering, said in 1981, "A major portion of the ultimate success of the [Carlucci Initiatives] can be directly related to the degree to which programs are stabilized. Although some progress has been made, significant problems remain."⁹

Jacques S. Gansler said in 1983, "Unfortunately, stability is probably the most important major characteristic that is missing from the American defense budget."¹⁰

David Packard, former Deputy Secretary of Defense, said in 1986, "Without stability, no permanent acquisition improvements are possible."¹¹

Frank Carlucci, former Defense Secretary, said in 1988, "We all know what is fundamentally wrong with [the acquisition system]: Time and again instability has been scored as its most chronic defect."¹²

Dr. Robert B. Costello, former Under Secretary of Defense for Acquisition, said in 1989, "Over the last eight years, DOD has been forced to live with sawtooth funding, which plays havoc with rational planning."¹³

Edward Hirsch and Fred Waelchli, Defense Systems Management College, said in 1989, "Program stability—surely a close cousin of Deming's 'constancy of purpose'—has long been recognized as perhaps the single most important contributor to efficiency and effectiveness in the acquisition process."¹⁴

Numerous studies and experts have identified instability as a serious defense procurement problem. It is persistent, pervasive and costly.

Destabilizers

A construct has been proposed to aid in understanding acquisition deficiencies. Its centerpiece is stability, argued to be the ingredient most lack-

ing in weapon acquisition. Stability requires quality planning and disciplined execution.

This section introduces specific causes or "destabilizers." Eleven destabilizers, judged to be among the most problematic, are described briefly to illustrate the mechanics of instability (See Figure 1). Each "threatens" program stability by degrading either planning or execution. If left unchecked, the destabilizers will introduce unfavorable cost, schedule, performance and supportability impacts. Experienced acquisition personnel will be familiar with most of these destabilizers. The construct does not introduce new causes *per se* but, rather, provides a framework for understanding how they operate to reduce acquisition effectiveness.

Faulty Requirements. This destabilizer is an appropriate starting point since requirements form the foundation of every program. Faulty requirements are mismatches between formal performance objectives and either the user's need, industry's capability, or reasonable affordability. Subsequent analysis or test will eventually reveal the disconnect. The corrective actions must include revising the plan, synonymous with instability.¹⁵

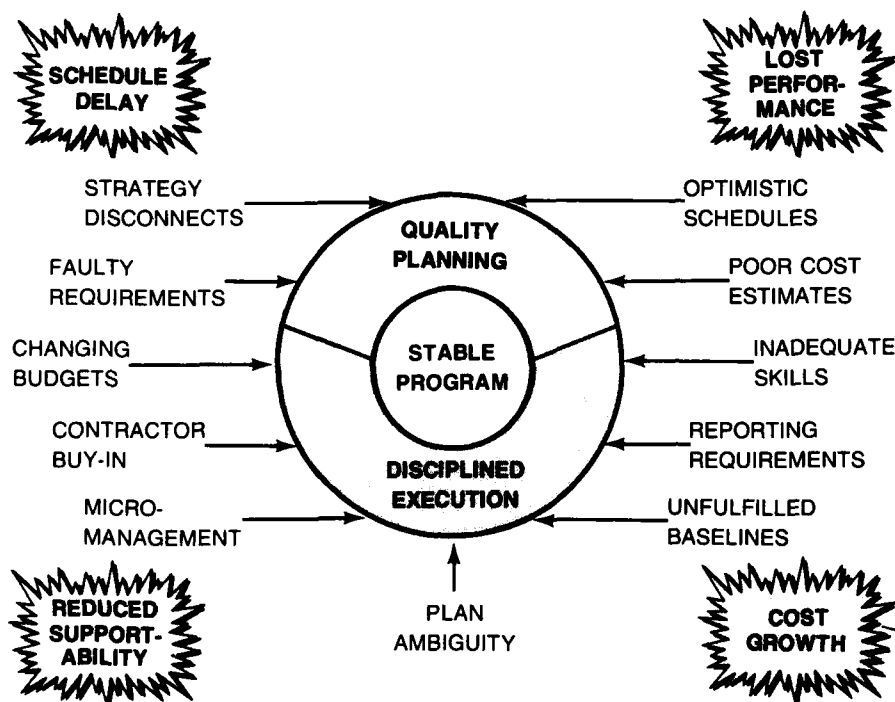
Requirements are faulty if unrealistic. For example, some have overestimated technical expectations. They assume the availability of knowledge, materials or processes which are not likely to be available when needed. Such requirements have "built-in-failure."

Requirements can be faulty because they overstate anticipated industrial capabilities. Political support is often influenced by "marketing" promises of significant capability enhancement. The tendency toward optimism is human but counterproductive.

The user may ask for more performance than needed, hedging against the possibility that the developer will fall short. Obviously, hedged requirements have the potential of adding unnecessarily to program cost. They also increase the development challenge and, thus, the risk of failure and instability.

FIGURE 1. STABILITY CONSTRUCT

A stable program is "protected" by quality planning and disciplined execution. However, 11 potential "threats" to stability are depicted, each one capable of introducing undesirable elements: schedule delay, lost performance, reduced supportability and cost growth.



Finally, requirements can be ambiguous. The user's documented operational requirements may not always adequately describe and communicate the desired capabilities. The program office can fail to understand the problem, threat or environment. The perceived urgency to initiate a program can distract both the user and the developer from the task of creating clear, concise descriptions of performance objectives.

Strategy Disconnects. In theory, national objectives determine security objectives which, in turn, dictate military strategies. Ideally, the Executive and Legislative Branches agree on these strategies. On this basis, the Congress then funds military forces.

In practice, strategy disconnects between these two government branches are common. An example is the decade-long debate regarding next-generation intercontinental ballistic missiles (ICBMs) and their

associated basing modes. Similar debates are festering over virtually all future systems including fighters, armament, bombers, transport aircraft and ballistic missile defense.

The Blue Ribbon Commission on Defense Management described this destabilizer as follows:

There is no rational system whereby the Executive Branch and Congress reached coherent and enduring agreement on national military strategy, the forces to carry it out and the funding that should be provided in light of the overall economy and the competing claims on national resources. The absence of such a system contributes substantially to the instability and uncertainty that plague the defense program.¹⁶

Optimistic Schedules. The time to develop and acquire a major weapon system in the acquisition environ-

ment today is averaging more than a decade. Hundreds of discrete, interdependent tasks are involved. Estimating the length and logical sequence of each one is not easy. The fact that schedule variances occur should not be surprising. However, these variances are almost always unfavorable—the actual schedule turns out to be longer than the prediction.¹⁷ Indeed, schedule optimism has become part of the defense acquisition culture.

Optimistic schedules are perpetuated for several reasons. First, planners can never foresee (and therefore do not include in their schedule estimates) all problems that must be overcome. Tasks always appear easier during planning. In the course of execution, unanticipated friction is a given.

Second, some managers believe the best way to minimize development time is to implement aggressive schedules. While recognizing the low probability of success, the work force is, theoretically, motivated to complete the activity in minimum time.

A third cause of schedule optimism is that DOD and industry executives can feel pressured to adhere to unrealistic schedules for political reasons. Programs are more attractive with earlier fielding dates. Similarly, schedules can be "milestone driven." Programs become locked into artificial calendar dates for major reviews or operational capability.

Schedules organize program activity and are, therefore, critical to stability. Accurate schedules facilitate effective execution; optimistic ones create waste and raise questions about management competence.

Poor Cost Estimates. Cost estimates are key elements of an acquisition plan, providing the basis for programming the total requirement and phasing of budgets, and program personnel expend considerable effort preparing them. Independent estimates are required, and obtaining accurate projections can be difficult. Programs usually involve new technologies and require years to complete.

Inaccurate estimates can result from the inability to predict technological advancements, task

complexity, economic conditions, schedule requirements, support environments or system employment concepts. Worse, managers sometimes feel pressured to provide optimistic estimates in order to obtain program go-ahead approval. Yet, a poor cost estimate creates an unexecutable plan.

A program with a faulty cost estimate eventually must deal with the disconnect. A poor cost estimate is a destabilizer. When the faulty estimate is discovered, a revised plan based on the adjusted cost will be needed if the program is to continue.

Four destabilizers affecting quality planning have been described. The seven remaining (continuing clockwise around the construct depicted in the Figure 1) impact disciplined execution.

Inadequate Skills. The turbulent acquisition environment demands considerable expertise from program office personnel. State-of-the-art technology, sophisticated management systems and regulatory complexity are occupational challenges. Successful execution of an acquisition plan depends on the competence of the acquisition team.

The DOD has been criticized for a perceived less-than-adequate skill level among acquisition personnel. The Blue Ribbon Commission noted that this work force operates the largest procurement agency in the world, spending billions of dollars, yet "...compared to industry counterparts, [it] is undertrained, underpaid, and inexperienced."¹⁸

The DOD has reacted to these criticisms; for example, the Air Force instituted an acquisition-certification program incorporating education, training and experience requirements. However, the perception continues that DOD personnel lack sufficient skills. The 101st Congress is considering legislation to require career programs (or possibly even an acquisition corp) in each Service.

Reporting Requirements. Tom Peters and Robert Waterman's book, *In Search of Excellence*, recommends that organizational structures be based on "...simple form and lean staff."¹⁹ The defense acquisition pro-

cess has been criticized for violating this management precept. Critics suggest that decision-making is not always responsive because of the long command channels and the large headquarters staffs, which overemphasize their particular interests at the expense of core program objectives.

In 1986, the Blue Ribbon Commission suggested that weapon acquisition be managed with "limited reporting requirements" and "small, high quality staffs."²⁰ The Commission specifically recommended the establishment of a new chain of command for major programs to include a DOD acquisition executive, individual Service acquisition executives and program executive officers.²¹ In the last 4 years, DOD has struggled to implement the letter and spirit of the Commission's recommendation.

A characteristic of stable programs is the channeling of effort toward achieving planned objectives. The program manager needs ready access to senior executives and timely decisions. Staffs should facilitate the process. Program stability is adversely affected to the extent that DOD reporting requirements do not work toward these purposes.

Unfulfilled Baselines. In the late 1970's, the "baselines" began to appear as tools for creating stability. Baselines summarize key performance, support, cost, and schedule objectives and they identify the resources required to acquire systems.

A baseline, when approved, is intended as an agreement between the program manager and senior management. In effect, the former commits to achieving the specified objectives, and the latter promises to provide specified resources (budget, manpower and facilities).

In 1986, DOD implemented baselining in Directive 5000.45, which states that a "...stable program environment provides the foundation for effective program management."²² Since then, many Air Force, Navy and Army programs have been baselined with the Office of the Secretary of Defense (OSD).

Despite high expectations and a decade of effort, baselines have yet to create acquisition stability. Baseline commitments are too often unfulfilled during execution. Changing requirements, unachieved performance, and missed schedules rapidly supersede the documents. Budget turbulence results in annual rebaselining for many programs. To the extent that baselines continue to be unfulfilled, programs will be destabilized.

Plan Ambiguity. In the preceding discussion, an unfulfilled baseline is described as a failure between a program manager and senior management; correspondingly, plan ambiguity is a failure between the program manager and the program team. Weapon system acquisition is a difficult undertaking involving many people, organizations, technologies and tasks. Creating a program plan is necessary but by no means sufficient; it also must be understood.

Unfortunately, I am convinced that plans are frequently misunderstood. Too often, they are not integrated, simplified and taught to acquisition-team members, a fact suggesting that few really understand them. More disturbing, some managers have a bias against sharing information that other team members need.

Tom Peters and Nancy Austin, in *A Passion for Excellence*, state that "The trick is demonstrating to people, every day, where you want to take your organization. It's being amazingly consistent that counts, ignoring the charge (which will be leveled) that you are a broken record."²³

Programs with ambiguous plans will suffer instabilities since execution cannot be disciplined. Disconnects will fester as a result of conflicting ideas about program objectives, priorities, milestones and resources. Team members will be caught by surprise and unprepared; effort will be wasted.

Micromanagement. Contemporary management experts overwhelmingly agree that decentralized execution is a virtue. Responsibility and authority for performing tasks should be delegated to the lowest possible level. People closest to activities generally manage them best.

In simple terms, micromanagement occurs when higher levels of bureaucracy violate this rule. The Congress, the Pentagon and Service materiel commands have been accused of usurping functions better performed by lower-level managers.

Once a weapon acquisition is initiated, the program manager should be concentrating on executing the approved plan. Unfortunately, program managers spend too much time ensuring compliance with regulations, responding to audits, and briefing organizations with marginal program involvement. The Blue Ribbon Commission noted that "The program manager spends a very high percentage of his time briefing his program, writing reports on his program, and defending his program, thus doing everything except managing his program."²⁴

Contractor Buy-in. Most acquisition managers have experienced buy-ins at one time or another; competitive source selections often evaluate proposals with buy-in promises. In fact, some industry personnel argue that buy-ins are occasionally a legitimate, perhaps even necessary, strategy for acquiring and maintaining business.

For the purpose of this study, a "buy-in" will be broadly defined to include both "optimistic proposals" (the traditional definition) and "trust-me tactics." Optimistic proposals offer performance levels, cost goals or schedules not likely to be achieved, with the motive of winning competitive programs. Trust-me tactics are employed after contract award. The contractor optimistically projects final system performance in order to placate the program office early-on. As time passes, the degraded performance becomes apparent, and the program manager must accept it or implement painful program adjustments.

Optimistic proposals and trust-me tactics inevitably result in cost, schedule and performance variances. Yet, these buy-ins can be profitable if the company is awarded follow-on business (for example, a lucrative production contract). Even without follow-on business, DOD often self-initiates program changes, providing opportunities to recover on the cur-

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rent contracts. Programs are frequently renegotiated to revise performance requirements, impose new budget profiles and reduce quantities. The government negotiators have difficulty separating the impacts of self-initiated changes and contractor buy-ins. The government position is further weakened when companies are sole-source or the government is pressured to settle quickly (for example, when funds are expiring). One industry manager told me government contract changes provide the "golden rope" to profitability.

While one might blame industry for this destabilizer, the problem is self-inflicted. Acquisition plans too often include unrealistic performance requirements or unachievable cost or schedule goals. When competition is intense and contracts are awarded largely on the basis of price, the system can encourage buy-ins.

Changing Budgets. Of all the sources of instability, changing budgets are the best documented and, perhaps, most problematic. Budget instabilities are similar to the strategy disconnects discussed earlier; however, this destabilizer occurs during program execution. It is defined as a deviation from the amount and timing of funding originally approved for a program.

For a program to pass a milestone decision successfully, its acquisition plans including funding needs must be reviewed and approved.²⁵ Often, however, approved funding subsequently is not provided. The Congress and DOD annually change, to some extent, the funding of almost every program. In its report to the 101st Congress, the Air Force stated,

The entire defense establishment has experienced a budgetary roller coaster. In the 10 to 15 years it takes to develop and field a new weapon system, there may be several substantial swings in defense funding. The inefficiency associated with this lack of stable financial planning dwarfs all other causes of inefficiency in defense procurement and programming.²⁶

Inefficiencies from budget instability are manifested by program stretchouts, restructuring, and smaller and less economical buys. James Kitfield, senior editor of *Military Forum*, writes "The services buy fewer, ever more expensive weapons; then the inefficiencies of program stretchouts make them even more expensive, and the services can afford to buy fewer of them still."²⁷

How can DOD programs be executed effectively with constantly changing budgets? No private company could operate profitably this way. According to the Blue Ribbon Commission, successful commercial programs enjoy dependable resource commitments from upper management.²⁸ The DOD programs will be stable only if they can enjoy dependable funding.

This list of 11 destabilizers is not all inclusive. Other obstacles to quality planning and disciplined execution exist. However, the 11 are among the most serious threats to stability and, thus, useful in completing the construct.

Conclusions and Implications

The purpose of the construct has been to provide a simple framework for understanding complex weapon acquisition problems. It can assist engineers, managers and executives in guiding actions and priorities. I

reiterate that what acquisition needs most is stability: quality planning and disciplined execution.

The construct has other implications. *First*, significant improvements in the acquisition process seem unlikely without added stability. Only when quality plans are developed and followed will the process be effective. Further, any proposed solution to acquisition problems should be suspect unless it promotes (or at the very least does not degrade) stability.

Second, all participants in the acquisition process have contributed to past problems. For example, weapon program management offices proposed optimistic schedules, paid insufficient attention to requirements, promised unrealistic performance, and failed to train personnel. Users and operators did not convey their needs with consistency, accuracy and clarity. Contractors made commitments that could not be fulfilled. The OSD, Service secretaries and the Congress imposed regulations and procedures that aggravated micro-management and unduly complicated reporting requirements. The Joint Chiefs of Staff, OSD and the Congress failed to create a system for making timely strategy and force-structure decisions. The Congress responded to lesser, newsworthy deficiencies while failing to take responsibility for budget decisions.

Yet, acquisition effectiveness has practical limits. By necessity, weapons push technology; thus, performance and cost and schedule uncertainties, to some degree, are a fact of life. Threats to national security evolve in unpredictable ways, forcing adjustments to requirements. The Constitution gives the Congress sole authority to fund military programs; the Congress will almost certainly continue to review and modify DOD weapon-budget requests each year.

Third, while the construct's purpose is to promote problem understanding, it also suggests solutions. Many are within the control of the program manager. Program managers directly influence requirements, cost and schedules estimates, skill levels, and other factors affecting stability. Concerned program managers should embrace the following

*"Reliable
planning, funding,
and system
configuration, and
continuity in
management
personnel, greatly
increase the
likelihood that
systems will be
delivered on time
and at projected
cost."*

policies: (1) define and validate requirements as soon as possible and consult often with the user on the subject; (2) create realistic cost and schedule estimates; (3) continuously educate the team members on the contents of the plan; (4) discourage buy-ins by creating an environment which rewards those who meet commitments.²⁹

The construct is compatible with the DOD Total Quality Management (TQM) program. Notionally, the construct identifies what needs to be done—quality planning and disciplined execution. On the other hand, TQM provides a management philosophy for successful planning and executing programs. The construct is concerned with faulty user requirements, strategic disconnects, unfulfilled budget commitments, ambiguous plans, and inadequate skills. The TQM complements this concern by promoting a customer focus, organizational goal setting, long-term

commitments from top management, process definition and training.³⁰ Do organizations committed to quality fail to understand the customer's requirements, produce optimistic estimates, or inadequately train employees, for example? Certainly they do not.

Perhaps the next time someone asks, What's wrong with acquisition, your answer will be the same as mine: "It needs more stability."

Endnotes

1. Tom Peters, *Thriving on Chaos* (New York: Harper and Row, 1987), pp. 564-65.

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3. Edmund Dews and Giles K. Smith, *Acquisition Policy Effectiveness: Department of Defense Experience in the 1970s* (Santa Monica: Rand Corporation, Santa Monica, 1973), p. 71.

4. William A. Long, "Final Report of the Task Force on Acquisition Improvement" (DOD Report, Office of the Under Secretary of Defense, Research and Engineering, Washington, D.C., 1981), p. 4-1.

5. Air Force Systems Command, "The Affordable Acquisition Approach, Executive Summary," (Command sponsored study, Andrews AFB Md., 1983), pp. 1-3, 54, 83.

6. The President's Blue Ribbon Commission on Defense Management, *A Report to the President on Defense Acquisition* (Washington, D.C.: Government Printing Office,

1986), pp. 1, 5 (hereafter cited as Blue Ribbon Commission, *Defense Acquisition*).

7. Blue Ribbon Commission, *Defense Acquisition*, p. 12.

8. Dick Cheney, "Defense Management Report to the President" (Department of Defense Report, July 1989), p. 10.

9. William A. Long, "Final Report of the Task Force on Acquisition Improvement" (DOD Report, Office of the Under Secretary of Defense, Research and Engineering, Washington, D.C., 1981), p. 2.

10. Jacques S. Gansler, "We Can Afford Security," *Current News*, No. 1028, Summer 1983, p. 8. In addition, his latest book, *Affording Defense* (Cambridge: The MIT Press, 1989), p. 11 states "The first priority is to improve long-term strategy and resource planning, and to improve the selection of weapon systems correspondingly. Once this has been accomplished, more stability in the programs and budgets must be achieved. (How can anyone manage efficiently if the programs, and dollars for them are always changing?)"

11. U.S. Senate, Committee on Armed Services, *The Acquisition Findings in the Report of the President's Blue Ribbon Commission on Defense Management* (Washington, D.C.: Government Printing Office, April 4, 1986), p. 32 (hereafter cited as U.S. Senate, *Acquisition Findings*).

12. Frank C. Carlucci, "Grappling With the Instabilities Of Our Acquisition System," *Defense 88* (1988), pp. 4-5.

13. Dr. Robert B. Costello, "Controlling the DOD Acquisition Process," *Signal* (February 1989), p. 21.

14. Edward Hirsch and Fred Waelchli, "Toward a Set of Guiding Principles for Defense Acquisition Management," *Defense 89* (March/April 1989), p. 7.

15. The term "plan" suggests a single document. Actually, a program's plan is more accurately a series of documents typically to include a decision coordinating paper, acquisition plan, baseline, test and evaluation master plan, and others.

16. David Packard, "Micromanage-

ment: The Fundamental Problem," *Defense 88* (1988), p. 8.

17. The experienced acquisition professional will not refute the claim that schedule estimates almost always err on the side of optimism. For an excellent discussion of the problem, see James Kitfield, "Unguided Missiles?" *Military Forum* (April 1988), pp. 16-24.

18. Blue Ribbon Commission, *Defense Acquisition*, p. 28

19. Thomas J. Peters and Robert H. Waterman, Jr., *In Search of Excellence* (New York: Warner Books, 1983), p. 311.

20. Blue Ribbon Commission, *Defense Acquisition*, p. 12.

21. *Ibid.*, p. 17.

22. Department of Defense, "Baselining of Selected Major Systems, Directive 5000.45" (Washington, D.C.: Government Printing Office, August 25, 1986), p. 1.

23. Tom Peters and Nancy Austin, *A Passion For Excellence* (New York: Random House, 1985), pp. 324-325.

24. U.S. Senate, *Acquisition Findings*, p. 34.

25. Milestones are formal program decision points. Milestones I, II and III precede concept definition/validation, full-scale development and production, respectively.

26. Department of the Air Force, "Report to the 101st Congress, Fiscal Year 1990" (Washington, D.C.: Government Printing Office, 1989), p. 52.

27. James Kitfield, "Acquisition: Are Stretchouts the Answer?" *Military Forum* (January/February 1989), p. 22.

28. Blue Ribbon Commission, *Defense Acquisition*, p. 12.

29. This paper is derived from a more detailed study focusing on the program manager. See Lt. Col. John L. Gray, "Air Force Acquisition Stability and the Program Manager." (Research Report, Air War College, Maxwell AFB Ala., May 1990).

30. Jack C. Strickland, "Key Ingredients to Total Quality Management," *Defense 89* (March/April 1989), p. 18.

IN MEMORIAM

William G. Gicking, 70, Defense Systems Management College registrar from 1971 until his retirement in 1984, died of cancer on July 26 at his home near Mt. Vernon.

Mr. Gicking was a retired Air Force chief master sergeant.

A native of Pennsylvania, Mr. Gicking was a graduate of the University of Omaha and held a master's degree in education from the University of Scranton.

He was a veteran of World War II, serving in the Navy; later, he enlisted in the Air Force and served in the Korean Conflict. Other Air Force assignments include service in Japan. His last Air Force assignment was at the Noncommissioned Officers Academy at Langley Air Force Base in Virginia where he was chief of the Communicative Skills/Personnel Training Section. He retired from active duty in 1962.

From 1963-65, he was registrar and director of placement at Keystone Junior College in Pennsylvania. He was director of admissions at that college from 1965-1969. From 1969-71, he was deputy director of the operations division, Office of the Dean, U.S. Military Academy.

He was selected registrar at the newly formed Defense Systems Management School in 1971. He directed admissions during a period that saw the school evolve into a college and the enrollment increase by 350 percent.

Mr. Gicking was an avid swimmer. He competed in the Virginia Golden Olympics in the early 1980s and won three gold medals. He was a past president of the Methodist Men, a member of the Council of Ministries, and an administrative board member at the Aldersgate United Methodist Church. He was an American Red Cross Volunteer.

He is survived by his wife, Eleanor of Alexandria; a daughter, Lonnie Dennis of Albuquerque; two sons, Jim Gicking of Wayne, Pa., and Richard of Alexandria; two sisters, Peg Miller of Allentown, Pa., and Jane Bogdon of Drums, Pa.; and four grandchildren.

DEMING FOR DEFENSE

*Author Discloses Gems of Wisdom Lying
Below Surface of the 14 Points*

Lieutenant Colonel Kenneth H. Rose, USA

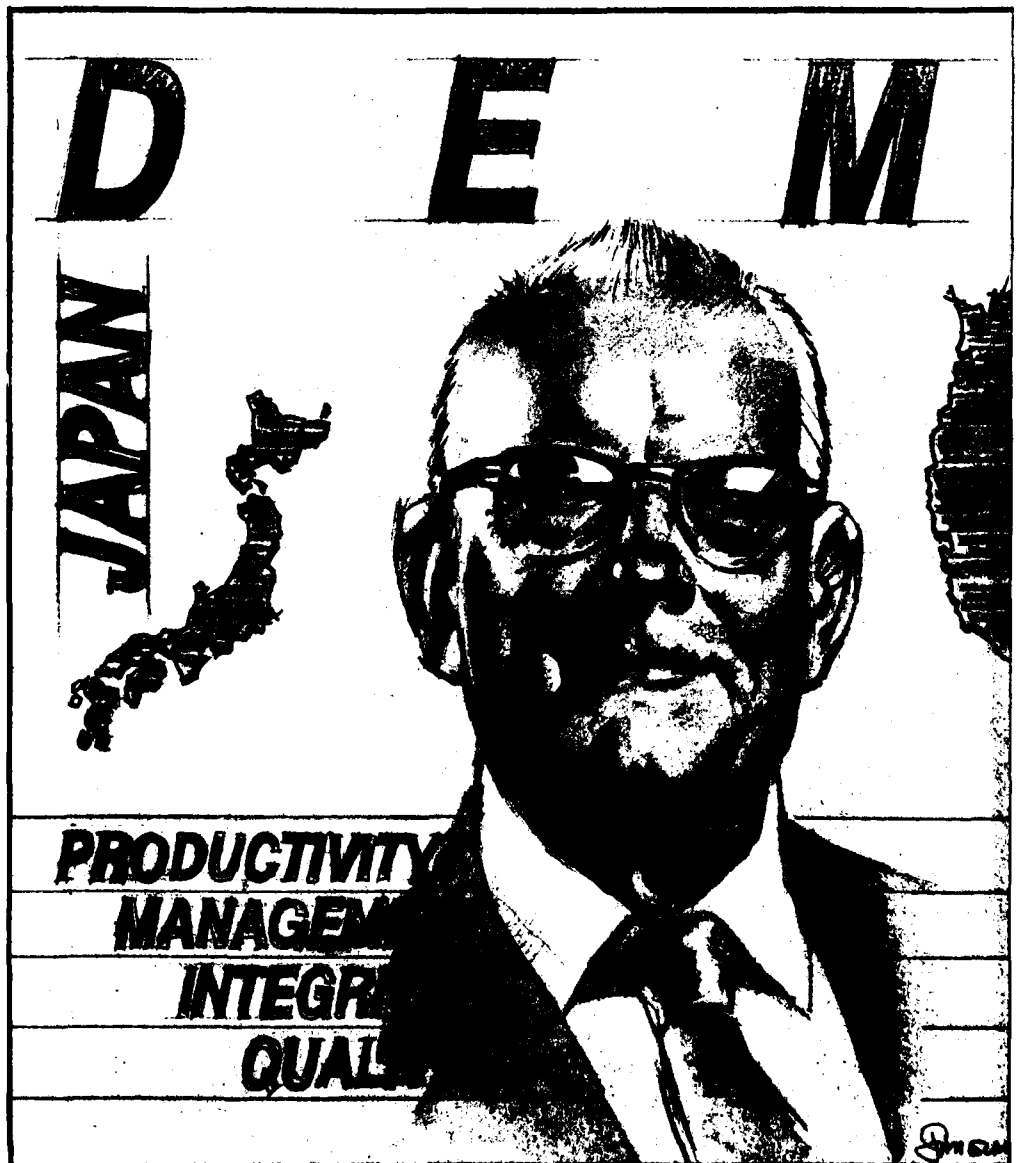
In his 1986 book, *Out of the Crisis*, W. Edwards Deming expressed harsh criticisms of American industry and bold proposals for improvement. Much of what he suggested also may be applicable to American military establishments.

This is not to say war is an industrial process and may be waged according to rules common to industrial analysis and control. Rather, military functions, like industrial production, are subject to certain enduring principles that seem to govern the conduct of human affairs, regardless of the class of action in which people are engaged.

First, a brief background. One of Deming's principal points is that it is better to build in quality on the production line than to "inspect" it in after the fact. To this end, he offers 14 points to guide management. These are neither aphorisms for a new age nor slogans to be posted on the shop wall but, rather, philosophical building blocks that, if properly interrelated, internalized, and implemented, will generate a life-style change for the better in the affected organization. His 14 points are below.

1. Create constancy of purpose for improvement of product and service.

LTC Rose is the Deputy Commander, Research, Development and Engineering Center, Fort Belvoir, Va.



2. Adopt the new philosophy.
3. Cease dependence on mass inspection.
4. End the practice of awarding business on the basis of price tag alone.
5. Improve constantly and forever the system of production and service.
6. Institute training.
7. Adopt and institute leadership.
8. Drive out fear.
9. Break down barriers between staff areas.
10. Eliminate slogans, exhortations, and targets for the work force.
11. Eliminate numerical quotas for the work force and numerical goals for people in management.

12. Remove barriers that rob people of pride of workmanship.
13. Encourage education and self-improvement for everyone.
14. Take action to accomplish the transformation.

Wisdom Below the Surface

The purpose here is not to offer another discussion of these points, some of which are not self-evident. That has been done best by Deming. Readers are encouraged to seek out the original text. *Instead, my purpose is to disclose additional gems of management wisdom that lie just below the surface of the explicitly stated, and much debated, 14 points.*

Deming minces no words at the start in making clear that this is serious business.

A quality program for a community, launched by ceremonies with a speech by the governor, raising of flags, beating of drums, badges, all with heavy applause, is a delusion and a snare.¹

It is fine to have an improvement program complete with symposia, conferences, workshops, breakfasts, testimonials, newsletters and awards, all serving titled masters and eager participants. But, we must never forget that the important thing is substance, not form-product, not appearance. In fact, a near-obsessive orientation toward appearances may be one of the most difficult problems we must solve.

Dr. Deming gets right at the heart of job performance and productivity.

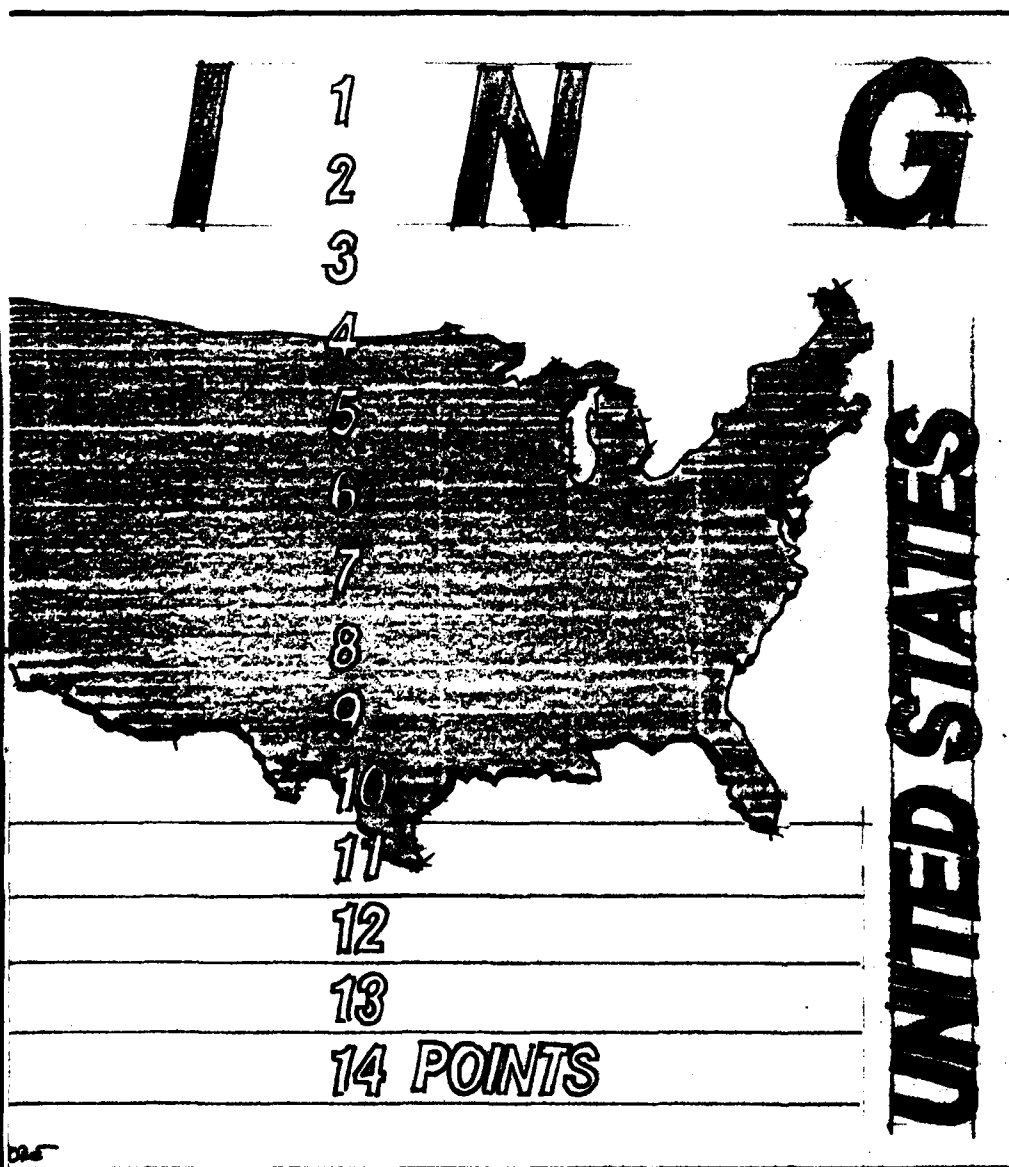
The possibility of pride of workmanship means more to the production worker than gymnasiums, tennis courts, and recreation areas.²

One apparently little-known tenet of modern human psychology is that people are motivated best by intrinsic benefits—those things that make them feel good about themselves and their jobs as they work; not extrinsic benefits—the perks and privileges usually assumed to be all-important. The Army recruiting slogan, “Be all you can be,” may be right on the mark. It seems to suggest a “releasing” that will tap the full power and potential of the human spirit. Unfortunately, once recruited, the newly employed are welcomed into an environment with narrowly defined patterns of allowable dress, speech and action—all with ample justification.

Allow People to Do Well

But Dr. Deming's point is less esoteric. He explains that keys to unlocking pride of workmanship are not quotas and criticism. Instead, these essential keys are skills, materials, tools, environment, time, management support, and leadership—things that allow people the opportunity to do well.

Deming plays the iconoclast, attacking the love affair with machinery and technology that



almost has become a national characteristic and, at times, a national embarrassment.

Lag in American productivity has been attributed in editorials and letters in the newspapers to failure to install new machinery, gadgets, and the latest types of automation such as robots. Such suggestions make interesting reading and still more interesting writing for people who do not understand problems of production. The following paragraph received from a friend in a large manufacturing company will serve as an illustration.

This whole program (design and installation of new machines) has led to some unhappy experiences. All these wonderful machines performed their intended functions on test, but when they were put into operation in our plants, with our people, they were out of business so much of the time for this and that kind of failure that our overall costs, instead of going down, went up. No one had evaluated the overall probable failure rates and maintenance. As a result, we were continually caught with stoppages and with not enough spare parts, or with none at all; and no provision for alternate production lines.³

Now, he is getting at things that we hold near and dear. Promising almost magical solutions to hard problems through the application of advanced, or worse, "emerging" technology has become a kind of cottage industry. We are quick to embrace a newly, even notionally, described system and put it on what appears to be an acquisition track, while we work backwards to invent a requirement and find a sponsor. Deming reminds us that there is no *deus ex machina* that will step in at the last moment and save us from failure. Developing and applying automation and other hardware is a complex, difficult task. It must not be approached through assumption and unbridled optimism. Or, as he puts it, the invention of new products and new services "...has been accomplished in every case in

my experience by application of innovation and knowledge."⁴

The matter of new products and services gets special attention. To the military community, it is a matter of special relevance.

Moreover, the customer is not in a good position to prescribe product or service that will help him in the future. The producer is in far better position than the customer to invent new design and new service. Would anyone that owned an automobile in 1905 express a demand for pneumatic tires, had you asked him what he needed? Would I, carrying a precise pocket-watch, have suggested a tiny calculator and quartz time piece?"⁵

Further,

A consumer can seldom say today what new product or new service would be desirable and useful to him three years from now, or a decade from now. New product and new types of service are generated, not by asking the consumer, but by knowledge, imagination, innovation, risk, trial and error on the part of the producer, backed by enough capital to develop the product or service and to stay in business during the lean months of introduction.⁶

This is pretty strong stuff. It seems to address directly the Army's Concept-Based Requirements System and kick it into a cocked hat. But does it really? Deming is only saying what most people already know: Users of products, or weapon systems, or whatever, are in a very poor position to specify new products because they usually lack the knowledge necessary to predict new products reliably. Their vision of the future is usually limited to the extent of their understanding of the present. Recognizing and admitting this limitation is difficult; people are simply not aware of what they don't know.

In the military community, two things mitigate the grim picture that Deming presents. First, the mobility of personnel throughout the organi-

zation presents the potential for individuals to serve as user and producer at different times. However, the absence of a directed personnel policy to implement this potential and manage individuals through successive, related user/producer/user assignments supports a continued division between user and producer.

Second, while users may be least able to specify new products, they certainly know what is wrong with the ones they have. Their strength is that they are best able to describe what is necessary—what they would like to be able to do—to accomplish tasks they must perform at the front lines. Accordingly, the Army theory is that users should describe desired capabilities and producers should suggest items whose performance characteristics provide or approach those capabilities. That's the theory. The practice is that users traditionally make great leaps over capabilities to system specifications and try to tell the producers what to build. The result, constrained by the user's limited understanding of what is possible, may be described as the manacles of modernization: thicker armor, bigger guns.

Bridging the Gulf

But, all is not doom and gloom. The Army attempts to bridge the gulf between user and producer with an organizational connector—a distinct organization that serves as the user's representative. This element conducts the combat developments process: It analyzes threats, develops concepts that respond to perceived deficiencies and requirements that follow from the concepts, coordinates material identification and development with the producer, monitors acquisition, and supports fielding of the procured items. Again, the theory is good. In practice, this solution may only exacerbate the original problem. The user's representative is neither the user nor the producer. It is not subject to the urgencies of the user or privy to the expertise of the producer. It becomes a follower of the process and a victim of the analytical system it created, severely mired in the problem described by Deming, as follows:

The difficulty in defining quality is to translate future

needs of the user into measurable characteristics, so that a product can be designed and turned out to give satisfaction at a price the user will pay. This is not easy, and as soon as one feels fairly successful in the endeavor, he finds that the needs of the consumer have changed, competitors have moved in, there are new materials to work with, some better than the old ones, some worse; some cheaper than the old ones, some dearer.⁷

In suggesting a way out of this morass, Deming draws a distinction between advertising (selling the user what you make) and consumer research (identifying things to make that the user will buy). One is more important than the other.

Foremost is the principle that the purpose of consumer research is to understand the consumer's needs and wishes, and thus to design product and service that will provide a better living for him in the future.⁸

This sounds very much like what the user's representative is trying to do. It may be that the role is better described by the term "consumer research" than the current, and somewhat oblique term "combat developments." This may serve to focus the process more outward, on the user, rather than inward, on itself. But, there is an issue here far more important than mere process.

A second principle is that no one can guess the future loss of business from a dissatisfied customer. The cost to replace a defective item on the production line is fairly easy to estimate, but the cost of a defective item that goes out to a customer defies measure. It was Oliver Beckwith who remarked in 1947, in a meeting of Committee E-11 of the American Society for Testing and Materials, that a dissatisfied customer does not complain: he just switches. Or, as my friend Robert W. Peach put it for Sears, Roebuck & Co., The goods come back, but not the customer.⁹

On the battlefield, dissatisfied users won't have the opportunity to switch, they just won't come back—ever.

So what is the value of Deming's book? Is it just another item to be placed prominently on the office bookshelf where it will be seen by important visitors or will complement the room decor? Hopefully not. Deming's own summary is below.

The central problem in management, leadership, and production, as my friend Lloyd S. Nelson put it, and as we have remarked in earlier chapters, is failure to understand the nature and interpretation of variation.

Efforts and methods for improvement of quality and productivity are in most companies and in most government agencies fragmented, with no overall competent guidance, no integrated system for continual improvement. Everyone, regardless of his job, needs a chance to learn and develop. In a climate of fragmentation, people go off in different directions, unaware of what other people are doing. They have no chance to work to the best advantage of the company nor with themselves, and little chance to develop.¹⁰

While not discussed in detail here, Deming's main theme is variation. His description of "system" variation and the need to bring it under statistical control is the foundation for the 14 points. Beyond this, there are messages with particular meaning for military readers.

1. There are no magic wands in technology. Everything comes from hard work.

2. Don't try to force people into a fixed process. Instead, modify the process until you maximize people's performance potential.

3. Shorten the link between consumer and producer.

Soldier in the Field

The interpretation and implementation of this last message gives rise to a probably controversial proposal. In the Army, the users are the soldiers in the field. The producer of weapons

and equipment is the Army Materiel Command. The connector, the user's representative, is the Training and Doctrine Command. If the true role of the connector is consumer research, as described earlier, then the combat developers who provide that connection should be organic to the producer, not organic to the user and not lost in some never-never land between the two. Once this is done, the consumer research-producer elements should be separated from the Army Materiel Command and all the attendant structures that seem to have a life of their own, perhaps under a Program Executive Office type organization. This must then be driven and maintained to be a lean, user/product-oriented operation where the link between user and producer is as short as possible.

This last point cannot be over-emphasized. When determining and designing tomorrow's material, there is simply no substitute for standing shivering on the border next to the soldier who may eventually live or die through its use. Deming makes a clear point for responsibility in a final admonition.

Every appalling example in this book turned up because I was there, on the line, on the job, trying to be helpful by looking for some sources of improvement and wrong practices. If I had waited for them to come for help, I'd still be waiting.¹¹

Endnotes

1. W. Edwards Deming, *Out of the Crisis* (Cambridge, Mass., Massachusetts Institute of Technology, Center for Advanced Engineering Study, 1986), p. 21.

2. Ibid, p. 85.

3. Ibid, p. 13.

4. Ibid, p. 182.

5. Ibid, p. 167.

6. Ibid, p. 182.

7. Ibid, p. 169.

8. Ibid, p. 175.

9. Ibid, p. 175.

10. Ibid, p. 456.

11. Ibid, p. 469.

YESTERDAY, TODAY, TOMORROW

The Evolution of **TOTAL QUALITY MANAGEMENT**

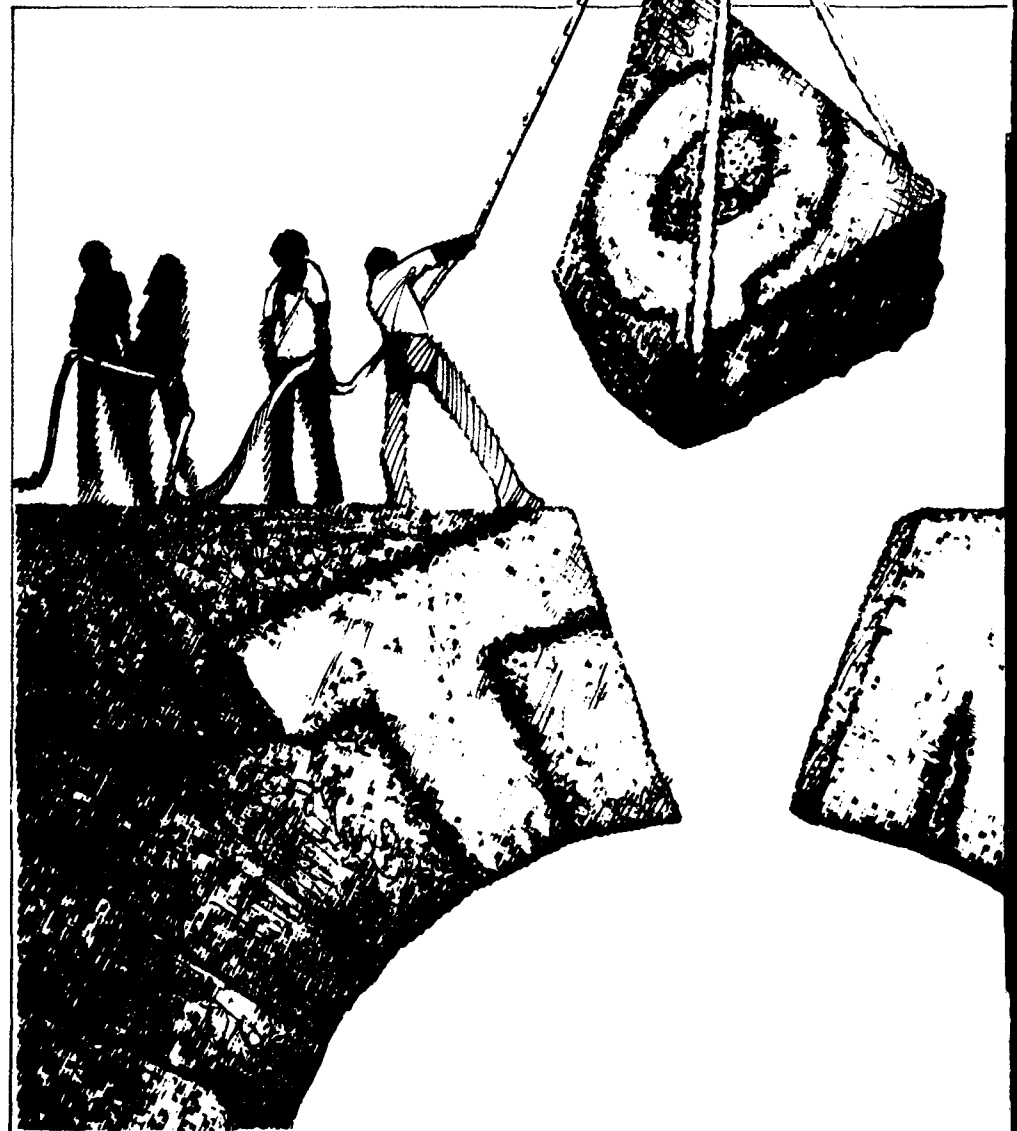
John P. McGovern

Something has been terribly wrong for a long time. Growing up in the Forties I knew American products were the best in the world. Now I know very few of our products are considered the best. The fact that our country's reputation for delivering quality products and services has been deteriorating translates into a real economic plight. It appears the United States has not kept up the required technical and managerial effort to produce superior quality products; or, our competitors in the world are doing things differently. After giving thought to this dilemma I have concluded both propositions are true.

What we did or did not do in the Forties and thereafter, and what needs to be done in the Nineties, to regain our reputation and market share is the subject of this paper.

The Forties

Pending entry of the United States into World War II, the War Department foresaw a need for methods to control the quality of materials and manufactured products. One of the first efforts was the War Department's request to the American Standards Association (ASA) in December 1940. The ASA was asked to initiate a project on the application of statistics to the quality control of war materials and manufactured products. The committee developed three standards used by the allies in World War II. These important standards were classified during the war. The committee comprised industry and government experts and two people who later achieved world prominence—W. Edwards Deming and Harry F. Dodge.



The first standard, Z1.1, was entitled "Guide for Quality Control Charts"; the second, Z1.2, "Control

Mr. McGovern is a professor assigned to the Research Directorate at the Defense Systems Management College.

Chart Method of Analyzing Data"; and the third, Z1.3, "Control Chart Method of Controlling Quality During Production." These standards followed the early work of Dr. Walter Shewart, Bell Laboratories physicist who in the early 1920s

developed a method of monitoring and analyzing variation over time; a method he called control chart.

Shewart did much of the early work of describing the phenomenon of variation in statistical terms. He found virtually all types of repeatable activities, from manufacturing processes to administrative processes, are characterized by variation. He recognized the importance of being able to monitor these processes to detect possible changes. A process can be defined by two characteristics, its central tendency and its spread;

i.e., average and dispersion, values required to construct a control chart.

Another statistical tool that facilitated the monitoring of the quality of large volumes of war materials required during World War II was the acceptance sampling plan. The chairman of the Emergency Technical Committee, Harold Dodge, a Bell Labs engineer, and his colleague Harry Romig, published acceptance sampling inspection tables in the January 1941 issue of *The Bell System Technical Journal*. These tables provided statistical guidance

allowing inspectors to accept entire lots of parts and materials after only inspecting a small portion of the lot. This provided another powerful tool enabling the United States to produce and ship war supplies expeditiously.

However, before the concepts of statistical quality control could be implemented, training was required. Dr. Deming, a student of Shewart with Ralph Wareham and Charles Mummery of Hoover Corporation, developed and conducted the initial training. For the next few years, they and others taught statistical quality control to 31,000 students from the government procurement arena.

It was 1957 when I learned about statistical quality control charts. The American Society for Quality Control (ASQC) conducted a course on Shewart Control Charts, which was held one night a week for five weeks and used the ASA standards for instruction. The following is the scope, as taken from Z1.1 paragraph 1.1 scope:

"This standard is intended as a guide for handling problems concerning the economic control of quality materials, manufactured products, services, etc. It has particular reference to methods of collecting, arranging and analyzing inspection and test records in a manner designed to detect lack of uniformity of quality." Figure 1 is an excerpt from Z1.1 and will serve to illustrate the construction and use of control chart.

The Fifties

During post-war years, American industry could not make products fast enough. Our products—tools, appliances, furniture, carpets, etc., were in demand throughout the world, and America was about the sole source of supply. Quality control learned and required for the war effort was second fiddle to high-volume sales and production. It took quite a few years for the rest of the world to get industrial capabilities back on stream.

Post World War II found Japan one of the most devastated countries in the world, virtually every city being in ruins. There wasn't enough food, clothing, housing and little means to pay for required imports.

Quality control learned and required for the war effort was second fiddle to high-volume sales and production.

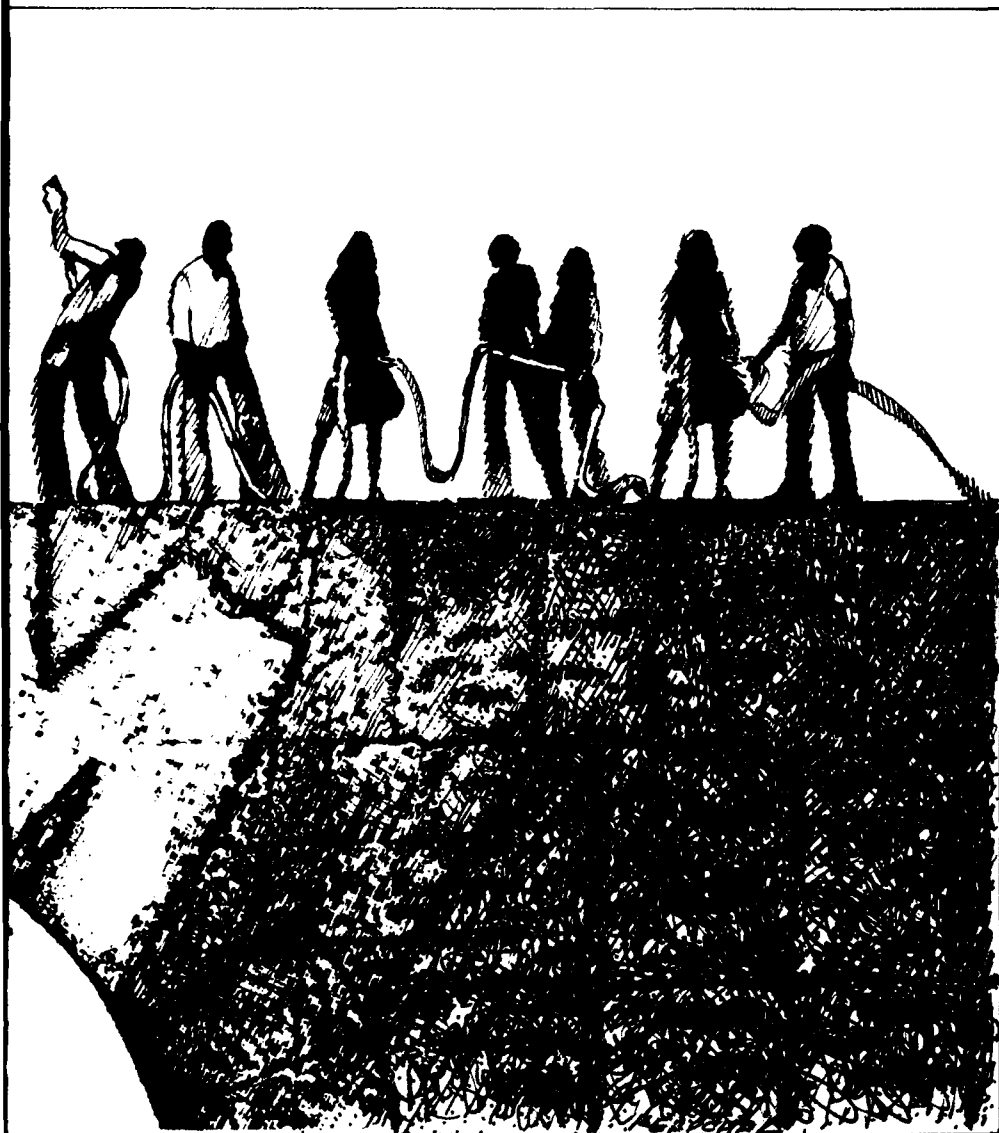
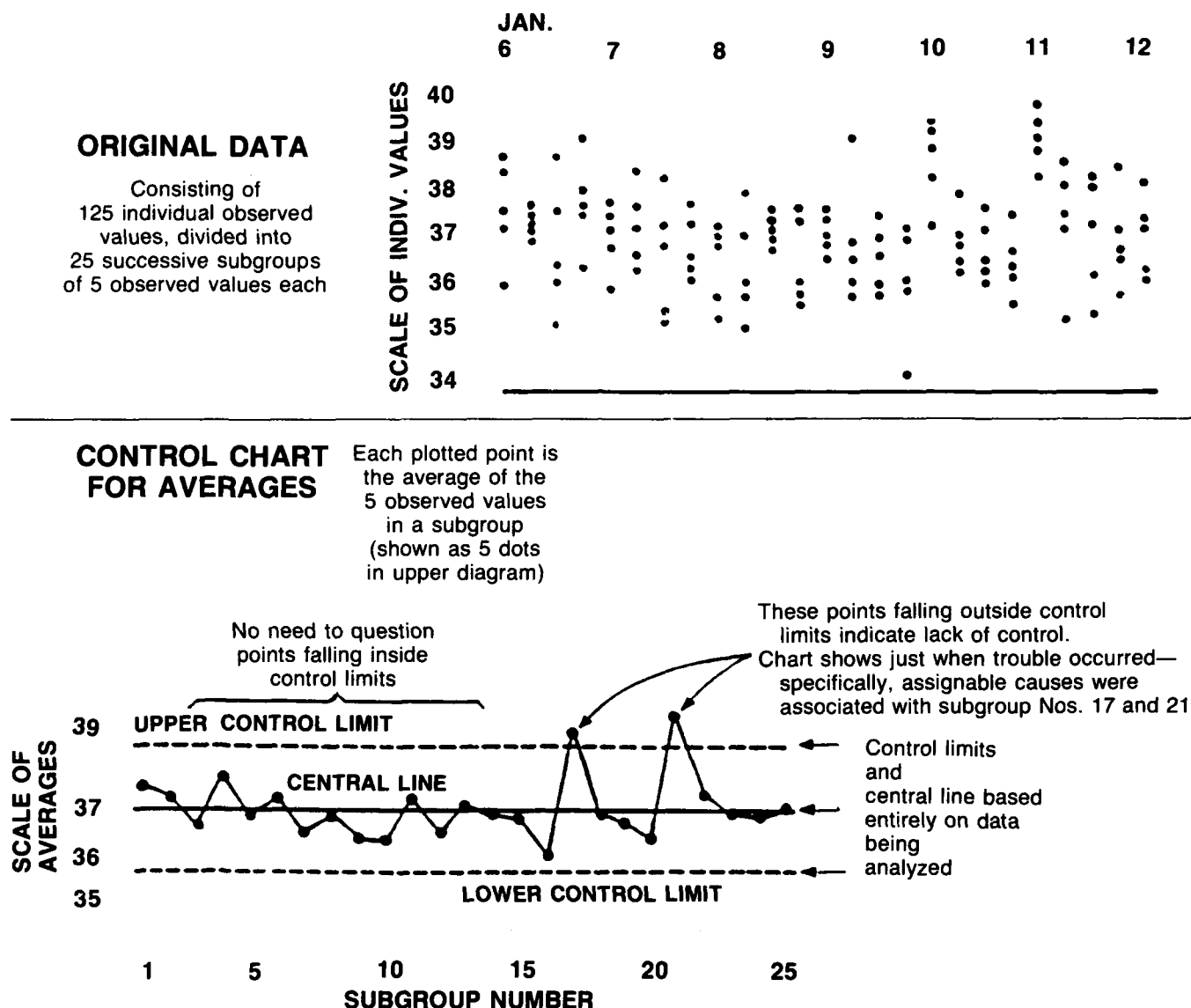


FIGURE 1. ILLUSTRATING FEATURES OF THE CONTROL CHART AS USED FOR ANALYZING A SET OF DATA TO DETERMINE WHETHER THERE HAS BEEN LACK OF CONTROL



The Japanese had to build up their production capabilities quickly to again commence trading.

Help arrived from America. One of the first was Dr. Deming, who went to Japan in 1947 by request of the Defense Department. His trip concerned the Japanese forthcoming census in 1951. During his initial trips, Deming socialized with the Japanese and began a long-term friendship. The Japanese, aware of Deming's knowledge of statistics and familiarity with the Z1-1, Z1-2 and Z1-3 standards through pamphlets from American Standards Association, invited him to Japan to teach these techniques. The invitation was

from the Japanese Union of Scientists and Engineers (JUSE). Subsequently, royalties from publication of his lectures were given to JUSE, which used them to establish the prestigious Deming Award, given annually to individuals and companies for excellence in quality. It often takes years of education and training, worker involvement and dedicated management to achieve this level of excellence.

The 1950 visit was followed by visits in 1951-1952 when more lectures on quality control were given. Dr. Deming has made frequent visits since the early lecturing days. Dr. J. M. Juran, invited to Japan by the

JUSE in 1954, conducted seminars concentrating on the middle-and-top-management role in quality-control activities. It seemed that concentrating on control charts and sample inspection created problems. Although these technical techniques were the major reasons for creating quality Japanese products, there was lack of top-management attention to the quality issue. This was cited in Kaoru Ishikawa's book *What Is Total Quality Control? (The Japanese Way)*. He said the 1950s was a period of overemphasis on statistical quality control. Again, according to Ishikawa, Juran's visit marked the transition in Japan's quality control activities from dealing primarily with

manufacturing-based technology to management for total quality control. It was this point in time that quality control was regarded by the Japanese as a tool for management.

Two other areas of importance were addressed during this period: quality assurance of newly developed products, and the contribution that could be made through quality circles. Using statistical quality control charts for monitoring variability and inspection for product acceptance was widely embraced during early stages of Japan's quality improvement effort. When top management learned what product markets could be captured with quality as a strategic priority, they branched out from statistical process control (SPC) and inspection to other avenues of success. They realized if a process makes defects even the best methods of inspection will not eliminate the problem. If the product is made without defects, significant savings can be realized. Prevention of defects is more cost effective than inspection and defect repair.

The concept of quality circles began as a means of educating the work force in Japan. At first, mostly engineers, staff and management had been trained in QC techniques. The way was found to educate the foreman and group leaders by forming study groups—quality circles. A correspondence course was developed and broadcast by the Japan Broadcasting Corporation as part of educational programming in 1957. Its goal, eventually achieved, was to reach the entire work force, and was attained by educational programs and by inculcation into the entire school system.

Years later when quality circles were imported into America, we somehow lost the intent of quality circles being study groups. What happened instead was the formation of groups that were given, for the most part, minimal training, the inference of management support and *implied* responsibility to change anything and everything. Many circles adopted the single objective of improving working conditions. When management reaction wasn't immediate the groups sometimes became negative contributors rather than positive.

What's Happening in the U. S.?

During the Sixties, companies in the United States were using technical and statistical tools to ensure product quality. Major companies, particularly those that had been engaged in war production, had formal quality control and reliability organizations. These companies practiced statistical quality control along with design of experiment and reliability engineering.

They performed design of experiments on new products and processes before release to production. They implemented statistical process control charts. They conducted failure mode analysis and adjusted designs and manufacturing processes to increase reliability. They practiced these techniques and others for a time; but, soon, little of these quality improvement activities were being implemented.

Following are some reasons for U.S. lack of attention to the question of quality improvement.

—American industries were making extraordinary levels of profits and the industrial leadership was frequently made the prerogative of financial managers. We saw business schools advocating the theory of general managership; i.e., that a good manager can manage any type of enterprise. A person need not know about steel to head a steel company, doesn't need to know about railroads to manage a railroad company, etc. I think that it is not incorrect to say our industry and business leaders were managing for growth, with little concern for improvement. If there were concerns, it was when major problems occurred that would result in gigantic consequences to company profits.

—Another dimension of this era was the impact behavioral scientists were having on management of our enterprises. Theories of Maslow, McGregor, Hertzberg, Argyris, etc., were being read and taught throughout the country. They weren't only taught in business schools; major corporations used many of their teachings for in-house management training. In a gross sense, the message of behavioral scientists was that of individual-worker needs, versus organizational needs. They probed

the nature of motivation and the means of satisfying those needs. Many theories and teachings were concerned with employee attitudes and motivation that would satisfy organizational missions and goals. They concentrated on manufacturing environments with goals of increasing employee morale and productivity.

—A major contributor to the U.S. shrinking competitiveness was that we disowned technical quality improvement and control techniques that, for the most part, we originated. Our technology concerns were not in attaining manufacturing excellence, but in developing new products and processes.

The Seventies

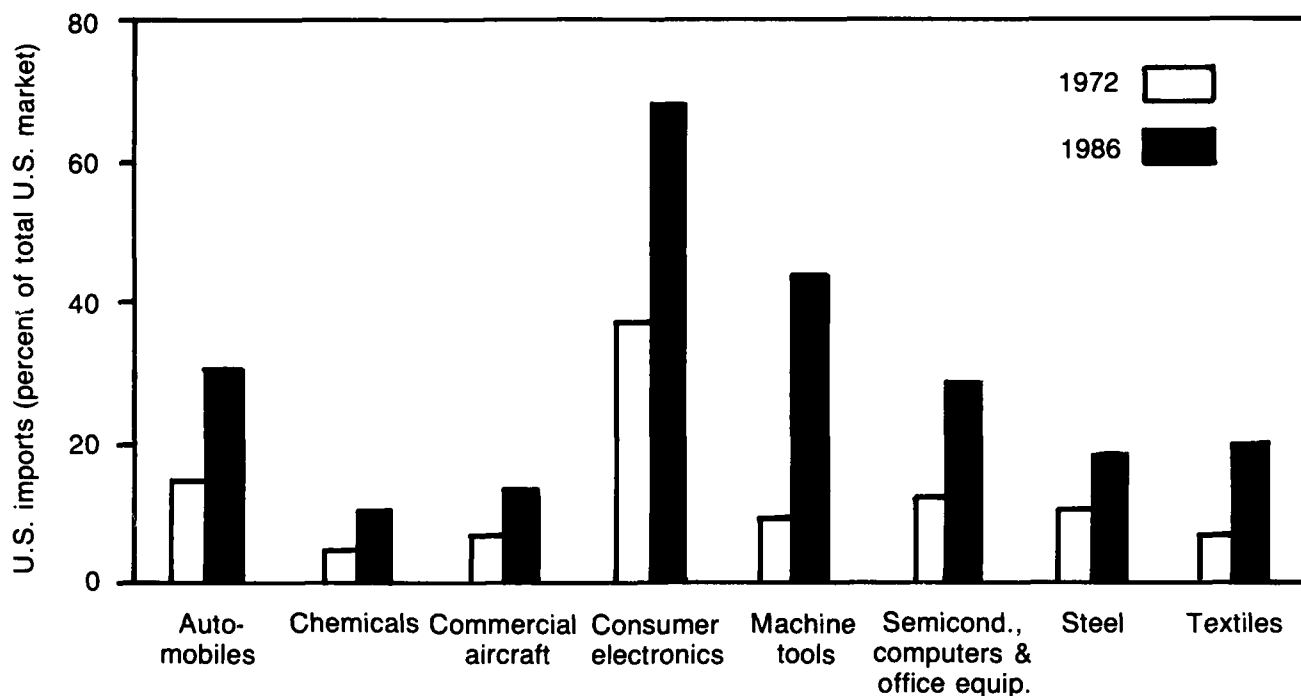
The United States experienced phenomenal market growth in the Sixties and Seventies. Except for the recessions of 1960, 1970 and 1973, the growth was non-stop and loss of market (specifically to the Japanese) went unchallenged. In 1964, for example, the United States had a \$6 billion trade surplus. By 1984, this turned into a \$123 billion deficit. Growth in the deficit was due primarily to market takeover by Japanese products giving our consumers unequaled quality for less money. Figures 2.a and 2.b are taken from the MIT Commission on Industrial Productivity Book, *Made in America—Regaining the Production Edge*. It illustrates the import-export posture of some key industries. The influx of Japanese products is the most significant reason for the changes from 1972 to 1986.

How did we lose so many product markets, specifically to the Japanese in such a relatively short time?

—The Japanese started in the Fifties to institutionalize the delivery of quality products and services and they succeeded. Their children are taught at home and in school that quality is expected, as a producer and as a consumer.

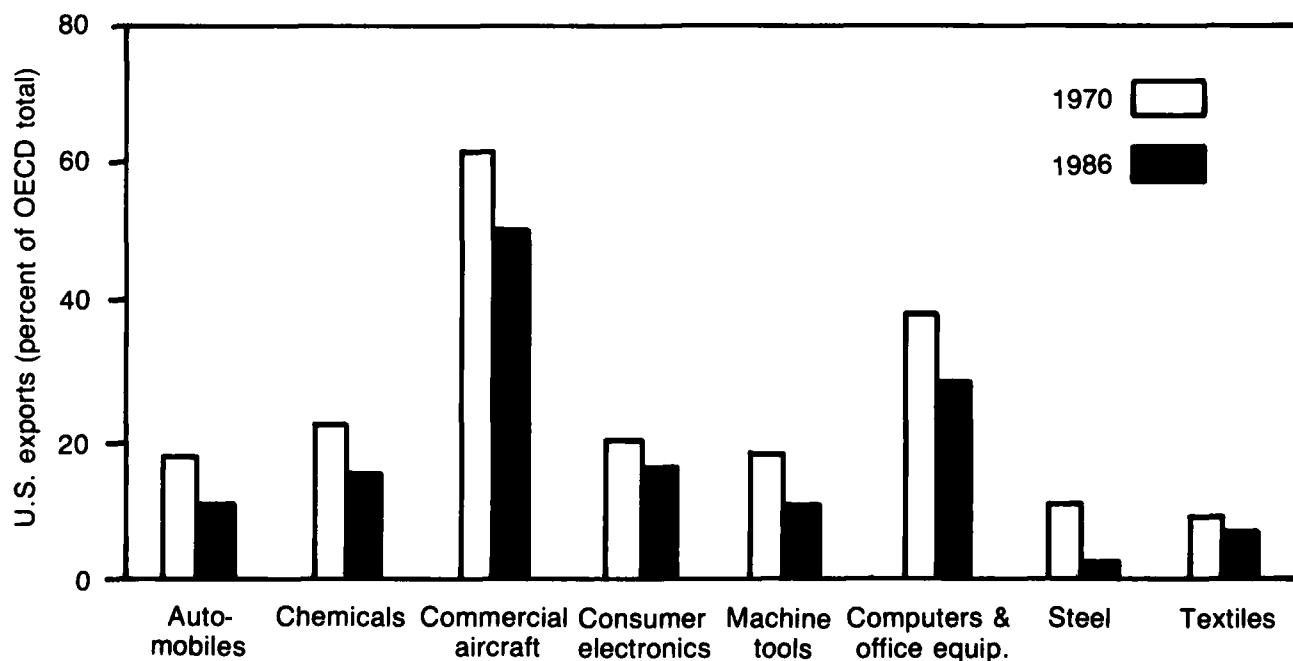
—All levels of management in industry and business recognize that quality of product and services not only results in increased customer demand, but is cost effective—competitive.

FIGURE 2.a. U.S. IMPORTS IN INDUSTRIES STUDIED



Sources: Based on data made available by the U.S. Department of Commerce, International Trade Administration, Office of Trade Information and Analysis, supplemented by data presented in U.S. Department of Commerce, International Trade Administration, *U.S. Industrial Outlook, 1988* (Washington, D.C.: U.S. Government Printing Office, 1988); and Organization for Economic Cooperation and Development, COMTAP Database.

FIGURE 2.b. U.S. EXPORTS IN INDUSTRIES STUDIED



Sources: Based on data made available by the U.S. Department of Commerce, International Trade Administration, Office of Trade Information and Analysis, supplemented by data presented in U.S. Department of Commerce, International Trade Administration, *U.S. Industrial Outlook, 1988* (Washington, D.C.: U.S. Government Printing Office, 1988); and Organization for Economic Cooperation and Development, COMTAP Database.

—All employees can and are expected to implement the improvement process. Their contributions are sought out and recognized by management.

—Supplier contributions to the final product in terms of time, cost and quality are requested and recognized.

—They seek out and recognize the voice of the customer from the initial design phase and throughout the product life cycle.

—They are dedicated to continuous improvement of all processes in the business enterprise.

—Their bottom-line is not the quarterly earnings statement, but to make the enterprise "recession proof"; "to make our company recession proof, with true sales and technological capabilities," stated Ricoh Co., LTD., 1975 recipient of the Deming Award, when asked advantages of total quality control.

—The belief that teamwork throughout an organization is essential.

—Total quality control (management) begins and ends with education and training.

—All levels of management, from chief executive officer to the foreman, practice the managerial and technical skills to accomplish continuous product improvement.

The Last Decade

In 1980, attitudes began to change in this country. Two events that helped trigger this were the NBC white paper "If Japan Can...Why Can't We?" and, the Ford Motor Company implementation of quality improvement as a competitive strategy. The NBC white paper introduced the American public to Dr. Deming. Claire Crawford-Mason, producer of the show, had learned about Deming. The program explored how Deming went to Japan in 1950 and taught the Japanese statistical process control. Many think he single handedly brought the Japanese to a level of excellence in terms of quality. Also appearing on the program was William Conway, chief executive officer of Nashua Paper Company, who used Deming to train the Nashua workforce in

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statistical process control (SPC). He credits SPC in significant cost and quality improvement that resulted in Nashua's competitive success.

Six months after the NBC white paper, Ford contacted Deming and asked for help. Ford Motor Company lost \$2.5 billion in 1979 and 1980 and was looking for a way to increase profits. Deming's major thrust in the '40s was SPC; in 1980, his major emphasis was turned to managerial matters. Deming was delighted to work with Ford and other large companies. He wanted to "create a bonfire that would create a prairie fire that would consume all America and turn it around." Dr. Deming's 14 points are a prescription for a company's competitive success. He is continually telling American management they are responsible for 94-96 percent of problems faced in business and industry.

Ford Motor Company led by Don Petersen, who took to Deming immediately, has made significant changes in the company and yielded significant success. For the first time, in 1986, Ford made more profit than General Motors. The manner in which Ford embraced Deming's concepts and work with their suppliers has significantly influenced other major U.S. companies.

The Term Total Quality Management Emerges

Two events in 1984 focused Department of Defense interest in total quality management: the Defense Logistic Agency (DLA) bottom-line conference, and the quality improvement activities at the Naval Air Repair Facilities.

In 1984, two of the country's experts on quality improvement urged attendees at a government conference to improve the quality of all U.S. goods and services. Dr. A. V. Feigenbaum and Dr. Myron Tribus spoke at a DLA bottom-line conference in Washington, D.C., to 400 corporate executives, government officials and academic leaders. Dr. Feigenbaum is president of General Systems Co. and a pioneer in quality improvement. With Dr. Deming and Dr. Joseph Juran, he taught the Japanese in the 1950s the competitive power in continuous quality improvement. At the time of the 1984 conference, Dr. Tribus was director of the Center for Advanced Engineering at MIT. Tribus had, years earlier, persuaded Dr. Deming to publish his book: *Quality, Productivity and Competitive Position*, which, with video tapes on the subject, has been distributed to thousands in American industry.

For the DLA bottom-line conference, Dr. Feigenbaum's address was "The Hard Road to Quality Excellence." He talked about a study indicating that 82 percent of the consumers, government and industrial markets placed quality in a position equal to, or more important than, price. Yet 4 years earlier, quality importance received a 48 percent response. He indicated three worldwide influences responsible for the increase.

1. Consumers' purchase expectation. There is a quality revolution today, as there was in 1984. Customer expectations for better quality products and services are increasing at a faster rate than the quality improvements delivered by American industry.

2. Management's recognition that quality improvement can be the most effective way an enterprise can increase productivity and reduce costs.

3. Japan's influence. No need to go into too much detail. Just take a look in parking lots or in electronic stores.

Dr. Tribus' presentation was "Cost of America's Defense; Is the DOD Part of the Solution Or Part of the Problem?" He was invited to discuss what is happening in academia regarding quality and productivity. He deviated and said the United States is not coming to grips with the quality and productivity issue. The result is an increasing deficit and military supplies and equipment costing too much, often defective and unreliable. Dr. Tribus said in 1984 the DOD spending rate was half a billion dollars per day for military weapons and supplies. Their role should be judged in light of "He who has the gold makes the rules."

I believe Dr. Feigenbaum and Dr. Tribus planted the TQM seed that day in the Department of Defense. The defense community, because it is driven by requirements and procedures, can move very slowly. On the other hand, because of impending financial crisis and competitive pressures, some U.S. companies made significant strides in quality improvement. Companies like Xerox, Harley Davidson, Motorola, Hewlett Packard and IBM prioritized quality into a strategic business role.

In 1984, while Dr. Tribus and Dr. Feigenbaum were getting the DOD stirred up about quality matters, a program, "Total Quality Management," was being implemented within one of defense's operating groups. The Naval Air Rework Facilities began an initiative of TQM in 1984; later (1986) it was proposed as the mechanism by which the Department of Defense could achieve President Ronald Reagan's goal of achieving 20 percent increase in productivity by 1992.

As stated in the 1986 *Report of the DOD Task Force On Productivity in the Support of Operations*: "total quality management training is aimed at improving the quality of our products through use of statistical process control. This requires changing the corporate environment to emphasize work processes and to increase communications and interaction within the organization. Our training is based upon management

Customer expectations for better quality and services are increasing faster than the quality improvements delivered by American industry.

theories taught by W. Edwards Deming, M. Tribus, P. Crosby and J. Juran and have proven successful in Japanese and U.S. companies." The report goes on about the improvements demonstrated by Ford Motor Company and the need for management commitment and extensive training for successful TQM implementation.

Where Are We Today?

Whether you call it Total Quality Improvement (Boeing), Star Quality (Lockheed), Six Sigma (Motorola), Quality Focus on the Business Process (IBM), Total Quality Management, etc. the Eighties have seen the quality of products and services becoming a major concern for many companies.

In the last few years, we have seen a shift, specifically in competitively threatened companies, to where statistical process control charts are utilized. Design of experiments are conducted to optimize product and process parameters. There is a call to listen and to meet customer requirements. Conferences are held to address concurrent engineering; i.e., systematic approach to the integrated, concurrent design of products and their related processes including manufacture and support. Seminars and conferences are conducted on employee teamwork and empowerment, and the contribution of quality improvement to a business.

Everywhere, short courses are offered in SPC, Taguchi design of experiments, quality function deployment, basic improvement tools, TQM implementation, and concurrent engineering and the behavioral aspects of teamwork and empowerment.

As suggested, many techniques are not new. That isn't the point. New or old, Japanese or American, the United States must recognize that continuous improvement of all processes, products and services in our enterprises is imperative to sustain and regain a world-market share. Although remarkable accomplishments of the Japanese have been cited in this paper, we must remember that other determined competitors must be considered in the future. *Europe 1992* is no small threat to many of our industries.

Conclusion

The birth of initiatives conforming to the concepts that many in industry and government call total quality management is necessary for industrial survival. Many U.S. government and industrial leaders recognize this and are taking a proactive stance. Many more, however, do not recognize this crisis and think business as usual, as in the last few decades, will sustain U.S. industrial dominance.

To those not believing there is a crisis I again quote Dr. Tribus, from his 1984 address.

In Madison Square Garden there was a boxing match. Before the main bout there was a preliminary in which the boxers were very badly matched. One of the fighters went down in the first minute of the first round. Someone in the audience shouted "fake" and the audience took it up. The fighter did not get up. The crowd shouted. "Fake. Fake. Fake." Finally the stretcher-bearers came and carried the fighter out of the hall. As he was being carried out the crowd kept up the chant. "Fake. Fake. Fake." The next day the boxer died. As the reporter said, he had to die, just to prove the fight was on the level.

The Improvement of **TECHNOLOGY TRANSFER** *From Government Laboratories To Industry*

Joseph W. Lee

There is a lack of useful feedback to the Congress and the Executive Branch on how to improve the government-industry technology transfer process. Industry responses and attitudes on technology transfer policies have been neglected because researchers focused on theoretical models, cumbersome procedures, narrow-focus case studies and the obsession for commercial payoff analyses. Commercialization success, in terms of economic gains and jobs created, can be difficult to quantify due to the lack of standardized evaluation procedures. This situation is complicated by the strategic impact of technology (the long-term effect on business and society) and other influencing variables such as management effectiveness and political change. Thus, it has been difficult for researchers to evaluate the impact of the Stevenson-Wydler Technology Innovation Act of 1980 and The Federal Technology Transfer Act of 1986.

Dr. Lee's report is the result of his research, sponsored by the Engineering Management Department of The George Washington University, conducted to provide a better understanding of the issues and identify barriers in government-industry technology transfer. A validated survey questionnaire, designed with the cooperation and assistance of technology transfer professionals in

the public and private sectors, was mailed to 531 members of the Technology Transfer Society living in the United States. Approximately half of these represent government and industry; the remainder are from various academic and legal professions, consultants, etc. The response exceeded 50 percent.

*Government needs
to increase
educational
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public and private.*

Impediments

Findings indicate 13 impediments to government-industry technology transfer, including lack of funds designated for technology transfer activities, ineffective communication,

cultural differences, ineffective mechanisms, bureaucratic inertia, not-invented-here syndrome and mission conflicts in government laboratories. Of these, five were policy-related, two were information/marketing-related and six were people/management-related.

The dismal progress in technology transfer from government laboratories to industry is due primarily to the lack of government commitment and industry interest. Government, leading in use of creative promotional programs, would motivate industry. Industry should develop a more positive attitude toward technologies developed elsewhere. Improving technology transfer from government laboratories to industry will require technology management expertise, effective leadership and government and industry executive commitment. Improved communication between government and industry would help them understand one another's environment; then, effective transfer can occur. Government needs to increase educational programs for training technology transfer managers, scientists and engineers in the public and private sectors.

Government Should Lead

The research project concludes that government has a leadership role in technology transfer and needs to provide the infrastructure for implementation. This report includes recommendations on improving the process.

Dr. Lee is president of International Consulting Services.

INTERNATIONAL DEFENSE COOPERATION AGREEMENTS

The authors are Dr. Philip E. Chartrand, Dr. James H. Hershman, Howard Stevens, Constance Cox, Heike Nuhsbaum, and Jennifer Bostow of the Government Affairs Division, U.S. Office of Personnel Management; and Richard Kwatnoski, Faculty of the Defense Systems Management College.

In international cooperative weapons agreements—whether to sell weapons or codevelop and coproduce them with our allies—the Congress plays a significant role in reviewing and, possibly, overturning negotiations completed by the Department of Defense. No multinational program manager can afford to ignore this congressional oversight authority while planning and conducting negotiations with allied military establishments.

We tend to think the Congress involves itself primarily in the sale of arms and weapons systems, but its statutory review powers extend also to memoranda of understanding (MOUs) where U.S. weapons, equipment or technology are transferred to foreign governments.

Memoranda of understanding are formal written arrangements between governments, setting forth the conditions under which they intend to cooperate in given areas, and are to be contrasted with letters of offer and acceptance (LOAs) used in foreign military sales (FMS).

*The FSX fighter
agreement
controversy with
Japan arose over
strong feelings to
protect the U.S.
industrial base.*

Congressional review powers over MOUs can and will be exercised when military aspects of our national security are considered on Capitol Hill, and also when economic or political aspects catch the Congress' attention. In addition, the Congress has mandated since 1985 that the Department of Defense shall reduce weapons costs and duplication by developing arms in concert with our NATO allies. This requires a greater number of multinational negotiations by DOD officials and

gives the Congress another basis for oversight as it reviews compliance with this directive.

This paper will explore the basis for congressional oversight of international technology transfers, how that oversight is exercised, and what factors attract special congressional attention.

Background

Throughout our nation's history, the Congress has been interested in



foreign arms sales control and weapons technology transfer. In the 1920s and 30s, the Congress passed the Neutrality Acts in an attempt to keep America out of foreign wars. Following World War II, in the era of a bipartisan foreign policy, the Congress deferred to the president on these issues. However, in 1974 the continuation of the Vietnam conflict convinced the Congress to enact legislation allowing for increased congressional participation in formulating U.S. foreign military sales policies. Amending the Foreign Assistance Act of 1961 and the Foreign Military Sales Act (later broadened and included in the 1976 Arms Export Control Act), enabled the Congress to monitor and, if necessary, regulate such sales.

To monitor, the president was required to notify the House Foreign Affairs Committee and Senate Foreign Relations Committee of any impending "major arms sale" to a foreign state. Regulation was provided by permitting the Congress to legislatively bar any major arms sale, or any commercial licensing agreements with non-NATO countries. A major arms sale is a sale of major defense equipment valued at \$14 million or more, or total sales of \$50 million or more.

To regulate these sales, the Congress, before 1983, could pass *concurrent* resolutions that served as "legislative vetoes." If passed by a simple majority of both houses, such a resolution (not requiring the president's signature) would prohibit any sale with which the Congress did not agree. Although the Congress never "vetoed" such legislative authority, it became entrenched in the process of determining the recipients of U.S. arms sales and technology transfers. More than once, the threat of a legislative veto caused the president to alter the contents of an arms sale package negotiated by the Department of Defense.

Arms Export Control Act and Chadha Case

In 1983, the Supreme Court ruled in the case of *INS vs. Chadha* that legislative vetoes were unconstitutional. Although the case itself dealt with a provision of immigration law, the impact on the Arms Export Con-

trol Act was great because it meant concurrent resolutions could no longer be used to veto sales of arms to foreign states. Therefore, the Congress has been forced to rely upon *joint* resolutions of disapproval as its main recourse against executive branch decisions to sell U.S. arms or to transfer technology abroad. The Arms Export Control Act, amended in 1986, reflects this change. A joint resolution requires legislative and executive branch power sharing: it needs a presidential signature to become law. Consequently, such a resolution is susceptible to a presidential veto, which would then require a two-thirds majority of the Senate and House of Representatives to be overridden.

Congressional Reporting Requirements

Under provisions of the Arms Export Control Act of 1976, as amended, two reporting requirements are imposed on the Department of Defense for (1) proposed individual foreign military sales and leases of defense articles or services, conducted by LOAs; and (2) proposed individual codevelopment agreements made under MOUs. When a sale is transacted through a commercial technical assistance or manufacturing licensing agreement with a non-NATO country, the State Department reports it.

A third reporting requirement added by the Congress in 1989, orders DOD to report annually, March 1, the status of *all* existing MOUs, and a description of every *proposed* MOU for which funding has been requested in that year's DOD budget request to the Congress.

The president is required to give the Speaker of the House (for the House Foreign Affairs Committee) and the Senate Foreign Relations Committee a detailed outline of most, but not all, proposed foreign military sales (FMSs) or leases of defense articles or services. Reporting is required only if the agreement involves foreign military sales of major defense equipment valued at \$14 million or more or total sales of \$50 million or more. In practice, notification has been given additionally to the House and Senate Armed Services Committees, and the House and Senate Appropriations Committees.

When reporting is required, notification is to be given after negotiations are completed between the relevant departments of the executive branch and the foreign government, but 30 days before the negotiated agreement is signed. However, if the sale is to a NATO ally, Japan, Australia, or New Zealand, notification may come only 15 days before implementation. To ensure the Congress has sufficient time to review the proposed sale, the Department of Defense *informally* provides advance notification to congressional committees 20 days before the formal notification, except when sales are to NATO allies, Japan, Australia, or New Zealand.

To create *codevelopment* arrangements, if entered into under the terms of the Arms Export Control Act, all MOUs must be reported by the Department of Defense to the Speaker of the House (for the House Foreign Affairs Committee), the Senate Foreign Relations Committee, and the Senate Armed Services Committee, at least 30 days before the agreement goes into effect. This reporting language was contained in the so-called Nunn-Quayle amendments added to the statute in 1985-86. These amendments permit the president to enter into "cooperative project agreements" with NATO allies or friendly foreign countries, and define the term "cooperative project" as well as set forth the requirements for such agreements.

In *coproduction* arrangements for weapons systems in our defense arsenal, reporting requirements are not set forth clearly in statute, so the Department of Defense has been treating these like FMS major arms sales, and reporting these MOUs on the same basis. Coproduction agreements are reported to the Congress if they: (1) involve sales of major defense equipment valued at more than \$14 million; (2) add up to a total sale of more than \$50 million; or (3) may be implemented through commercial, technical or manufacturing licensing agreements with non-NATO countries.

If a bar is to be raised to the implementation of these sales, leases or cooperative projects, it must start by having a senator or member of the

House of Representatives introduce a joint resolution of disapproval in his/her chamber. Such a resolution would be considered first by the House Foreign Affairs Committee or the Senate Foreign Relations Committee. However, failure of either committee to approve it would not preclude the full House of Representatives or Senate from passing the resolution. In the case of foreign military sales of major defense equipment, special procedures have been established by statute to expedite congressional action in the House and the Senate within 30 days on a joint resolution of disapproval. Remember, issues that seem unrelated to the negotiation may be viewed on Capitol Hill as justification for blocking the sale, lease, or cooperative development/production project. If the Congress chooses to enact legislation barring such a project from continuing, the 30 day "clock" is irrelevant; such a project can be stopped after it has begun.

Beyond the congressional role in overseeing foreign arms sales, leases and cooperative agreements, the legislature additionally has the power not to fund or reduce funding for projects already agreed to by the president, in consultation with the Congress, in the name of the United States. Since the Congress ultimately has the power over all federal government appropriations, it is always possible that the Congress will refuse to fund projects, even after they have begun. Because the Congress is sensitive to the harm that could follow a reneging on U.S. commitments, it remains an exception for it not to fund a project where an MOU has been reached and has been accepted by the Congress. Yet, there are some indications this may be changing. In the 1989 Conference Report to accompany HR 3072, the Department of Defense Appropriations Act of 1990, ten international programs were identified to be withheld from "NATO research and development funds." There were no surprises on this list. These programs, for various reasons, were not considered viable candidates for completion. However, zeroing of the domestic (Army) funding of the 155mm autonomous precision-guided munitions program resulted in a

cancellation of this program, even though Nunn Amendment funds were available.

Arms Sales—The Politics

A good example of this legislative oversight process at work is the Saudi arms sales deal of 1986. Under the original agreement, the Reagan Administration intended to sell 1666 Sidewinder air-to-air missiles, 100 Harpoon air-to-sea missiles, 200 Stinger ground-to-air missiles, and a number of F-16 fighter jets, wing tanks and helicopter gunships to Saudi Arabia. After the Administration informally notified the Congress of the agreement, intense opposition emerged in the Senate and the House, due to a perceived threat to Israeli

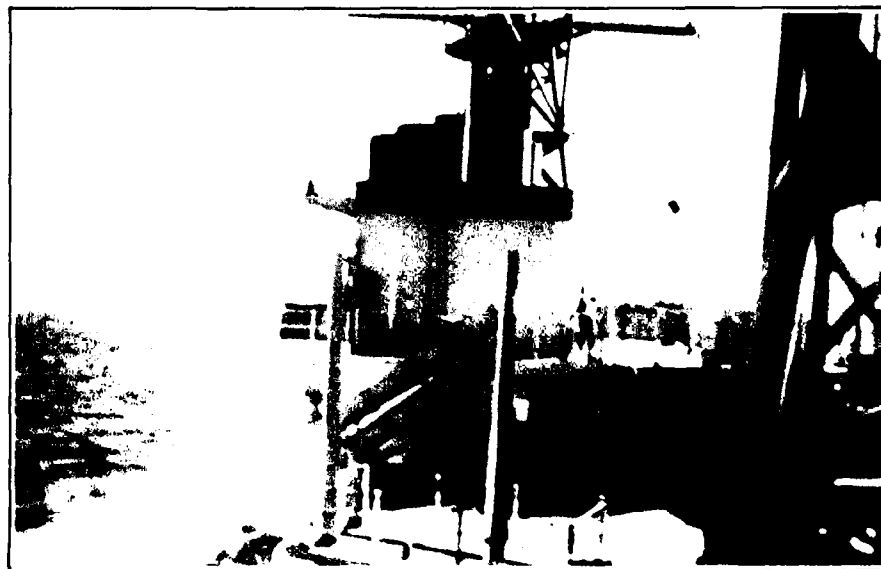
security posed by the sale of highly transportable weapons to any Arab state. While the Administration viewed this arms sales package as necessary to strengthen the security of a major Middle East ally, the very different way the Congress viewed this sale caused rethinking and renegotiation of an arms package by the executive branch to avoid having the legislative branch kill the sale altogether. When the president submitted the formal notification, he dropped everything from the agreement except various missiles, but Capitol Hill opposition continued.

On May 6-7, 1986, the House and the Senate passed a joint resolution of disapproval by a two-thirds majority, should the president veto the resolution. While the president exercised his veto, he told the Congress he no longer intended to include the 200 Stinger ground-to-air missiles in the arms sale package. This tactic made the proposal more politically acceptable to its opponents and created an atmosphere conducive to compromise. On June 5, 1986, the Senate voted to override the president's veto but failed by one vote to get the required two-thirds vote, allowing the revised sale.

A contrasting example of the legislative oversight process at work was the 1989 proposed arms sale to Saudi Arabia. On October 11, the Bush Administration informally notified the Congress it planned to sell the Saudis 315 tanks worth an

In the case of foreign military sales of major defense equipment, special procedures have been established by statute to expedite congressional action in the House and the Senate....

Harpoon





Stinger

estimated \$3 billion, beginning a 20-day informal notification period. This was followed by a 30-day formal period, during which the Congress could have stopped the sale if a sufficient majority in the House and Senate opposed it. Unlike the 1986 Saudi arms sale, there was little opposition to this sale from Israel's supporters. In part, this was because tanks are not as likely to fall into the hands of terrorists as are Stinger missiles.

Another reason for the lack of congressional opposition was the way the Bush Administration approached the legislative branch before the required notification. While President Reagan complained that required congressional involvement was onerous and unduly inhibited executive branch conduct of foreign policy, President Bush smoothed the way for his proposals by extensive congressional consultation. His Administration spent months preparing its case for the Saudi tank sale, ending with 2 weeks of intense discussions with congressional leaders and approximately 25 key Hill players.

The president's representatives emphasized that 40 states would reap hundreds of millions of dollars of business and thousands of man-years of employment. The Bush team held up informal notification for 5 weeks to complete the process of advance consultations. While this detailed involvement of the Congress in the preliminary stages of the negotiations goes far beyond the minimum requirements under the law, this effort by the

president to work closely with the Congress to avoid confrontation was highly successful. No action was taken or proposed by the Congress to oppose the 1989 tank sale to Saudi Arabia.

Commerce Department Role

In the FY89 Defense Authorization Act, the Congress added further requirements before DOD could enter into international memoranda of understanding "relating to research, development or production of defense equipment." These requirements involved additional studies by DOD and advance consultations with the Department of Commerce.

First, in negotiating and renegotiating any international MOU, the Secretary of Defense must consider the effect of that MOU on the "defense industrial base of the United States"; and "regularly solicit and consider information or recommendations from the Secretary of Commerce with respect to the effect" of such an MOU on our industrial base. In order to conduct the required consideration, the Defense Department established a "defense industrial base office" to develop and propose plans for maintaining and fostering U.S. defense industrial readiness. Through this office, or by other means, the Secretary of Defense must consider the impact on the industrial base of each major defense acquisition program as well as every MOU with a foreign country.

Second, the law provided for consultation with the Secretary of Commerce when an MOU with a foreign

government would require a transfer of technology in connection with a contract subject to an *offset* arrangement. "Offset arrangements" are agreements, made as a condition of the sale, in which the purchasing government receives U.S. technology, investment funds, or items purchased by our government, to offset or reduce the costs to the recipient of the U.S. defense product being purchased. Offset arrangements are integral parts of virtually all coproduction agreements, but not necessarily in all codevelopment agreements.

Memoranda of understanding with offset arrangements are barred by the FY89 Act if their implementation would significantly and adversely affect the defense industrial base of the United States and would result in a substantial financial loss to a U.S. firm. The only exception would be where the Secretary of Defense determined, in consultation with the Secretary of Commerce and the Secretary of State, that the agreement would strengthen the national security of this country, and so certify to the Congress.

Third, provision was made for U.S. firms to protest whenever required by an MOU to transfer defense technology to a foreign country. Such firms could insist that the consequences would be to adversely affect our defense industrial base or result in a financial loss to the firms. Once again, the Secretary of Defense would consult with the Secretary of Commerce and the Secretary of State, before deciding validity of these claims.

The authority of the Department of Commerce over technology transfers was strengthened in the Defense Authorization Act for FY90 and FY91. There, the Congress ordered the Secretary of Defense to "regularly solicit and consider comments and recommendations from the Secretary of Commerce with respect to the commercial implications of such memorandum of understanding and the potential effects of such memorandum of understanding or related agreements on the international competitive position of United States industry" (10 USC sec. 2504).

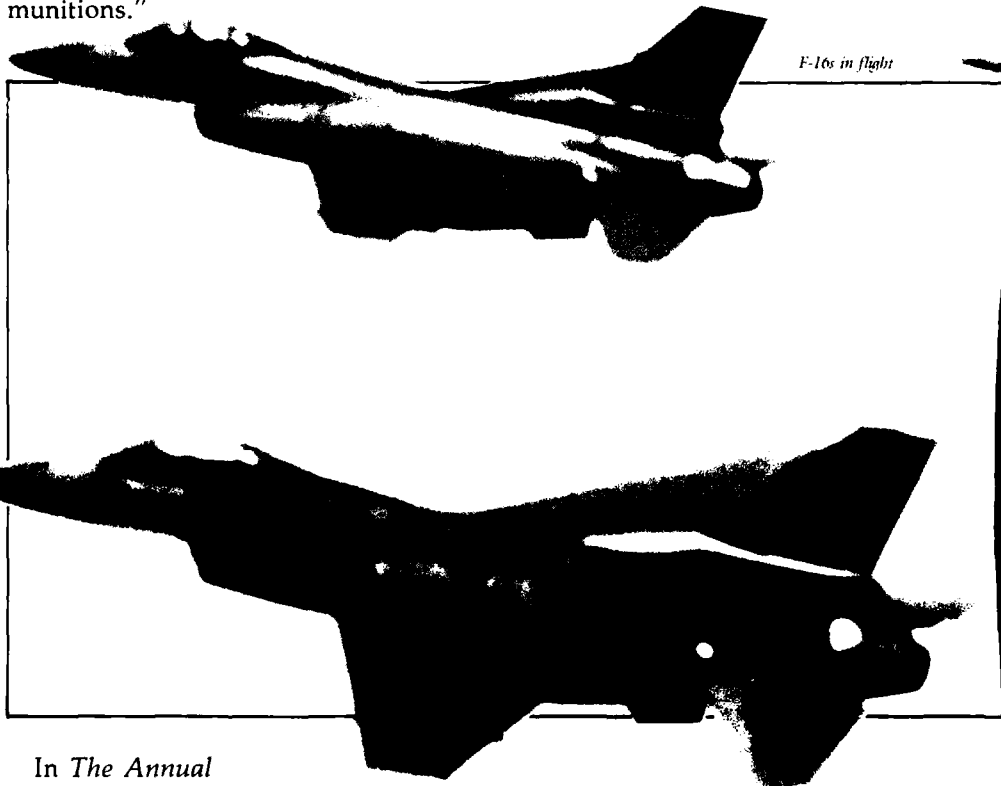
In addition, an interagency review procedure was established. Its purpose

was to provide the Department of Commerce and United States industries, particularly those related to defense, with a means of challenging MOUs or other agreements made by the Department of Defense. If the Department of Commerce has reason to believe that an existing or proposed agreement has, or threatens to have, "significant adverse effects on the international competitive position of United States industry" the Secretary may now request this interagency review. If, after the review, the Secretary determines that the "commercial interests of the United States are not served...the Secretary shall recommend to the president the renegotiation [or modification] of the existing memorandum or related agreement...to ensure an appropriate balance of interests." If the president agrees with the view of the Secretary of Commerce, the MOU may not be entered into or implemented.

Nunn Amendment

In the Department of Defense Authorization Act for FY86, enacted into law November 8, 1985, Senator Sam Nunn (D.-Ga.) inserted an amendment urging and requesting the president and the Secretary of Defense to "pursue diligently opportunities for member nations of NATO to cooperate in research and development on defense equipment and munitions" as well as in "the coproduction of conventional defense equipment." Money was set aside in the act to fund such cooperative projects; to pursue this objective, the Department of Defense was required to consider a cooperative research and development project at program initiation and subsequent formal development milestones. In effect, the amendment forced DOD to justify, for each new defense equipment project, why it was not seeking to structure a cooperative development program with one or more NATO allies. Finally, the amendment added that it was the sense of the Congress that DOD should do more side-by-side testing of U.S. conventional defense equipment being developed against existing equipment manufactured by other member nations of NATO. A second Nunn amendment, passed in 1986, extended the reach of these provisions to "major non-NATO allies."

The clear implication of the 1985-86 legislation was to signal congressional enthusiasm for joint development and joint production of defense equipment among the United States and its major allies. The preamble underscored this by noting that a major reason why Warsaw Pact nations produced and deployed more major combat items in recent years than members of NATO is because of "inadequate cooperation among NATO nations in research, development, and production of military end-items of equipment and munitions."



F-16s in flight

In *The Annual Report to the Congress for FY90*, the Secretary of Defense reported 17 Nunn Amendment projects existed with signed MOUs (as of January 1989). Since then, the number has increased to 35, according to informal sources within the Office of the Secretary of Defense. According to the Deputy Under Secretary for Industrial and International Programs, it is planned that more than \$10 billion will be spent on Nunn Amendment projects by the United States and its allies during the next 5 years. Thus, congressionally mandated requirements for investigation of cooperative opportunities with our allies have been acceded to by the Department of Defense. Consequently, DOD reacted with surprise when a similar

cooperative project, undertaken in 1988 with Japan, met with opposition on Capitol Hill.

FSX Proposal and Technology Transfers

While the Congress has exhibited a desire to promote "Rationalization, Standardization, and Interoperability (RSI)" of military equipment through technology sharing, as stated in the Nunn Amendment, it is driven also by the need to protect the U.S. industrial base. Nothing demonstrates the importance of this factor on con-

gressional oversight of technology transfers more clearly than the controversy surrounding the FSX fighter agreement with Japan. The president's proposal called for codevelopment and coproduction by the United States and Japan of the Fighter Support Experimental (FSX) jet based upon the F-16C, manufactured by General Dynamic Corporation. Congressional opposition arose over the relative economic and military benefits each country would gain from the proposed program.

A principal concern of critics of the FSX program is that it would allow Japanese companies to gain access to American technology at a relatively low cost and would enhance their

ability to compete in the aerospace industry, one of the last strongholds of American high technology. According to the Office of the United States Trade Representative, Japan has used similar agreements in the past to undermine the U.S. advantage in the electronic and automotive industries. As Senator Alan Dixon (D. Ill.) said May 1, 1989, the deal was "one-sided and so utterly outrageous that I'm astonished that the Administration is trying to get away with it." Critics like Dixon argued that the technology the United States

In addition, congressional opponents were concerned about setting a precedent for transferring commercially valuable technology to U.S. trading partners for the sake of mutual security. The more recent South Korean proposal to coproduce the F-16 with the United States is only one example of pending cases involving these potentially contentious technology transfers.

To supporters, it was incredibly shortsighted for the Congress to block the FSX proposal. They argued a codevelopment project of this nature would benefit U.S. security and American industry. Instead of the Japanese producing the jet fighter on their own, they would pay the United States to assist them in its development and would share any new technology. The royalties from the FSX, in turn, would reimburse the aerospace industry for initial development costs associated with the 1970 vintage F-16. Blocking the deal, proponents stated, would not stop Japan: it would produce an indigenous jet fighter even if it meant approaching other nations for the necessary technology. With European aerospace industries lobbying for Japanese contracts, the threat of Japan developing the FSX without the United States was a viable one and would certainly damage our aerospace industry.

Furthermore, codevelopment of the FSX would strengthen Japan's defense capabilities in the Western Pacific, enhancing protection against Soviet invasion of Hokkaido Island. If implemented successfully, the codevelopment of the FSX would have short-range and medium-range benefits to U.S.-Japan defense cooperation. Based on the F-16C, the FSX would be more compatible with American aircraft and would lend itself to more simplified coordination of joint operations and support for communications and fuel.

Senate Joint Resolution 113

In accordance with provisions of the Arms Export Control Act, President Bush submitted the required "certification" outlining details of the FSX proposal to the Congress. Al-

though several members of the House and the Senate sought to block the deal, they failed to win a majority of their colleagues. A strong bipartisan effort developed in support of S.J. Res. 113, a proposal to strengthen terms of the FSX Agreement. The resolution contained three major elements concerning the U.S.-Japan codevelopment project. It precluded the release of critical U.S. engine technologies, the result of American research. Furthermore, the resolution reiterated U.S. statutory prohibitions regarding third-party transfers of U.S. defense technology by Japan. Finally, the resolution specified the United States should obtain at least 40 percent of the production work resulting from the FSX.

On May 16, 1989, the Senate voted 52-47 to approve S.J. Res. 113. On June 7, 1989, the House passed the joint resolution by a margin of 241-168. The president vetoed the resolution July 31, 1989. The Senate defeated the motion to override the veto on September 13, 1989, by a vote of 66-34 (one vote less than the required two-thirds), allowing the FSX agreement to be implemented according to the Administration guidelines.

After FSX

By late 1989 and 1990, congressional concerns with technology transfers became more varied and complex. There were members wanting to encourage transfers, as exemplified by the Nunn Amendments; and, there were those concerned to protect our defense industrial base, who had urged a stronger review role by the Department of Commerce over DOD's international defense cooperation negotiations. Now with declining defense dollars available for any weapons development, there were members of the Congress worried primarily about parochial interests like defense contractors in their districts. In short, international, national, and local concerns could cause the Congress to examine, and seek to regulate further, international defense cooperation agreements.

Indicative of the interest in encouraging cooperative agreements that would improve the conventional defense capabilities of the United

would receive from the Japanese as a result of the FSX project was questionable at best. For instance, some U.S. corporations already have the composite materials technology that Japan would offer General Dynamics through the program.

The largest concern of opponents to the FSX project was the existing trade deficit between the United States and Japan. These critics felt that rather than build a new aircraft, Japan should obtain an equivalent airplane by buying upgraded F-16s or F-18s from the United States. By purchasing existing American planes instead of attempting to develop the technology independently, the Japanese would reduce the costs of development and shorten delivery time of the planes, as well as reduce the U.S. trade deficit with Japan.

States and its major allies, the Congress revisited the Nunn Amendments in 1989. The Conference Report accompanying the Defense Authorization Act for FY90 insisted that the "senior leadership of the Defense Department needs to manage more closely" the process of identifying cases where cooperative research and development projects with allies should be negotiated. To put more pressure on the Department, the Congress added another reporting requirement. By March 1 each year, DOD must supply to the Speaker of the House of Representatives, and the Committees on Armed Services and Appropriations in the Senate a yearly report on the status, funding and schedule of every existing memorandum of understanding; also on every proposed project for which no MOU has been entered into, but for which funding has been requested in the budget submitted for that year.

At the same time, the Act emphasized protecting our national defense industrial base by giving the Department of Commerce more authority to comment on pending MOUs, oppose their completion, and push concerns of domestic firms fighting foreign competition. That role is likely to be further enhanced as congressional demands persist for the Department of Commerce to protect America's eroding world trade status.

As for parochial concerns, and with defense spending declining, there undoubtedly will be hundreds of cases where members will fight to prevent—or continue—international cooperative agreements, depending on constituents' needs. For example, DOD decided in its FY91 budget submission to cease funding the Mark XV radar IFF project being developed jointly with NATO partners, leading a member to demand reconsideration because 250 jobs and \$2 billion for the congressional district were at stake. The House member mustered company officials of Allied Signal Aerospace and West German defense officials to urge the Deputy Defense Secretary in January 1990 to reconsider the cut decision. A similar process will pressure DOD not to fund new cooperative agreements when the result may endanger U.S. firms.

As ever with the Congress, parochial interests will overhang all considerations and, depending on varying circumstances, will complicate and perhaps shape the legislative decision on international cooperative projects.

Conclusions

With a growing appreciation on Capitol Hill that the economic well-being of the United States depends on its competitive position in the global economy, and with a dramatic lessening of the Cold War confrontation in Central Europe, economic concerns are a major dimension in the congressional definition of national security. Because the definition involves the broadest range of economic, foreign policy, and national security interests, codevelopment and coproduction agreements will attract congressional scrutiny. In the 1990's, the potentially conflicting goal of increasing international arms development arrangements and the rising mood of economic protectionism will frame congressional consideration of technology transfers. As ever with the Congress, parochial interests will overhang all considerations and, depending on varying circumstances, will complicate and perhaps shape the legislative decision on international cooperative projects.

While it is always difficult to predict when and to what extent the Congress will oppose such an agreement, recent Capitol Hill battles, such as the FSX, give some guidelines. Four factors triggering intensified scrutiny of an international defense agreement are the:

—State of trade relations between the United States and the project partner nation

—Type of technology involved in the transfer

—Ratio of benefit to cost for each of the two countries

—Home state concerns of members of the Congress.

The outcome of each issue will be determined on a case-by-case basis as the Congress attempts continually to reconcile its conflicting desires to either encourage international defense agreements and increase standardization, or oppose them and protect our economic well-being and domestic defense industrial base.

This material was prepared for participants in the DSMC Advanced International Management Workshop.

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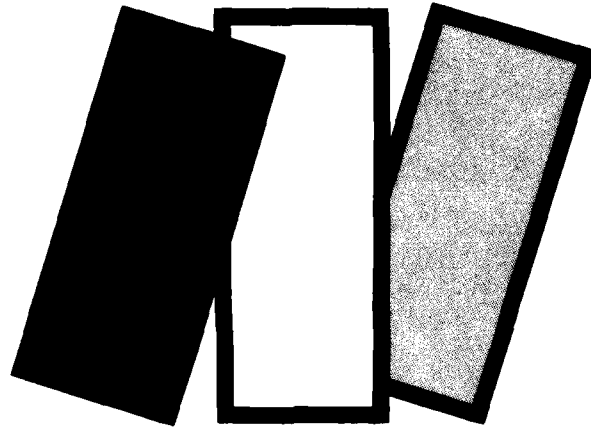
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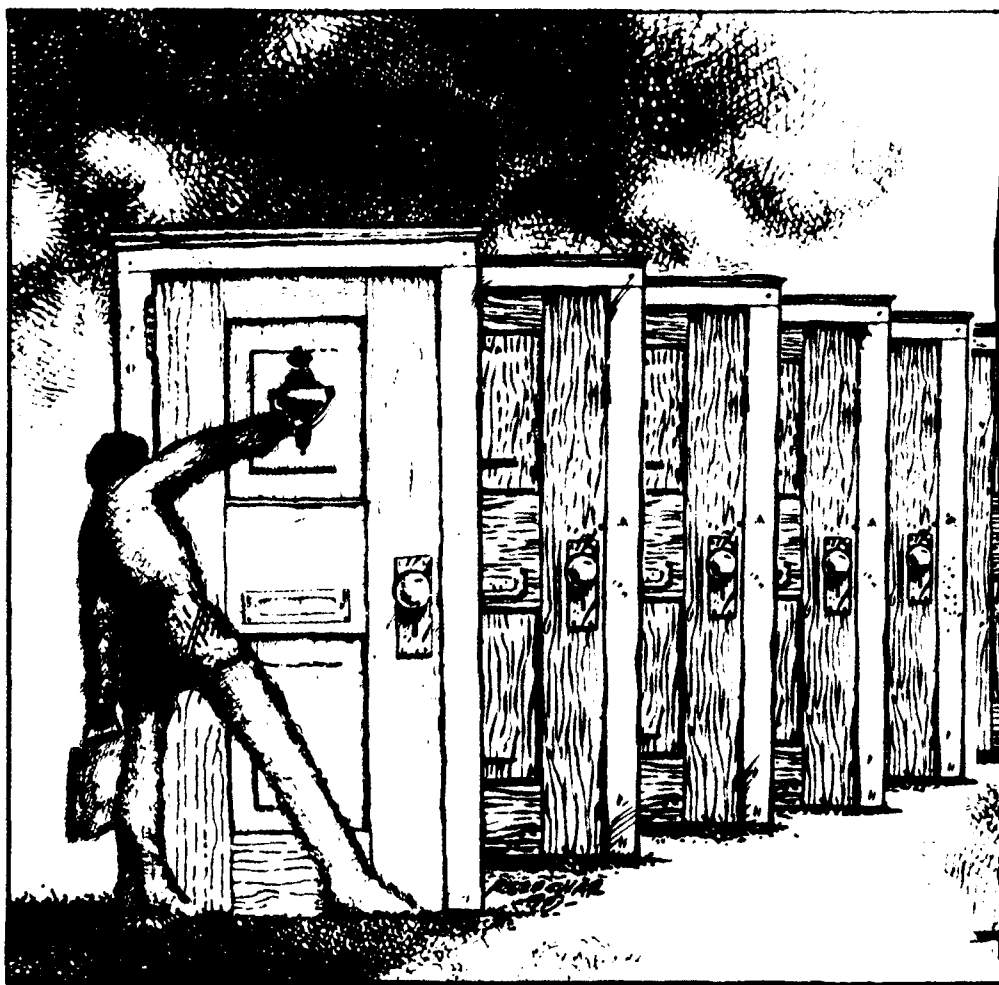
QUALITY FORCE DEPLOYMENT

A Technique for Applying "Strategy to Task"

Captain Thomas H. Miller, USAF

Weapon system capabilities are subject to great debate. With the Cold War ending and the defense budget shrinking, many in the Congress and the Department of Defense are questioning the need for new advanced weapon systems. There is little agreement regarding what is not needed. All agree our military forces need sufficient warfighting capability to provide national security but how much is enough? Tying system capability to national security is difficult.

Weapon systems are taking longer to field. Program Initiation to Initial Operational Capability may take as long as 12-15 years as developers wind their way through a maze of bureaucratic red tape, and government officials define and redefine needed system capabilities. Packard's Blue Ribbon Commission, the Goldwater-Nichols Act, and the *Defense Management Review* have addressed the need for a more streamlined acquisition process. Most focus has been only on the middle part of a time line that stretches from need identification to full operational capability.



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A Top-Down Comprehensive Approach

Lieutenant General Kent, USAF (retired), in *A Framework for Defense Planning*¹ proposed a new streamlined top-down approach to military force planning. His "Strategy to Task" approach tracks operational tasks from our national security strategy, through our national

military strategy and the regional military strategies to the combatant commander's Concept of Operation. At each level, the strategy is defined by objectives which must be accomplished.²

Lieutenant General Kent links operational tasks that must be performed to critical system and equipment functions through operational concepts. Looking upward, opera-

operational tasks according to agreed-to, end-to-end operational concepts—a concept for each task. The way to fail in this endeavor is to start by assessing the ability of individual systems to perform functions.⁴ He points out that *operational capability is the goal; hardware is only the means*.

He proposes the basis of new acquisition or modification programs be the formulation of new operational concepts. The Department of Defense approval of the operational concepts, as documented in the Services' proposal, would constitute program initiation. Each proposal would contain a concept package and an acquisition package.⁵ The concept package would address the "what" and would be on a broader scale than that addressed by the Air Forces current System Operational Requirements Document (SORD). The acquisition package would address the "how." Proposal approval would authorize the service to conduct Concept Demonstration/Validation.

Operational concepts are formulated jointly by the operational command and the acquisition command.⁶ For technology programs, the Air Force Systems Command Aeronautical Systems Division has a well-defined process for formulating operational concepts. Operational command inputs are made through the use of a Mission Requirements Package.⁷ For acquisition programs, the Strategic Air Command forms an acquisition support group, to include systems and logistics command representatives, to prepare its SORD.⁸

Contrary to acquisition theory, "Strategy to Task" is being used informally today. The C-17, B-2, Advanced Technology Fighter, and A-12 (Advanced Tactical Aircraft) programs independently passed acquisition reviews. Still, Secretary of Defense Cheney held a Major Aircraft Review on March 30, 1990. The Navy proposed that the A-12 could accomplish many of the B-2's missions. The Air Force proposed that the B-2 could perform the conventional deep strike mission more efficiently than the Advanced Technology Aircraft.⁹ Unlike acquisition reviews, the Major Aircraft Review

focused on broad competing operational concepts, not independent system concepts. A recent Air Staff survey of Air Force operating commands (SAC, TAC, MAC and ATC) found that none of their major programs went through an acquisition Concept Exploration.¹⁰ All were top-down directed.

Without clearly defined operational concepts that tie our national security objectives to system capabilities, the debate continues. Sometimes acquisition concerns, not operational concerns, take precedence creating an environment that fosters disagreement on customer wants, changing requirements, deployment problems and long product development cycles.

The "Strategy of Task" approach would overcome these problems by requiring a correlation of national security objectives to system capabilities. Assuming a structured approach is desired, how is this done? One method is through Quality Force Deployment (a derivative of Quality Function Deployment).

A Proven Planning Tool

Quality Function Deployment (QFD) is a planning tool effectively used by industry for product development.¹¹ Consumer product development can, like weapon system development, consist of numerous technical tradeoffs, organizational conflicts resulting from shared responsibility and differing interpretations, and mixed or contradictory priorities. Also, like systems development, it can take place over a long time frame where resources (manpower and funding) seem to be constantly changing.

The QFD primary purpose is to reduce the product development cycle while improving quality and reducing costs.¹² Toyota Autobody adopted the QFD approach in 1977. Using it, Toyota suppliers reduced both product development time and costs by one-third to one-half. The increase in the quality of their products has made them the "best in the class."¹³ In 1983, Ford Motor Company introduced the operating mechanisms of QFD to their engineers and key suppliers.¹⁴ By the late 1980s, Ford became the most profitable auto manufacturer in the



tional concepts define the means of attaining the objective. Looking downward, they define programs to be implemented to provide the equipment.³ He says "The operational concept provides the peg on which to hook the procurement of systems, equipment, weapons, and munitions. The key to linking strategies to task is to assess the correlation between achieving a stated operational objective and accomplishing a cluster of

United States. The QFD focuses on "the voice of the customer."¹⁵ Its success lies with its ability to track design and manufacturing parameters back to the original customer requirement.

As structured, QFD cannot be directly applied to force planning. The business terms and definitions must first be translated into military operational terms and definitions. Since basically all of the terms change, I have taken the liberty of changing the name of "Quality Force Deployment." It's more descriptive of our overall objective.

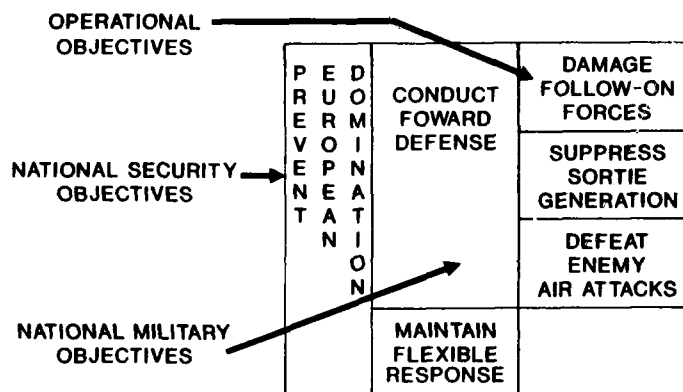
Because QFD focuses on "the voice of the customer" and "product development," it's important to discuss how these terms have been redefined. I have defined the customer of force planning to be the National Command Authorities (NCA), the combatant commander (CINC), and the Congress. The National Command Authorities establish our national security and military objectives and the combatant commander establishes the operational objectives. The Congress influences these objectives by selectively funding those they support. (Ignoring the influence of the Congress on military requirements would be the same as ignoring the influence of a family on a car buyer's requirements.) Since military forces conduct missions to accomplish various operational tasks to achieve these objectives, the desired "product" of force planning is successful mission completion. In times of war, the "product" is easily summarized by one word—victory.

Applied Together

The rest of this paper will concentrate on the 10 steps needed to apply "Quality Force Deployment" to the "Strategy to Task" approach. The technique combines two matrixes—the Mission Requirements Planning Matrix and the Operational Task Achievement Matrix—to trace our national security objectives down to system capabilities. The steps and the matrixes were derived from those described in "Quality Function Deployment" by L. P. Sullivan.¹⁶

Step 1: Expand mission requirements into secondary and ter-

FIGURE 1. EXPAND MISSION REQUIREMENTS



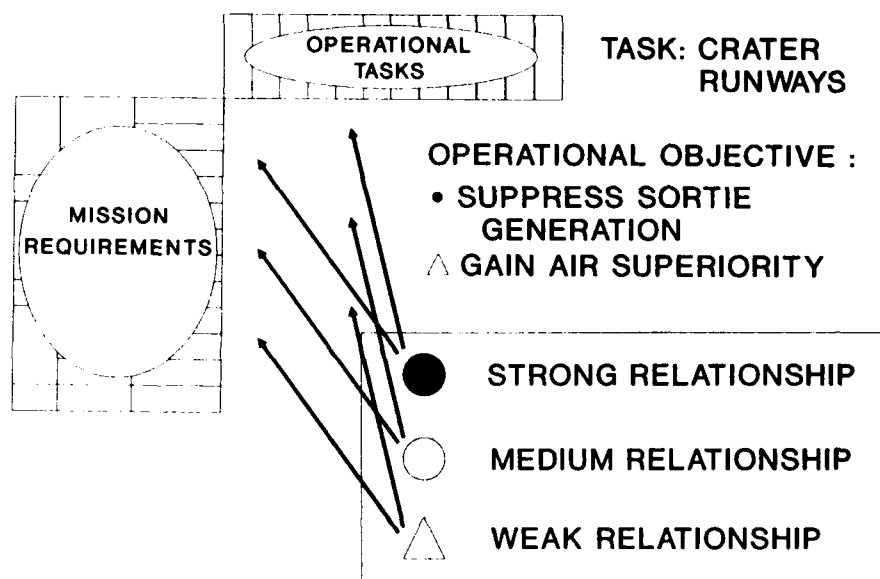
tiary requirements to obtain a more definitive list (Figure 1). The "Strategy to Task" approach uses a hierarchy of security and military requirements.¹⁷ Our fundamental goal is the survival and prosperity of the United States. The next lower level is that of the national security strategy and objectives, and so on down to our operational objectives. Saying that we have a requirement for a particular system or weapon is a corrupted use of the term.¹⁸ Examples of Lieutenant General Kent's "Strategy of Tasks" requirements¹⁹ include: to prevent the domination of the Eurasian land mass by the Soviet Union (a national security objective); conduct a forward defense and maintain capability for flexible response (its supporting national military objectives); delay/damage Soviet follow-on forces and supplies, suppress generation of enemy air sorties and defeat enemy air attacks (supporting operational objectives for the former). The QFD format not only permits, but encourages the use of hierarchical requirements. The completed list of mission requirements then becomes the vertical axis of the Mission Requirements Planning Matrix.

Step 2: Define the measurable operational tasks needed to accomplish the operational objectives.

For "suppress generation of enemy air sorties," the operational tasks were crater runways, mine operating surfaces, disrupt/damage air base infrastructure, damage aircraft in the open and in shelters, and pin down takeoffs.²⁰ We would continue to expand the list until all operational tasks to achieve the other operational objectives, such as delay/damage Soviet follow-up forces and supplies, and defeat enemy air attacks, have been included. This list then becomes the top horizontal axis of the Mission Requirements Planning Matrix.

Step 3: Define the mission requirements to operational task relationships (Figure 2). For example, achieving the operational task of "crater runways" would have a strong relationship to "suppress sortie generation," but it might also have a weak relationship to "gain air superiority." If they can't get into the air, they can't fight you. The relationship matrix can quickly indicate whether the operational tasks adequately cover the operational objectives. The amount of white, unfilled squares indicates the robustness of the Concept of Operation. A robust Concept of Operation would allow the operational objective to be attained even though a particular task was not adequately accom-

FIGURE 2. DEFINE RELATIONSHIPS



plished. Conflicting relationships can also be demonstrated by the use of negative symbols (not shown).

Step 4: Conduct campaign evaluation by adding the NCA/CINC importance ratings and mission area analysis. Mission area analysis should include a force-on-force or dynamic campaign analysis of the operational objectives. This analytical evaluation should point out force strengths and weaknesses. It may result in a realigning of the operational objectives and tasks. The NCA/CINC importance ratings prioritize the operational objective according to more subjective criteria.

Step 5: Conduct operational task achievement evaluation and compare to campaign evaluation to identify operational deficiencies. Current force element capabilities are evaluated as to their ability (with current weapons and personnel) to accomplish the operational task. Current capability is compared with needed capability to identify deficiencies. For example, if the operational task, as adjusted by campaign evaluation, is to crater N runways in D days and the force element can only accomplish 80 percent of the task, then an operational deficiency exists. Its seriousness depends upon the importance of the objective, and

the robustness of the Concept of Operation.

Step 6: Create the selling points for a new operational concept. The right hand column of the Mission Requirements Planning Matrix documents the selling points of a new operational concept. Selling points are derived from the importance of the objective, the past performance of the force element (similar force elements for new systems), the maturity of the proposed technology, and the costs (not only system life-cycle costs, but also force attrition, etc.) of attaining the objective. If past performance is poor, technological risk is high, and losses would be high, the operational concept has few legitimate selling points—unless the campaign swings on attaining the objective. Then, the costs may become acceptable. An example of a new operational concept proposal for "suppress sortie generation" could be 200A-16 with X Weapons Package.

Step 7: Develop measurable, achievable targets for the operational tasks (Figure 3). Defined operational task targets are critical to developing a marketable operational concept. Task targets will later drive the force structure and system characteristics to be acquired. As systems are deployed and test data are ac-

cumulated, a comparison should be made to the operational task target to see if an adjustment in force structure will be necessary. If the task target is not achievable within the bounds of the expected force structure, then ever accomplishing the task and attaining the objective is doubtful. Perhaps other operational concepts should be pursued. Defining the operational concept and associated targets completes the mission requirements planning matrix. Their approval would constitute Milestone O.

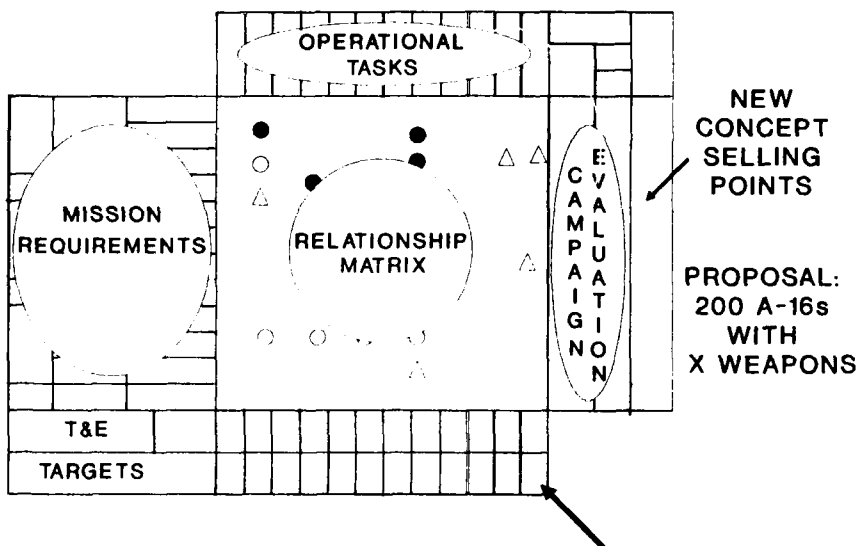
Step 8: Select the operational tasks with strong mission requirements relationships to carry forward. Again, depending on the importance of the objective and the robustness of the Concept of Operation, critical operational task targets are selected to be carried forward to the Operational Task Achievement Matrix. These become the basis for the force structure and system capabilities to be acquired.

Facilities Tradeoffs

Step 9: Develop expected force element and operational capability quantities, expected system capabilities and system capability to operational task relationships (Figure 4). The Operational Task Achievement Matrix not only ties system capabilities and force structure to the operational task, but it facilitates tradeoffs between system capability and force structure. (Manpower, and the number of personnel required by each specialty code, should be included.) If the target system capability is not achievable, then the relationship of that system characteristic to achieving the operational task weakens. To offset this, either other system capabilities must be strengthened or increased quantities must be purchased. It may even become necessary to revise the operational concept or task target. This should be done only after evaluating the impact of a change on achieving the objective through the Mission Requirements Planning Matrix.

Tradeoffs could also take place by tracking a change in the other direction. For example, mission area analysis has concluded that the threat is not as substantial as first suspected;

FIGURE 3. OPERATIONAL TASK TARGETS



MEASURABLE OPERATIONAL TASK TARGETS
CRATER N NUMBER OF RUNWAYS IN D NUMBER OF DAYS

this results in a reassessment of our current capability to accomplish the task. If current operational capability can adequately accomplish the task and attain the objective, then the new operational concept, and resulting forces and weapons to be procured, may not be needed.

Combining the two matrixes, through current and expected operational capabilities, "enables us to assess the current and future ability of our forces to perform clusters of tasks to achieve the multiple operational objectives that underwrite stated regional strategies."²¹

FIGURE 4. OPERATIONAL TASK ACHIEVEMENT MATRIX

MISSION RQMTS		RELATIONSHIP MATRIX		CAMPAIGN EVAL
T&E				
TARGETS				
FORCE ELEMENT	OP CAP			SYSTEM CAPABILITY
A-16	200 AIRCRAFT			
	2000 DAACM			
	8000 PEOPLE			

BLAST A 40 FT CRATER THROUGH 12" REINFORCED CONCRETE RUNWAYS

Step 10: Determine critical system capabilities, characteristics and constraints to be carried forward into systems development (Figure 5). The selection of critical system capabilities, characteristics and constraints to be monitored during system development is documented in the concept package to be submitted to the Defense Acquisition Board at Milestone I. It would explain the "what" while the developing command's acquisition package would explain the "how."

Result: More Effective Mission Planning Process

The following quotes were taken from the summary of Lt. Gen. Kent's *A Framework for Defense Planning*:²²

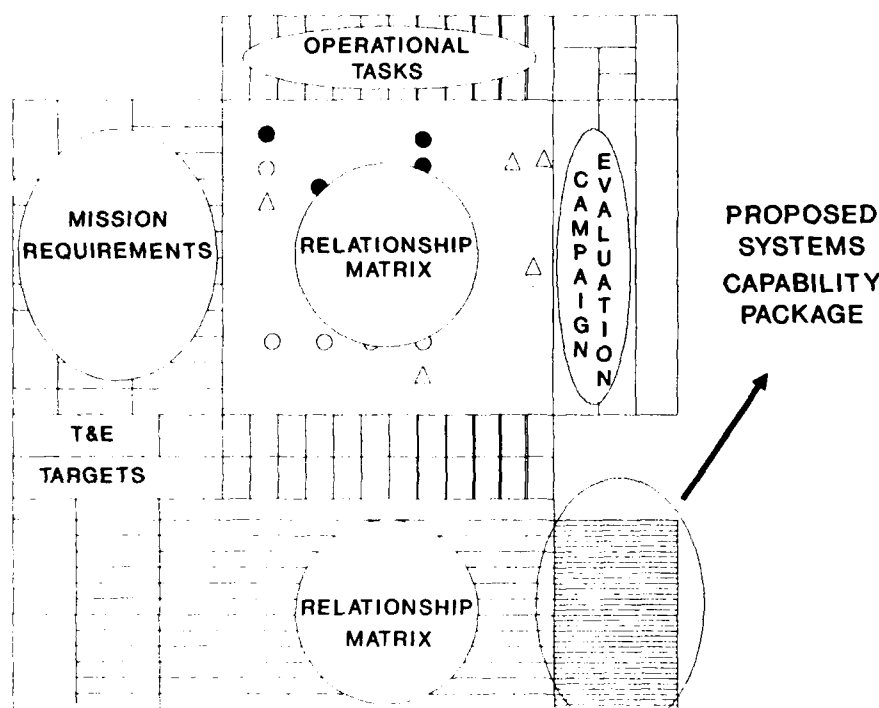
"Congress is growing increasingly critical of the apparent lack of a logical and persuasive relationship between U.S. military strategies and the defense budgets they approve." Quality Force Deployment is specifically designed to listen to "the voice of the customer"—the NCA, the combatant commander and the Congress.

"The framework demonstrates the relationships of strategies down to tasks—or tasks up through strategies...." The Mission Requirements Planning Matrix not only correlates the strategies to tasks, but also identifies the strengths and weaknesses of the relationships, or identifies conflicting relationships.

"The key to this approach is the formulation of operational concepts to provide the link between development and acquisition programs and operational tasks." Quality Force Deployment assists in developing the operational concepts by documenting their foundation, selling points and targets. The Operational Task Achievement Matrix facilitates force structure and system capability trades by showing the relative strengths of system capabilities to operational task achievement.

Quality Force Deployment is a planning tool to tie systems capabilities to national security objectives. It has a proven track record in industry. Demonstrated results are: preservation of knowledge, fewer startup problems, lower

FIGURE 5. PROPOSED CAPABILITY



AFIT SCHOOL KEEPS CURRENT

The Air Force Institute of Technology School of Systems and Logistics, Wright-Patterson AFB, Ohio, while expecting challenges from the future, finds the present abundantly busy. Notwithstanding reductions in defense resources, the school will meet challenges and perform current tasks, in large part because of its varied and thorough curriculum of graduate and continuing education.

The school has an overall goal to enable graduates to perform better the technical managerial tasks required to meet missions and to improve their critical thinking skills. Meeting this goal leads to effective leadership.

Distance Education

The School is committed to having the most current technology to serve faculty and students. It is actively using the upgraded television capabilities located in its video classroom. While television production capabilities have been used for many years to produce videotapes for distance education, recent upgrades improved the ability to output signals to the AFITNET TV systems, the base TV cable system, and to satellites. Soon to be added will be the capability to improve the character generation for lecture videos, and to use the TV mixing boards with direct computer input. These gains will help support faculty involvement with distance education.

As world technology grows, I believe H. G. Wells may have stated the role of education today best when he said, "Human history becomes more and more a race between education and catastrophe."

In a changing political and military world, education becomes the one constant tool for success. For more information, contact AFIT/LS at Autovon 785-5361.

—Colonel R. S. Cammarota

startup costs, shorter lead time, and customer satisfaction.²³ Using it with the "Strategy to Task" approach would go a long way toward eliminating much of the confusion and debate concerning weapon system procurement.

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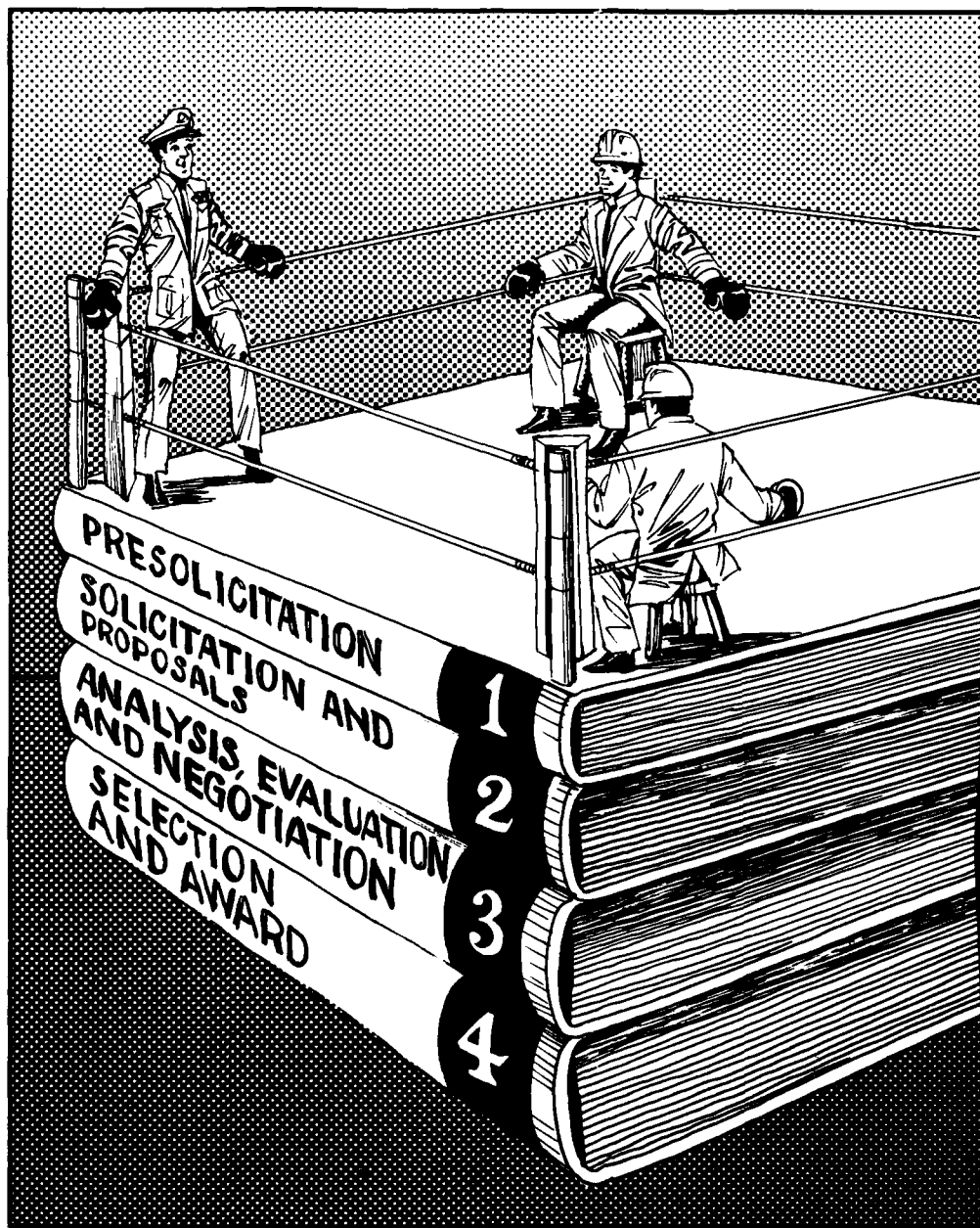
HOW CONTRACTORS SEE SYSTEMS ACQUISITION

Marshall H. Kaplan

Many people involved in the acquisition of major systems for the government are not aware of the contractor culture which must deal with responding to government needs. Most contractor/customer relationships are adversarial in nature and this limits the amount of cooperation between agency personnel and supplier personnel. Recently enacted laws have further separated these two groups. Thus, marketing and bidding to the government involves some extremely complex interactions.

This article is designed to enlighten government acquisition personnel regarding the response process as seen from the contractor's point of view. The acquisition process is specified via the Federal Acquisition Regulation (FAR), which specifically defines procedures for contract award resulting from competitive negotiations. Any acquisition procedure that does not involve sealed bids or auctions and is competitive is considered to be a *source selection process*, the objectives of which are to maximize competition, minimize

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the complexity of acquiring new systems for the government, assure impartial evaluation of offers, and guarantee the selection of the offer in terms of stated requirements. In summary, the government wants the most for its money. Unfortunately, it rarely gets its money's worth. Some of the reasons are presented here.

Formal Acquisition Procedures

Our government started to formalize the acquisition process in 1948, thus, the concept of source selection is not a new one. The fundamental FAR does not go beyond a general level of specification and definition so agencies, departments and Services have been implementing acquisition procedures designed for

their specialized needs. This has resulted in each element of the federal government having a different set of detailed procedures for selecting contractors, and they vary widely from agency to agency. To demonstrate the extent of development of special procedures in these agencies, consider the Department of Defense (DOD). Beyond the basic FAR, the Department of Defense has a set of general Defense FARs, called DFARs; and each Service has a subset of these. For example, the Army has AFARs, Navy has NAVFARs, and Air Force has AFFARs.

To focus on one of these, consider the AFFARs. These regulations set policy, assign authority, and prescribe procedures for Air Force solicitations and evaluations of proposals. To make it more complicated, the Air Force has another level of regulations for its Systems Command (AFSC) called the AFSC Supplement. Under this, there is still another level; e.g., Space Division Supplement, Aeronautical Systems Division Supplement, and Electronics Systems Division Supplement.

The acquisition of a large system by the government is characterized by a highly formal and restricted interaction between the government and the offerers (or contractors). The larger the procurement, the more restrictive is the interaction. Conventional source-selection processes can be described as a four-phase sequence.

Phase I: Pre-solicitation Activities

Pre-solicitation phase activities in the procuring agency occur simultaneously with a number of bidder activities; i.e., marketing, management deliberations, and pre-proposal preparations. This phase is characterized by an intense effort culminating in the release of the request for proposal (RFP). Bidders are allowed limited access to the agency for purposes of marketing and technical discussions related to the system being procured. This is the period in which contractors can potentially have a significant influence on the RFP. Most contractor organizations hope to persuade the agency to slant the RFP in favor of their company in one or more minor or major ways.

Phase II: Solicitation and Proposal Preparation

Solicitation and proposal preparation activities consist of the development and release of the RFP by the sponsoring agency, and submission of proposals by contractors. Functions of the RFP are to describe the requirements, state the contract terms, establish the evaluation criteria, set the proposal format, and provide information on the source-selection process. Each RFP must include a description of deliverable items, specification and statement of work (SOW), special contract requirements and clauses, proposal preparation instructions (PPI), and evaluation factors for award.

The specification gives a detailed set of requirements to be satisfied by the system being procured, while the SOW is a description of contractor work items to be accomplished. Evaluation factors identify those criteria used in the evaluation process to select a winner. Finally, the PPI specify the basic contents of the proposal. The sum of all these documents should represent a logical set of goals for an offerer to achieve in the proposal. In fact, the proposal should be structured to simultaneously satisfy the evaluation criteria, SOW, specification and PPI.

The unfortunate truth is that it is rare indeed to see a well-structured, logical RFP that can easily be interpreted in terms of required proposal contents and volume outlines. In fact, it is usually a gut-wrenching experience to extract the real intent and objectives of a procuring agency from the RFP. Typically, it is only through a long and tedious process of analysis, discussions with technical staff, interviews with marketing personnel, and guessing that a logical connection can be developed between the evaluation criteria and SOW. Superimpose the PPI on this and you have the perfect ingredients for a case of "high anxiety." Many times the result has no basis in fact vis-a-vis the customer, and the bid becomes a waste of time, money and morale.

Many contractors have countered this situation by taking an offensive, rather than a defensive, approach. The general philosophy is to comply



with all requirements of the SOW and specification, and satisfy the letter of the PPI. Beyond these items they make sure to explain the logic used in the proposal carefully and thoroughly. Whenever possible, the better contractors use proposal maps, guides to the reader, indexes, and compliance matrices to assure clarity and easy review.

Phase III: Analysis, Evaluation, And Negotiation

Evaluation. The FAR specifies that evaluation criteria will address three areas of concern: price, needs of the specific acquisition, and other considerations, such as performance and experience. Specific evaluation criteria are developed with four types of questions in mind: what to evaluate, how to evaluate, relative weighting, and minimum satisfactory levels. Another way to identify these is: subject matter, assessment criteria, weights, and standards.

Each item under subject matter is scored in each category of assessment criteria. Typical topics being assessed are soundness of approach, experience, past performance, understanding of requirements, compliance and risk.

The evaluation criteria are always weighted to reflect the relative importance of the various aspects being evaluated. Rarely does the procuring agency release these weighting factors to the bidders. However, the FAR does require disclosure of the relative importance of criteria. Thus, an RFP will usually have a "riddle" which is a qualitative statement reflecting the relative importance of the scored items. If an RFP does not have a riddle, then all criteria are of equal importance.

A set of standards is used to establish an objective evaluation process. Without standards, evaluators would measure proposals against each other, resulting in one proposal becoming the standard for each of the criteria.

The evaluation process for large systems acquisitions incorporates the use of numerical or color-code (or symbols) scoring by the Source Selection Evaluation Board (SSEB). The most common method is to use numerical scoring. However, color-

coded scoring is occasionally preferred and is mandatory for certain types of acquisitions. It is generally felt that color-coding allows greater flexibility in the award decision. It is important to note that an award need not be made to the bidder with the highest numerical score. In fact, the record shows that the point scores can differ by as much as 15 percent and still be considered to be "substantially equal."

Contractors generally assume that the numerical scoring of proposals will result in a very close set of numbers. This is usually the case, unless one or more of the offerers has an outstandingly good or bad proposal. In close cases, cost is usually the tie-breaker. If the Source Selection Authority (SSA) has a strong preference for one bidder because of reputation, program plan, or extra aspects in the bid, cost may not decide the winner. This is especially true when the bid prices in the competitive range are within a few percentage points.

Source Selection Organization. There are generally at least three levels of organization in a formal source selection. Take, as an example, a DOD procurement where the SSA is at the top, followed by a Source Selection Advisory Council (SSAC). At the bottom is the Source Selection Evaluation Board. In more complex procurements this structure may have more than three layers. In fact, the SSEB is usually structured into three panels: technical, management and cost. Each may have two or more sub-panels.

The SSA selects the winning bidder. This person may be an agency secretary, senior deputy, and so on. The SSAC supports the SSA in reviewing the work of the SSEB to assure that all agency and federal regulations have been satisfied, that the evaluation is thorough, and that the results are justifiable and supportable. An additional task of this group is to compare proposals using results of the SSEB, while the SSEB evaluates the bids against a set of standards. Membership of the SSAC typically includes the agency's program manager, a senior legal officer, a senior financial officer, contracting personnel and logistics staff.

The SSEB does the actual reading and scoring of proposals. Its membership is largely made up of specialists participating only in their areas of expertise. One interesting and little known fact is that the same people do not have to evaluate all proposals; i.e., it is conceivable that one set of people on the SSEB will never set eyes on any part of one or more bidders' proposals. In principle, the evaluation is still objective since SSEB members score against a set of standards. However, in practice, these standards are not always well established and well defined, leading to a scoring process which is essentially arbitrary.

Responsiveness to the RFP. Bidders generally try to be responsive to all aspects of the RFP, even though the FAR does not require a bid to be eliminated automatically if it offers other than the preferred terms and conditions. If this is the case, it will be identified as such in the evaluation process, and called a "deficiency." The offerer may correct deficiencies through discussions. However, most bidders propose those terms and conditions that appear in the RFP.

There are some instances in which it is highly desirable to bid a variation on the requirements. In those cases, the more astute contractors will submit a compliant proposal and an alternative proposal. The latter proposal includes differences that might reduce the offering price below that of the competition, correct a basic weakness in the RFP, or enhance a company's basic design relative to government needs. Many agencies specify whether or not an alternative proposal will be considered in a procurement.

Cost/Price Evaluation. Cost/price evaluation is done separately from technical and management. It is done with the contract type in mind. The FAR requires that fixed-price and cost-type contracts be handled differently. For example, cost should not be a deciding factor in the award of a cost-type contract, but "cost realism" is the most important cost criterion.

In the case of fixed-price contract awards, the lowest-price, acceptable bid is commonly selected. However, there is no requirement to award a

contract on that basis. The corollary to this is that a below-cost, fixed-price bid may not be rejected on that basis alone. In other words, the SSA has a great deal of latitude in selecting a winner, and he or she is allowed a full range of subjective interpretations of the bids.

Best and Final Offer. The FAR requires that every offerer in the competitive range be given an opportunity to revise its offer through the use of a best and final offer (BAFO). These must be submitted by a specified deadline, but no specific format is given in the FAR. Thus, BAFOs may be very extravagant in large procurements.

Phase IV: Selection and Award

Selection. The award decision is made by the SSA, who is not bound by the findings of the SSEB. In fact, the SSA may ignore the SSEB and proceed to establish independent findings. He or she may determine that two proposals are substantially equal, even though the scores are substantially different. It is the bidder's responsibility through the combination of marketing, proposal development, and post-proposal activities to convince the SSA that theirs is the proper bid to select.

Once the winner is selected, the contracting officer awards the contract and notifies the unsuccessful offerers. In cases of large awards, it is politically wise for the SSA to personally notify appropriate members of the Congress before public announcements of the award.

Debriefing of Unsuccessful Offerers. Upon notification of an unsuccessful bid, an offerer may request a debriefing. This request must be honored, even though the amount of information given to the bidder is limited. For example, a debriefing does not include a point-by-point comparison with other proposals, and must not reveal relative standings of the competitors or the scoring. Nevertheless, a debriefing is almost always requested so that the offerer can assess its weaknesses and strengths as seen by the government.

Protests. It is usually difficult for government personnel involved in an evaluation to fully empathize with the offerers. This is one reason that

*This article is
designed to
enlighten govern-
ment acquisition
personnel regarding
the response pro-
cess as seen from
the contractor's
point of view.*

many debriefing sessions are quite unsatisfactory to bidders. It is typically true that dozens of contractor personnel spent months working long hours in the development of a proposal which has cost the company millions of dollars. These people are convinced that theirs is the best proposal and is sure to win. Many times careers depend on winning a given contract. Thus, if a debriefing is unsatisfactory, a bidder may file a protest.

Such actions can be accomplished in many ways and to a variety of government entities. The easiest and most common avenue is to file a protest with the General Accounting Office. Other routes include the U.S. District Court, General Services Board of Contract Appeals, and the procuring agency. However, protests have proved to be unfruitful and, in fact, detrimental to a company's future with a given agency. Thus, most experienced contractors avoid protests. They accept defeat gracefully and are disgustingly obnoxious when winning.

The Language of the Offer

Members of the government acquisition team need to understand the concerns and constraints of offerers in order to be most effective in getting the best offer at the least cost. A great deal of insight may be attained by understanding several key terms and concepts used by contractors in developing strategies and formulating proposals.

AGOD THEORY. An important theory used in large and complex proposals to help formalize the thinking process associated with generating strategies and themes. The acronym stands for Ahas, Ghosts, Oh-ohs, and Discriminators.

AHA. A strength or an accomplishment of which an offerer is proud. It gives the contractor an edge or enhances its reputation to perform well in certain bids.

BIDDER-TO-BEAT. The competitor a contractor considers to have the best posture to win, other than itself.

BID/NO-BID DECISION. A decision by the contractor's management to proceed toward a proposal submission or to terminate all bid activities on a given procurement.

BLUE TEAM. A small, select group of highly experienced technical, management, marketing, and cost experts assembled for a sole and direct purpose. They are charged with the task of emulating the bidder-to-beat, and producing a plausible competitor's bid strategy.

CAPTURE PLAN. A standardized presentation to the contractor's own management on an upcoming procurement of possible interest. The contents usually include a program overview, funding evaluation, competitive assessment, resource allocation, estimate of company funds needed for the bid, and the probability of winning.

COMPLIANCE MATRIX. A cross-referencing tabulation of RFP requirements and corresponding proposal locations where each is addressed.

DISCRIMINATORS. Some unique aspect of an offer that gives the contractor a definite advantage and gives the agency a specific reason to pick that bidder as the winner.

GHOSTS. A negative or weak aspect of a competitor's bid which a contractor skillfully plants in the mind of the evaluator.

ME-TOO. In the absence of a discriminator in a given area, this is used to show that the offerer is at least as good as other bidders.

OH-OH. A particular weakness that an offerer has that the competition will surely use against it in the form of a ghost.

PINK TEAM REVIEW. This is the first comprehensive and complete review of a draft proposal in which RFP requirements and compliance aspects are taken into account.

RED TEAM REVIEW. The final major review of a proposal draft during the development period. The mission of the red team review is primarily to simulate the activities of the SSEB in order to score the proposal according to the evaluation criteria. A secondary function of the team is to double-check the proposal draft for compliance to assure that the RFP requirements have all been met.

SILVER BULLET. Usually, this refers to a decisive discriminator or bid strategy which a bidder believes can be used to eliminate the competition.

THEMING. The art and science of generating a set of selling messages to

be incorporated directly into proposal volun.es.

Guidelines for Future

Typically, contractors go through four well-known phases during the process of acquiring a major systems contract; i.e., enthusiasm, panic, search for the guilty, and punish the innocent. This bears a good deal of realism. If the government is to get its "money's worth" from contractors, its systems acquisition personnel need to become better acquainted with contractor concerns and constraints, just as contractors do with respect to government agencies.

In the past, close working relationships between customers and suppliers were very helpful in assuring the government of getting expected performance at the quoted price and within the specified time frame. Recent legislation has discouraged such interactions; thus, the lack of contractor appreciation by agency personnel has become more pronounced.

The government needs a solution to this costly situation. One approach involves establishing training programs focused on educating acquisition personnel on contractor marketing and bidding procedures. The objectives of such programs would include:

—A better understanding of marketing and bid processes

—How to evaluate bidder constraints and decisions

—How to make competitive assessments among contractors

—Understanding costs of marketing and bidding

—Anticipating bid strategies of offerers.

Achieving these objectives will lead to more effective RFPs, better proposals, and better systems acquired for our nation.

Contractors will be able to respond in a fashion that brings out their best attributes, offers the lowest possible price, and delivers systems that perform as expected.

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DOD METRIC TRANSITION PLANS AND ACTIONS

John M. Tascher
Defense Quality and Standardization Office

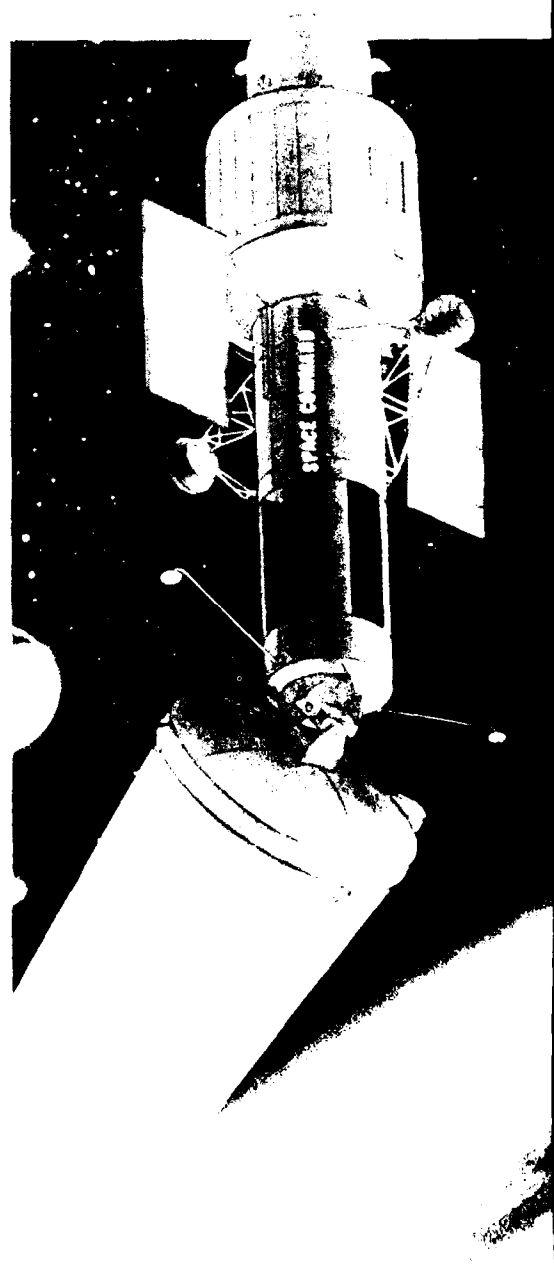
The Department of Defense has increased its attention to metric transition since the passage of P.L. 100-418, The Omnibus Trade and Competitiveness Act of 1988. The Act designates the metric system as the preferred system of weights and measures for United States trade and commerce. It requires "that each Federal Agency, by a date certain and to the extent economically feasible by the end of fiscal year 1992, use the metric system in its procurements, grants, and other business-related activities, except to the extent that such use is impractical or is likely to cause significant inefficiencies or loss of markets to U.S. firms." It requires that each agency establish guidelines to carry out this policy. The DOD Directive 4120.18 on the Metrication Program was cited in the conference committee report before passage as a good model for federal agencies to follow in meeting this requirement. The Act requires each agency annually to report to the Congress on actions it has taken during the previous year, and the actions it plans for the fiscal year involved.

Primary incentives for metric transition within the DOD are long-term savings and interoperability of equipment with U.S. allies, especially NATO. To establish policy for metric transition, the DOD issued its Directive 4120.18 in September 1987. Among other things, this directive requires metric to be used in all new

designs unless exceptions are approved by designated senior officials. It requires the DOD to emphasize development of metric specifications, standards, and other general purpose technical data to support development of Defense systems, equipment, and material. These requirements, and others affecting DOD acquisition programs, are being consolidated into DoDD 5000.2, DOD Acquisition Policy. This will emphasize metric transition in the DOD.

Weapon Systems and Equipment

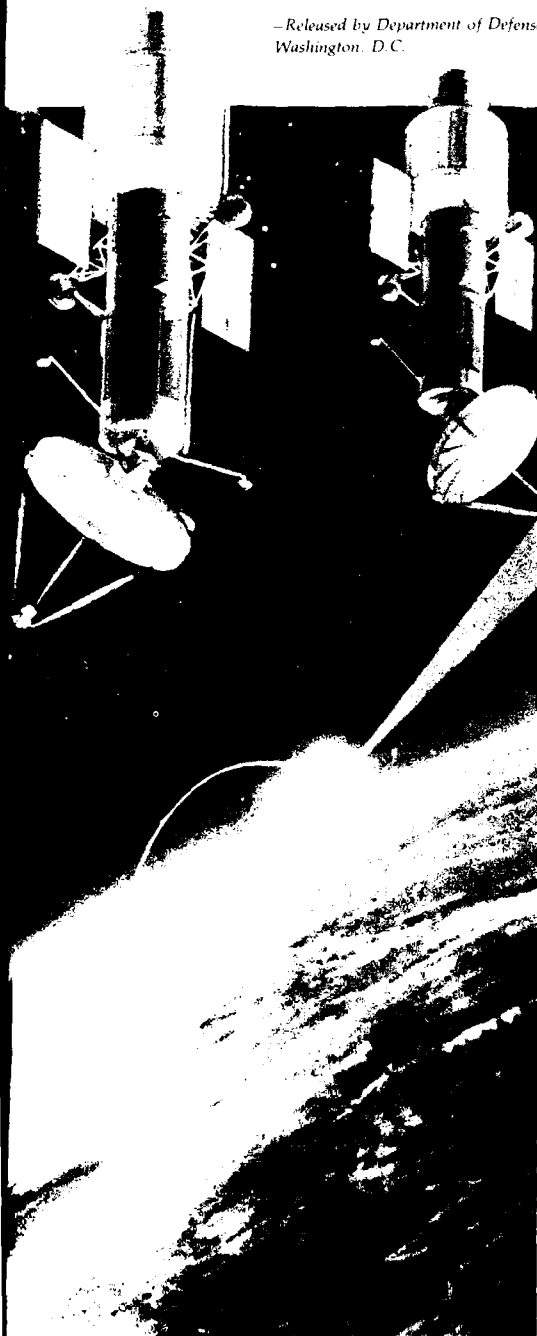
The recently submitted DOD metric report to the Congress, as required by P.L. 100-418, listed metric weapon systems and equipment already acquired, or being acquired, by the DOD. The LHX helicopter is an outstanding example of a metric-based system. In addition to current status and activities, this report to the Congress outlines future plans to effect metric transition within DOD. The Metric Transition Plan, signed by Defense Secretary Frank Carlucci on January 9, 1989, builds on the metric program directive to further satisfy requirements of the Act, and the Plan established 16 Task Groups. Task Group 1 addresses establishment and operation of the Defense Metric Transition Management Group to provide administrative support for managing the DOD transition efforts. The other 15 Task Groups represent major product or problem areas, in which metric transition needs to be addressed to meet



Mr. Tascher is Chairman of the Defense Transition Management Group.

SHOWN BELOW: SDI satellites use chemical lasers to intercept enemy missiles.

—Released by Department of Defense
Washington, D.C.



requirements of the Public Law. The Task Groups include such areas as military operations, construction, food, electronics, test equipment, and logistics.

The DOD Metric Transition Plan requires that each Task Group prepare long-term plans and identify initiation and completion milestones. The Plan identifies other government and non-government organizations that might be involved in DOD metric transition. Preliminary plans were submitted by the Task Groups on May 1, 1989, and subsequently were approved by the DOD Production and Logistics Committee. The Task Groups were to revise their Plans by August 1, 1990.

Two General Approaches

There are two general approaches DOD is using in dealing with metric.

The *first* is to buy commercial products where significant industry metric transition is underway or will be in the near future. In this area, the DOD role is to facilitate industry transition by removing barriers and by giving appropriate preference to acquisition in metric. Examples have included the automotive and construction equipment industries. However, DOD does not attempt to force metrication where it would not be economically feasible to do so. Thus, DOD continues operating in the inch-pound system in commercial areas in which significant industry metric transition is not underway and would not be induced by DOD action. Food is an example.

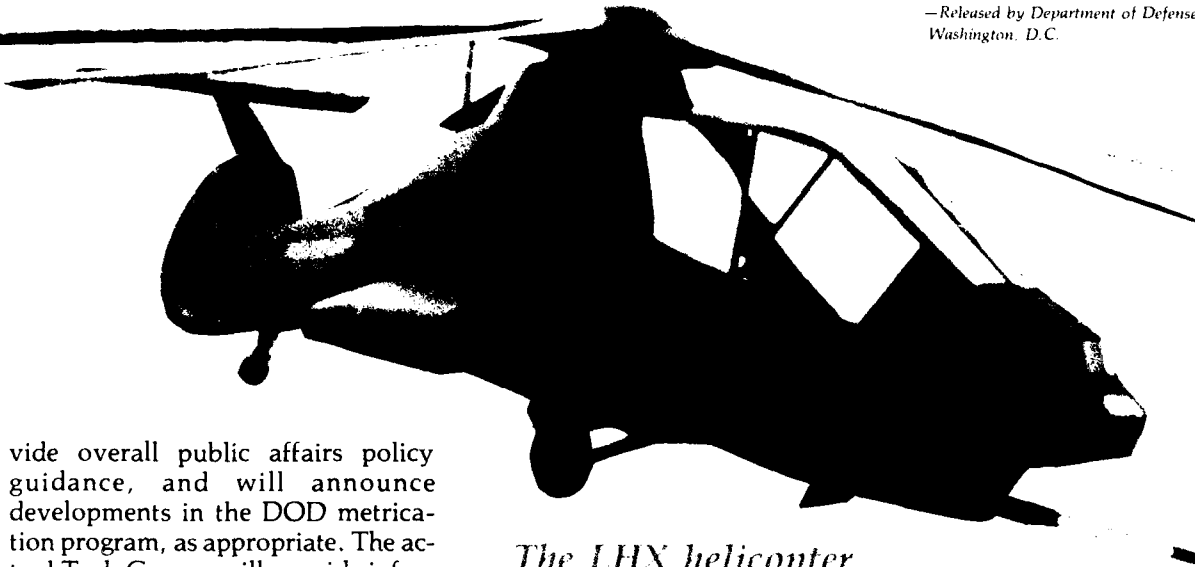
The *second* in dealing with metric is to establish DOD metric requirements. This approach is used where significant metric transition is reasonable and practical. In this category, DOD has plans and requirements for effecting transition in the near future to conform with the Act. The LHX helicopter and Strategic Defense Initiative systems are examples of this approach. However, DOD will continue using non-metric requirements where significant metric transition is neither reasonable nor practical. No efforts will be initiated by the DOD to acquire metric spare parts for already purchased inch-pound equipment, for example.

The DOD Transition Plan recognizes that significant progress must be made by the Task Groups, and others involved in metric transitions, before dates for full metric use can be determined. Our transition is dependent to a large extent on the transition efforts of other agencies and industry. The DOD Plan sets July 1, 1991, as our target date for identifying when metric will be used; however, the Plan recognizes that Task Groups may not be able to provide specific dates in some cases.

Two Task Groups

Two Task Groups dealing with broad-based issues affecting many people and organizations are Education and Training, and Public Affairs. The Task Group on *Education and Training* believes that the DOD, at this time, does not need a common metric education and training program. The DOD currently trains individuals needing a "working knowledge" of the metric system to do their jobs. This is similar to the approach used by the automotive industry, and, for the near term, should continue to be adequate to satisfy the needs for metric-trained personnel. As DOD use of the metric system increases and more weapon systems are built using metric measure, it will become necessary to expand the scope and breadth of metric training for military personnel and civilians. As DOD institutes changes and lays out schedules, the Education and Training Task Group will decide on and promulgate a uniform metric education and training program. Meanwhile, the Group plans to meet periodically to assess progress toward metrication in DOD. It will formulate a recommended, phased, program based on needs arising from these assessments.

The Task Group on *Public Affairs* is developing a plan to provide direct public affairs assistance, as required, to other Task Groups. This should overcome personnel resistance to the use of metric measurements in everyday activities within the DOD; reinforce dedication to using the metric system; and inform the public that the Department of Defense is committed to using the metric system. The Office of the Assistant Secretary of Defense (Public Affairs) will pro-



vide overall public affairs policy guidance, and will announce developments in the DOD metrication program, as appropriate. The actual Task Groups will provide information and materials to DOD public affairs offices to support the metrication program. The Service Chiefs of Information will develop internal information programs to inform military personnel and civilian employees of the metrication program and how it affects them, and will use metric terminology in external information programs, as appropriate.

Interagency Committee

The DOD, through its Task Groups, is participating in activities and programs of the Interagency Committee on Metric Policy, a federal government-wide committee chaired by the Under Secretary of Commerce for Technology. There is a close working relationship with private sector metric transition planning organizations, such as the American National Metric Council and the U.S. Metric Association. This close cooperation is necessary since, except

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for a few military unique areas, the DOD ability to unilaterally make substantial metric transition progress is limited.

In conclusion, the DOD has a metric policy directive, a plan, and organizational structures in place to address metric transition. We are emphasizing the fact that the use of the metric system in the design and construction of our weapon systems and other defense material will achieve long-term cost benefits and contribute to interoperability and standardization with our allies. When metric transition is done in a thoughtful and practical manner, benefits outweigh costs. Substantial metric transition has to be a well-planned, cooperative, national effort by industry and government, with widespread public acceptance.

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DSMC's New COURSE DEVELOPMENT PROCESS

Paul J. McIrvine

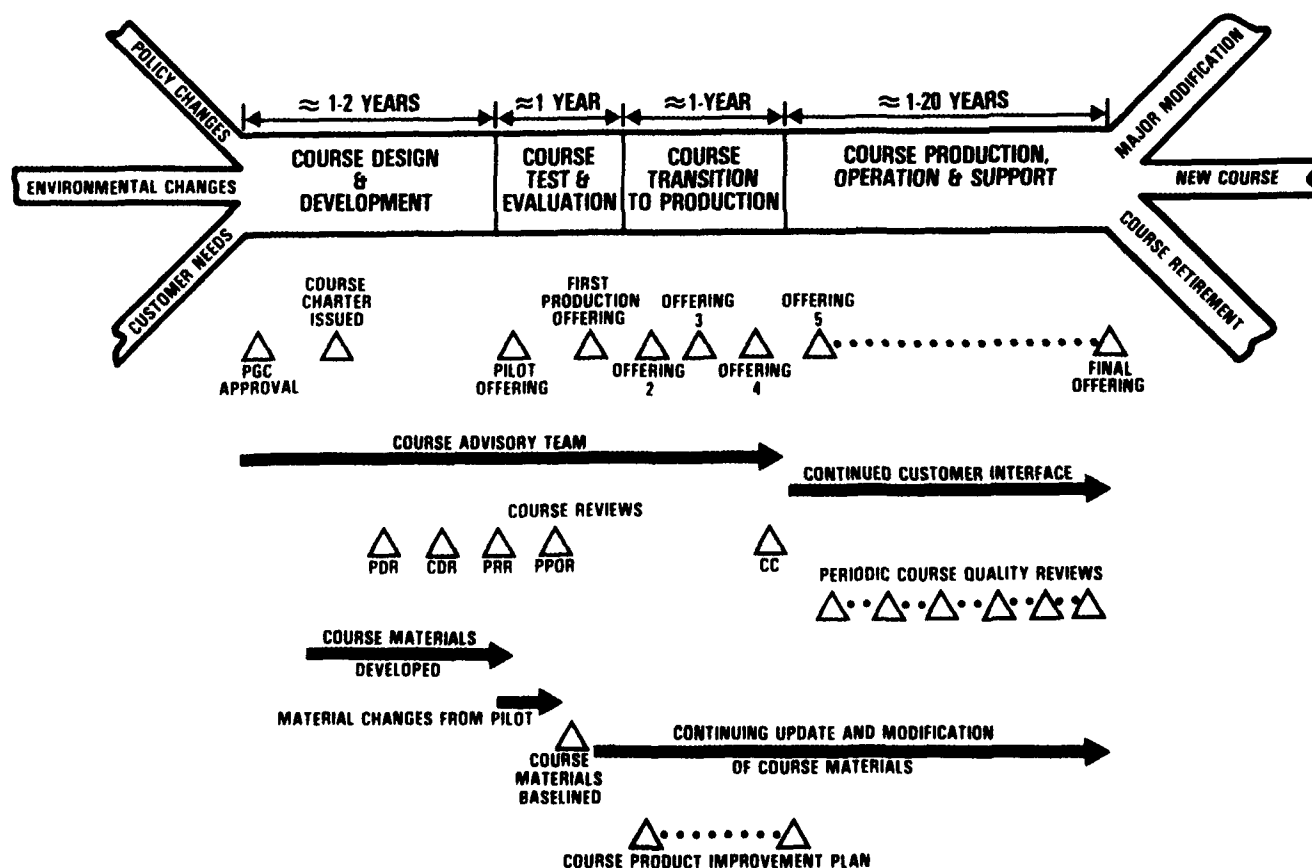
A past approach 8-10 years ago at the Defense Systems Management College (DSMC) was to contract out the development of brand new courses of instruction. Upon completion of development, these courses were then transitioned to the DSMC organic faculty to take over. Problems in this "transition to

production" of courses led to a search for ways to improve the process of new course development at DSMC.

Major improvement started with the observation that the Defense Systems Acquisition Process in many ways parallels the acquisition process for new DSMC courses of instruc-

tion. If DSMC considered a new course as a "system," then a DSMC Course Acquisition Process could be developed with many similarities to the Defense Systems Acquisition Process. This could permit DSMC to undertake more organic development of its own courses and perhaps smooth the "transition to produc-

FIGURE 1. THE DSMC NEW COURSE DEVELOPMENT PROCESS



tion." The latest results of this evolution are shown in Figure 1.

As one might guess, requests for the development of new DSMC courses come from almost everywhere—Army, Navy, Marine Corps, Air Force, Office of the Secretary of Defense, Industry associations, internal DSMC faculty—and continue to outstrip all available resources. Past problems that resulted from a lack of control on this "requirements" process prompted the DSMC Policy Guidance Council (PGC) to direct that the initiation of all new DSMC courses were subject to approval by customer requests and the ability of DSMC to develop and present new courses of instruction. In fact, from Academic Year 1988-1991, the number of new DSMC short courses increased by 33 percent, as shown in Figure 1. During this timeframe, DSMC was undertaking a massive redesign effort in the Program Management Course that would significantly expand the quantity of students.

What Causes DSMC to Develop A New Course?

1. *Policy Changes.* A good example of this is the Total Quality Management (TQM) area. Total Quality Management clearly was an area of significant interest to DSMC and the entire Department of Defense. Hence, DSMC recognized the need for organic leadership in this area and instituted the development of the 1-week Total Quality Management Course. This soon was followed by the "transition to production" of an experimental 2-day TQM Workshop. Continuing demands have resulted in the current development effort for the new TQM "Facilitators" Course.

2. *Environmental Changes.* The rapidly changing "state of the art" in Systems Acquisition Management often demands changes. A good example is the DSMC Systems Engineering Management Course. This area was taught as a discipline within the Program Management Course, but no short course existed

Mr. McIlwaine is the Associate Dean of the School of Systems Acquisition Education.



—Photo by Richard Marton

PROFESSIONAL INSPIRATION... Three DSMC professors "inspire" three PMC 90-2 students. Seated, left to right, the students are Captain Leigh French, USAF, who also is on DSMC's staff; Department of the Air Force Civilian Wanda KausHagen; and LTC Wendell T. Tengan, USA. The professors (left to right) are Sherman Jacobson, Paul McIlwaine and James Sheldon. Mr. Jacobson is the Functional Coordinator for Software and Director of the Management of Software Acquisition Course. Mr. McIlwaine wrote this story. Mr. Sheldon is Director for PMC, Part 1, and Director of the Acquisition Basics Course.

in this area. Since there is no Assistant Secretary of Defense for Systems Engineering Management, there was no external advocacy for this truly interdisciplinary area of engineering. When DSMC was formally asked to undertake a Technical Risk Assessment Course, the College position was that the development of a System Engineering Management Course with Technical Risk Assessment as a topic within this course was the appropriate course of action to pursue.

3. *Customer Needs.* Not all DSMC customers are able to devote the 20 weeks of full-time residency necessary to graduate from our long course—the Program Management Course (PMC). This course currently addresses the 12 major functional disciplines of program management.

During the previous 6 years, efforts have been underway to develop

1-week short courses in each of these functional disciplines of Program Management. These courses provide much needed instruction for functional specialists and others unable to devote 20 weeks of residency to the PMC. These courses permit DSMC to further explore additional depth in these topical areas, to test and evaluate new or modified units of instruction, and to introduce new topical areas in a less-risky environment than that of the Program Management Course. The FY92 introduction of the Managerial Development Course (MDC) will complete the cycle and DSMC will have 1-week short courses in virtually each functional discipline that constitutes Program Management.

How Does DSMC Develop New Courses of Instruction?

Once a requirement for a DSMC course has been established and PGC

FIGURE 2. OVERVIEW OF DSMC COURSES

	LENGTH	ACRONYM	
PROGRAM MANAGEMENT COURSE			
Program Management Course	20 wks	PMC	Course Revised - Academic Year 1988
EXECUTIVE COURSES			
Executive Refresher Course	2 weeks	ERC	
Systems Acquisition Mgmt for General/Flag Officers	1 week	SAM	
Executive Management Course	3 weeks	EMC	New Course - Academic Year 1988
INTERNATIONAL COURSES			
Multinational Program Management Course	2 weeks	MPMC	Course Retired - Academic Year 1989
Multinational Program Management Course	1 week	MPMC	
Advanced International Management Workshop	1 week	AIMW	New Course - Academic Year 1990
BUSINESS COURSES			
Contract Finance for Program Managers Course	1 week	CFPMC	
Contractor Performance Measurement Course	1 week	CPMC	
Contract Management For Program Managers Course	1 week	CMPMC	New Course - Academic Year 1988
Systems Acquisition Funds Management Course	1 week	SAFMC	
Systems Acquisition for Contracting Personnel	2 weeks	SACPC	New Course - Academic Year 1990
Selected Acquisition Report Course	1 week	SARC	New Course - Academic Year 1989
TECHNICAL COURSES			
Management of Software Acquisition Course	1 week	MSAC	
Test & Evaluation Management Course	1 week	TEMC	New Course - Academic Year 1988
Defense Manufacturing Management Course	1 week	DMMC	
Management of Acquisition Logistics Course	1 week	MALC	
Technical Managers Advanced Workshop	1 week	TMAW	
Systems Engineering Management Course	1 week	SEMC	New Course - Academic Year 1988
Introduction to Software Mgmt & Acquisition Course	2 days	ISMAC	New Course - Academic Year 1991
TOTAL QUALITY MANAGEMENT COURSES			
Total Quality Management Course	1 week	TQMC	New Course - Academic Year 1989
Total Quality Management Workshop	2 days	TQMW	New Course - Academic Year 1990
Total Quality Management Facilitators Course	1 week	TQMFC	New Course - Academic Year 1991
POLICY COURSES			
Fundamentals of Systems Acquisition Management	1 week	FSAM	
Defense Systems Acquisition Management	1 week	DSAM	New Course - Academic Year 1990
Program Managers Briefing Course	1 week	PMBC	Course Retired - Academic Year 1991
Managerial Development Course	1 week	MDC	New Course - Academic Year 1992
INTEGRATED COURSES			
Acquisition Basics Course	4 weeks	ABC	New Course - Academic Year 1991

approval has been gained, the next step is the preparation of a Course Charter. The DSMC Program Management education stresses that DOD program managers are charged with specific duties via means of a Program Manager's Charter. Hence, DSMC decided to "practice what it preaches" and issue a Course Charter for the DSMC Course Director as a means of initiating a new effort.

The Course Charter provides the management information and lays the groundwork necessary to permit the Course Director to apply proven program management techniques to the task of developing a new course of instruction. Course Charters provide the following information:

- Course Title and Acronym
- Identification of Course Director and Course Director Assistant
- Statement of Tasking
- Background Information
- Identification of Originator of Requirement
- Target Audience
- Course Objective
- Design Constraints
- External Course Advisory Group Requirements
- Equivalency/Comparability/Commonality with Other Courses
- Required Reviews
- Development Schedule
- Assignment of Resources
- Course Documentation and Materials Requirements.

Probably the most important function of the formal Course Charter is to communicate to all personnel—internal and external to the College—that a new course development is underway and provide a complete set of "specifics" on what the course will be and when it will be offered.

For most of our courses, the DSMC Course Charter specifies the formation of a Course Advisory Team. This Team normally includes the Course Sponsor (if any), Course Customer representatives, military representatives, civilian government representatives, and defense industry representatives (usually members of one or more industry associations) who are practicing managers in the discipline(s) represented in the

course. The purpose of the Course Advisory Team is to provide practical, "real world" influence during Course Design through attendance at the formal course reviews and the pilot course offering, and working closely with the course director to provide advice on curriculum realism, currency and improvement.

Design constraints and requirements normally specified in Course Charters include:

- Prerequisites
- Course Length Constraints
- Geographical Transportability
- Planned Production Rate
- Administrative Requirements
- General Topical Areas of Course Coverage.

Establishment of a "functional baseline" of competencies or topics the course will address is usually the first milestone in course design and is normally reviewed at the Preliminary Design Review (PDR). This functional baseline reflects the specified topical areas of course coverage and the course objectives when integrated with the target audience and other constraints. The PDR also reviews the requirements, evaluates the various alternative course design concepts available, and selects the course concept which will be pursued for the pilot offering. This review normally results in the first top-level course outline.

Translation of the "functional course baseline" into an "allocated baseline" is the next milestone in course development and is usually subject to a Critical Design Review (CDR). The CDR reviews the block-by-block and hour-by-hour course schedule, productibility, planned instructors, planned materials, and application (integration) instruments which are crucial to each block. Approval of the design at this time signifies go-ahead to proceed with finalization of each single hour of instruction.

Another important review is the Pilot Offering Readiness Review (PRR). This review can be done formally and be open to all participants or can be considered as an internal DSMC administrative milestone. In

either case, the PRR assesses readiness of student and instructor materials, course schedule completion, instructor commitments, classroom setup, materials reproduction status, student status, and other details necessary to ensure the successful conduct of the pilot offering.

Course materials development normally include both instructor materials/guides and student hand-out materials. The dynamic, constantly changing nature of the defense acquisition process normally requires DSMC to develop custom-tailored materials or guidebooks. Judgment must be applied regarding the quantity and type of materials to be used in any course. The environment necessitates that instructor notes/guides and student materials must be carefully preserved to ensure the best quality materials are available in a legible, attractive format.

Test and evaluation of a new course is normally accomplished by means of a "Pilot" offering. This normally includes handpicked students, consisting of customers, experts in the field, complete novices, target audience personnel, DSMC faculty, and experts in educational technologies. The "Pilot" offering is intended to be fully identical to the planned "production" offerings. A detailed critique and specific suggestions for improvement of the Pilot Course Offering are solicited from students.

The Post Pilot Offering Review (PPOR) normally is conducted within 30 days after completion of the Pilot Offering. Lessons learned, "Pilot" problems, and improvement areas are addressed and production changes are planned. The decision is made at this review whether or not to continue with production offerings as scheduled.

A key aspect of scheduling is to leave sufficient time in the schedule to fully incorporate any needed changes (resulting from the "Pilot" Offering) in the first production offering. The DSMC experience shows 4-6 months between "Pilot" Offering completion and first-production is about right. After this, a smooth transition to production usually results.

(Continued on page 58)

tions in their managements—in both basic philosophy and actions—if they are to be successful in the world economy of tomorrow.

SERVICE MANAGEMENT

A. Ambiguity of Terms

Generally, the term "service industries" refers to all "tertiary" industries—barring utilities—because they belong to the industrial category. According to a study on the employment structure carried out in 1987, approximately 57% of the Japanese work force is now employed in service industries (see Figure 1).

This percentage has been growing at an almost constant rate since 1965. Growth in personal services has been sustained through increasing demand for enhanced quality of life (in education and health, for example). Growth in corporate services has been sustained through demands for ever higher management effectiveness. Both trends are common in other advanced industrialized nations.

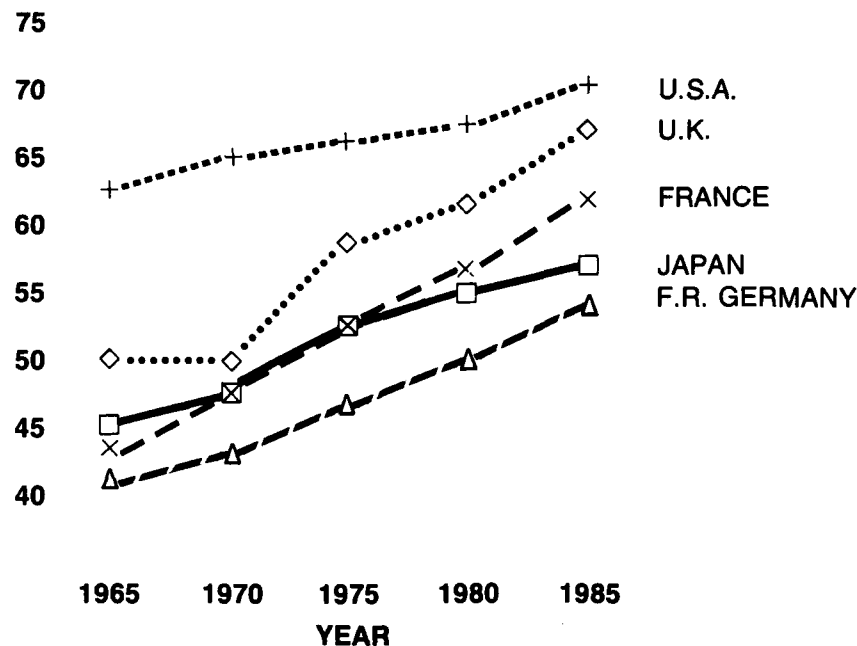
The boundary between manufacturing and service industries is not always readily distinguishable. For example, if a manufacturer establishes an affiliate to take charge of its distribution or system functions, this offshoot clearly qualifies as a service company. In this respect, corporate products are always made up of two elements: the tangible and the intangible. Questions of sector definition are generally determined according to how the management of the intangible element is perceived and executed.

"Service management," as we will refer to it here, is common to all industrial categories. In contrast to conventional management, which deals primarily with tangible goods, service management is an attempt to seek new management concepts applying to the specific needs of the service sector.

As we have seen, the term "service industry" applies only to those industries in which intangible elements account for a relatively large share of the total product. In the words of Prof. Christian Gronroos of the Swedish School of Economics & Business Administration, "A service industry is any industry that thinks of itself as a service industry."

FIGURE 1. RATE OF TERTIARY INDUSTRY EMPLOYMENT IN THE MAJOR INDUSTRIALIZED NATIONS

PERCENTAGE OF TOTAL WORK FORCE



B. Service Quality: Inherent Difficulties

Service management differs fundamentally from goods-oriented management in the following respects:

- (1) It deals with intangible products.
- (2) It applies simultaneously to production and consumption.
- (3) It depends on human capabilities.

These characteristics make it far more difficult to achieve quality control in service management than in goods management. Yet, at the same time, they are critically important to total management because, as noted earlier, in the service sector the intangible element occupies a relatively large portion of the total output. To compound matters, in many cases services are provided concurrently through several sources. For these reasons it is impossible to prevent defective services in the same manner as with goods management.

In the service sector, production and consumption of services occur simultaneously. This circumstance prevents the provider of services from making minor adjustments or replacements as might be necessary, as he would in the case of goods provision. The result of this is that defective service causes immediate loss of customers.

Because service depends on human labor, there can be sharp unevennesses in the quality of the service provided. And because of the dependence on human labor, consumers of services rarely vocalize or register complaints (for reasons explained below). Consequently, even when faulty service results in the loss of a customer, it is easy for management to fail to recognize the existence of a problem. As a result, service businesses often persist in their ways, unaware of a steady—and perhaps preventable—loss of customers.

How then is service quality evaluated? According to a survey of

managers and consumers in four categories of the service sector carried out by the Marketing Science Institute of Harvard University, service quality is determined by the degree to which a customer's initial expectations (what he expects the service will achieve for him) are ultimately fulfilled: better than expected, as expected, or less than expected.

When service received surpasses initial expectations, the provider acquires a steady customer; when service fails to meet expectations, the provider loses a customer.

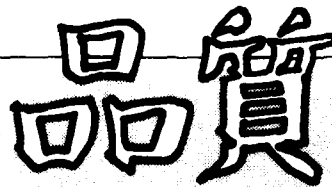
As a result, it is extremely useful to acquire an understanding of the gap between customer expectations and fulfillment in service management. Through such an understanding new ideas can be generated that will lead to more effective service management.

C. Flawless Quality: The Best Growth Strategy

Given our definition of service quality, it becomes immediately obvious that a service is an entity whose quality cannot be evaluated until it is actually provided and "consumed." Accordingly, when deciding whether to use a particular service, a potential customer will frequently seek out the opinions of people who have used the service in the past. In this way, potential customers are strongly swayed in their decision by the opinions of previous users.

Through this process, users whose initial expectations are more than adequately fulfilled not only become repeaters themselves, they also generate a succession of new customers, thereby creating automatic growth for the service provider. Conversely, users who have been disappointed by a service hinder potential new customers and thereby stifle the provider's latent market.

Unlike the case with physical goods, with services it is impossible to examine quality in advance, so word of mouth plays a significant role. When quality is flawless the first time, business grows, since satisfied customers are a company's best salesmen. Any corporate policy which fails to devote sufficient attention to quality places itself at great risk.



***It becomes
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QUALITY

D. The All-Important Human Factor

Because nearly all service activities depend on human labor, the success or failure of service management is directly affected by the temperament and abilities of a company's service personnel. Physical facilities play only a secondary role.

It is essential, therefore, that managers at all levels continuously check on their service personnel. Do they demonstrate agreement and pride in the company's service philosophy? Do they dedicate themselves to their tasks of their own volition? Is their working environment attractive and energetic? Do workers have a sense that their individual abilities will be enhanced through their jobs? Is the company a place where people of outstanding character and potential naturally come together? If the answer to any of these questions is "no", then it is up to management to devise and implement improvements.

The foremost function of service management should be education. Higher-level executives must make the greatest efforts in this area, and they must possess outstanding skills in matters relating to capability development and personnel management (hiring, placement, transfer, and promotion). Achieving and continuously improving these skills is especially important for mid-level managers because their work affects the human aspects of peoples' jobs, such as trustworthiness, motivation, and training.

E. Other Special Characteristics of Service Management

Services come in great varieties. For example, they can appeal to the senses or be functionally useful. They may rely heavily, or relatively little, on physical facilities. They may be offered at one central location or provided where they are required. Often these categorical boundaries are freely crossed. In every case, however, the following aspects demand close attention in the performance of service management.

● **Quality First, Productivity Second**

With services, the highest priority must be given to achieving perfect quality; only after this should attention be turned to productivity enhancement. It is self-destructive to work on cost reductions before quality is perfected. In most instances it is actually wiser to address problems relating to unprofitable services not by reducing labor, but rather by eliminating these services altogether and replacing them with new areas of business.

● **Difficulty in Understanding Latent Complaints**

As described earlier, latent complaints against services cause the loss of not only dissatisfied customers but of potential new customers. Eradicating latent complaints is, therefore, an issue of great importance in service management.

For a number of reasons, complaints are registered against services far less often than against physical goods. Dissatisfaction with services lacks physical evidence. It pertains to past events and it is based on human interactions. It is easily remedied by

simply deciding not to use the same services again. As a result, special measures and efforts are needed if the service provider is to gain a grasp of latent complaints.

- **Strategic Use of Information Systems**

Because services of an essentially individualized nature must be provided to many different customers with different needs, the service provider must be able to process large volumes of information quickly and accurately. Efficient, high-speed information systems are thus extremely valuable as strategic management tools. They contribute dramatically to achieving outstanding service quality control and they reduce lost business opportunities, aid in product development, and boost competitive strength.

- **Response to Changing Demands**

In most service industries, the cost structure leans heavily towards fixed costs. Fluctuating costs are relatively minor in comparison. For this reason, service industries are highly vulnerable to changes in demand.

To overcome this vulnerability, a corporate structure must be achieved that can cope with fluctuating manpower and operational needs on a yearly, monthly or daily basis.

- **Continual Price Increases**

Because of the relatively large weight of personnel costs within the service industry, a major issue in service management is the ability to absorb cost increases incurred each year through wage increases.

With human labor it is as difficult to cut costs as it is with physical goods; therefore, prices tend to increase on a recurring basis. Once a market price is raised, it rarely drops back to its previous level.

GUIDELINES FOR INNOVATION IN SERVICE QUALITY

The Japan Management Association has compiled the following guidelines for the performance of management activities by service industries and service activities by manufacturing industries.



Members of the service industry should instigate useful changes based on well-delineated service philosophy and pertinent policies.

INNOVATION

A. Re-establishing a Service Philosophy and Policy

Members of the service industry should not become complacent just because they are generating profits. Instead they should seek to win the trust and confidence of society at large by instigating useful changes based on a well-delineated service philosophy and pertinent policies.

Rather than pursue a vague general philosophy, each business should embrace its own unique and appealing service philosophy based on its particular characteristics and management principles. It should also clarify specific service policies, incorporating important working guidelines that will allow it to execute its philosophy. Through continuing education, it should build a deep understanding of its policies in all company employees.

If company's service philosophy is poorly delineated or too vague to have sufficient appeal, it should be re-

established. All members of management should then take leading roles in acting out these philosophies and policies as examples for employees.

The performance level of service management is inherently determined by the abilities of the people who work for the company. Service philosophy and policies must, therefore, have sufficient appeal to make an impression on employees and to generate an interest in active participation in their organization.

B. Revitalizing Standardization

Unlike manufactured goods, whose quality can normally be made uniform by superior production equipment, standardization of excellent service quality is difficult to achieve. To do so, the following actions are essential: studies should be undertaken within each work sector and improvements instituted to achieve optimum results; optimum work methods should be compiled into written manuals or video presentations; these materials should be shown to all managers to eradicate variations in service quality.

Compiling procedures for standardizing service quality into written manuals is a viable means to put a service philosophy and policies into action. These procedures should deal initially with matters of form but should ultimately extend to a philosophy of mind. Manuals also enable efficient training of part-time and new employees; permit organized accumulation of management know-how in a written format; give higher-ranking managers more time to attend to matters of special concern through the application of "exception management" principles; and lead to greater competitive strength through the pursuit of optimum work procedures in each sector of the company.

In Japan, however, with few exceptions (like hotels and banks) service quality standardization efforts to date have proven inadequate. In some cases these efforts have been misunderstood or reviled. These negative views notwithstanding, manuals do not in any way seek to demand a "mechanical" response from people in supervisory positions; nor do they negate activities aimed at achieving improvements in the work place.

The intensity of research focused on the individual task level is a decisive factor in attaining high service quality and productivity. Once this is understood, conventional means of handling employees—assigning a person to a given job, leaving everything to that person, and telling him to come for help if he gets in to difficulties—should be eliminated and replaced by standardized procedures. Linked with activities designed to improve task performance, this standardization can achieve continuous enhancements in quality and productivity levels.

In the years ahead, as labor shortages become increasingly severe, standardization activities will take on ever greater importance. Indeed, without standardization, innovations in service quality and productivity will be inconceivable.

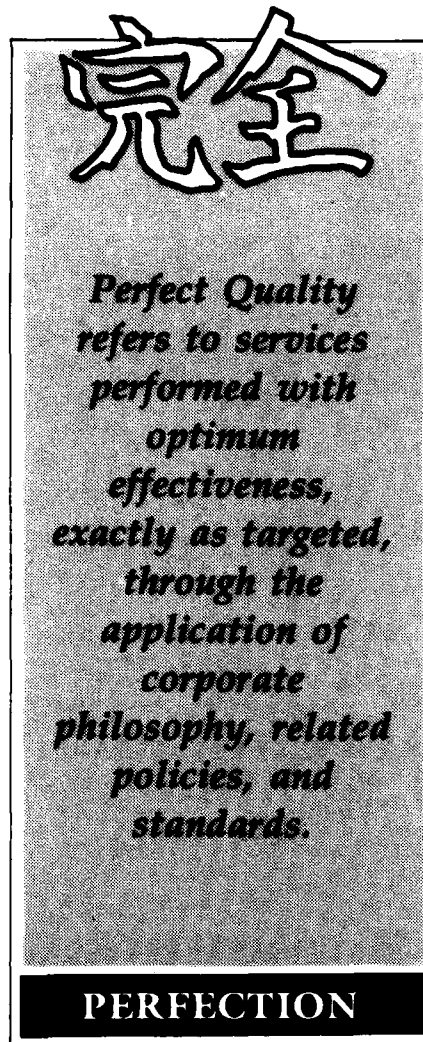
C. Creation of a "Perfect Quality" Structure

"Perfect Quality" as used here, refers to services which are performed with optimum effectiveness, exactly as targeted, through the application of corporate philosophy, related policies, and standards.

Although it should be self-evident that perfect quality provides the key to growth in the service industry, in actual practice this fundamental truth is not necessarily recognized and implemented by all employees in all companies. In some cases the highest priority is considered to be mere profitability, resulting in a narrowing of the company's market. It is, therefore, imperative for all managers to take a second look at their corporate environment and to undertake reforms where needed.

Even after a service philosophy and related policies have been re-established, standardization has been revitalized, and educational procedures have been fortified, many things remain to be done to achieve a structure conducive to perfect quality. All personnel in charge of service divisions should give first priority to these actions, double-checking to ensure that they are duly implemented.

Sales divisions should exercise an element of restraint in their promo-



tional activities. Aggrandized advertisements and excessive sales pitches only tend to inflate customers' expectations, making them dissatisfied when these expectations are not met. Sales personnel should be trained to conduct promotional activities within rational limits, aiming to win business through bonds of personal trust.

Because of the inherent difficulty in understanding latent customer complaints toward services, it is extremely important for both service personnel and sales staff to engage in two-way contacts with the customer. Rather than seeking merely to reduce the number of complaints received, attention should focus on recognizing legitimate complaints and rectifying their causes.

Complaint processing must also be viewed as a service activity in its own right. In this case too, it is important that corrective actions be taken which exceed the customer's initial expectations. It is essential also

for the service provider to learn through complaint processing how to prevent similar complaints from recurring.

Specific categories subject to quality control should be determined by each service segment (see Figure 2). A system should then be established to measure customer satisfaction, along with a system for reporting on service quality. In some cases it is also useful to engage the investigative service of an external organization to analyze one's own service quality.

Ideally, each service provider should establish its own quality control department. Duties should include the following: studies and planning directed toward attaining perfect quality; promotion of standardization and corrective actions; design and implementation of a quality control system.

D. Productivity Innovations

Innovations in service productivity fall into two categories: those which achieve greater added value by qualitatively enhancing output, and those which realize equal quality with less input.

The importance of qualitative output enhancement should be self-evident. As far as possible the degree of enhancement should be quantified exactly. Standardization and enhancement measures should be formulated through extensive studies of each individual work area, and should apply both to output and input.

Service organizations may divide productivity innovations along two lines: those for sections which come into direct contact with customers, and those which provide back-up support. Back-up sections should fundamentally apply the same management techniques as those used in the manufacturing sector—industrial engineering and quality control, for example. Productivity measurement systems applying standard times can also be used without modification in labor-intensive work areas.

As in the manufacturing sector, mechanization of operations and automation are important means of enhancing productivity in service industries. Achieving this mechaniza-

FIGURE 2. SERVICE QUALITY CONTROL CATEGORIES

1. **RELIABILITY:** ACCURACY, FAULTLESSNESS, PUNCTUALITY.
2. **RESPONSE SPEED:** QUICK, TIMELY RESPONSE TO CUSTOMERS.
3. **QUALIFICATIONS:** ADEQUACY OF SERVICE PERSONNEL'S KNOWLEDGE AND SKILLS.
4. **ACCESS:** APPROACHABILITY, EASE OF CONTACT AT ALL TIMES.
5. **ATTITUDE:** POLITENESS, RESPECTFULNESS, SOLICITOUSNESS, AGREEABILITY.
6. **COMMUNICATION:** WILLINGNESS TO LISTEN TO CUSTOMER'S VIEWS, ABILITY TO EXPLAIN IN EASY-TO-UNDERSTAND TERMS.
7. **TRUSTWORTHINESS:** TRUST PLACED IN COMPANY, RELIABILITY OF PERSONNEL IN CHARGE.
8. **SAFETY:** PHYSICAL SAFETY, FINANCIAL SECURITY, INTEGRITY IN PRESERVING CONFIDENTIALITY SECRETS.
9. **UNDERSTANDING OF CUSTOMERS:** CLEAR UNDERSTANDING OF CUSTOMER'S NEEDS AND DEMANDS.
10. **TANGIBILITY:** PHYSICAL PLANT, PHYSICAL APPEARANCE OF MANAGERIAL PERSONNEL, TOOLS, ACCOUNT KEEPING.

(From "What is Service Quality?" *JMA Journal*, August-September, 1988)

Note: In actual practice, quality control categories vary for each service product and service segment and must therefore be established for each segment separately.

tion and automation, however, requires the organized cooperation of machine and equipment makers. The inherent aim of mechanization is to create a system which lets workers concentrate on tasks which produce added value. At the same time, however, the degree of mechanization should not be allowed to conflict with the service philosophy of the organization.

E. Continuously Strengthening Operation and Development Capabilities

Generally speaking, Japanese service organizations are still relatively poor at developing new areas of business and new industrial formats. Development activities in Japan appear to be no more than imitations of those carried out in the United States and Europe.

Most of Japan's major manufacturers have achieved corporate struc-

tures which allow them to introduce new businesses almost every year, based on operational and technical developments geared to short-range, mid-range or long-range goals. Today, it is a matter of urgent priority for the nation's service industries to achieve a similar structure. In this case, development must be carried out within specific time frames. Each operational division within a company must work on its own initiative to develop new areas of business and new business formats.

Continuous corporate development divides into two categories: diversification into affiliated business areas, taking full advantage of the company's special strengths in terms of location, expertise, personnel, and capital; and diversification into non-affiliated areas, through mergers and acquisitions. In both cases, the foremost task is to increase the number of personnel in the corporate

group who possess capabilities for starting businesses, structural reform, and corporate revitalization. 57

To achieve this aim, a number of steps are normally needed. First, to the maximum extent possible, the company itself should be organized into profit centers, or sub-units capable of profitability on an independent basis. Second, the activities of dynamic young managers should be monitored closely, and those with capabilities for corporate enhancement and reform should be singled out. Third, division units should be gradually increased in size from small- to large-scale. Finally, it is important to rotate personnel from one division to another.

F. Management Innovations At Service Affiliates

In recent years a trend has emerged in the manufacturing sector whereby service functions are increasingly separated into independent service companies. Separation of these functions is a highly desirable form of innovation for the following reasons: it enables simplification of the organization of the head office; it enables the acquisition of external sales and improves productivity; and it encourages re-evaluation of the quality of internal services.

In actual practice, however, service affiliates of this type generally possess meager profit-producing ability. In fact, many such firms operate in the red.

Contributing to the lagging profitability of manufacturing service affiliates are their relatively small size in most cases, and the fact that their operations were previously carried out exclusively within their affiliated company's market. As a result, these affiliates tend to have inadequate competitive strength in the open market—both in terms of service quality and productivity. In addition, manufacturing firms tend to be content simply if their service affiliates accommodate certain personnel needs and absorb a certain portion of the parent company's labor costs.

In fact, however, these service industries possess the potential to grow independently in new circumstances. They should reconsider their operating status as independent com-

panies, review how to select the most capable managers for each job, expand their size through mergers and acquisitions, and assiduously promote comprehensive measures to achieve innovations in service quality.

G. Maintenance and Enhancement Of Social Trustworthiness

Even more than manufacturers, service companies must be keenly attuned to their reputations and the trust which the public has for them.

Service companies typically operate under a cost structure centered on fixed costs. These companies tend to raise fees regularly to absorb rising labor costs. This tendency is especially marked in fields with light competition.

Price increases should reflect *only* increases in quality, or they will cause a lower standard of living. The particularly high cost of services in Japan is attracting public attention. Entrenched business practices giving the impression of price gouging should be reconsidered. This includes preset service menus giving little choice in price and service and creating pressure to buy unnecessary services.

進歩

Only when concerted efforts are made to provide quality services which consistently exceed the customer's initial expectations can a sense of fulfillment be added to our lives.

PROGRESS

Up to the present, the service industry has generated social evils because of managers who believed in the pursuit of immediate profit even if it means the loss of customers. Service provision can easily run astray if the highest priority is given to profits. In all cases, service should be carried out according to a set philosophical principles; profits should be considered end results. Particularly close care must be exercised when providing new services.

Countless service activities are carried out each day to countless numbers of customers. Only when concerted efforts are made to provide quality services which consistently exceed the customer's initial expectations can a sense of fulfillment be added to our lives. For this reason, the service industries should work to eliminate all customer dissatisfaction and distrust.

In the final analysis, service industries cannot survive and grow without the trust of society at large. As businesses engaging in the sale of intangible products, they should be aware of potential criticisms of the "emptiness" of their operations; and they should adopt a self-effacing attitude of dedication to serving society's true needs.

COURSE DEVELOPMENT PROCESS

(Continued from page 51)

The first year of "production" offerings is then set to commence. DSMC experience has shown that a "low rate initial production" during the first year of a new course offering is prudent and the best method to ensure a quality course.

Upon completion of the first year of offerings, the final design review—the Course Critique (CC)—takes place. Emphasis is on baselining the production version of the course. During this review, course strengths and any course weaknesses will be identified and necessary modification or product improvement plans will be initiated.

The methodology just described has been successfully applied to the following DSMC courses that have been developed under the auspices of a Course Charter:

—Academic Year 1988:

Systems Engineering Management Course (SEMC)
Test and Evaluation Management Course (TEMC)

—Academic Year 1989:

Selected Acquisition Report Course (SARC)
Total Quality Management Course (TQMC)

—Academic Year 1990:

Advanced International Management Workshop (AIMW)
System Acquisition for Contracting Personnel (SACP)
Defense Systems Acquisition Management Course (DSAM).

Three Academic Year 1991 courses, currently under development, that are utilizing this methodology are as follows:

—Acquisition Basics Course (ABC)
—Introduction to Software Management and Acquisition Course (ISMAC)
—Total Quality Management "Facilitators" Course (TQMFC).

Summary

The utilization of a Course Charter and the Figure 1 methodology it outlines resulted in a significantly improved DSMC new-course development process.

From Academic Year 1988-91, DSMC increased short courses by 33 percent. This process allowed DSMC to continue this rapid rate of short-course growth while managing the most significant redesign of PMC in the history of the College.

BIGGEST BUSINESS IN THE WORLD

DEFENSE ACQUISITION MANAGEMENT

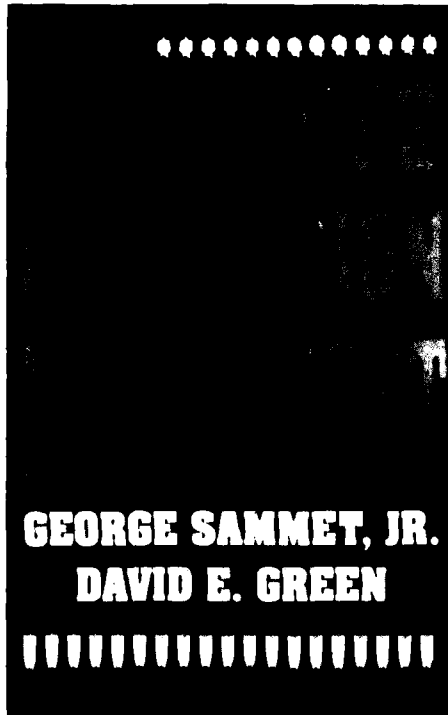
George Sammet, Jr., and David E. Green
(Florida Atlantic University Press, 1990. 498 pp.)

This book, written by two people who have participated in the defense acquisition process, brings together all aspects of acquisition management. These include current philosophies, organization, program management, procurement, manufacturing management, contract administration, subcontracting, supportability, and innovations to be proved in the future.

Defense Acquisition Management begins by recognizing that buying for the Defense Department is the biggest business in the world, costing about \$688 million each workday. The authors explain that the buying process is one step in a multiple-step process. The process starts with an assessment of the need for a specific capability, and is followed by a strategy that places in the hands of troops the equipment they need, and its maintenance, replacement and disposition. The authors discuss procurements, serving the best interests of the Services, the nation and the taxpayers.

In the *Introduction*, the authors explain the need for acquisition of a new system is triggered in the Defense Department by recognizing a tactical or strategic deficiency, a technological breakthrough, or a need to replace equipment that served a purpose during the years, is worn out, but still needed. The *Introduction* contains some history, a discussion of the Congress' role in defense acquisition, and a general description of the acquisition process. There is

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heavy concentration on the Army research, development, and acquisition process.

Sammet and Green assume correctly that understanding the history, character, uniqueness, economic impact and strategic role of the defense industry is fundamental to any study of defense acquisition management. They believe that the high state of defense preparedness today will ease the burdens of mobilization should such a need arise suddenly. Unfortunately, the defense industry is becoming more inefficient economically speaking, and less responsive strategically speaking. Weapons sophistication appears to be growing without bounds; industrial preparedness planning is weak, and mobilization lead times are lengthening.

A strong industrial base is necessary to maintain a strong defense. Unfortunately, there has been a continuing deterioration and contraction of the defense industrial base. The authors refer to the House Armed Services Committee report of December 31, 1980, indicating there was (1) no preparedness plan, (2) turbulence in defense system programs, (3) a shortage of critical materials, (4) restrictive procurement policies and procedures, (5) tax and profit policies that discourage investment, and (6) diffused responsibility for the condition of the industrial base. Thus, the ability of the industrial base to respond to near-term readiness, surge and mobilization requirements is not possible.

Sammet and Green say defense marketing is not limited to companies seeking to win a government contract. It includes marketing of products and programs by government personnel to higher levels in the Department of Defense and the Congress. Generally, the fate of major programs is based on their reception by the Congress.

Under organization, the three basic forms are identified—the functional organization, the pure program (project) organization, and the matrix organization. Also discussed is the “two-boss” concept practiced by industry. The authors deal with the person—loyalties, required and desired characteristics, authority, demands and problems—and with the criteria for selecting program managers. Roles and challenges of industry and government program managers are discussed.

Program controls and product assurance receive adequate coverage; however, "total quality management," a popular term in defense system acquisition management today, is never mentioned.

Manufacturing management is recognized as a major subset of program management. The authors believe objectives of manufacturing management are to (1) ensure proper planning early in a program; (2) ensure system design will lead to efficient and economic quantity production; (3) assess program status at any point during the production phase to determine if schedule, costs, and quality standards are being met; and (4) conduct assessment and reviews of the manufacturing effort required to meet decision points. The *DSMC Defense Manufacturing Management Handbook for Program Managers* is referenced and quoted in this and other chapters. Unfortunately, the 1984, rather than the 1989, version is used. Manufacturing problems experienced by defense manufacturing companies are presented on a non-attribution basis.

Procurement objectives, authority and responsibilities are included. Supplier selection, evaluation, business relationships and international procurement are discussed. The authors cover spares management and adverse publicity in the 1980s.

In *Subcontracting*, Sammet and Green guide those who manage major subcontracts or wish to become acquainted with basic practices and procedures required to administer subcontracts. The authors recognize that the prime contractor must have a strong, sophisticated, and profit-conscious subcontracting function to ensure subcontract performance at the lowest overall cost. Lessons to be learned from successful and unsuccessful subcontracts are presented.

Supportability is a concern to military programs managers and to contractors who design, develop, produce and initially field defense systems. The authors recognize this fact and that operations and support compromise one of three slices of the budgetary pie; the others are manpower and procurement.

Contract administration and control are essential to efficient program performance and resultant profitable operation. These subjects and effective negotiations receive adequate coverage.

There is a short chapter on multinational programs. Recognition is given to the growing emphasis on standardization and interoperability of defense equipment between the United States and its allies. This has resulted in an increase in multinational programs.

There are chapters on training, ethics and innovations in defense acquisition. Under "innovations," the authors provide a summary of the most promising innovations on the 1990 horizon.

In the final chapter, the authors describe the Bush-Cheney challenge in a positive context. They conclude three things will have an impact on defense acquisition management in this decade: political upheaval in eastern Europe, formation of a dedicated acquisition corps, and "smart/brilliant" weapons of war.

The appendix, more than 70 pages long, contains useful information.

I believe the book will be of interest to personnel in the Office of Secretary of Defense, the Services the Congress, defense contractors, educators, students, and taxpayers. It should be read by program managers in government and industry and their staffs.

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