DMEA

Defense MicroElectronics Activity

DMSMS ACQUISITION GUIDELINES

Implementing Parts Obsolescence Management Contractual Requirements

Rev 3.0

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ARINC

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Implementing Parts Obsolescence Management
Contractual Requirements

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Prepared for

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ABSTRACT

These Diminishing Manufacturing Sources and Material Shortages (DMSMS) acquisition guidelines compile the ideas and comments expressed by experienced program managers over the past few years at a variety of forums, meetings, and conferences. This Acquisition Guidelines document for DMSMS provides the program manager and the integrated product team (IPT) with suggested contractual language that could be used to prepare a request for proposal (RFP) or to modify an existing contract to include cost effective DMSMS practices. This document is an adjunct to and its use is complementary with the *Resolution Cost Metrics for DMSMS, Program Managers Handbook - Common Practices to Mitigate the Risk of Obsolescence* – and the resolution guides referenced therein.

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ABBREVIATIONS AND ACRONYMS

AA	Acquisition Activity
AFMC	Air Force Materiel Command
AMC	Army Materiel Command
ASIC	Application Specific Integrated Circuit
BCA	Business Case Analysis
CAIV	Cost As an Independent Variable
C&TD	Concept and Technology Development
CPAF	Cost Plus Award Fee
CPFF	Cost Plus Fixed Fee
CPIF	Cost Plus Incentive Fee
COTS	Commercial Off The Shelf
CR	Cost Reimbursable
DAU	Defense Acquisition University
DFARS	Defense Federal Acquisition Regulation Supplement
DLA	Defense Logistics Agency
DMEA	Defense MicroElectronics Activity
DMS	Diminishing Manufacturing Sources
DMSMS	Diminishing Manufacturing Sources and Material Shortages
DoD	Department of Defense
DSCC	Defense Supply Center Columbus
ECP	Engineering Change Proposal
EDI	Electronic Data Interchange
EEIC	Expense Element Investment Code
EIA	Electronics Industries Alliance
EOL	End of Life
FFP	Firm Fixed Price
FMS	Foreign Military Sales
FPIF	Fixed Price Incentive Firm
FYDP	Five-Year Defense Plan

ABBREVIATIONS AND ACRONYMS (continued)

GAO	General Accounting Office
GFE	Government Furnished Equipment
GFI	Government Furnished Information
GIDEP	Government Industry Data Exchange Program
HW/SW	Hardware/Software
ICP	Inventory Control Point
ILS	Integrated Logistics Support
IOC	Initial Operating Capability
IPB	Illustrated Parts Breakdown
IPPD	Integrated Product and Process Development
IPT	Integrated Product Team
ISEA	In-Service Engineering Agent
ISSC	In-Service Support Contractor
JTIDS	Joint Tactical Information Distribution System
LOE	Level of Effort
LOT	Life of Type
LRU	Line Replaceable Unit
MPCAG	Military Parts Control Advisory Group
MSD	Material Support Division
MYB	Multi-Year Buy
NAVSEASYSCOM	Naval Sea Systems Command
NDI	Non Developmental Item
NSN	National Stock Number
O&S	Operations and Support
OEMs	Original Equipment Manufacturers
OSA	Open Systems Architecture
PBL	Performance Based Logistics
PBSA	Performance Based Services Acquisition
PCP	Parts Control Plan
PDD	Program Design Document
P&D	Production and Deployment
PEM	Program Element Monitor
PM	Program Manager

ABBREVIATIONS AND ACRONYMS (continued)

PMO	Program Management Office
PMP	Parts Management Plan
PO	System Program Office
POM	Program Objectives Memorandum (POM)
PSMP	Product Support Management Plan
RFP	Request For Proposal
RIW	Reliability Improvement Warranty
SCD	Source Control Drawing
SD&D	System Development and Demonstration
SDP	Software Development Plan
SLEP	Service Life Extension Program
SOO	Statement of Objectives
SOW	Statement of Work
SRA	Shop Replaceable Assembly
SRU	Shop Replaceable Unit
TDP	Technical Data Package
TO	Technical Order
TOC	Total Ownership Cost
TSPR	Total System Performance Responsibility
VHDL	VHSIC Hardware Description Language
VHSIC	Very High Speed Integrated Circuit
WRA	Weapons Replaceable Assembly

CONTENTS

Page

CONTENTS (continued)

Page

ILLUSTRATIONS

SECTION 1

INTRODUCTION

1.1 OVERVIEW

To minimize the impact of Diminishing Manufacturing Sources and Material Shortages (DMSMS), Department of Defense (DoD) agencies, organizations, and program offices must be able to incorporate timely and cost-effective engineering practices during development, production, and sustainment. To ensure the goal of least total ownership cost (TOC), the concept of DMSMS management must be accepted at the highest programmatic levels and ***contractually invoked*** during the system life cycle.

In May of 1999 DMEA developed cost metrics (ARINC 1999) for various DMSMS resolutions so that DoD programs could uniformly report cost avoidance and determine the cost benefit of implementing a DMSMS program. In May of 2000 the *Program Managers Handbook—Common Practices to Mitigate the Risk of Obsolescence* (ARINC 2000) for implementing a DMSMS program was introduced by DMEA. The *Program Managers Handbook* provides practical recommendations for program managers to consider when determining the level of DMSMS management requirements needed to minimize the impact of DMSMS. This Acquisition Guidelines document for DMSMS integrates the previous efforts by providing the program manager and the integrated product team (IPT) with suggested contractual language that could be used to prepare a request for proposal (RFP) or to modify an existing contract to include cost effective DMSMS practices.

This *DMSMS Acquisition Guidelines* document contains information for all experience levels of program managers. Section 2, DMSMS Familiarization, is particularly helpful to new program managers recently introduced to the problem of DMSMS. It should be read first before reviewing Section 3, Contractual Considerations for DMSMS. All program managers will find Section 3 of great benefit in reviewing elements that affect DMSMS acquisition strategies. Section 4 provides a summary of sample contractual language that could be used to implement risk mitigation techniques. Section 5 contains a list of references cited throughout the text. Appendix A contains the sample contractual language collected as a result of this effort.

1.2 SCOPE

The information provided in these Acquisition Guidelines pertains only to acquisition and sustainment of electronic components. Inclusion of nonelectronic and mechanical component acquisition guidance will be considered in future revisions of these guidelines. Figure 1-1 provides a roadmap on how to use this Acquisition Guidelines document.

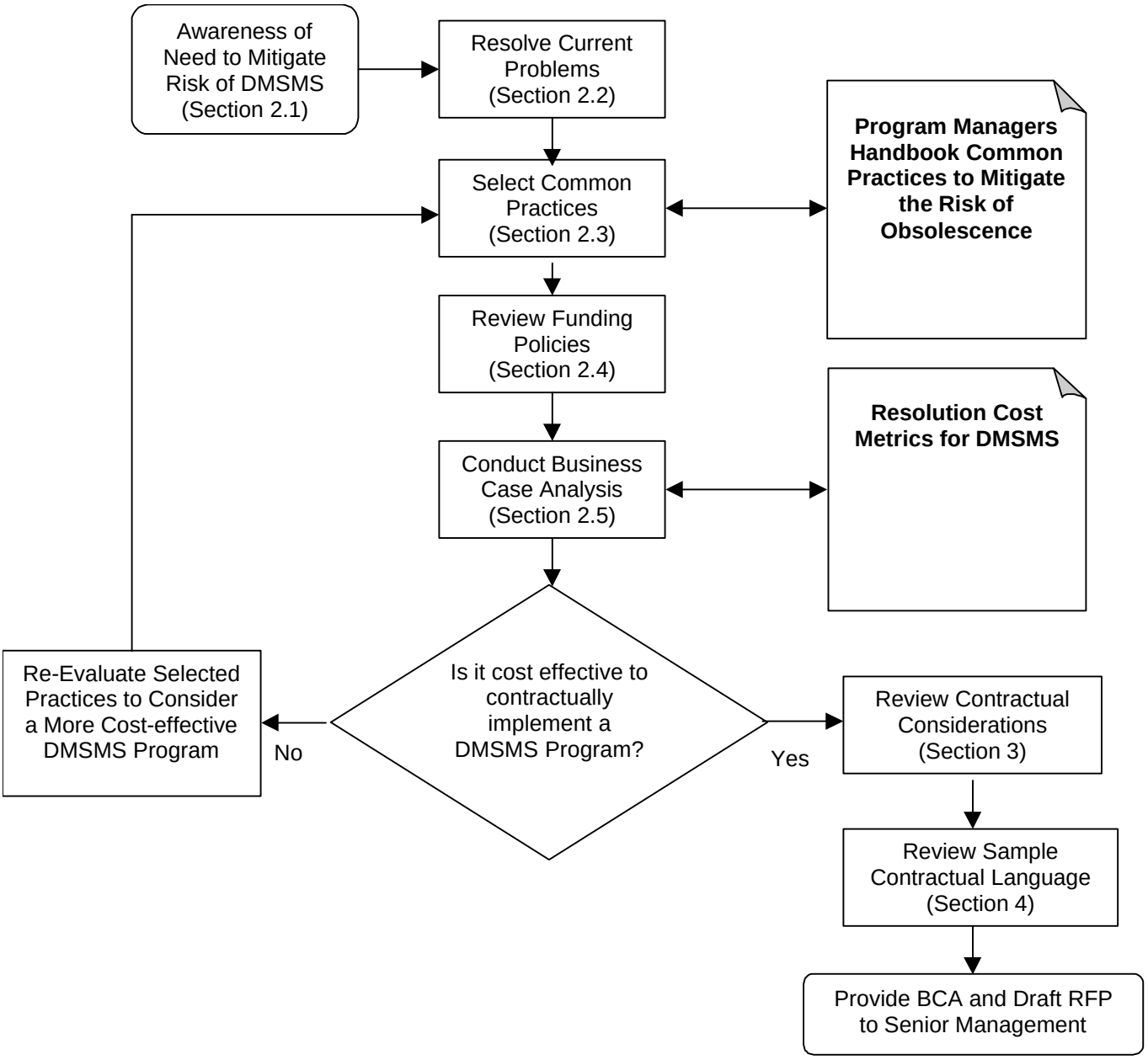


Figure 1-1. DMSMS Acquisition Guidelines Roadmap

Specifically, this Acquisition Guidelines document provides the following information:

- Summary of common DMSMS practices that mitigate the risk of DMSMS
- Sample cost benefit analyses from implementing risk mitigation strategies
- Effects on contract content (e.g., language, appropriateness) of the following:
  - Life-cycle phase
  - Contract type
  - Sole source or competitive contracts
  - Repair depot location
- Sample DMSMS contractual language

1.3 BACKGROUND

The need for contractually based obsolescence management has been indicated by attendees at various conferences during the past several years, including the October 1999 workshop sponsored by the Defense MicroElectronics Activity (DMEA) and the August 2000 workshop sponsored by DMEA, Naval Supply Systems Command, and Naval Sea Systems Command. The August 2000 DMSMS Conference of approximately 400 attendees overwhelmingly indicated that contractual language for acquisition documents is an important priority (DMEA 2000). A survey (DMEA 2001a) conducted by DMEA in spring 2001 also confirmed the need for contractual language.

Experienced program managers are indicating that it is necessary to provide guidance on how and when to incorporate obsolescence risk mitigation strategies into contracts. Many experienced program managers from both the Department of Defense (DoD) and industry shared their thoughts about contract language at the May 2001 Acquisition Guideline Workshop hosted by DMEA (DMEA 2001b). The minutes summarizing the thoughts from the workshop are provided on the DMEA web site at http://www.dmea.osd.mil/dod_workshop_2001_minutes.pdf.

As a result of these workshops and the data collection effort to prepare these Guidelines, useful contractual language has been obtained. However, the task is not over. Feedback on the use of these Guidelines is essential to ensure that the DoD is implementing guidance that can reduce the impact of obsolescence. To meet that goal, the DMEA website contains a comment form (http://www.dmea.osd.mil/AcquisitionGuidlines/comments), which is also provided at the end of this document. This form is to solicit information about improving these Guidelines.

SECTION 2

DMSMS FAMILIARIZATION

DoD Regulation 4140-R defines DMSMS as the loss or impending loss of manufacturers or suppliers of critical items and raw materials due to discontinuance of production (DoD 2001). This problem is particularly acute for electronic systems, but as shown in Figure 2-1, DMSMS affects nonelectronic systems as well.

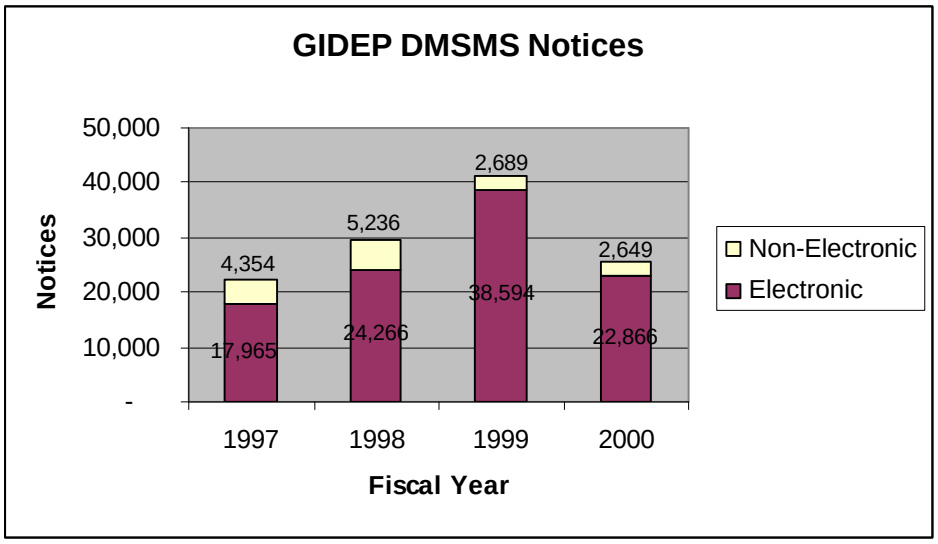


Figure 2-1. GIDEP DMSMS Notices

A U.S. General Accounting Office report (GAO 1995) summarizes the DMSMS concerns as follows:

> DoD has indicated that diminishing manufacturing sources is a major potential problem, particularly in the electronics and microcircuit areas. According to industry sources and DoD officials, because of rapidly changing technology in the electronics and microcircuit industry, decreasing demands due to the downsizing of DoD, and the emphasis on DoD using commercial-off-the-shelf

items, the private sector is increasingly more sensitive to its commercial customers rather than DoD. As a result, DoD expects the availability of DoD specification items to decrease and the number of DMSMS situations to increase. DoD officials have also asserted that DMSMS situations may affect the availability of parts to DoD in areas other than electronics and microcircuits.

DMSMS is a serious issue for the DoD, the airline community, and many commercial industries. Due to rapid advances in semiconductor technology, microelectronic component life cycles have been shortened from between 3 and 5 years to 18* months. The DoD acquisition life cycle is shown in Figure 2-2. The average system acquisition life cycle time (measured from program start to initial operating capability) is 132 months† (Spruill 2000). Semiconductor technology could change over seven times during this acquisition cycle which could cause significant risk that components selected during system development and demonstration might be obsolete before initial operating capability (IOC) or sooner.

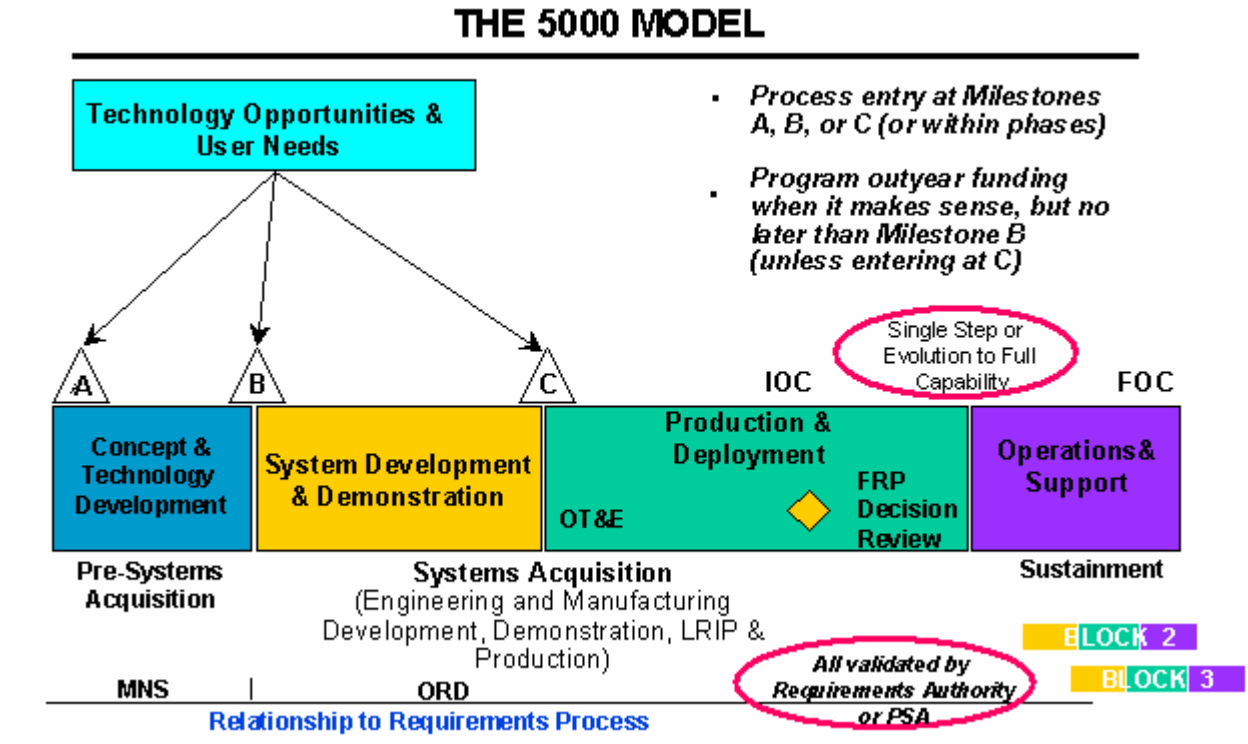


Figure 2-2. Defense Acquisition Management Framework (Source: DoD 2001b, Figure F1)

To minimize the risk of DMSMS during the acquisition cycle and through sustainment, programs must:

1. Obtain notification of their potential and current DMSMS problems.

* The 18 months is based on Moore's Law which states that the density of components (e.g., fabrication process minimum feature size measured in micrometers) doubles about every 18 months.
† The historical baseline is 132 months. The current DoD goal is to reduce this by 25% to 99 months.

2. Resolve their current DMSMS problems.

3. Implement risk mitigation techniques.

4. Understand funding sources needed for the implementation of the techniques.

The following subsections provide guidance for these four basic steps—the basis of a DMSMS program. Once this DMSMS familiarization is complete, program managers are prepared to review the contractual considerations in Section 3 and select the appropriate contract language contained in Section 4 that will implement the risk mitigation techniques.

2.1 PROBLEM NOTIFICATION

DMSMS discontinuance notices alert program managers that production is concluding for a specific part (i.e., the part is about to become unavailable). The notices usually contain part numbers, last order and shipment dates, minimum order quantities, and sometimes national stock numbers. To receive a problem notification, the program office must first know their parts and be working with the various organizations that can provide discontinuance notifications. Notifications of a DMSMS problem typically come from any or all of the following sources, depending on program phase:

- All program phases

  — Government Industry Data Exchange Program (GIDEP)
  — Part manufacturers
  — Original equipment manufacturers (OEMs)

- Sustainment only

  — Defense Supply Center Columbus (DSCC)
  — Government repair activities

Because of the numerous sources for notices, the potential exists for inaccurate, duplicate, or late arrival of notices to the cognizant program office. A notice may arrive at a program office as early as when a manufacturer begins to plan the discontinuance of a device or as late as years after a device has been discontinued.

2.1.1 Government Information Data Exchange Program

GIDEP has been designated as the central repository within the DoD for all discontinuance notices. GIDEP receives documented notices from parts manufacturers or GIDEP participants about parts or production lines that will be discontinued. After receipt of a notice, GIDEP prepares and distributes alerts through subscriber activities within the DoD and to member organizations in private industry. GIDEP alerts usually contain part numbers, last order and shipment dates, minimum order quantities, and national stock numbers. To become a GIDEP

subscriber, program offices contact the GIDEP Operations Center in Corona, California. Their Internet home page is http://www.gidep.org.

2.1.2 Defense Supply Center Columbus

DSCC is a procurement and supply activity for the Federal Government and is an inventory control point for material managed by the Defense Logistics Agency (DLA) in Ft. Belvoir, Virginia. DSCC provides discontinuance notices to program offices for electronic components and assists in identifying resolutions for DMSMS electronic devices. For life of type (LOT) buy purposes, DSCC assists calculating demand and reviewing alternatives. Program offices work with DSCC when programs are in the sustainment phase.

2.1.3 Government Repair Activities

Government repair activities may issue internal government alerts following "no bid" or "not available" responses to equipment or part procurement efforts during repair of systems during sustainment. In these cases, a technical referral is usually generated on a DLA Form 339, *Request for Engineering Support* and forwarded to an inventory control point (ICP), which may pass the information to an in-service engineering agent (ISEA) for further review and analysis. Contact with ICP and ISEA technical referral personnel may be necessary to obtain specific alert information from these organizations.

2.1.4 Part Manufacturers

Part manufacturers ***may*** notify the OEMs and the program offices via letter or phone if they are a ***known*** customer. They also notify GIDEP, DSCC, and commercial database subscription services that their parts are, or will soon be, discontinued. Many part manufacturers have web pages that provide details and suggestions for possible replacements on parts that they discontinue. Program offices access these sites periodically to obtain information about parts availability.

2.1.5 Original Equipment Manufacturers

OEMs send discontinuance notices when part manufacturers or government agencies are not direct purchasers of a part. For example, alerts may be originated by OEMs when a component manufacturing contract cannot be filled because a supplier has provided them a discontinuance notice on a part needed for a contracted component. Some OEMs also provide discontinuance notices on their web pages, which can be accessed periodically. To ensure receipt of OEM notifications, program offices usually insert appropriate requirements and clauses in system sustainment support and production contracts.

2.2 RESOLUTION OF PROBLEMS

Each of the services has published a resolution guide identifying not only suggested resolutions but also policy and procedures:

- Naval Sea Systems Command (NAVSEASYSCOM)—*Case Resolution Procedures Guide* (NAVSEASYSCOM undated)

- Air Force Materiel Command (AFMC)—*DMSMS Program Case Resolution Guide* (AFMC 1998)

- Army Materiel Command (AMC)—*DMSMS Case Resolution Guide* (AMC undated)

The DMSMS resolutions contained in these documents are well known and usually are applied to existing or newly arising problems. The guides also provide information about coordinating actions with key activities such as DLA, DSCC, and DMEA. The DoD DMSMS Working Group is reviewing the possibility of developing a common DoD guide with appendixes for each unique service.

To supplement the resolution guides, DMEA has published *DMSMS Resolution Cost Factors* (ARINC 1999) and the *Program Managers Handbook* (ARINC 2000) The resolution guides and these DMEA documents be can downloaded from the GIDEP web site (www.gidep.org) or DMEA web site (www.dmea.osd.mil)

2.3 RISK MITIGATION

Minimizing the impact of component (parts) obsolescence and technical obsolescence risk is the heart of the DMSMS concern. Risk management techniques have been addressed by AFMC (AFMC 2001), the DMEA (ARINC 2000), and the Electronics Industries Alliance (EIA) (EIA 2000). One way to plan for risk is noted in *DMSMS Program Case Resolution Guide* (AFMC 2001) as follows:

> An excellent approach to resolving DMSMS issues is to include a requirement in the Statement of Work. This way bidders can propose their approach to minimize the impact of obsolescence occurrences during the life of the system. The importance attached to this requirement must be reflected in the proposal evaluation criteria.

Section 4 of this Acquisition Guidelines document provides statement of work (SOW) language and evaluation criteria. Some approaches from the AFMC case resolution guide are the following: (AFMC 1998):

- Create an integrated product team including suppliers and end users (System Program Office DMSMS Management Activity)

- Incorporate availability guarantees in contracts

- Create early-warning databases that contain complete indentured configuration data
- Implement open systems architecture (OSA) interface standards
- Design for obsolescence using very high speed integrated circuit (VHSIC) hardware description language (VHDL) to describe components or systems in VHDL
- Plan for periodic replacement (i.e., technology insertion or technology refresh)
- Select parts relatively new into their life-cycles

The Program Managers Handbook (ARINC 2000) provides three intensity levels of common practices that include activities that could be implemented to mitigate the risk of DMSMS:

- Level 1—Practices are implemented to resolve current obsolete items. Some of these activities may be considered reactive.
- Level 2—Minimal required practices are needed to mitigate the risk of future obsolete items. The majority of these activitives are perceived as proactive.
- Level 3—Advanced practices are required to mitigate the risk of obsolescence when there is a high opportunity to enhance supportability or reduce total cost of ownership. These activities are proactive and may require additional program funding.

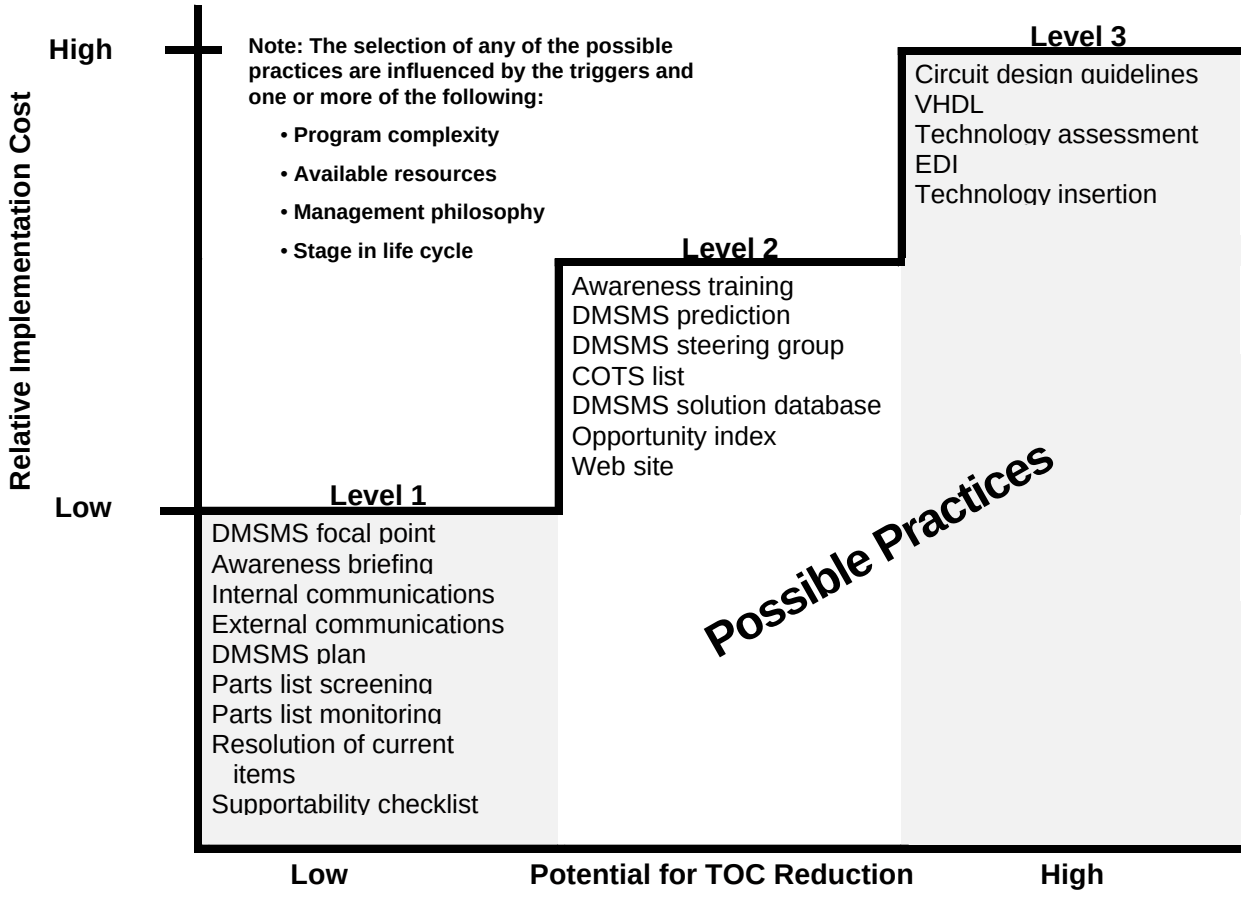
Selecting a practice is influenced by the resources available to manage DMSMS. The practices associated with these levels form the basis of a DMSMS program that can be implemented to mitigate the impact of DMSMS. Although an expense is associated with the implementation of a DMSMS program, cost avoidance can be realized from such a program. A list of the practices for each level is presented in Table 2-1. An event usually occurs that convinces the program manager that one or more practices need to be implemented. These events are called *triggers*.

Table 2-1. Common Practices

Level 1	Level 2	Level 3
DMSMS Focal Point Awareness Briefing Internal Communications External Communications DMSMS Plan Parts List Screening Parts List Monitoring Resolution of Current Items Supportability Checklist	Awareness Training DMSMS Prediction DMSMS Steering Group COTS List DMSMS Solution Database Opportunity Index Web Site	Circuit Design VHDL Technology Assessment Electronic Data Interchange (EDI) Technology Insertion

Business case analyses from the B-2, AEGIS, and Joint Stars programs have shown that the implementation of these practices can result in lowering the cost of resolving obsolescence

problems and reducing TOC. It is important to note that as more practices are selected, the potential for reduction of TOC increases. The relative implementation cost versus potential for TOC reduction, along with a summary of the possible triggers, is shown in Figure 2-3.



Possible Triggers		
Level 1	**Level 2**	**Level 3**
Initial DMSMS awareness by program manager (PM) <10% of parts unsupportable <10 years remaining in system life cycle	Increased awareness from PM 10–20% of parts unsupportable 10–20 years remaining in system life cycle	Higher management (above PM) awareness of supportability problems >20% of parts unsupportable >20 years remaining in system life cycle Opportunity to enhance supportability or reduce total cost of ownership

Figure 2-3. Stepping Up to Minimize the Risk of Parts Obsolescence (ARINC 2000)

The EIA bulletin GEB1 (EIA 2000) describes methods that can be applied during system design to minimize the impact of future component obsolescence issues. These methods include:

- Technology Independence—use modular systems and VHDL modeling

- Software Portability—compile software independent of the target
- Technology Road Mapping—conduct market surveys to stay abreast of technology advances
- Technology Insertion—introduce new technology into a design
- Planned System Upgrade—bring the design up to date at defined intervals
- Life Cycle Analysis/DMSMS Monitoring—review current parts lists for discontinuance.
- Part Selection Guidelines—select components early in their life cycle
- Part Description—implement a database to collect, store, and retrieve data

DoD program managers and industry have been implementing programs and developing techniques and tools to actively manage DMSMS for more than 10 years. Although implementing a DMSMS program requires some cost, far greater cost avoidance can be realized when program managers select the risk mitigation techniques needed to minimize the impact of obsolescence. Program complexity, available resources, management philosophy, and the stage in the system's life cycle together influence the decision in choosing any of the techniques.

2.4 FUNDING POLICY - TYPES AND CONTRAINTS

Funding will be required to resolve obsolescence problems and implement risk mitigation techniques. Rigid "color of money" rules established by congress limit the options available to program managers. Specifically, Title 31 United States Code (U.S.C.), Section 628, states that funds appropriated by Congress must be applied only to the purposes authorized for the appropriation. The types of funding generally available for use in each life cycle phase are:

- Development phase—Research, Development, Test and Evaluation (RDT&E) appropriations fund the efforts performed by contractors and government activities required for the research and development of equipment, material, computer application software, and its test and evaluation to include initial operational test and evaluation and live fire test and evaluation. RDT&E also funds the operation of dedicated research and development (R&D) installations activities for the conduct of R&D programs
- Production phase—Procurement appropriations fund those acquisition programs that have been approved for production (to include low rate initial production (LRIP) of acquisition objective quantities), and all costs integral and necessary to deliver a useful end item intended for operational use or inventory upon delivery.
- Sustainment phase—Operations and Maintenance (O&M) appropriations fund expenses such as civilian salaries, travel, minor construction projects, operating military forces, training and education, depot maintenance, stock funds, and base operations support.

Although the areas between these phases sometimes overlap or are blurred, funds appropriated for one budget category cannot be used to solve a problem with another. For example procurement funds cannot be used to research a solution for obsolescence. The report *Aging Avionics in Military Aircraft* (NAS 2001) summarized the legal constraints established by Congress that impact the funds available to address the aging avionics [obsolescence] problem:

- Project requirements of a specific fiscal year must be funded only with appropriations enacted for obligation in that fiscal year.

- The purpose of the expenditure must be authorized in the appropriation.

- Amounts appropriated for general or specific purposes may not be exceeded even if changing priorities dictate otherwise.

Constraints within budget categories also impact DMSMS risk mitigation techniques. For example the B-2 program reported that rules associated with O&M material support division (MSD) stock funds create roadblocks in resolving DMSMS problems, specifically (Shaw 1999):

> MSD Buy/Repair dollars are required (per OC-ALC/JA) for multi-year buys (MYBs). MSD dollars can only be used for parts whose national stock numbers (NSNs) are known. In the Program Objectives Memorandum (POM) cycle, when we are trying to estimate funds required for expected MYBs, we only know the current obsolete NSNs and the currently available replacements. Some of the current replacements will themselves be obsolete when the earmarked funds are available several years in the future. This becomes a repetitive cycle in which the program is exposed (at high risk) to serious supportability impacts.
>
> A similar problem exists for MSD engineering dollars needed to validate recommended solutions. These scarce funds also require the identification of specific NSNs (which are not known during the POM cycle as explained above). These "known unknown"needs also expose the program to high risk.

If funding is not available resolve current DMSMS problems or implement risk mitigation strategies, program managers must be willing to petition their program element monitor (PEM) or other higher acquisition authorities for the necessary funding. The program manager and PEM must work together to input DMSMS requirements into the Five-Year Defense Plan (FYDP), taking into consideration the program phase, as well as the color and type of money required. Program managers should be aware of these funding policy constraints and that various color of money categories may be required to completely resolve a DMSMS problem.

2.5 BUSINESS CASE ANALYSIS

Business case analysis (BCA) determines if a return on investment can be made if DMSMS risk mitigation practices are contractually implemented. Three methods to evaluate the BCA can be considered:

1. Identification of the most cost effective practices—practices that have the highest ratio of TOC reduction potential versus implementation cost.

2. Calculation of cost avoidance using a simplified approach—DMEA cost avoidance methodology.

3. Comparison of proactive versus reactive approaches to DMSMS—B-2 Business Case Analysis.

The completion of any of the three methods could be used to justify the costs of contractually implementing a DMSMS program.

2.5.1 TOC Reduction Analysis

The most cost-effective practices are those practices that have a low cost to implement and a high TOC reduction potential. The program manager and IPT should obtain an implementation cost estimate for each mitigation practice. If the potential TOC reduction for the specific practice can be estimated, the ratio between TOC reduction and implementation cost should be calculated. In addition to the guidance provided in the Program Managers Handbook (ARINC 2000), there are generally three discriminators to evaluate which practices to select:

1. Rank the practices by the TOC reduction to implementation cost ratio
2. Rank the practices by the implementation cost if a ratio cannot be determined
3. Identify the implementation time and ease of completion

The practices that are selected form the basis of the DMSMS program. Program managers should then monitor their DMSMS program costs because conceptually, the cumulative costs typically follow one of the two scenarios shown in Figure 2-4. Level 1, 2, and 3 practices* should be

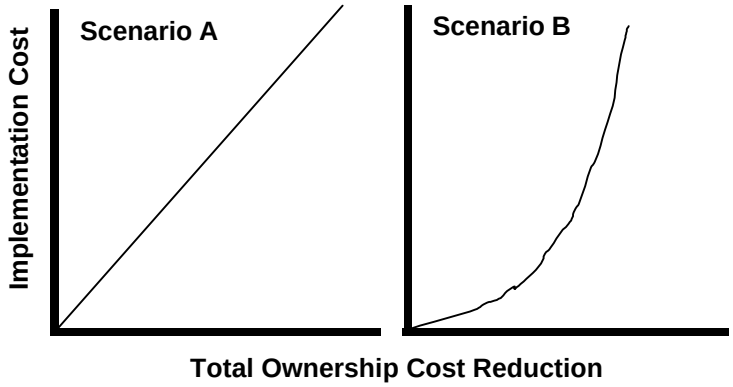


Figure 2-4. Conceptual DMSMS Program Cost versus TOC Reduction

* The program manager and IPT should also consider risk mitigation techniques described in the AFMC Case Resolution Guide and EIA Bulletin GEB1.

implemented for programs that follow Scenario A. If programs follow Scenario B, careful consideration should be given before practices are implemented, specifically:

- Evaluate practices based on best TOC to implementation cost ratio
- Evaluate time to implement and ease of completion
- Implement easy to complete practices

Although it is difficult to ascertain the TOC reduction specific to each practice, experienced program managers have found that if their programs implement many or all of the level 1 and level 2 practices, a return on investment can be obtained.

2.5.2 DMEA Cost Avoidance Methodology

The DMEA cost avoidance methodology ranks each resolution from lowest cost to highest cost (ARINC 2001). Cost avoidance is determined by subtracting the cost of a resolution (Table 2-2) from that of the next-higher-cost resolution. Table 2-3 lists the resulting average values.

Table 2-2. Average NRE Resolution Cost Metrics (BY1999)

Resolution	Average
Existing Stock	$ 0
Reclamation	1,884
Alternate	6,384
Substitute	18,111
LOT Buy*	43,684
Aftermarket	47,360
Emulation	68,012
Redesign—Minor	111,034
Redesign—Major	410,152

Table 2-3. DMEA Cost Avoidance Values

Resolution	Average
Existing Stock	$ 1,884
Reclamation	4,500
Alternate	11,727
Substitute	29,249
LOT Buy	3,676
Aftermarket	20,652
Emulation	43,022
Redesign—Minor	299,118
Redesign—Major	0

* LOT Buy data was based on a MIL-SPEC integrated circuit with an estimated unit cost of $40.00

ARINC analyzed resolution data from the Joint Tactical Information Distribution System (JTIDS) program from 1997 - 1999. The data provide the number of times a resolution was used for a total of 181 obsolete parts. Using the average cost avoidance values from Table 2-3 and the JTIDS data, we determined the data summarized in Table 2-4. To determine estimated cost avoidance resulting from a DMSMS program for JTIDS, we subtracted the cost of the DMSMS program from the total value of $2,553,725. If the DMSMS program cost were $100,000 per year for three years, the resultant cost avoidance for this example would be $2,253,725. There are two situations in which adjustments to the cost avoidance calculation would be required:

- In some instances, the next-higher-cost resolution may not be technically feasible; for example, emulation may not be a viable alternative for a complex ASIC.

- A redesign may resolve DMSMS problems for more than one (often five) components at once.

Table 2-4. Cost Avoidance Estimate for JTIDS Using DMEA Methodology – BY1999

Resolution	Probability of Occurrence (%)	Number of Occurrences	Average Delta	Cost Avoidance
Existing Stock	4.5	8	1,884	15,345
Reclamation	0.0	0	4,500	0
Alternate	68.0	123	11,727	1,443,324
Substitute	7.0	13	25,573	324,009
LOT Buy	12.0	22	3,676	79,837
Aftermarket	5.0	9	20,652	186,898
Emulation	3.0	5	43,022	233,610
Redesign—Minor	0.5	1	299,118	270,702
Redesign—Major	0.0	0	0	0
Total	100.0	181		$2,553,725

2.5.3 B-2 Business Case Analysis

The Air Force B-2 Program released this BCA as a Command wide best practice on the DoD Acquisition Deskbook (www.deskbook.osd.mil). The B-2 BCA determined the costs associated with the reactive versus proactive approach to resolving DMSMS problems. The overall objective evaluates the economic effectiveness of the B-2 (Proactive) Diminishing Manufacturing Sources and Material Shortages (DMSMS) Management Program.

The key assumptions and data sources are:

- Without a Proactive program, the B-2 would react to problems identified in the repair process

- Time frame is from 1997 (point of decision) through 2008 (ten years forward from 1999)

- Sunk cost for DMSMS projects in 1997 through 1999 are the same for both approaches

- Obsolescence predictions are derived (extrapolated) from TACTRAC data
- Resolution cost data from a DMEA Cost Metrics Report (DMEA 1999)
- B-2 flying hours per year; B-2 D041 Demand Rates; OMB discount rate = 2.7%

With the assumptions noted above, the following methodology is used:

- Compute the expected cost streams from Reactive and Proactive Approaches
- Categorize costs as investment or sustaining, determine benefit (cost avoidance)
- Apply standard economic metrics such as return on investment
- Apply sensitivity analysis to the input variables (Flying Hours and Resolution Cost)

The economic and value analysis results of the proactive compared to the reactive approach to DMSMS is shown in Table 2-5

Table 2-5. Economic and Value Analysis (Dillahunty 2000)

Item	Reactive	Proactive
Investment Cost (CY 00 $M)	N/A	$47.3
Sustainment Costs (CY 00 $M)	$426.0	$93.0
Total Cost (CY 00 $M)	$426.0	$140.4
Total Cost (PV 00 $M)	$369.3	$130.2
Break Even Point (from FY 97)	N/A	6 Years
Benefit-to-Cost Ratio	N/A	7.0
Return on Investment	N/A	6.0
Net Value (CY 00 $M)	N/A	$285.5
Net Present Value (PV 00 $M)	N/A	$239.1
Estimated Annual Savings/Avoidance (CY 00 $M)	N/A	$23.8
Estimated Annual Savings/Avoidance (PV 00 $M)	N/A	$19.9

Based on the data presented in Table 2-5, it can be concluded that with a 6 to 1 return on investment it is cost effective to contractually implement the B-2 DMSMS Management Program.

SECTION 3

CONTRACTUAL CONSIDERATIONS

Before implementing the contractual language provided in Section 4 of this document, program managers need to understand the overall acquisition process defined by the 5000 series documents, and how their elements may affect DMSMS. Five areas have been identified by DMEA to consider before implementing DMSMS contractual language:

- Acquisition Process
- Life-cycle phase
- Contract type
- Competition or sole source
- Depot repair location

Program managers who contributed contractual language, panel members from the acquisition guidelines workshop, and the DoD 5000 series documents provided guidance for these five areas. These considerations are synopsized beginning in Section 3.2 of this document.

3.1 ACQUISITION PROCESS

The first step for the program manager is to understand how the 5000 series documents address DMSMS. The program manager should be familiar with the following 5000 series documents:

- *The Defense Acquisition System* DoD Directive, (DoDD) 5000.1 (DoD 2001a)
- *Operation of the Defense Acquisition System,* DoD Instruction (DoDI) 5000.2 (DoD 2001b)

- *Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs.* DoD Regulation 5000.2-R (DoD 2001c)

These documents, updated in 2001, describe the acquisition process as a series of activities, logical phases, and work efforts separated by major decision points called milestones. The functional areas within the acquisition process that should be understood for DMSMS risk mitigation include:

- Acquisition Policy
- Program Management and Leadership
- Contract Management
- Funds Management
- Systems Engineering
- Manufacturing and Production
- Logistics Management

A pictorial roadmap and summary of the functional activities stated within the updated DoD 5000 series documents is provided in Defense Acquisition Management Framework Chart available from the Defense Acquisition University (DAU) Press Web Site at http://www.dau.mil/pubs/pdf/pmpdf01/hel%2Dmj.pdf (DAU 2001). The chart is not a substitute for the 5000 series documents, but it provides basic information needed to help the program manager and IPT understand the Defense Systems Acquisition Life Cycle process.

3.2 LIFE-CYCLE PHASE

The Defense Systems Acquisition Life Cycle is defined in DoD 5000 series documents (DoD 2001a, b, c). The activities, phases, and work efforts of the Defense Systems Acquisition Life Cycle are shown in Table 3-1. These Acquisition Guidelines identify sample language

Table 3-1. Defense Systems Acquisition Life Cycle

Activities	Phases	Work Efforts
Pre-Systems Acquisition	**Conceptual** Concept and Technology Development (C&TD)	Concept Exploration
		Component Advanced Development
Systems Acquisition	**Development** System Development and Demonstration (SD&D)	System Integration
		System Demonstration
	Production Production and Deployment (P&D)	Low-Rate Initial Production
		Full-Rate Production and Deployment
Sustainment	**Sustainment** Operations and Support (O&S)	Sustainment
		Disposal

appropriate for the four phases shown (shaded).

3.2.1 Conceptual Phase

Conceptual phase language should focus on providing the incentive to use DMSMS risk mitigation techniques such as VHDL modeling and OSA.

During the conceptual phase, as an integral part of the acquisition strategy, the provisional program management office (PMO) determines the supportability strategy. Items to consider are readiness and total ownership cost objectives along with performance based logistics. Performance based logistics consists of defining output performance parameters to ensure system ready capability, assignment of responsibilities with incentives for attainment of the goals associated with the performance parameters, and overall life cycle management of system reliability, sustainment, and total ownership cost. It is during the conceptual phase where many of the Level 3 practices (e.g., VHDL, OSA, EDI) would be most cost effective to implement and should be considered to reduce the future risk of DMSMS.

The conceptual phase also provides the opportunity to release draft RFPs to obtain feedback on proposed DMSMS contractual language that would be used for subsequent phases. For example, during production, and sustainment, the AN/ARC-210(V) radio program, which provides the contractor with complete configuration control, implemented a reliability improvement warranty (RIW) to reduce parts obsolescence and infuse technology changes without ECPs.

Prior to exiting the conceptual phase, the Program Manager (PM) and PMO should develop a product support management plan (PSMP). The PSMP provides integrated acquisition and logistics support strategy that will be used throughout the systems life cycle. As shown on the Defense Acquisition Management Framework Chart (DAU 2001), the plan is updated during development as the systems engineering and supportability analysis process evolves with two primary goals:

- Influence the product design for supportability
- Design and develop a support system

3.2.2 Development Phase

To facilitate the successful implementation of these two goals, development phase language should address the risk mitigation techniques described in Section 2.3.

The majority consensus as indicated in the Acquisition Guidelines Survey (DMEA 2001a) recommends that during development, DMS requirements should be included in the RFP[*]. Whether the requirement is a preliminary obsolescence management plan, or a more detailed process, the RFP must include a DMS requirement for contractors to bid against. If there is no DMS requirement, the contractors may focus on keeping their costs down so they can win. The

[*] The others believe that specific practices that reduce the risk of obsolescence should not be specified in a contract—they prefer to suggest practices as a discriminator during source selections.

proposal's management section should show the contractor's DMS experience. For example, "Here is our experience working with DMEA, IPTs, DoD DMSMS Teaming Group (ARINC 1998), for the past x years …". As a minimum, development phase RFPs should include the requirement for a contractor parts management plan (PMP). In conjunction with the award of the development contract, the PM establishes an integrated product team. The PMP should have the mechanism to provide a list of DMSMS problem parts to the IPT. For development contracts, especially cost plus type contracts, the IPT should participate in the DoD DMSMS Teaming Group to resolve the problem parts list and reduce the associated resolution costs. If not specified by the contract, contractor participation in the DoD Teaming Group is left to the discretion of the contractor.

As required by Title 10USC2440, an Industrial Capability Assessment must be completed by the PMO at each milestone to determine industrial capability to design, develop, ***produce***, and ***support*** the system. Stronger adherence to this legal requirement focussing on ***supporting the system,*** especially during the transition from development to production, may help reduce the risk of DMSMS. An industrial capability analysis includes the following elements:

- New and unique capabilities that must be developed or used to meet program needs. Identify DoD investments needed to create new industrial capabilities. This includes any new capability (e.g. skills, facilities, equipment, etc.).

  Identify new manufacturing processes or tooling required for new technology. Funding profiles must provide for up-front development of manufacturing process/tooling and verification that new components can be produced at production rates and target unit costs.

  Identify exceptions to FAR Part 45, which requires contractors to provide all property (equipment, etc.) necessary to perform the contract.

- Program context in overall prime system and major subsystem-level industry sector and market.

- ***Strategies to address any suppliers considered to be vulnerable***.

- Risks of industry being unable to provide new program performance capabilities at planned cost and schedule.

- Alterations in program requirements or acquisition procedures that would allow increased use of non-developmental or commercial capabilities.

- ***Strategies to deal with product or component obsolescence***, given DoD planned acquisition schedule and product life.

- The overall manufacturing plan and management program should be reviewed for shortfalls in accordance with the guidelines discussed in the Manufacturing and Production Section.

Industrial capabilities encompass technical capabilities: technologies, processes, skills, facilities, equipment and tooling needed to design, develop, manufacture, repair or support DoD products. If the analysis indicates that certain microelectronic components may be at risk for long term supportability the IPT should coordinate the information with DLA/DSCC or DMEA through its Flexible Foundry™ program.

DMEA's Flexible Foundry™ supports obsolete 5-volt semiconductors that the commercial industry has abandoned in the pursuit of newer lower-voltage technologies. The program was implemented after the commercial semiconductor industry made the understandable and justifiable business decision to no longer produce parts for the low-volume, long-product-cycle military market. The Flexible Foundry™ solves this problem by licensing and fabricating proven industry microelectronics processes. The flexible foundry provides a diverse mix of functions ranging from personalization of device and gate arrays to full custom fabrication of application specific integrated circuits (ASICs).

3.2.3 Production Phase

With requirements specified in the development phase contract, the supportability of the system demonstrated, and the product support management plan validated, production contracts can be developed. The focus of contractual language during the production phase is similar to the development phase with increased emphasis on component monitoring.

An example of what can occur during the production phase follows. In 1998 an assembly in the F-16 aircraft had DMS problems (DMEA 2001b). Foreign Military Sales (FMS) customers were very concerned, because FMS customers are often placed low on the requisition priority list. The FMS customers pushed for redesign with intent to design out DMS. The contractor did not screen parts used in the redesign. Before production, the contractor notified the government that there were DMS problems and that the assemblies could not be manufactured.

In addition to monitoring, implementation of the most cost-effective resolutions is also important during the production phase. During the production phase, there may be additional costs for redesign and engineering change proposals (ECPs) due to obsolescence. If it is a fixed priced contract, the contractor knows this is their responsibility, and will seek the most cost-effective solution. If it is a cost plus type contract then incentives should be provided to encourage contractors to implement resolutions that will reduce total ownership cost.

When starting production, if commercial off the shelf (COTS) hardware was used in development, the COTS supplier often has moved on to the next generation of that product family. The prime contractor is in the position where his product meets the requirements, but product design is not producible or supportable. Where does the responsibility lie? How is the production stage completed? Panel members at the May 2001 Workshop offered the following solutions:

- Increase strategic alliances and encourage licensed aftermarket

- Use common software and interfaces and aftermarket
- Plan for technology insertion and refresh during development
- Implement performance-based acquisitions.

Each of the solutions could be specified in contractual language. As stated by one participant:

> If you have gone through development the contract is basically over. You have defined your configuration, and you are going into production; then you must allow for configuration changes. The production contract must allow for changes to configuration for resolution of DMS impacts. Plan ahead and predict during the conceptual and development phases. Define the technology and plan for periodic change-out. To minimize lack of foresight, you need to define technology insertion refresh points and plan during design. There is also a need to sustain equipment even after production. COTS users should try to standardize interfaces and look at backward capability. The best approach is a flexible design to be able to handle change-outs throughout the life cycle, and this flexible design should be defined during development.

3.2.4 Sustainment Phase

During production, the contractor often does not address the sustainment phase. The contractual language is similar to production but with increased emphasis on ensuring that TOC can be reduced. One participant's comment (DMEA 2001b) is as follows:

> The F-22 seven-year development program had many DMS issues. I would not like to have certain DMS requirements mandated; however, the SOO should include DMS requirements. If it is not in the contract, it is likely that it won't get done. From the business side, we are responsible to the shareholders to make a profit. They may ask why are you spending $750K a year on DMS management when it is not part of the contract?

Others made the following comments:

- DMS has to be in the beginning of every contract. All designers have to take into account DMS, and show what they are doing to make the design DMS-resistant. We are putting that in contract language to all of our suppliers.
- Industry needs something to keep the playing field equal. There have to be words in the RFP such as, "Here is how DMS will be evaluated." For competitive contracts, DMS words are needed in the RFP. Existing contracts should require DMS collaboration as part of an IPT.

Language for sustainment, especially legacy systems, is the most difficult area to address due to current FAR Part 16, as stated at the workshop:

> The FAR says we can have a contract for five years and in some cases ten years. What happens when your five-year support contract runs out and you have to re-compete it, or renegotiate it? We have a tendency to focus on short-term issues, and try to get well next time we compete the contract. We may get a good deal for the first few years of a contract, but we need to look at the whole life cycle.

The best sustainment contracts for new acquisitions should address sustainment issues during design and development. Contractors should challenge their designers to plan for sustainment and the Government PM should provide incentives for contractors that can demonstrate that sustainment was addressed.

Service life extension programs would use the same guidance and language recommended for the sustainment phase, with additional emphasis on depot repair considerations.

3.3 CONTRACT TYPE

For DoD system acquisitions[*] there are basically two types of contracts, fixed price and cost reimbursable. Fixed price contracts are where the government pays a price that is subject to specified provisions, and the contractor delivers a product or service. Fixed price contracts may provide for payment of incentives or other sharing arrangements. Cost reimbursable contracts are where the government pays the cost (subject to limitations) and the contractor provides their best efforts to complete the tasks. Cost reimbursable contracts may provide for payment of a fee that may consist of an award fee, incentive fee, or fixed fee. Contract types by phase are provided in Table 3-2 summarized from the Acquisition Framework Chart (DAU 2001). Detailed information can be found in FAR Part 16.

The 5000-series documents provide guidance related to contract types and incentives (DoD 2001a, b, c). This same guidance is applicable for these DMSMS guidelines and are reproduced here as follows:

> Acquisitions shall be structured in such a way that undue risk (such as through the use of firm fixed price options that cover more than five years) is not imposed on contractors, and so that excessive contractor investment (beyond normal investments for plant, equipment, etc.) is not required. Contractors are entitled to earn reasonable rewards on DoD contracts, including competitively awarded contracts. If competition is not available, PMs shall devise incentives to motivate contractors in a way that will yield the benefits of competition. These benefits include innovation, improved product quality and performance, increased efficiency, and lower costs.
>
> Management incentives shall apply to both Government and industry, to both individuals and teams, to achieve cost as an independent variable (CAIV) and schedule objectives. Incentives shall stress up-front investments to minimize production cost, operating and support cost, and/or cycle time, where applicable. Awards programs (both monetary and non-monetary) and "shared savings" programs shall creatively encourage the generation of cost-and-schedule-saving ideas throughout all phases of the life cycle.

[*] These guidelines do not address time and material type service contracts.

Table 3-2. Contract Type versus Phase (Source: Acquisition Framework Chart)

	Acquisition Phase				
Contract Type	**Conceptual**	**Development (System Integration)**	**Development (Demonstration)**	**Production**	**Sustainment**
Cost Reimbursable (CR)	●				
Firm Fixed Price (FFP)	●			●	●
Firm Fixed Price - LOE*	●				
Cost Plus Fixed Fee (CPFF)		●			
Cost Plus Incentive Fee (CPIF)		●	●		
Cost Plus Award Fee (CPAF)		●	●		
Fixed Price Incentive Firm (FPIF)			●	●	●
*LOE = Level of Effort					

The PM, via the Contracting Officer, shall structure Requests for Proposal (RFPs) and resulting contracts to incentivize the contractor to meet or beat program objectives. Whenever applicable, risk reduction through use of mature processes shall be a significant factor in source selection. RFPs and resulting contracts shall include a strict minimum number of critical performance criteria (i.e., threshold and objective requirements) to allow industry maximum flexibility in meeting overall program objectives. The source selection criteria communicated to industry shall reflect the importance of developing a system that can achieve stated production and TOC objectives within schedule and performance objectives.

3.4 COMPETITIVE OR SOLE SOURCE CONTRACT

DoD Instruction 5000.2 paragraph 4.7.1.5 states that:

> Throughout the life of a technology project, service contract, or acquisition program, cost-effective competition (at both the prime and sub-contractor levels) shall be maintained to the maximum extent practical by means of either head-to-head competition, competition of alternative ways to meet the mission need, reliance on market surveys for commercial alternatives, or changing requirements (through the process of cost and performance trades) to allow increased competition. This competition for best value to the DoD shall be identified in the acquisition strategy. Wherever possible and appropriate, performance-and price-based acquisition methods should be used. The benefits of long-term contracting shall be explored. Contractors shall be encouraged to submit realistic cost proposals, including fair and reasonable profit or fee

amounts.

Paragraph C1.3.4.3. in DoD 5000.2-R summarized a common theme voiced by industry at the DMSMS May Workshop (DoD 2001a):

> For industry, competition to win business, along with attendant business profit, is by far the most powerful incentive. Therefore, the PM shall maintain competition as long as practicable in all acquisition programs.

As noted at the workshop, if time is expended to convince management that DMS is important and resources have been acquired to work the issues, then contractors want to be measured on their internal DMS performance. Contractors generally want past obsolescence management performance to be part of the contract competition or source selection. This will show the senior management that managing DMS is a tangible benefit. Two out of the five objectives of the Guidebook supports this concept *for Performance-Based Services Acquisition (PBSA)* (DoD 2000), specifically:

> **Maximize performance:** Allows a contractor to deliver the required service by following its own best practices. Since the prime focus is on the end result, contractors can adjust their processes, as appropriate, through the life of the contract without the burden of contract modifications provided that the delivered service (outcome) remains in accordance with the contract. The use of incentives further motivates contractors to furnish the best performance of which they are capable.
>
> **Maximize competition and innovation**: Encouraging innovation from the supplier base by using performance requirements maximizes opportunities for competitive alternatives in lieu of government-directed solutions. Since PBSA allows for greater innovation, it has the potential to attract a broader industry base.

To implement the past performance requirements for obsolescence management, sections L and M should have evaluation requirements, such that discriminators can be discerned for the prime weapon system manufacturers with a solid obsolescence program. Section L is that place in the solicitation where information and guidance are provided to help offerors prepare proposals in response to the solicitation. Section M describes how the proposal will be evaluated for source selection purposes. The SOW or SOO[*], and Sections L and M, all tie together. The SOW or SOO describes the requirement and Section L requests information relating to how the offeror will execute that requirement for evaluation purposes. The following example describes one piece of a requirement to illustrate the relationship between the three areas simply.

SOW or SOO	Section L	Section M
The contractor shall establish and implement a parts obsolescence program	The offeror shall describe how their obsolescence program will reduce the impact of DMSMS	The offeror's approach for parts obsolescence management will be evaluated for best value in terms of technical approach and cost, with additional consideration for past performance and cost avoidance.

[*] Or performance work statement for performance based services acquisition

As noted in the PBSA Guidebook the use of incentives may further motivate the contractor to provide the best performance for the above example. The contract types are grouped into two broad categories: fixed-price contracts (see FAR Subpart 16.2) and cost-reimbursement contracts (see FAR Subpart 16.3). The specific contract types range from firm-fixed-price, in which the contractor has full responsibility for the performance costs and resulting profit (or loss), to cost-plus-fixed-fee, in which the contractor has minimal responsibility for the performance costs and the negotiated fee (profit) is fixed. In between are the various incentive contracts (see Subpart 16.4), in which the contractor's responsibility for the performance costs and the profit or fee incentives offered are tailored to the uncertainties involved in contract performance. For competitions obsolescence past performance and incentives should be considered. For sole source or follow-on contracts detailed contractual language in the SOW or SOO is required.

3.4.1 Profit Incentives for Aggressive DMSMS Management Practice Implementation (Livingston 2001)

The Director Defense Procurement issued a final rule amending the Defense Federal Acquisition Regulation Supplement (DFARS) to implement Section 813 of the National Defense Authorization Act for Fiscal Year 2000. Section 813 requires DoD to review its profit guidelines to consider whether appropriate modifications would provide an increased profit incentive for contractors to develop and produce complex and innovative new technologies. The rule amends the weighted guidelines method of profit computation at DFARS 215.404-71 to combine the management and cost control elements of the performance risk factor; to establish a new "technology incentive" range for technical risk; and to modify some of the cost control standards.

The rule modifies the evaluation criteria for management / cost control to include evaluation of the contractor's cost reduction initiatives. The contracting officer may assign a higher than normal profit factor value when the contractor's management / cost control effort is intense. Indicators for above normal conditions now include an aggressive cost reduction program and aggressive process improvements to reduce costs. The rule specifically cites technical insertion programs and obsolete parts control programs as examples of cost reduction initiatives the contracting officer should evaluate when determining profit factors associated with performance risk. This amendment to the DFARS, effective 13 December 2000, presents the contracting officer with an approach to encourage contractors to implement DMSMS management practices. The inclusion of obsolete parts control programs in the evaluation criteria for performance risk provides rationale to consider increasing profit incentive for contractors who implement them aggressively. This would also apply to technical insertion programs that deal with the rapidly growing problems posed by DMSMS.

3.5 DEPOT REPAIR LOCATION

Many legacy systems have an organic support depot that provides "maintenance and repair of military materiel requiring major overhaul, complete rebuild, or other high-order repair work for end items (including weapon systems), subsystems, parts, assemblies, and subassemblies. It may also include depot field teams, maintenance engineering, technical support, manufacture of parts,

certain modification (or actions related thereto), testing, and reclamation as required. Depot maintenance serves to support lower categories of maintenance by providing technical assistance and performing that maintenance beyond their responsibility or capabilities. Depot maintenance provides end items and stocks of serviceable equipment by using more extensive facilities for repair than is available in lower levels of maintenance activities." (AFMC/LG 2000)

Newer acquisitions are implementing flexible sustainment and total system performance responsibility (TSPR) strategies. The Air Force has implemented Boeing's C-17 flexible sustainment contract and a TSPR contract for Lockheed Martin for the F-117 (Kratz 2000)

> For the C-17—Boeing, the aircraft prime contractor, manages the national level support, including technology refreshment, supply management and depot maintenance.
>
> For the F-117—Lockheed Martin provides product support under a long-term, five-year contract (with two five-year options) with incentives for mission capable rates and supply availability.

Contractual language for these two contracts will be provided in the next revision. DMSMS Contractual language for legacy systems using an organic depot are still in development. "The DoD's greatest challenge is backfitting promising [logistic support] strategies for existing, fielded systems" (Kratz 2000). Once sample language is developed for organic depots, that material will be provided in the next version of these guidelines.

SECTION 4

CONTRACTUAL LANGUAGE

4.1 SAMPLE PARAGRAPHS AND CLAUSES

Prior to reviewing the sample contractual language, Sections 2 and 3 of this document must be reviewed. In tailoring an acquisition strategy and selecting this language the Program Manager (PM) address management constraints imposed on the contractor(s). Paragraph C2.6.6.3 in DoD 5000.2-R, Applying Best Practices (DoD 2001a), states that when developing contractual language, PMs shall avoid imposing government-unique restrictions that significantly increase industry compliance costs or unnecessarily deter qualified contractors, including non-traditional defense firms from proposing. Examples of best practices (DoD 2001a) that support the implementation of paragraph C2.6.6.3 and help mitigate DMSMS include:

- Integrated Product and Process Development (IPPD)
- Performance-based specifications
- Management goals
- Reporting and incentives
- Open systems approach that emphasizes commercially supported practices
- Products, performance specifications, and performance-based standards
- Replacement of government-unique management and manufacturing systems with common, facility-wide systems
- Technology insertion for continuous affordability improvement throughout the product life cycle
- Realistic cost estimates and cost objectives
- Adequate competition among viable offerors
- Best value evaluation and award criteria
- The use of past performance in source selection
- Results of software capability evaluations
- Government-industry partnerships, consistent with contract documents
- and the use of pilot programs to explore innovative practices.

Every attempt has been made to ensure that the sample contractual language meets the above requirements. In the event that the contractual language conflicts with the above “best practices” because of program specific requirements, then the PM should tailor the language accordingly. A summary of the contract language content will be provided here. Table 4-1 provides a suggested

Table 4-1. Suggested Applicability Matrix

Requirement	Common Practice Level	Appendix A Reference	Life Cycle Phase				Contract Type						
			Conceptual	Development	Production	Sustainment	CR	CPFF	CPIF	CPAF	FFP	FFP - LOE	FPIF
Parts Control Program	1	S1		●	●	●			●	●	●	●	●
GIDEP	1	S1, H4		●	●	●	●	●	●	●	●	●	●
Interchangeability Parts List	2	S1		●	●	●	●	●	●	●	●	●	●
Parts Obsolescence Management Plan	1	S2	●	●	●	●			●	●	●	●	●
Service Life Extension Program (SLEP)	3	S3				●					●	●	●
Support Integrated Product Team Meetings	1	S3		●	●	●			●	●	●	●	●
SLEP Program Design Document	3	S3				●					●	●	●
Interchangeability	1	S4	●	●	●	●			●	●	●	●	●
Parts Control Program	1	S4		●	●	●			●	●	●	●	●
Obsolescence Engineering	1	S5			●	●		●	●	●	●	●	●
COTS System Supportability	2	S6			●	●		●	●	●	●	●	●
Obsolescence Management Plan	1	S7				●			●	●	●	●	●
Obsolescence Reviews	2	S8				●			●	●	●	●	●
End of Life Parts Status	1	S9		●	●	●		●	●	●	●	●	●
DMSMS Management	1	S10		●	●	●		●	●	●	●	●	●
Obsolescence Database Maintenance	2	S11,16		●	●	●		●	●	●	●	●	●
Manufacturers and Distributor Tracking	2	S11,16		●	●	●		●	●	●	●	●	●
Non Standard Parts Management	1	S11,16		●	●	●		●	●	●	●	●	●
FMS Systems Maintenance	2	S11				●			●	●	●		●
Component Engineering Services	1	S11		●	●	●		●	●	●	●	●	●
Associate Contractor Agreement	1	S12			●	●		●	●	●	●		●
Second Source Re-Engineering	3	S12			●	●		●	●	●	●		●
Product Data Baseline	1	S12		●	●	●		●	●	●	●	●	●
Health Model Development and Evaluation	2	S12		●	●	●		●	●	●	●	●	●
Parts Control Plan	1	S13,14		●	●	●			●	●	●		●
Engineering Technology Assessments	2	S15		●	●	●		●	●	●	●	●	●
Parts Management Program	1	S17		●	●	●			●	●	●		●
DMSMS Notification and Relief	1	H1				●			●	●	●		●
DMSMS Notification and Producibility	1	H2			●	●			●	●	●		●
DMSMS Resolution and Funding	2	H3			●	●			●	●	●		●
DMSMS Notification and Resolution	1	H5		●	●	●		●	●	●	●	●	●
Obsolete Items (DSCP instruction)	1	L1				●					●		
COTS Supportability	2	L2				●			●	●	●		●
DMSMS and Producibility	1	L3			●	●			●	●	●		●
Identification and Resolution	1	L4		●	●	●		●	●	●	●	●	●
Use of COTS	2	M1			●	●			●	●	●		●
Open System Architecture	3	M2			●	●			●	●	●		●
Software Development Plan	2	M2			●	●			●	●	●		●
COTS Supportability	2	M3			●	●			●	●	●		●
DMSMS and Producibility	1	M4			●	●			●	●	●		●

applicability matrix and common practice intensity level* for the SOW/SOO, Section H, and Section L&M, paragraphs and edited clause excerpts provided. SOW and SOO paragraphs that are more applicable to procuring activity or program office support contractors and are not directly related to an acquisition are not included in Table 4-1. Miscellaneous paragraphs and clauses are provided in Section 4.6. The miscellaneous paragraphs provide examples of:

- Spares and Obsolescence [MC1]
- Mission Critical Computer Resources [M2]
- Obsolescence Warranty [M3]
- Section I – Incentive Fee Clause [M4]

A compendium of all collected DMSMS contractual language, with the complete citation, is provided in Appendix A. Once the PM has reviewed this sample contractual language, the IPT should prepare a draft RFP and provide it, along with the business case analysis that justifies the implementation of DMSMS language, to appropriate senior management or the source selection authority.

4.2 SOW OR SOO PARAGRAPHS

The following ***edited excerpts*** of SOW or SOO paragraphs are presented to provide suggested requirements to place on contract. Because the majority of these requirements have only been in contracts for a few years and some are proposed and not on contract, no recommendation as to the success will be provided. However, subsequent revisions of these guidelines will provide information on lessons learned and will attempt to identify the best requirements based on documented program cost avoidance or total ownership cost reductions. ***Appendix A provides the complete paragraph citation***. The reference code in [brackets] refers to the Appendix A citation. For example [S1] is the first SOW sample paragraph, [S2] is the second example and so forth. SOW or SOO paragraphs that are more appropriate for support contractors will be noted. The PM may review these paragraphs to determine if aspects of the language could be used in an acquisition or sustainment contract.

Parts Control Program [S1] – The contractor shall implement a parts obsolescence program to include a quarterly report and parts control plan. The contractor may select alternate parts that meet component performance, environmental, and physical characteristics to the shop replaceable unit (SRU) level. The use of plastic parts may be evaluated when there is no other cost-effective alternative.

Government Industry Data Exchange Program (GIDEP) [S1] – The contractor shall participate in GIDEP to screen parts prior to their selection.

* The common practices (ARINC 2000) and this sample language were collected and developed independently. The paragraph titles and common practice name may not correlate and new practices may be identified, in either case, the applicable intensity level will be identified.

Interchangeability Parts List [S1] – The contractor shall implement an interchangeability parts list that contains the vendor name and vendor part number, and comparison of the alternate part versus the part it replaces detailing any differences in the specifications, testing, and manufacturing operations performed by the vendor.

Parts Obsolescence Management Plan [S2] – The contractor shall document procedures for identifying and controlling diminishing manufacturing sources (DMS) and obsolescent technologies in a Parts Obsolescence Management Plan.

Service Life Extension Program (SLEP) [S3] – The contractor shall document a cost effective COTS/NDI solution, in Engineering Change Proposal (ECP) format, to the parts obsolescence problem currently affecting the operation, maintenance, and support of the *system*. The ECP will present HW/SW configuration(s) that will, when implemented, extend the service life of the system

Support Integrated Product and Process Development (IPPD) Integrated Product Team (IPT) Meetings [S3] – The contractor shall support the IPPD IPT meetings to be held bimonthly starting with the formal kickoff meeting scheduled for the week of *Date*. The core IPT team members will consist of (but not limited to) representatives from the government users, maintainers, and support agencies. The contractor will be a contributing player and participant but not a voting member of the IPT.

SLEP Program Design Document (PDD) [S3] –The contractor shall document the COTS/NDI mechanical and electrical component's parts selection process used in meeting the PIDS functional and performance requirements in the SLEP PDD.

Interchangeability [S4] – The contractor shall ensure interchangeability and backward compatibility at the SRU/SRA, and LRU/WRA levels, with the current configuration. The only permissible changes are those required to overcome parts obsolescence, improve produce-ability, or correct any latent design deficiencies. No changes will be permitted that affect the form, fit, or function of the individual LRU/WRA and/or SRU/SRA, the system's functional allocation, or interface definition.

Parts Control Program [S4] – The contractor shall establish and/or maintain a parts control program IAW MIL-HDBK-965. The contractor shall notify the Government as soon as a part is identified as obsolete. For obsolete parts, the contractor shall locate a second source, a different MIL-qualified part that performs the same function without redesign, or a non-standard part that performs the same function without redesign. If a non-standard part is chosen, the contractor shall submit a non-standard parts request. If the aforementioned steps do not produce a substitute part and a redesign is required to solve the obsolete part problem, the contractor shall submit an ECP upon government direction.

Obsolescence Engineering [S5] – The contractor shall investigate, evaluate, develop and replace, where applicable, obsolete and non-obtainable parts/components for all supported systems.

COTS System Supportability [S6] – The contractor shall provide engineering and technical services for the *system name* equipment Commercial Off The Shelf (COTS) Obsolescence Resolution Effort (CORE). The contractor shall assist in the identification of obsolete items and provide technical and engineering research and analyses of potential obsolete COTS parts replacements. The contractor shall deliver a monthly report not later than the 5th of each month, identifying the vendors surveyed, alternate supply sources, repair data development status, COTS procurement status, status of COTS items under repair and related repair issues, ECP development status and issues, COTS obsolescence item list additions/deletions and related COTS issues.

Obsolescence Management Plan [S7] – The Contractor shall develop a plan for managing the loss or impending loss of manufacturers or suppliers for the spare and repairable items covered under the system name performance based logistics (PBL) Program.

Obsolescence Reviews [S8] An obsolescence review is an analysis to determine whether system life cost savings are obtainable by acquiring newer technology resources relative to continued operation of existing outdated resources. The contractor shall evaluate existing outdated computer resources to determine whether the cost of operating them is greater than the cost of acquiring and operating technologically newer resources. When the cost of operating existing outdated resources is greater than the cost of acquiring and operating technologically newer resources, agencies shall replace the existing outdated resources.

Reporting Status of EOL Parts[S9] – The contractor shall report on the status of end of life (EOL) hardware that has been procured for *system name*. EOL hardware includes the following: electronic components/piece parts, mechanical hardware, COTS and other items which the *program office name* authorized/directed the contractor to make an EOL buy.

DMSMS Management [S10] – The contractor shall maintain—or develop alternate sources of supply/designs for—all components, materials, assemblies, subassemblies and units throughout the contract. If DMSMS affects production of the *system name,* the contractor shall pursue and secure DMSMS case solutions such as alternate vendors, substitute parts, or redesign(s) as part of and within the price of each CLIN. The contractor shall resolve such issues in accordance with procedures outlined in the *system name* DMSMS Management Plan and with the quality provisions specified in the contract.

Component Obsolescence Management Database Maintenance [S11] – The contractor shall analyze the avionics system technical data documentation supplied by *program office name* to determine exactly what information needs to be incorporated into the government furnished *system name* component obsolescence management database, to update the database to the current hardware configuration. The contractor shall incorporate the change information into the *system name* component obsolescence management database while maintaining configuration control of the database and verify that the update is both complete and did not degrade the pre-existing data.

Strategic Manufacturers/ Distributors Tracking [S11] – The contractor shall track, through vendor polls, the qualified strategic manufacturers/distributors of parts contained in the system

name component obsolescence management database to maintain the government's pro-active obsolescence prediction capability for the avionics systems vendor status. The contractor shall develop and implement, in conjunction with *program office name*, a standard case file for use with problem devices which warrant formal action, delineating options and firm recommendations by the contractor.

Non-Standard Parts management [S11] – The contractor shall provide management of all non-standard parts contained in the *system name* component obsolescence management application, including all hybrids, ASICs, oscillators and custom devices, which are OEM specific and cannot be found in standard part catalogs.

DMS Technical and Engineering Support [S11] – [Support contract] The contractor shall provide dedicated DMS management and analysis support, through extensive use of the Component Obsolescence Management application. The contractor shall provide special reports and analyses on an "as required" basis. The government will provide the avionics hardware specifications, amendments, workspace, and access to government support equipment as required .

DMS Reliability Engineering Support [S11] – [Support contract] The contractor shall provide dedicated DMS Reliability Engineering Support to enhance data and analyses derived from the DMS program. The contractor shall provide special reports and analyses on an "as required" basis. The government will provide the avionics hardware specifications, amendments, workspace, and access to government support equipment as required.

Trade Studies and Technology Surveys [S11] – [Support contract] The contractor shall perform trade studies on the microelectronics content of the *system name* Subsystems, which address the following subjects:

Plastic Encapsulated Microelectronics
MIL-STD 883 testing of microelectronics
Industrial grade microelectronics
Offshore manufacturing facilities
Shrinking of die sizes
Lower supply voltage devices
Microwave/RF Technology Address manufacturing initiatives

FMS Systems Maintenance [S11] – The contractor shall provide application maintenance of FMS specific systems as required. FMS specific systems typically occur when the US Military discontinues the use of systems, while the FMS customers opt for continued use and maintenance of those items. A separate contract line item will be established for FMS funding directly to the contractor for support of this maintenance activity.

Component Engineering Services [S11] – The contractor shall provide detailed design/ component engineering support for the resolution of specific devices that have become obsolete, including redesign support as needed, identification and evaluation of suitable substitute parts, locating sources of discontinued die for LOT buy or other solution options.

General Parts Research [S11] – [Support contract] The contractor shall assist *program office name* in the assessment and resolution of obsolescence issues as they arise including, but not limited to, analysis and evaluation of technical proposals for particular 'piece part' obsolescence elimination by industry piece part manufacturers and Original Equipment Manufacturers (OEM).

Government/Customer Furnished Resources [S11] – [Support contract] The *program office name* will provide the contractor access to data required for the completion of this delivery order. Typically this data will be in the form of Technical Orders (TOs) or Illustrated Parts Breakdowns (IPBs) for each system to be entered into the component obsolescence management application.

Associative Contractor Agreement [S12] – The contractor shall share information and pass data to the prime contractor as necessary. The contractor shall facilitate the sharing of the data through the development and implementation of an Associative Contractor Agreement. This agreement shall be in place within 60 days of contract award. The contractor shall deliver all applicable data to the government with unlimited rights.

Second Source Re-engineering [S12] – The contractor shall conduct second source re-engineering efforts for selected *system name* SRUs (or subassemblies thereof) of the *system name* subsystem. The objective is to develop second sources for all critical components, generate a system health model and functional performance baseline, and re-establish system supportability.

Product Data Baseline [S12] – The contractor shall provide a relational database application for the management of component life-cycle availability and system structural hierarchy information. This hierarchy will be based on an indentured structured parts list, which describes the system's interconnectivity. The indentured parts list for *system name,* as well as any available Technical Data Package (TDP) information, will be provided to the contractor as Government Furnished Information (GFI). The contractor shall verify the contents of the parts list against the technical data package and enter the data into a health model.

Health Model Development [S12] – The contractor shall develop a detailed component-level health model for all LRUs in the *system name* that includes all digital components, provides immediate assessment of the *system name* critical SRUs, and whose capabilities include, but are not limited to, data scrub, data analysis, electronic formatting of the data, and determination of critical SCD data elements that need to be entered in the health model database.

Health Model Evaluation [S12] – The contractor shall complete comprehensive health model evaluations of the system name.

Component Supportability Engineering [S12] – The contractor shall provide engineering support to *program office name* for *system name* hardware components, subassemblies, and SRUs as assigned which are identified as non-procurable, including the following activities for the number of components (in parentheses) assigned:

Component Research: (xx) The contractor shall investigate the component in terms of whether the component is available from other sources, applicability to other LRUs, systems, and platforms.

Component Repackaging: (xx) For those solutions where alternate dies are suitable and available, the contractor shall repackage the dies in component packages which are form, fit, and function compatible with the original part, the SRU and system requirements.

Substitution: (xx) For those components for which a substitute component is recommended or identified, the contractor shall insure that the substitute part meets all system requirements.

Reverse Engineering: (xx) The contractor shall conduct reverse-engineering activities for components for which no alternate or substitute parts can be identified. The parts to be reverse-engineered will consist of the following types:

- Low Complexity: (1) Under 1000 gates/junctions
- Medium Complexity: (1) 1000-5000 gates/junctions
- High Complexity: (1) >5000 gates/junctions

Complexity level may be affected by availability and completeness of component design data such as schematics, layout drawings, test vectors, ATPs, etc.

Radiation Testing: (xx) The contractor shall identify the required type and magnitude of radiation testing for substitute, alternate, or reverse-engineered components as required to meet *system name* Hardness Critical requirements.

Parts Control Plan [S13] – The contractor shall develop and ensure an integrated approach to improved responsiveness and use of the most cost-effective solutions to DMSMS problems affecting the system. The contractor shall develop and implement a Parts Control Plan (PCP) that includes procedures for addressing DMSMS concerns in the selection of components.

Parts Control Plan [S14] – For obsolete parts, the contractor shall select replacement parts in the sequence listed below.

a. New Source for the same part.
b. New technology direct replacement part.
c. Lower MIL quality level part.
d. MIL-STD-883 screened or tested part.
e. Commercial ceramic part.
f. Commercial plastic part (requires prior NAVSEA approval).

Engineering Technology Assessments [S15] – The contractor shall conduct engineering technology assessment(s) by providing microelectronic management and obsolescence avoidance such that the result of the assessment(s) will be an understanding of the current microelectronic status of the system, the scope of any immediate nonavailability and obsolescence problem, the

magnitude of the future problem, and any possibilities for alleviating the impacts. The contractor will develop a detailed cost analysis of the alternative solution(s).

Component Obsolescence Database Maintenance [S16] – The contractor shall analyze the system technical data documentation to determine what information needs to be incorporated into the Component Obsolescence Management system, to update the database to the current hardware configuration. The contractor shall incorporate the change information into the Component Obsolescence database while maintaining configuration control of the database and verifying that the update is both complete and did not degrade the preexisting data.

Component parts tracking [S16] – The contractor shall track, through vendor polls, etc., the qualified manufacturers/distributors of parts contained in the Component Obsolescence Management database.

Component Solution Engineering Services [S16] – The contractor shall assess and resolve obsolescence issues as they arise, including, but not limited to, analysis and evaluation of technical proposals for particular piece-part obsolescence resolution by industry piece-part manufacturers and Original Equipment Manufacturers (OEM).

Parts Management Program [S17] – The contractor shall establish and maintain a Parts Management Program that ensures the use of parts that meet contractual requirements, reduces proliferation of parts through standardization, enhances equipment reliability and supportability, and proactively manages obsolescence. Within *XX* days after contract award, the contractor shall provide an Parts Management Program plan or procedure for review and use. The *program office name* may perform audits to ascertain program conformance and adequacy of the implementing procedures. The contractor shall utilize MIL-HDBK-512 as a guide for developing and maintaining the Parts Management Program.

4.3 SECTION H SPECIAL CLAUSES

The following ***edited excerpts*** of RFP Section H clauses are presented to provide suggested requirements to place on contract. Because the majority of these requirements have only been in contracts for a few years and some are proposed and not on contract, no recommendation as to the success will be provided. However, subsequent revisions of these guidelines will provide information on lessons learned and will attempt to identify the best requirements based on documented program cost avoidance or total ownership cost reductions. ***Appendix A provides the complete clause citation***.

DMSMS Notification and Relief [H1] – The contractor shall promptly notify the Contracting Officer in writing whenever the contractor believes that one or more of the components or materials intended to be incorporated directly into an end item specified to be delivered under the purchase order or contract is a DMS component. The notice shall identify the part number, national stock number, and nomenclature of each DMS component.

If the contractor believes that one or more of the components or material intended to be incorporated into an end item specified to be delivered under the purchase order or contract is a

DMS component, the contractor may request contractual relief according to this clause. The contractor shall submit the request in writing to the Contracting Officer within thirty (30) days after the contractor discovers a DMS situation.

DMSMS Notification and Producibility [H2] – The contractor is responsible for identification, resolution and implementation for all DMSMS/Obsolescence/Producibility issues associated with production and delivery of hardware under this contract in accordance with the TDP. For purposes of this clause, Producibility is defined as the ability to procure, fabricate, assemble, and test an item using available production technology while still meeting the necessary quality and performance requirements.

The provisions of this special provision shall apply to all technical data supplied as a part of any change issued under this contract, provided that any additional DMSMS/Obsolescence/ Producibility effort required by reason of a Government-issued change shall entitle the contractor to an equitable adjustment for which the amount shall be included in the settlement of the change order for the Government-issued change.

DMSMS Resolution and Funding [H3] – The contractor shall be responsible for identifying and resolving DMS for current and future production deliveries in accordance with the Statement of Work (SOW) paragraph ____, and this special contract requirement. The contractor is contractually obligated to meet this schedule except as provided for in this clause and AFFAR Supplemental 5352.217-9000, Long Lead Limitation of Government Liability.

If, during the execution of Lot 1 Advance Buy, a DMS unknown (pop-up) occurs that would impact a future production lot, the contractor shall take the necessary action to support the requirements specified in SOW paragraph____. The contractor shall track, at the total DMS budget line, rather than by project, DMS expenditures separately during the Advance Buy period of performance. The contractor shall separately estimate and track pop-ups by project and provide this information to the government on an as needed basis. This is required for future pop-up estimates and budgets.

GIDEP [H4] – The contractor shall notify GIDEP of DMSMS items and materials that suppliers/vendors have declared obsolete or discontinued that may impact production or logistics support of systems, subsystems, software, or equipment. The contractor shall take appropriate action and make appropriate notification, as deemed necessary by the Contractor, in response to GIDEP Failure Experience and DMSMS reports electronically distributed which may impact the performance of materials procured hereunder. The contractor shall maintain a status of GIDEP Failure Experience and DMSMS reports and the benefits accrued thereof, and shall provide an Annual Utilization Report to GIDEP.

DMSMS Notification and Resolution [H5] – The contractor shall conduct a detailed evaluation of all technical data associated with this contract. Such evaluation shall include, but not be limited to, analysis, identification, and recommended corrections for problems associated with DMSMS/Obsolescence.

The contractor shall submit DMSMS/Obsolescence Issues to the Contracting Officer, unless this contract states otherwise. If this contract is administered by other than the contracting office, the contractor shall submit a copy of the DMSMS/Obsolescence Issues simultaneously to the Administrative Contracting Officer and the Contracting Officer .

If a DMSMS/Obsolescence change is accepted, the contractor shall share in net acquisition savings according to the Incentive Fee Clause I-1

4.4 SECTION L – INSTRUCTIONS TO OFFERORS CLAUSES

The following ***edited excerpts*** of RFP Section L clauses are presented to provide suggested instructions to offerors to place on contract. Because the majority of these requirements have only been in contracts for a few years and some are proposed and not on contract, no recommendation as to the success will be provided. However, subsequent revisions of these guidelines will provide information on lessons learned and will attempt to identify the best instructions based on documented program cost avoidance or total ownership cost reductions. ***Appendix A provides the <u>complete</u> clause citation***.

Obsolete Items [L1] - If any item in the Schedule either becomes obsolete or is superseded during the term of this contract, the contractor shall advise the Contracting Officer thereof within fifteen (15) business days of the determination of obsolescence, or of the determination to supersede the Scheduled item. If the obsolete or superseded item is covered by a delivery order issued prior to the determination to declare that item obsolete or superseded, the notice shall be given to the Contracting Officer within five (5) business days of the date of the determination.

COTS Supportability [L2] – Technical and Program Management Approach and Experience. Provide a technical and program management approach that demonstrates the offeror's understanding of the work required to successfully accomplish the Statement of Work (SOW) tasks and a description of capability to meet the required performance delivery date. Provide a listing of not more than three relevant "project" examples that shall include requirements to support COTS equipment in fleet and shore based life cycle applications, requirements to provide *system name* ILS, and hardware maintenance and modification requirements similar to those described in the SOW.

Past Performance. Provide three (3) past performance references that reflect recent relevant experience performed within the past five-(5) years.

DMSMS and Producibility [L3] – DMSMS/Obsolescence/Producibility: This part shall describe the offeror's approach, which details the methodology to be used in the identification and resolution of DMSMS/Obsolete parts/Producibility. Technical: The adequacy of the offeror's approach and how the proposal demonstrates its understanding of the Government's requirement will be evaluated. The Technical Area is divided into four elements: Production Capability, DMSMS/Obsolescence/Producibility, Quality and Production, and Scheduling. Production Capability and DMSMS/Obsolescence/Producibility are equally weighted and each is slightly more important than quality, which is somewhat more important than production scheduling.

Identification and Resolution [L4] – This part shall describe the offeror's approach, which details the methodology to be used in the identification and resolution of DMSMS/obsolete parts. Electronic Parts, Materials, and Processes (PMP) Control Program: The offeror shall describe in detail his Electronic PMP Control Program which includes, as a minimum, controls and policies on the following subjects: Government involvement, including Military Parts Control Advisory Groups (MPCAG); parts selection; approved parts list; supplier management; part quality; part derating/tolerance analysis; plastic encapsulated devices; testing/analysis required or performed to assure compliance for parts procured non-compliant to Government or DOD-adopted industry standards (including custom parts) printed wiring assembly design and component mounting practices; materials and equipment used for electronic manufacturing processes; electrostatic discharge control; maintenance of solderability of parts; printed boards and components; process controls/workmanship methodologies; training/proficiency of the workforce; rework and repair of PWAs and; rework and repair of cable assemblies.

4.5 SECTION M – EVALUATION CRITERIA CLAUSES

The following ***edited excerpts*** of RFP Section M clauses are presented to provide suggested evaluation criteria to place on contract. Because the majority of these requirements have only been in contracts for a few years and some are proposed and not on contract, no recommendation as to the success will be provided. However, subsequent revisions of these guidelines will provide information on lessons learned and will attempt to identify the best evaluation criteria based on documented program cost avoidance or total ownership cost reductions. ***Appendix A provides the complete clause citation***.

Use of COTS [M1] – Commercial Leverage (15%) Proposals must demonstrate that a commercial item or items form the core of the prototype. In addition, proposals that use open commercial standards to avoid obsolescence will be viewed more favorably. Proposals that are based on widely used commercial items will fare better than those whose "commercial core" has fewer applications outside the defense realm. Proposal based on items that (1) are not currently available in the commercial marketplace and have neither clear plans nor pathways for sale to non-government customers, or (2) are or will be available for sale only to Government customers will generally score poorly.

> Authors note: The remaining selection criteria are as follows:
>
> O&S Savings (30%)
> Military Customer Commitment (25%)
> Technical and Management Approach (15%)
> Military Department Share of Project Costs (15%)

Open System Architecture [M2] – The proposal will be evaluated for the potential ability of the Air Vehicle to possess the attributes of an open architecture: 1) modular structure and partitioning; 2) well defined, preferably non-proprietary, internal and external interfaces; 3) use of standards adopted by standards bodies or the commercial marketplace; 4) controlled coupling among subsystem elements; 5)scalability and evolvability with minimal impact to the system; 6)

ability of the Air Vehicle to function within the context of the Air System as a node in the C4I 2010 system of systems architecture; **7) technology independence and parts obsolescence risk mitigation;** 8) support for reliability and maintainability; 9) guaranteed timing and real-time execution; 10) information assurance and protection. This evaluation also includes the completeness of the architecture models, consistency of information mapped across the models, and the ability of the architecture to support the Source Selection Aspects of Interoperability, and Data Fusion and Information Management.

Software Development Plan [M2] – The proposal will be evaluated for the Offeror's potential ability to implement an effective software design, development and support process, as documented in the Offeror's Software Development Plan (SDP). The evaluation of this aspect will include:

Review of the proposed processes and infrastructure for software development
Integration of these processes with the overall systems engineering process
Design for re-use of software components
System/Software Engineering Environment (tool-set, facilities, and processes for accommodating System/Software Engineering Environment component obsolescence)
Assessment of the software development effort

COTS Supportability [M3] – Each contractor shall be evaluated relative to the following:
Factor 1: Technical and Program Management
Factor 2: Past Performance
Factor 3: Evaluated Cost

Factor 1, Technical and Program Management Experience. The Government will evaluate each offeror's Technical and Program Management Experience to perform the requirements in the solicitation, considering the offeror's Technical and Program Management Approach and Experience and Resumes of proposed personnel.

Factor 2, Past Performance. Past Performance is a measure of the degree, to which an offeror satisfied its customers in the past and complied with Federal, state, and local laws and regulations. The Government will contact some of each offeror's customers to ask whether or not they believe:

That the offeror consistently met required time frames
That the offeror maintained stable well-trained staffing under contractual arrangements similar to the order contemplated under this solicitation
That the offeror was capable, efficient and effective
That the offeror's performance conformed to the terms and conditions of its contract
That the offeror was committed to customer satisfaction; and
if given a chance would they select the same or a different contractor.

Factor 3, Evaluated Cost. The evaluation will be based on an analysis of the realism and completeness of the cost data, the traceability of the cost to the offeror's capability data and the proposed allocation of man-hours and labor mix.

DMSMS and Producibility [M4] – The Government reserves the right to award the production quantity CLINs with or without their corresponding First Article CLINs and with or without the DMSMS/Obsolescence/Producibility CLINs.

The evaluation criteria are delineated in this section by areas, elements within an area, and factors within an element. Evaluation will include 3 areas: Technical, Performance Risk, and Price. Technical is somewhat more important than Performance Risk which is significantly more important than Price. The combined areas of Technical and Performance Risk are substantially more important than Price.

The adequacy of the offeror's approach and how the proposal demonstrates its understanding of the Government's requirement will be evaluated. The Technical Area is divided into four elements; Production Capability, Diminishing Manufacturing Sources and Material Shortages (DMSMS)/Obsolescence/Producibility, Quality, and Production Scheduling. Production Capability and DMSMS/Obsolescence/Producibility are equally weighted and each is slightly more important than quality, which is somewhat more important than production scheduling.

(2) DIMINISHING MANUFACTURING SOURCES AND MATERIAL SHORTAGES (DMSMS)/OBSOLESCENCE/PRODUCIBILITY: This element consists of the following five (5) factors, which are of approximately equal weight:

(a) The proposed process the contractor will use to identify and resolve obsolete parts will be evaluated for adequacy. The evaluation will consider the specific procedures, criteria, and techniques the contractor proposes to use.

(b) The adequacy of the proposed process the contractor will use to identify new sources will be evaluated.

(c) The proposed procurement/test lead-times will be evaluated to determine whether or not the proposed schedules will allow for completion of deliveries within the contract period of performance.

(d) The adequacy of the offeror's proposed analysis and testing will be evaluated to ensure that it will satisfy all component, subassembly, and system level form, fit and function requirements.

(e) The availability of tools and equipment to be used in performance of the contract, and the adequacy of the techniques to be employed will be evaluated.

4.6 MISCELLANEOUS PARAGRAPHS AND CLAUSES

The following ***edited excerpts*** of miscellaneous paragraphs and clauses are presented to provide the PM with additional ideas related to contractual language to mitigate the impact of DMSMS. Subsequent revisions of these guidelines will provide information on lessons learned and will