WILL COMMERCIAL SPECIFICATIONS MEET OUR FUTURE AIR POWER NEEDS?

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With the decline in procurement dollars for the Air Force, it is imperative that action be taken to acquire our weapon systems at the lowest possible cost while still acquiring effective systems using the latest technologies. This paper addresses one approach of reforming the acquisition system by using performance and commercial specifications vice military specifications. This article addresses how this reform effort must be carefully managed to be effective.

To meet today's national security challenge, the Air Force must maintain its technological superiority by using and maintaining a strong industrial base. The Air Force must do this in an environment of declining defense spending and rapidly paced development of key technologies in the electronics market. In order to meet this challenge, the Air Force must reduce its acquisition costs and remove any barriers to ensure greater access to the latest commercial technologies. On June 29, 1994, Secretary of Defense William Perry issued a memorandum that gave preference to performance and commercial specifications over military specifications (MILSPECs) and standards (MILSTDs). While the intent of the memorandum is good, its implementation has been overzealous, with the banning of MILSPECs with no regard for the phase of the acquisition, performance information, or whether a commercial specification or standard is available. The Air Force must carefully manage the use of specifications and standards, be they military, commercial, or performance, to ensure access to the latest available technologies while still obtaining a quality product, at the lowest possible cost, that will be supportable in the field.

INTRODUCTION

The U.S. Air Force, along with the entire Defense of Department (DoD), faces a new set of political, economic, and military challenges as we prepare to move into the 21st century. Though the requirements to maintain technological superiority and readiness remain constant, the circumstances have dramatically changed. Defense spending has declined in real terms by more than 40 percent since 1985; while procurement spending has been reduced by 70 percent. The Air Force's procurement spending has gone from one-half of its total budget to about one-third (Druyan, 1995). This decline in procurement spending has resulted in a shrinking defense industrial base. At the same time technology, driven by commercial markets, is evolving at a rapid pace. In the electronics industry, for example, more than 50 percent of DoD's budget is research and development, production, and upgrade of military equipment supplied by the defense electronics industry (Gansler, 1995, pp. 37–38). But the growth of commercial technology advancement in this sector far exceeds DoD-sponsored technology efforts. The design cycle for commercial technology is about 3 to 4 years; for DoD it is 8 to 10 years (Perry, 1994a, p. 3). Many DoD systems are technologically obsolete by the time they are fielded. To survive in this environment, the DoD needed to reform its acquisition practices. Secretary of Defense Perry outlined this need for change, naming dual-use technologies, use of commercial equipment, and sharing defense technologies as ways of establishing a national industrial base that preserves core defense technologies and reduces cost of acquisition (Perry, 1994a, pp. 2–3).

One of the most important steps taken by DoD to increase access to commercial suppliers and products is to move to greater use of performance and commercial specifications and standards. On June 29, 1994, Perry issued a directive that outlined a preference for performance and commercial specifications over MILSPECs and MILSTDs (Perry, 1994b). This directive recognizes that some MILSPECs are unique, and allowed for a 6-month transition period for implementation. While MILSPEC reform is both well-defined and intentioned, the implementation by the armed services has been overzealous and not properly managed. In most cases, MILSPECs are being banned immediately, without regard for their purpose, the system's acquisition life-cycle stage, or the existence of a commercial specification (Logistics Management Institute, 1996, pp. 1–9). The use of any specification (military, commercial, or performance) must be carefully managed, to ensure that future weapon systems will be affordable, supportable, and meet our war-fighting

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needs. This management effort should include the adequate research of the available specifications, training of our acquisition workforce, and the use of metrics to measure the effectiveness of performance and commercial specifications. In addition, the effort should allow the flexibility for program offices to determine which specification to use for a particular requirement.

This article will discuss the need for and current efforts in acquisition reform, particularly in the area of MILSPECs and MILSTDs. Then I'll discuss the origin, purpose, and problems of MILSPECs and MILSTDs, and compare that with commercial and performance specifications. I'll give an analysis of the implementation of MILSPEC reform, and recommend actions that will ensure DoD effectively manages the use of specifications and standards.

Need for Acquisition Reform

The Defense Industrial Base

The U.S. defense industry is characterized by its size and its capacity to mobilize when required. During World War II, it produced 296,000 aircraft, 1,201 naval vessels, 65,546 landing craft, and 86,333 tanks for Allied Powers. Though this industry was demobilized after the war, it was reactivated during the Korean conflict and remained at a wartime level during the Cold War (Gansler, 1995, p. 19). Because of a reduced strategic threat and economic pressures to reduce our budget deficit, the post Cold War era is another time of change for our defense industry. Our nation's leaders realized that this change must occur without severely affecting our defense capability and our economy. President Dwight D. Eisenhower, who coined the phrase "military-industrial complex," first warned of the potential impact that the defense industry has on the U.S. economy and the importance it has on our national defense (Gansler, 1995, p. 20). Today we must understand our defense industry and consider both the potential impact and benefits to our defense capability that may come out of any changes in DoD.

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Our defense industry is made up of contractors who deal directly with the government (known as prime contractors) and the prime contractors' suppliers (known as the subcontractors). For our major weapon systems, the prime contractors are the manufacturers whose primary business is defense. Their lower tier subcontractors provide components, such as electronic parts, that are a key part of the weapon system performance. These suppliers normally provide parts and components for both defense and commercial contracts. For many, the commercial market is a predominant part of their business base. One of the commercial industries that plays a significant role in our weapon systems is the electronics industry.

DoD and the Electronics Market

Technology for the electronics industry is driven by commercial markets and is evolving at a rapid pace. The growth of computers, personal communication equipment, office automation, and factory automation has put the commercial electronics

market significantly ahead of the defense market. And the gap is widening. At the same time, DoD is moving to more information-based requirements involving sensors, computers, intelligence data, communications, and simulations (Gansler, 1995, pp. 37–38).

In addition to the requirement for electronics technology, there is another aspect of the commercial market that is attractive to DoD. Because of intense global competition, companies in the commercial marketplace have reduced overhead costs, have fewer internal reporting requirements, and have given more authority to their operating managers. This has resulted in lower costs and an increase in productivity (Kapstein, 1993, p. 190). Because of this competition and the high volume of commercial production, DoD can benefit both in cost and performance if it can integrate its electronics requirements with the commercial marketplace. However, barriers exist: Government-imposed technical and administrative requirements impede the integration of civil and military production activity.

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Some of these barriers are administrative, such as requiring contractors to maintain certain cost accounting records and systems for their defense-related work. Other barriers are technical in nature, such as imposing MILSPECs and MILSPECs as contract requirements. Although these requirements had or may still have a purpose, they may limit the suppliers who can or who want to do defense business. Additionally, these requirements isolate the defense work from commercial work and can make defense business noncompetitive with its commercial counterparts (Gansler, 1995, p. 23). Firms within the same company have to separate their commercial work from their military operations. An example of this can be found at the Motorola Corporation, which operates two separate plants in Phoenix, AZ. The commercial facility is a world-class operation; the defense plant is obsolete (Gansler, 1995, p. 24). Another problem, amplified with a declining defense budget, is the added cost of doing defense work. The American Defense Preparedness Association found that the "cost premium" of unique government requirements has driven the "overhead" cost of doing defense business to two to three times that of commercial work ("Acquisition Reform," 1996).

Acquisition leadership has been aware of this situation for some time. Numerous government commissions and studies have studied the problem. However, until the 1990s, there was not an urgent need to have greater access to commercial products from a technological or fiscal perspective. The required restructuring of the U.S. defense industrial base and the DoD approach toward acquisition could only come about with active government involvement and direction (Gansler, 1995, p. 27). The underlying question was how the DoD could shift from a defense industrial base to a national industrial base.

Acquisition Reform

A major government initiative toward achieving greater access to commercial products and services was the Federal

Acquisition Streamlining Act (FASA) of 1994. A key aspect of the act was the expansion of the commercial product and service definition. Additionally, FASA established a preference on acquiring commercial over military products or services. This removed certain administrative requirements, such as detailed cost and pricing data, for buying commercial products and services. Referring to FASA as an integral legislative vehicle for acquisition reform, Perry commented, "When I came to the Pentagon in 1993, one of my most important initiatives was to achieve real acquisition reform...The real objective of acquisition reform is to allow the Defense department to buy products (weapon systems), not only at lower cost, but also to get higher quality products because we have access to the most modern technology" (Johnson, 1996, p. 6).

The other key issue that DoD faced was the military-unique product and process specifications and standards (MILSPECs and MILSTDs) used to acquire military systems. To address this issue, the Office of the Secretary of Defense (OSD) established a process action team (PAT), to analyze why government specifications and standards were used despite a 3-year-old policy providing a preference for commercial and performance specifications (Perry, 1994a, p. 18). Based on this PAT, Perry issued another significant directive in a June 29, 1994, memorandum, "Specifications and Standards—A New Way of Doing Business." This memorandum became known in the acquisition community as the "Perry Memo." The memo directed that performance and commercial specifications be used when purchasing new systems, major modifications, and upgrades to current systems. If it was not practical to use a performance specification, a nongovernment standard would be used. When MILSPECs were required, they were authorized as a last resort with an appropriate waiver. Waivers for the use of MILSPECs had to be approved by the Milestone Decision Authority. The purpose of the memo was to remove the technical barriers that impede the access to commercial products. Both FASA and the Perry Memo provided the required direction for greater access to commercial products for the acquisition of military systems. They provided a clear preference for the acquisition of commercial products and the use of performance and commercial specifications. However, the use of MILSPECs and MILSTDs was not prohibited and could be used when they were shown to be cost effective and required for system performance.

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How the Perry Memo was implemented by the military services and the potential problems will be addressed later. For DoD to keep up with the pace of technology development, barriers had to be removed to allow the commercial side of U.S. industry to have easier access to defense acquisition. Initiatives such as FASA removed many of the administrative barriers, while the Perry Memo removed technical barriers brought about through the use of MILSPECs and MILSTDs. To understand the current MILSPEC and MILSTD reform it is important to trace

the origin of military specifications and standards.

Military Specifications and Standards

Origin of MILSPECs

Specifications and standards are difficult to understand, much less reform. The first area to understand is the terminology. Industry uses the term "standards" in relation to both products and processes. In DoD, "specifications" are used to describe products, material items, or components, while "standards" describe methods, processes, or procedures (Office of the Under Secretary of Defense for Acquisition & Technology [OUSDA&T], 1994, p. 17). The origin of MILSPECs came from an attempt to guarantee product performance of military equipment. Any failure of this equipment under the stress of combat and in an often-harsh environment could cause a tremendous loss of military lives and defeat. History has provided some bitter experiences.

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In 1879, a column of 1,300 British soldiers was annihilated because their ammunition cases were screwed shut. In 1942, the German army's 48th Panzer Division found that only 42 of the 104 tanks en route to Stalingrad could be moved; mice had eaten the insulation off the electrical wiring of the other tanks. In the South Pacific in World War II, the U.S. supplies shipped to the area at enormous expense were corroded by fungus. Today, specifications ensure that ammunition boxes can be opened without tools, insulation is rodent proof, and fungus is not a threat (Van Opstal, 1994, p. 10).

Purpose of MILSPECs and MILSTDs

In the early 1990s, there were approximately 30,000 MILSPEC and MILSTD documents. These documents were viewed as the foundation for our superior military weapon systems (*Washington Technology*, 1992). A military specification describes the essential technical requirements for purchased material that are military-unique or are substantially modified commercial items, and a military standard establishes uniform engineering and technical requirements for military-unique or substantially modified commercial processes, procedures, practices, and methods (OUSDA&T, 1994, p. E-3). Military specifications and standards were created with a great deal of analysis and rationale. MIL-STD 961D, Appendix A, provides for the scope, purpose, requirements, and verification for military specifications. It also establishes the format and content guidelines for program-unique system, item, software, process, and material specifications. Its purpose is to establish uniform guidelines, define essential requirements, ensure verification methods for each requirement, and aid in the use and analysis of requirement content. Most important, it defines the analyses, modeling and simulations, demonstrations, and tests to be performed in order to ensure that the product, material, or process conforms to the essential requirements (OUSDA&T, Standardization Program Division, 1996).

Specifications and standards are not unique to military acquisitions. They are

used by quality manufacturers and suppliers around the world. For example, they ensure that plugs from different appliances fit into the same electrical outlet and that light bulbs fit into standard fixtures (OUSDA&T, 1994, p. 17). For the military, the rationale for specifications and standards is driven by the special requirement of fielding many advanced systems that have to perform under the stress of combat with critical logistical requirements. If any system breaks down in the field, such as an M–1 tank, the military wants to ensure that there are not five different versions of the spare part required to make the system operational again. Standardization is required for spare parts and the maintenance manuals to repair the systems. The lack of standardization would create a logistical problem that would get even larger if each Service were to stock different versions of the same component for each of their systems (OUSDA&T, 1994, p. 18). One of the key standardization issues for military weapon systems is interoperability and interchangeability.

The first question asked is whether a part is going to be repaired or replaced. If the part can be thrown away, then all that is required is a performance specification that defines the performance and interface requirements of the item. Under this situation, performance of the part within a larger system becomes the key requirement. But if the logistics plan calls for a part to be repaired in the field under battlefield conditions, the configuration of the parts must be identical for the stockpiling, maintenance, and training requirements to be effective. This would require a detailed, military-unique design specification (OUSDA&T, 1994, p. 18).

MILSPECs Pertaining to Electronics

Since a key part of acquisition reform was to improve the access to the commercial electronics market, it is important to understand the role of MILSPECs and MILSTDs in that market. When developing contract requirements, a number of issues need to be addressed. As mentioned above, logistical considerations need to be determined and specified. Other key requirements are the functionality and operating environment of the system. The contract requirement process flows down at the system level but its influence is at the parts level. Integrated circuits (IC) are a critical component for many of our military systems. Figure 1 describes the requirements process flow and the role MILSPECs play in IC part selection, design, and manufacture (LMI, 1996, pp. 2–10, 11). This process starts at the system or device level, with contract requirements outlining the functionality, operating environment, and logistic requirements of the system or device being procured.

> "Bounded discretion is caused by the sum total of all the bureaupathologies, which deflect energy and effort from those activities that really matter."

As Figure 1 shows, system performance directs the IC device requirements. As you go down the requirements process, there are a number of decisions that either direct particular parts from a military parts list or allow the contractor to choose to use a commercial part. Commercial ICs are frequently not used because of insufficient data supporting their capability of operating in the environment required for

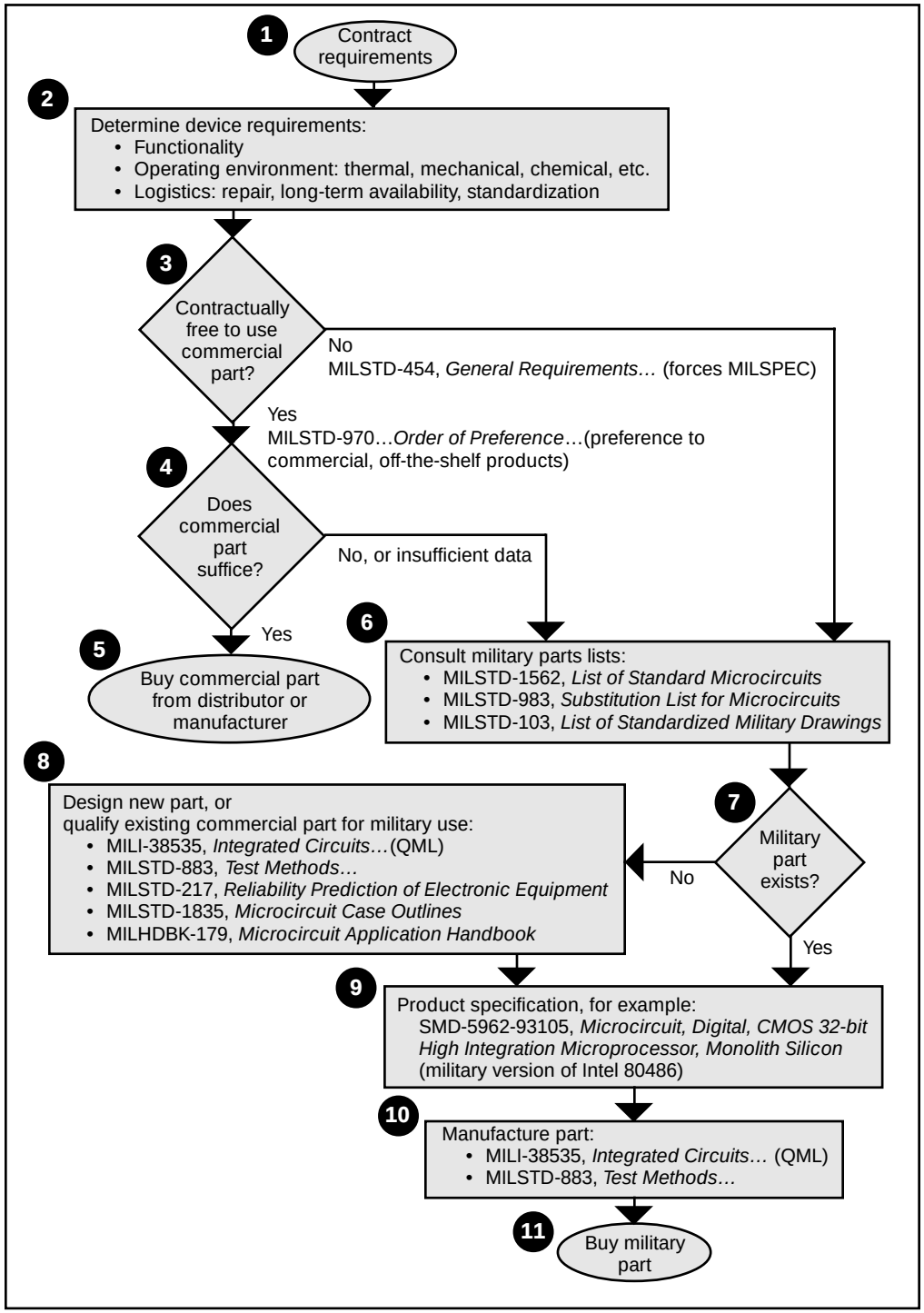

Figure 1. Role of Major MILSPECs in Integrated Circuits Part Selection, Design, and Manufacture

military use (LMI, 1996, pp. 2–10). Military parts lists serve the purpose of controlling the proliferation of parts in the military supply system and its inventory costs. Most important, it lists the parts that are qualified for use. This would include militarized versions of commercial ICs. If a military or commercial part does not exist, the contractor must design a new device or qualify an existing part. A number of MILSPECs may apply that would address the many performance requirements and the tests (electrical, thermal, chemical, and mechanical) that devices must pass (LMI, 1996, pp. 2–12).

Figure 1 demonstrates the benefits of MILSPECs and MILSTDs for most military acquisitions. Specifications and standards describe the performance requirements for a system and how the various components are incorporated into the larger system (form, fit, and function). However, during the 40 years since their inception, there have been increasing problems with the use and content of military specifications.

Problems with MILSPECs and MILSTDs

Discussion of the MILSPEC problem often confuses two issues. The first is the military's practice of using MILSPECs to buy clearly commercial items: dog combs, tacos, fruitcakes. Applying MILSPECs to these items creates several problems. DoD may have to pay for specialized manufacturing capability to produce an item at a higher price than its commercial counterpart. A specification for white gloves caused one manufacturer to set up a different assembly line with a unit cost of $32 per pair, while the same manufacturer sells nearly identical gloves commercially for $20. A related issue in this area is that needless specifications take away resources from the task of drafting, reviewing, and updating specifications for combat equipment. The second issue involves dual-use materials and components that the military buys. Unlike gloves, which can be bought off-the-shelf, these parts must be tailored for the application. MILSPECs and MILSTDs often make it impossible for commercial companies to do business with the DoD, even though they are technically capable of producing the item. In particular, when the specification tells the contractor how to make the product, the type of quality assurance program, and how to manage the program, it keeps world-class producers away from DoD business (Center for Strategic and International Studies [CSIS], 1993, p. 7).

The problem of MILSPECs and MILSTDs is not with the principle behind them but rather in the way the documents are written and applied, along with the lack of authority and control over the standardization process. In particular, military specifications create a problem when they:

- describe essentially nonmilitary items;
- reference obsolete products and processes;
- detail requirements relating to process rather than performance; and
- differ from common commercial practices and standards (CSIS, 1993, p. 9).

Even with well-established military specifications and standards, problems arise if they are not properly tailored to the system be acquired. Requirements are put on contracts that add cost without

value and unnecessarily differentiate commercial and military operations (OUSDA&T, 1994, p. 41).

Unnecessary requirements have found their way into DoD contracts for a number of reasons:

Established practices. Acquisition activities borrow from previous requirements documents, i.e., statements of work or technical specifications, on the assumption that what worked before will work again. This copying from one contract to another brings about inappropriate specifications and standards that have been canceled or are not cost-effective or necessary for this particular contract.

"Unnecessary requirements have found their way into DoD contracts for a number of reasons... "

Comfort level. Requirements are put on contracts out of fear of being accused of mismanagement if they were eliminated.

Excessive referencing. If properly applied, referencing of other specifications and standards can reduce length and complexity. However, there are many references that are inappropriate and excessive for the particular procurement on hand. Where commercial and military standards tend to differ is in the number and types of references. Sometimes this difference is 2 to 1.

Tiering. The referencing of MILSPECs and MILSTDs creates an enormous tiering in which one reference brings about another reference without regard to its need in a contract. This a particular problem during the production phase of a DoD acquisition.

Improper tailoring. MILSPECs and MILSTDs provide guidance on a variety of engineering matters depending on the requirement being procured. If the specification or standard is not properly tailored for a particular contract (a whole MILSPEC is called out instead a portion), more requirements than necessary are added, which drives up the cost and may make the item unnecessarily defense-unique (OUSDA&T, 1994, pp. 41–42).

Some feel that military and civilian technologies are inherently different. Military unique systems must push the envelope of performance and endure harsh battlefield environments. This has brought about a belief that has driven the need to have military specifications to ensure performance of military products. Critics of the "uniqueness position" believe that commercial products can be as rugged as those built to MILSPECs and MILSTDs (Office of Technology Assessment, 1989, p. 162). For example, during the Gulf War, many commercial electronic components, from semiconductors to global positioning systems, met or exceeded their military counterparts' performance at a significantly lower price (*Washington Technology*, 1992).

Commercial and Performance Specifications

What Is a Performance Specification?

As mentioned earlier, one of the keys to obtaining the latest in electronic technology at the lowest possible cost is through military-commercial market integration. To accomplish this, DoD must use performance specifications, when practicable, in specifying its requirements. The following is the definition of a performance specification from DoD Policy

memo 95-2A issued on March 10, 1995 (Bergmann, 1995):

> A performance specification states requirements in terms of the required results with criteria for verifying compliance, but without stating the methods for achieving the required results. A performance specification defines the functional requirements for the item, the environment in which it must operate, and interface and interchangeability characteristics.

A key aspect of a performance specification is that it describes the form, fit, and function of the required product. An example of this is the required size, weight, durability of an item. This allows the contractor to control the production baseline by giving the contractor detailed configuration management authority. By specifying functional requirements, the contractor has greater flexibility to incorporate the latest technology and manufacturing methods in the product (OUSDA&T, 1994, p. 21). This allows for a variety of design and manufacturing solutions that encourage more commercial companies to bid for the work, particularly at the subcontract level.

Aside from allowing greater access to more advanced technology, the use of performance specifications also provides a cost benefit. This comes from greater competition and the fact that commercial companies have already conducted the research and development, tooling, and equipment investment to provide their commercial product. DoD and its prime contractors can leverage on an existing capability for their requirement (OUSDA&T, 1994, p. 19). Another characteristic of performance specifications is that the contractor picks the test procedure that may offset some of the cost benefits with higher risks. This will be addressed later.

What Are Nongovernment Standards?

Standardization in the commercial arena is used for both technical and economic reasons. It simplifies the maintenance and repair of systems, ensures that systems are interoperable with other systems, and often lowers costs through quantity purchasing. In the commercial sector, companies get together to establish minimum performance requirements for their particular industry. There are national standards setting organizations, such as the American National Standards Institute, that set performance standards (i.e., quality and reliability) for the industry. There are international standards, such as the ISO 9000 series for quality assurance (OUSDA&T, 1994, p. 18). However, the initiative to merge the military and the commercial industrial base by encouraging the use of performance and commercial specifications doesn't come without concerns and potential problems.

> "Standardization in the commercial arena is used for both technical and economic reasons."

Shortcomings of Performance and Commercial Specifications

As shown above, MILSPECs were established for some very good reasons and their real purpose is to reduce combat risk. So it's important that we examine

the critical and unique aspects of our military systems and how performance specifications can be used. The first area is the environment that military systems operate under. The Air Force and contractors have expressed concerns over using commercial-grade electronic boards on fighter aircraft. People in this community find it acceptable to avoid MILSPECs for the C–130, C–17, or C–5A, where the environment is not harsh, but not for fighter aircraft (Baker, pp. 6–9). On the latest fighter development program, the F–22, there is some concern over the use of commercial specifications. For the F–22 and other military systems there is the harsh environment of heat, cold, and vibration, as well as the military-unique requirement for chemical, nuclear, and biological protection. Circuit boards built to commercial specifications may not survive or protect the system without special insulation that may create a money, schedule, and weight issue for the program (Costigan, 1997).

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Another area of concern is whether the contractor is capable of meeting the environmental or any other technical performance requirement in testing and evaluation. Performance specifications may require more testing and evaluation of parts and systems to demonstrate that they meet requirements (OUSDA&T, 1994, p. 19). However, a greater concern is whether or not commercial vendors will allow test information on their parts to be released. Some vendors of commercial hardware have succeeded in blocking the release of test results on equipment under the threat of lawsuits. A government organization, after carrying out testing of DC-DC converters, was deterred from publishing the results on the World Wide Web as the testers intended. This is a growing design issue with commercial parts. Another issue is the occasional need for more rigorous testing than commercial contractors typically perform. This testing and its results are required before a decision can be made between choosing commercial or MILSPEC parts (Dizard, 1996). When a MILSTD is not used, is there an appropriate nongovernment standard available?

One important part of this reform effort is the replacement of MILSTDs with nongovernment standards. In those situations when commercial companies use a military standardization document, there needs to be a suitable nongovernment standard (Bergmann, 1997). However, since the issuance of the Perry Memo, there have been wholesale cancellations of military standards, without suitable replacements, that serve a useful purpose. A particular concern was the cancellation of military documents that provide the essential information that defines as much as one-third of the parts used on most of the aircraft built. According to the Aerospace Industries Association (AIA), DoD is canceling documents that are the state-of-the-art in commercial practices. The burden then falls on industry to prepare new documents to replace the ones that are canceled (Mabone, 1996). As mentioned earlier, one of the purposes of specifications and standards, both in military and commercial acquisitions, is to help in the logistical support of a system.

Logistical support is probably one of the biggest concerns with the new emphasis on performance specifications, though personnel from the OSD Standardization Program Division believe this has been blown out of proportion (OUSDA&T SPD, 1995). There are those who remember the logistics and maintenance nightmare of programs such as the F–111. Because of this, it is important that supportability is built into the design. A concern exists that if military standards, such as MIL-STD-1388, Logistics Support Analysis, are not requirements on contracts, then proper supportability requirements will not be adequately explained in performance specifications (DiNicola, 1995).

Another characteristic of performance specification is that it leaves the parts or materials selection to the contractor. Concern then arises over whether the spare parts will meet the performance requirements. When addressing this and other logistical support concerns, the reply from the OSD Standardization Program Division is to "place the burden on the contractor" and "make it [logistical requirements] a performance requirement of the contract" (OUSDA&T SPD, 1995, p. 7). This statement does not relieve the concern that people have in this area.

Another important logistical concern with performance specifications is the interface requirement. It is important to know early in the development phase of a program what the support philosophy of the program will be. Then the interface requirements can be defined in the performance specifications. With electronics parts technology, where new designs may be produced every few years, a plan must be developed to handle new parts in the spare parts pipeline (Lightsey, 1996).

IMPLEMENTING MILSPEC REFORM

SERVICE IMPLEMENTATION

A key aspect of MILSPEC reform was to change the way the individual armed services established requirements, in particular specifications and standards, for their solicitations and contracts. The intent of the Perry Memo was to reverse the priority by which military and commercial specifications and standards were used in contract actions. This memo recognized that some MILSPECs and MILSTDs were unique and should be used. The use of military specifications and standards were authorized as a last result, with an appropriate waiver.

Waivers must be approved by the Milestone Decision Authority (MDA) as defined in DoD Instruction 5000.2 (Perry, 1994b). The MDA may be at the OSD level, for large programs designated acquisition category (ACAT)1D, or at the individual armed service level for programs that are not ACAT 1D. Whether the MDA is at the OSD or service level, the key decision point for deciding the use of MILSPECs is with the individual Services. This is because most program offices, which generate the requirement, reside within the Services and all acquisition decisions are either coordinated (thereby strongly influenced) or approved by the Services.

"It is important to know early in the development phase of a program what the support philosophy of the program will be."

One of the intents behind the Perry Memo was to eliminate a culture surrounding the use MILSPECs and

MILSTDs, without the thought of their purpose. However, a culture has developed within the Services that seems to encourage a complete ban of MILSPECs and MILSTDs without regard to their purpose or value. Within the Army, the unwritten rule for program managers was not to have any MILSPECs or MILSTDs if you wanted your program approved. Program managers wanting to use MILSPECs and MILSTDs, but also wanting their program to get through the approval process, resorted to writing MILSPECs and MILSTDs in full text without the "MILSPEC label" or putting MILSPECs and MILSTDs on solicitations and contracts for "guidance only" (Defense Systems Management College, 1993–1996). This became the chosen method of program managers throughout the acquisition system of getting a MILSPEC or MILSTD as a requirement and still getting the program through the approval process. This practice became a concern for the acquisition leadership within DoD and industry. It sent a confusing message to industry (what is the requirement?) and did not promote the cultural change regarding MILSPECs. MDAs were tasked to challenge those programs that excessively list MILSPECs for guidance only (OUSDA&T SPD, 1995, p. 13). The Air Force created requests for proposal (RFP) support teams whose job was to scrub RFPs and ensure that performance-based specifications were used in lieu of MILSPECs. However, many senior acquisition managers questioned the role of these support teams as "facilitators" or as another layer in the review process (Air Force Contracting Conference, 1996). With this senior leadership's emphasis towards performance specifications, what have individual programs done?

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Examples of MILSPEC Reform

A number of programs have really scrubbed their requirements. As Table 1 shows, they cover a variety of types of programs in various stages in the acquisition cycle (OUSDA&T, 1996, p. 3). The other Services have made similar efforts

Table 1.
Reduction of Requirements in Some Air Force Programs

Program	Specs and Standards
C–130 Periodic Depot Maintenance	From 200 MILSPECs & STDs to 5
Maintenance Skills Trainer	From 21 MILSPECs & STDs to 0
KC–135 Avionics Upgrade	No MILSPECs or STDs in RFP
Milstar Satellite Communications	From 110 MILSPECs & STDs to 43
Joint Direct Attack Munitions Development	No MILSPECs or STDs in RFP

in reducing the number MILSPECs in their solicitations and contracts.

The initial results of MILSPEC reform have been positive with greater access to commercial technology, improved performance, and more than $2 billion in anecdotal savings and cost avoidance (OUSDA&T, 1996, p. 19). However, not all of these savings can be attributed to removing MILSPECs. Other acquisition reform initiatives have also contributed to reduced program costs. One of these efforts is reducing the data requirements in contracts that makes up a significant amount of program costs. Another initiative that the Air Force is advocating is having statements of objectives vice statements of work, to get away from telling the contractor "how to" make a product or perform a service. The Services, with support from DoD, are reducing costs by promising contractors a stable production quantity through multiyear and other contract incentives. Additionally, DoD cannot lose sight of one of the main goals behind MILSPEC reform, which is easier access to state-of-art technology. This reform is not limited to the actions of program offices.

Document Infrastructure

An important part of MILSPEC reform will be to implement standardization document improvements. This is a challenging task for DoD, involving many documents and much preparation: the Services, Defense Logistics Agency, industry, and other government agencies all are involved. DoD intends to have a document infrastructure based on performance specifications and interface standards for weapon systems and military-unique items of supply; commercial item descriptions and nongovernment standards for commercial items and processes; and a library of guidance handbooks that contain lessons learned and offer known technical solutions (OUSDA&T, 1996, p. 10). This will be the key effort for an effective and permanent MILSPEC reform. With more than 30,000 MILSPECs and MILSTDs, and the many preparing activities, this will not be an easy task and will require an active central effort led by DoD.

The Standardization Program Division of the Acquisition Practices Directorate of OSD was tasked to lead this effort; one of its first steps was to establish a communication forum. A MILSPEC Reform Home page was established on the World Wide Web and was among the top 5 percent of the most frequently accessed home pages on the Internet. The Home page included policy and guidance memos, questions and answers on MILSPEC reform, status reports on the top 100 cost driver documents, lists of proposed canceled documents, lists of recently canceled documents, the *Standardization Newsletter*, and hot links to other related homepages (OUSDA&T, 1996, p. 11).

> "Another initiative that the Air Force is advocating is having statements of objectives vice statements of work, to get away from telling the contractor 'how to' make a product or perform a service."

While this has been a positive effort, there is still a more challenging task of standardizing the way the Services are handling the cancellation and waiver process of MILSPECs. Each Service is deciding which MILSPECs are allowed without a waiver and which ones cannot

be used at all. An example of this is with MILSTD–1388, Logistics Support Analysis, which is allowed by one Service but not another. This inconsistency will cause problems in joint programs where systems will be fielded by the individual Services and in contractor facilities where one contractor could have two specifications for a process or processes. This situation conflicts with the goal of MILSPEC reform (Delorie, 1996). Another important player in MILSPEC reform is industry.

Industry's Role

The first key aspect that industry played in this reform effort was the keeper of the nongovernment standards. An example of this was the Aerospace Industry Association (AIA). AIA's National Aerospace Standards has been a part of worldwide aerospace production since 1940. They define a large portion of the parts for commercial and tactical fighter aircraft. AIA has the largest collection of standards of any trade association and defines more national stock numbers than any other nongovernment agency (*AIA Newsletter*, 1996). Industry must have a continual dialog with DoD regarding the proper documentation to use as requirements for the acquisition of its weapon systems. As outlined above, it must complain when MILSPECs are canceled without a proper commercial replacement. During the solicitation process, it must recommend the use of MILSPECs when it would be the best way to acquire a system. As a united front, it must insist that test results of commercial parts or components are published to allow its use for military systems (*Military & Aerospace Electronics Newsletter*, 1996).

"DoD's MILSPEC reform appears to be achieving its stated objective: reducing acquisition costs, enabling greater access to state-of-the-art technology, and integrating the defense and commercial market places."

Where Do We Go from Here?

Benefits and Risks

DoD's MILSPEC reform appears to be achieving its stated objective: reducing acquisition costs, enabling greater access to state-of-the-art technology, and integrating the defense and commercial market places. The benefits will be more dramatic with electronics parts, as they make up a large part of our weapon system and their technology is growing at a rapid pace. However, the key word is "appears," because this initiative is still in its early stages. Only over time, as new systems that are using performance specifications instead of MILSPECs are fielded, will the effectiveness of this reform be measured. Perry's June 29, 1994, memo provided the proper framework for change within the acquisition community for both the government and industry. This change will encourage those developing requirements to use all the specifications available, from performance specifications to MILSPECs, in acquiring weapon systems. Emphasis on government specifications was turned around, with MILSPECs going from the preferred to the least preferred specification method. However, MILSPECs were not eliminated with the Perry Memo, but that is not the attitude that Service implementers had.

The way the Perry Memo was implemented by the Services has brought about some unnecessary risk to DoD's acquisition. By seeming to say "do not bring a MILSPEC in for a waiver," the senior leadership has forced program managers to abandon MILSPECs without the proper performance or reliability knowledge of appropriate performance or commercial specifications. It has also created a situation of gaming the approval process by putting MILSPECs on solicitations and contracts as guidance documents or in full text. Both practices confuse industry. The other risk is not having performance and reliability data on commercial parts in the harsh environment under which military weapons operate. With the freedom of design of performance requirements, it is more critical to have the right interface specifications on our complex weapon systems. To reduce this risk, there must be a continued emphasis on research, training, metrics, and flexibility regarding specifications.

RESEARCH

DoD and industry must continue their research on the performance and reliability of commercial parts. This includes testing under the harsh conditions that are standard for military systems and also the interface requirements of these parts into military systems. Industry must be willing to open up its test data to others to enable informed decisions to be made regarding contract requirements. This research will require funding by DoD in a time of declining budgets. DoD must be careful in not counting its savings from MILSPEC reform too early and set aside some funding for required research on commercial parts. Prime contractors must have incentives to conduct performance research and conduct tests on commercial parts to determine how they will interface with military systems. As critical as research is to the ultimate success of MILSPEC reform, the DoD must consider the critical area of training if it hopes to succeed.

TRAINING

With the implementation of MILSPEC reform, personnel who had to write requirements documents were left in a difficult situation. Many of these personnel, both in industry and DoD, were trained and had the experience of using MILSPECs in calling out requirements for an acquisition. As an instructor at the Defense Systems Management College, I saw that a number of my students were concerned did not feel that they had the experience to write performance specifications. Training must be accomplished using all available avenues: Internet, classroom, conferences, and video. The Standardization Program Office must be the centerpiece to ensure that adequate information is available for all personnel involved in developing requirements documentation. However, only through proper metrics will we know how effective the MILSPEC reform has been.

> "DoD and industry must continue their research on the performance and reliability of commercial parts."

METRICS

In the current acquisition reform environment, the only metrics that I am aware of are the counting of MILSPEC documents

and projected cost savings. This does not provide a measure of the effectiveness of utilizing performance and commercial specifications. A more appropriate measurement would be to compare the performance and reliability of the parts for systems acquired by using performance specifications instead of MILSPECs. Another metric that could be used to measure cost as a comparison is the total life cycle cost of a system. This would provide a measurement of how cost effective commercial parts are in not only in development and production, but the more important area of operational and support costs.

Flexibility of the Specification Used

In order to be both effective and efficient, the Services must follow the direction provided under the Perry Memo. The intent of MILSPEC reform was to put an emphasis on performance specifications over MILSPECs, not eliminating their use. However, the overzealous implementation practices of the Services has created an environment of eliminating MILSPECs completely. This practice has to stop before too many weapon systems are developed without the proper knowledge of the performance specifications being put on contracts. Specifications and standards are the most important part of weapon system development. Because they represent key technical decisions, specification decisions should be made by the program team. The program manager, who is responsible for the success of the program, should have the authority to make specification decisions with the approval of the Milestone Approval Authority. There should not be the sort of inflexibility (i.e., "do not bring us a program with MILSPECs") that currently characterizes the environment in the Services. The Perry Memo set the stage for acquisition reform. Now it must be properly managed through research, training, metrics, and flexibility in the type of specifications used to acquire effective weapon systems.

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