MIL-SPECS

Mark Lorell   Jeffrey Drezner   Julia Lowell

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Reforming
MIL-SPECS

The Navy Experience with Military Specifications and Standards Reform

DB-312

Mark Lorell   Jeffrey Drezner   Julia Lowell

Prepared for the Office of the
Secretary of Defense

RAND

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The RAND documented briefing series is a mechanism for timely, easy-to-read reporting of research that has been briefed to the client and possibly to other audiences. Although documented briefings have been formally reviewed, they are not expected to be comprehensive or definitive. In many cases, they represent interim work.

This documented briefing (DB) describes a RAND study conducted in response to a November 1998 Navy request for help in determining why its military specifications and standards reform (MSSR) efforts appeared to be underfunded. The study had four objectives: first, to define the status of Navy military specification and standards reform as of approximately December 1998; second, to find possible explanations for why, as of December 1998, the Navy had not met its self-imposed target date for MSSR completion; third, to describe the primary options for MSSR completion available to the Navy's Acquisition Reform (AR) Office; and fourth, to suggest further steps RAND might take to inform the Navy's choice of options.

From December 1998 through March 1999, interviews and data collection efforts were undertaken with personnel from the Navy AR Office, NAVSEA, and NAVAIR. In addition, officials in the U.S. Air Force, U.S. Army, Defense Logistics Agency, and Office of the Secretary of Defense were interviewed. Initial analysis and assessment of the data were completed by the end of February 1999, and findings were presented to the sponsor in the form of a briefing on 5 March 1999. RAND's initial findings were accepted by the sponsor, and one of the options chosen as the solution to completing implementation of Navy Mil-Spec reform. As a result, the sponsor invited RAND to attend a meeting of the systems command (SYSCOM) standardization executives on 16 July 1999 in order to present the findings and assist in implementation approaches as needed. This DB documents the briefing that was presented to Navy officials at both the March and July 1999 meetings.

Although this documented briefing describes and analyzes a specific situation faced by the Navy in 1998-1999, RAND believes that MSSR has pro-

foundly affected the acquisition environment for all the services, in ways that are not all yet fully understood. By shedding light on some potential future issues raised by military standards reform, the research presented here remains timely and still should be of interest to service, defense agency, and OSD personnel concerned with weapon system acquisition and military acquisition reform.

This research was conducted for the U.S. Navy Acquisition Reform Executive within the Acquisition and Technology Policy Center of RAND's National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the Unified Commands, and the defense agencies.

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ACKNOWLEDGMENTS

In November 1998, the U.S. Navy (USN) asked RAND for assistance in determining why funding for ongoing military specifications and standards reform (MSSR) efforts in the Navy appeared to be inadequate for the task, and in light of that answer, to describe some likely options for funding and completing the MSSR task. In response, we collected data from and held discussions with various Department of Defense (DoD) officials involved in the reform process in order to understand the perspectives, interests, and concerns of the various actors. The initial interviews were conducted with officials in the Navy Acquisition Reform (AR) and System Command (SYSCOM) organizations; we also spoke with officials from the Air Force, Army, Office of the Secretary of Defense (OSD), and Defense Logistics Agency (DLA).

This documented briefing defines the status of Navy reform efforts as of approximately December 1998. It describes the processes used by the SYSCOMs to perform reform activities and by AR to provide oversight and guidance to SYSCOM efforts. Comparing Navy, Army, and Air Force MSSR processes, it outlines four hypotheses that might explain why, as of December 1998, the Navy appeared to have had less success than the other services at completing MSSR. It concludes by outlining options available to the USN AR Office for MSSR completion, and describing steps RAND might take to inform the USN AR's choice.

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Outline

- **The role of MSSR in the Department of Defense's (DoD) Acquisition Reform (AR) strategy**
- **The USN Problem: Budget and schedule**
- **Dispositions compared: NAVAIR, NAVSEA, USAF, USA**
- **Hypotheses explaining differences in outcomes**
- **Basic options for resolving the problem**
- **Determining the best option(s)**
- **Additional data & research support requirements**

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We begin by briefly reviewing the role of MSSR in DoD's AR strategy. We then describe the nature of the Navy's MSSR situation, and compare the document disposition strategies adopted by the Air Force and Army with those adopted by two Navy SYSCOMs, NAVAIR and NAVSEA. We chose to examine NAVAIR and NAVSEA because these two SYSCOMs, which have traditionally owned the vast majority of the Navy's military specifications (Mil-Spec) and military standards (Mil-Std) documents, also have the furthest to go towards completion of MSSR.

On the basis of this comparison of document dispositions, we formulate four separate but not mutually incompatible hypotheses to explain why MSSR outcomes differed across the services. We then suggest three basic options for resolving the Navy's MSSR funding and implementation problem. We conclude by identifying the additional data and analysis required for determining which of these options is likely to be optimal for the Navy.

In his June 1994 memo, "Specifications and Standards: A New Way of Doing Business," then Secretary of Defense William Perry mandated the virtual elimination of Mil-Specs and Mil-Stds by directing the services and relevant defense agencies to "use performance and commercial specifications and standards instead of military specifications and standards, unless no practical alternative exists to meet the user's needs."[1] MSSR was—and still is—seen as a critical enabler in an approach to acquisition that is all in all more commercial-like. Elements of a commercial-like approach include the exploitation of dual-use technologies, components, and processes that are better and cheaper than their military-unique counterparts; the adoption of cost-effective commercial business practices; the achievement of commercial economies of scope and scale in R&D and production through the exploitation of dual-use facilities; and the elimination of the cost-premium associated with unnecessarily burdensome government regulations, including Mil-Specs and Mil-Stds.

[1]Outside of the services themselves, DLA is the DoD organization with the largest procurement responsibility. DLA handles most of the services' commodity purchases.

Cost Savings on Custom-Designed Radar Components Are Significant

(AIL Modular Radar Prototypes)
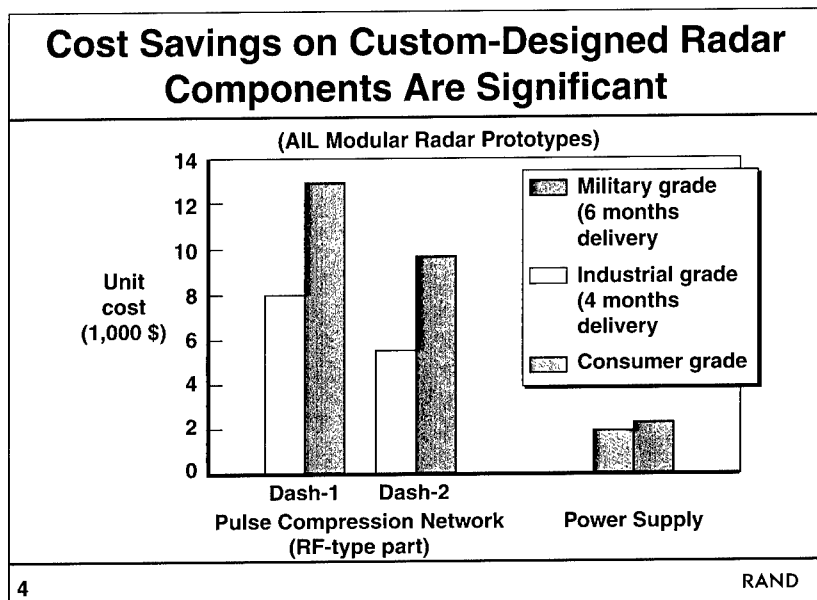
As suggested by several studies, including some performed by RAND, the cost savings from adopting a more commercial-like approach to acquisition in general, and to adopting MSSR in particular, can be significant.[2] The chart above gives two examples of the differences in schedule and cost for Mil-Spec and commercial grade parts considered for the Eaton AIL Division family of modular radars.

The left side of the figure compares prices for a Mil-Spec and an industrial grade Pulse Compression Network, a custom-designed radio frequency part. Two parts versions are shown, the Dash-1 and Dash-2. The industrial grade and Mil-Spec versions of the part are identical in performance, but not in recommended temperature range, resistance to humidity and vibration, and so forth.[3] The industrial grade parts are about 40 percent cheap-

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[2]See, for example, Mark Lorell and John C. Graser, *An Overview of Acquisition Reform Cost Savings Estimates*, Santa Monica, Calif.: RAND, MR-1329-AF, 2001. The examples presented here borrow from Mark Lorell, Julia Lowell, Michael Kennedy, and Hugh Levaux, *Cheaper, Faster, Better? Commercial Approaches to Weapons Acquisition*, Santa Monica, Calif.: RAND, MR-1147-AF, 1999.

[3]In particular, serious performance degradation problems have been encountered at temperatures below –30°C. For effective operation in cold environments below –30°C, the AIL modules will have to be protected or different parts will have to be used.

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er than the Mil-Spec parts. Further, they take one-third less time for delivery.

The right side of the figure compares the price of a custom-designed Mil-Spec power supply component to a consumer grade component with the same design and performance characteristics. The consumer grade component costs about 20 percent less.

Huge Cost Premiums Are Paid for Mil-Spec Parts Screening

(AIL Modular Radar Prototypes)

Cost ($) (10 part lot)

- Military grade: Basic lot cost
- Consumer grade: Basic lot cost
- Screening (per lot)
- Testing
- Fixturing

*Excludes lot charge

RF Mixer — $15,410*, $410

Digital Integrated Circuits (750-1, 751-1) — $18,210, $3,210, $410, $1,210, $2,100, $850, $100

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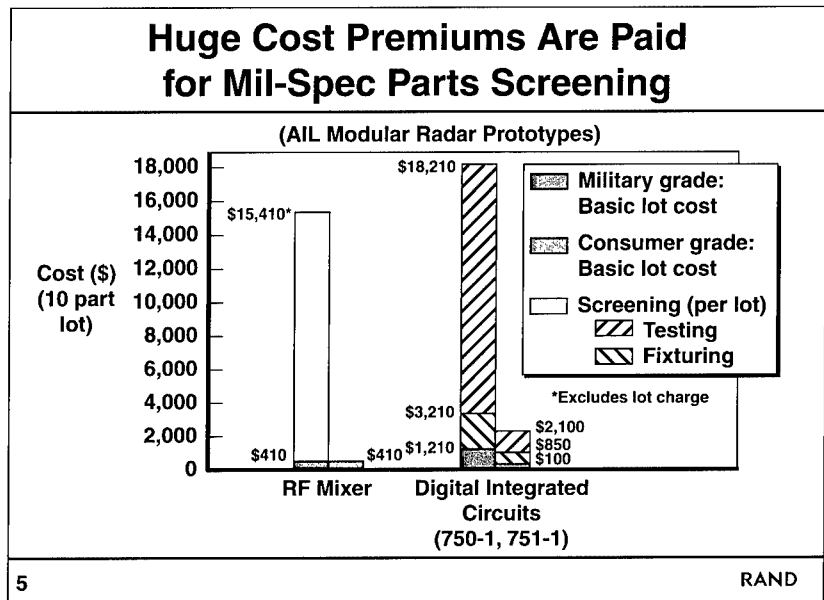
Numerous Mil-Spec electronics parts are manufactured on dual-use commercial lines and are in fact identical to commercial parts. But these parts can differ enormously in price because of the extensive screening and testing required of Mil-Spec parts. Commercial vendors or their manufacturing processes are often qualified by the system integrator, but not each and every part they produce. Mil-Spec parts on the other hand are individually subjected to rigorous testing that greatly increases their cost. Much of the Mil-Spec cost premium derives from the extensive testing and screening of Mil-Spec parts and components.

The figure above shows the basic ten-item lot cost for two parts investigated by AIL for its Modular Radar program, plus the cost of screening. The left side of the figure shows two RF mixers, one Mil-Spec and one consumer grade. The basic ten-part lot cost for both is $410. However, for the Mil-Spec version, the vendor adds a lot charge plus $15,000 for screening the parts. Further, while the commercial RF mixer was in stock and immediately available, the Mil-Spec version required at least four months for delivery.

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The right side of the figure shows two Mil-Spec digital integrated circuits used by AIL in its modular radars. The vendor had discontinued manufacture of these Mil-Spec parts, but the nearly identical consumer grade ICs were available for ten to twenty dollars each. To deliver the Mil-Spec part, the vendor asked for $121 for the die per IC, plus $2,000 for fixturing, and $17,000 for repackaging and testing the IC. Instead, AIL decided to buy the consumer grade parts, which are encapsulated in plastic, and conduct its own limited temperature tests. This testing cost $750 for fixturing and $1,250 for lot testing. By adopting this approach, AIL was able to purchase a small lot of 10 parts for less than one-eighth the cost of a ten-part Mil-Spec lot.

Problem Definition

- **Missed self-imposed Oct 98 MIL-SPEC Reform completion date**
- **Remaining actions relatively more costly and take more time**
- **Funding requests of SYSCOMS significantly greater than available funds for FY99 and beyond**

FY99 Funding

Unit cost (1,000 $)

Legend: Request, Available

Y-axis: 0, 2,000, 4,000, 6,000, 8,000, 10,000, 12,000, 14,000, 16,000

X-axis: NAVAIR, NAVSEA, SPAWAR, NAVFAC, NAVSUP, Marine Corps
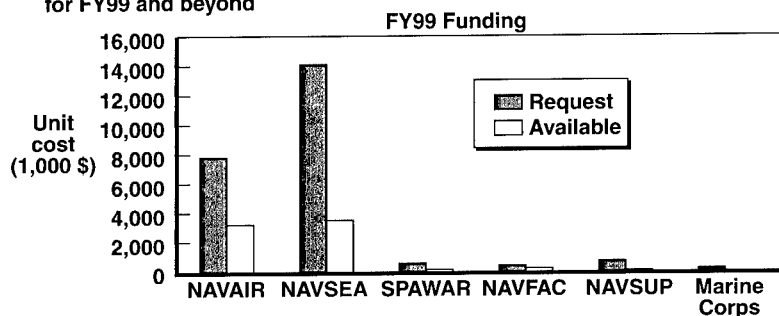
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Given the centrality of Mil-Spec reform to DoD's overall efforts to achieve acquisition reform, what then were the issues and problems surrounding the Navy's attempt to implement MSSR? Discussions with Navy officials involved in MSSR revealed three primary problems.

First, the Navy missed the services' self-imposed completion date of October 1998 for MSSR. At the beginning of Fiscal Year (FY) 1999, the Navy had completed just 50 percent of the document actions it specified during its initial assessment of what to do with approximately 8500 Mil-Spec and Mil-Std documents. By way of comparison, both the Army and Air Force had essentially completed their respective document actions as of October 1998.

Second, most of the document actions taken by the Navy as of October 1998 consisted either of canceling documents or inactivating them for new designs. These are relatively easy and inexpensive actions compared to the challenge and cost of writing military performance specifications or revising and updating documents in accordance with commercial specifications, both of which will be required if the original document dispositions are not changed.

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Third, the original planned Navy budget for MSSR has already mostly been spent, and new funding for MSSR is unavailable after FY99. There is a significant shortfall between budgeted funds and the funds needed to complete MSSR as estimated by the SYSCOMs. As shown in the figure above, in FY99 the projected budget for NAVSEA and NAVAIR for completion of MSSR is less than half of what these SYSCOMs had requested.

Status of USN MSSR Actions by Disposition Categories

Source: ASSIST database 12/1/98

Legend: Completed / TBD

Note: total adds to 6086; disposition of remaining 2,483 unknown

Categories: Cancelled, Inactivate for new design, Convert to commercial, Convert to performance, Retain and update

7   RAND
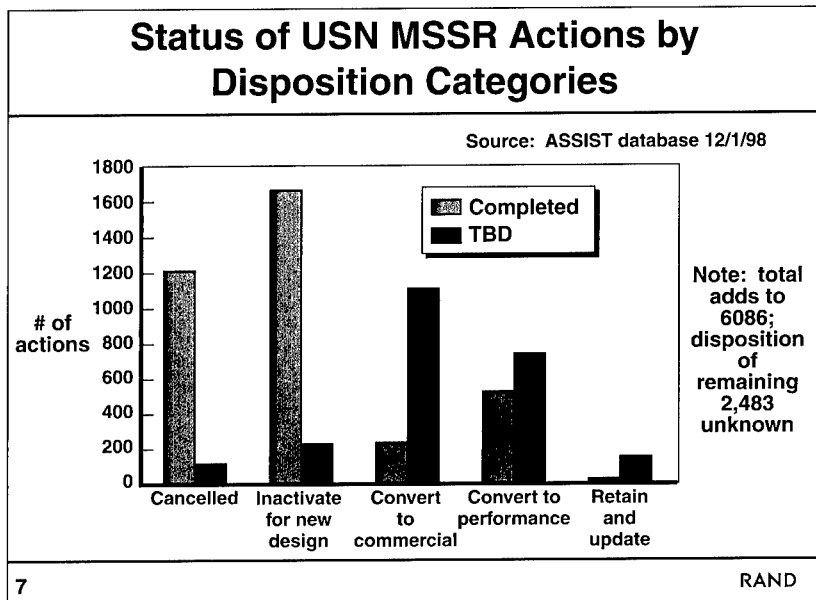
DoD's Acquisition Streamlining and Standardization System (ASSIST), a database system for DoD-wide standardization document information management, lists five possible document disposition categories:

- Cancel;
- Inactivate for new design;
- Convert to commercial;
- Convert to performance; and
- Retain and update.[4]

According to ASSIST, as of December 1, 1999, the Navy had completed most of its planned dispositions in the "Cancel" and "Inactivate" categories. About half of the documents it intended to convert to performance specifications had been converted. However, less than a sixth of the documents so designated had been either converted to commercial standards and specifications or retained and updated.

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[4]The ASSIST database provides a useful, standardized record of DoD document management. However, it does not explicitly track service or SYSCOM decisions to transfer preparing activity (PA) for a document to other DoD agencies. As discussed below, some services and some Navy SYSCOMs took full advantage of the MSSR option to transfer PA. For this reason much of the data we use in our later analysis come from sources other than ASSIST.

Status of MSSR Actions by SYSCOM

Source: ASSIST database 12/1/98

Completed
TBD

Number of documents (actions)

2000
1800
1600
1400
1200
1000
800
600
400
200
0

NAVAIR SPAWAR NAVSEA NAVSUP NAVFAC Marine Corps Other

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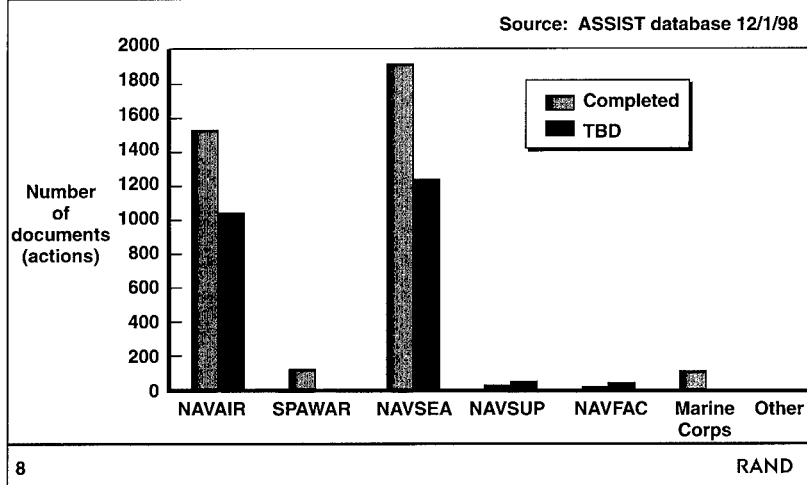
At the beginning of MSSR, two SYSCOMs—NAVAIR and NAVSEA—
"owned" far and away the largest number of Mil-Spec and Mil-Std docu-
ments in the Navy. According to ASSIST, as of December 1, 1998, they were
also the furthest from completing their new document dispositions in
terms of absolute numbers.[5] As illustrated in the chart above, as of
December 1, 1998, NAVAIR and NAVSEA each had over 1,200 document
actions left to complete, while NAVSUP, NAVFAC, and the Marine Corps
had under 200 document actions to go, and SPAWAR had essentially com-
pleted its task.

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[5]However, they were not furthest from completion in percentage terms: As of December 1,
1998, both NAVAIR and NAVSEA had completed well over 50 percent of their document con-
versions, while NAVSUP and NAVFAC had completed less than half of theirs.

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NAVAIR and NAVSEA Status by Category
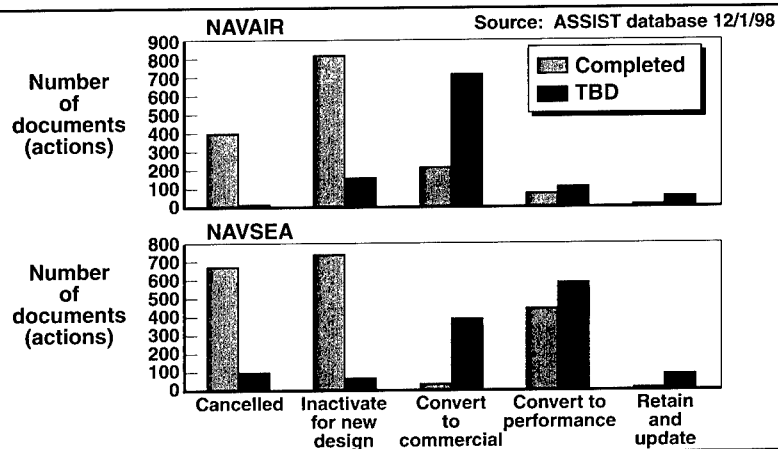
As of December 1, 1998, NAVAIR had completed the transition for the majority of its documents in the "Cancel" and "Inactivate for new design" categories. Roughly half of the documents in the "Convert to performance" category had been converted, while substantially less than half of the documents in the "Convert to commercial" and "Retain and update" categories were done.

For NAVSEA, the majority of the documents in the "Cancel" and "Inactivate for new design" categories had been completed. NAVSEA had many more documents in the "Convert to performance" category than NAVAIR, and slightly less than half of these had been converted by December 1, 1998. Substantially less than half of the documents in the "Convert to commercial" and "Retain and update" categories were complete.

Differing MSS Dispositions Help Explain Schedule Differences

- **June 1994 Perry memo contained no guidelines for implementation**
- **Services developed their own implementation strategies**
- **Implementation approach affected by differences in service organizational structure, leadership, strategies, acquisition "culture", & other factors**
- **Significantly differing final MSS dispositions**
- **Examination of dispositions helps explain schedule differences and suggests various hypotheses regarding different outcomes**

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When MSSR was first inaugurated by Dr. Perry in June 1994, his memo contained no detailed guidelines for implementation. The services—and relevant defense agencies such as DLA—developed their own approaches to implementation, approaches that were affected by differences in their organizational structures, the nature of their leadership, and their individual organizational "cultures," as well as by other factors. As a result, the final document dispositions chosen by the Air Force, Army, and Navy—and within the Navy, NAVAIR, and NAVSEA—differed markedly from each other.

These differences help to explain why the Navy lagged behind the other services in completing MSSR by the self-imposed October 1998 deadline. They also suggest various hypotheses as to why MSSR implementation has proceeded more slowly in NAVAIR and NAVSEA than in the other Navy SYSCOMs and other services.

Pre-Reform Mil-Spec/Stds and MSS Dispositions by Organization

Sources: Various reports on MSSR status by the USN SYSCOMS, Air Force, and Army.

Legend: DETAIL SPEC, PERFORMANCE, NGS, TRANSFER PA, INACTIVATE, CANCEL

Y-axis: Number of documents (0 to 14000)

X-axis: NAVSEA, NAVAIR, USAF, USA
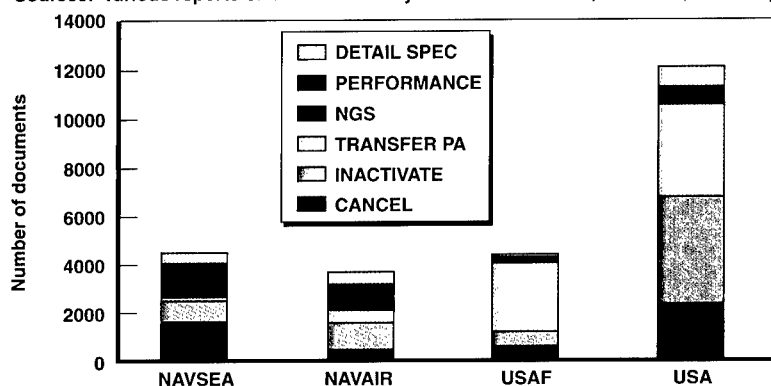
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To operationalize the Perry memo, OSD identified six broad categories of possible document actions and asked the services and defense agencies responsible for preparing activity to decide in which of the categories their documents belonged. For each service, the six possible disposition categories were:

- Keep as detailed military specification (Detail Spec)[6];

- Convert to military performance specification (Performance or Mil-Prf)[7];

- Convert to non-governmental standard (NGS);

- Transfer preparing activity (Transfer PA);

- Inactivate for new procurement; and

- Cancel.

Note that these document disposition categories differ from those included in the ASSIST database because they include the category "Transfer PA."

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[6]Includes test method and manufacturing process and design criteria standards and handbooks as well as detailed and federal specifications.

[7]Includes interface and standard practice standards, specifications, and commercial item descriptions (CIDs).

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Most of the documents in this category were designated for transfer to DLA, which, as part of MSSR, formally requested that the services transfer PA for most commodity items it was already responsible for ordering.

As shown in the figure above, NAVSEA and NAVAIR's failure to complete MSSR by the self-imposed October 1998 deadline cannot be explained simply by the large number of documents for which they were responsible. Prior to MSSR, NAVAIR and NAVSEA managed approximately 8,000 documents combined, with NAVSEA alone responsible for roughly the same number of documents as the Air Force, which had about 4,000. However, according to various service briefings and databases tracking the status of MSSR, prior to June 1994 the Army had approximately 12,000 Mil-Spec and Mil-Std documents to manage, the largest number of all the services.[8] As mentioned above, both the Air Force and Army for the most part met the October deadline.

Instead, the probable explanation for the schedule differences across services lies in initial differences in the document dispositions they chose.

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[8]The data presented here are derived from various service briefings and databases that are not entirely consistent with each other. In a few cases, we have used our own judgment to assign Army and Air Force document actions to MSSR disposition categories consistent with those used by NAVAIR and NAVSEA. The broad pattern of the data is robust to any errors that may have been introduced as a result of this approach.

Mil-Spec/Stds Disposition Percentages: Comparing Workload Categories

Sources: Various reports on MSSR status by the USN SYSCOMS, Air Force, and Army.

Legend: DETAIL SPEC, PERFORMANCE, NGS, TRANSFER PA, INACTIVATE, CANCEL

Categories: NAVSEA, NAVAIR, USAF, USA
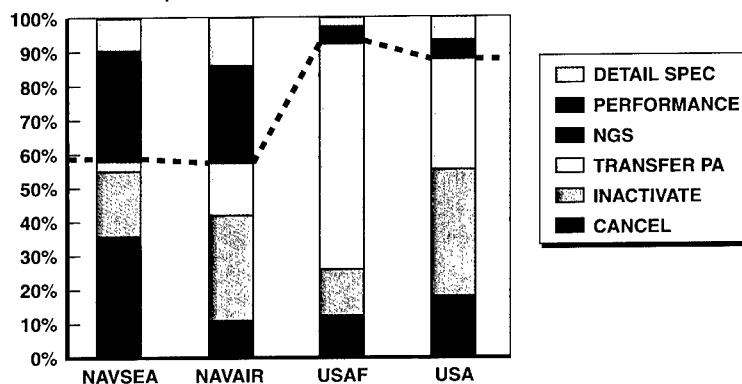
12   PRF Includes Interface & STD Practice STDS, SEPCS, and CIDS. DETAIL, Includes Test Method, MFG Process, & Design Criteria STDS, HDBKS, DTL & FED SPECS   RAND

The disposition categories that have the highest workload are those that require expensive and time consuming updates or conversion of Mil-Specs and Mil-Stds. The lowest workload categories are those involving the cancellation or inactivation of documents, or the transfer of document preparing authority. Many times, dispositions to these low workload categories can be achieved with the stroke of a pen.

As shown in the figure above, more than 40 percent of NAVSEA and NAVAIR documents fell into the three high workload categories, with NAVSEA placing proportionately more into the "Performance" category and NAVAIR placing proportionately more into the "NGS" category. For NAVSEA in particular, the "Transfer PA" category was a tiny fraction of the total.

In contrast, the Army and Air Force placed proportionately more of their documents in the three "low workload" categories than did either NAVSEA or NAVAIR. For example, over 90 percent of Air Force documents were placed in the "Cancel," "Inactivate," and "Transfer PA" categories. The "Transfer PA" category alone accounted for over 60 percent of Air Force documents, most of which were given to DLA. The Army also transferred over 30 percent of its documents, but chose to inactivate an even higher proportion (37 percent).

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Pre- & Post-MSSR Ownership of Specs and Standards

Source: DIA

Legend:
- June 1994 (41,000+ docs)
- February 1999 (31,000+ docs)

% of Total (y-axis: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45)

Categories: USA, USN, USAF, DLA, Other DoD

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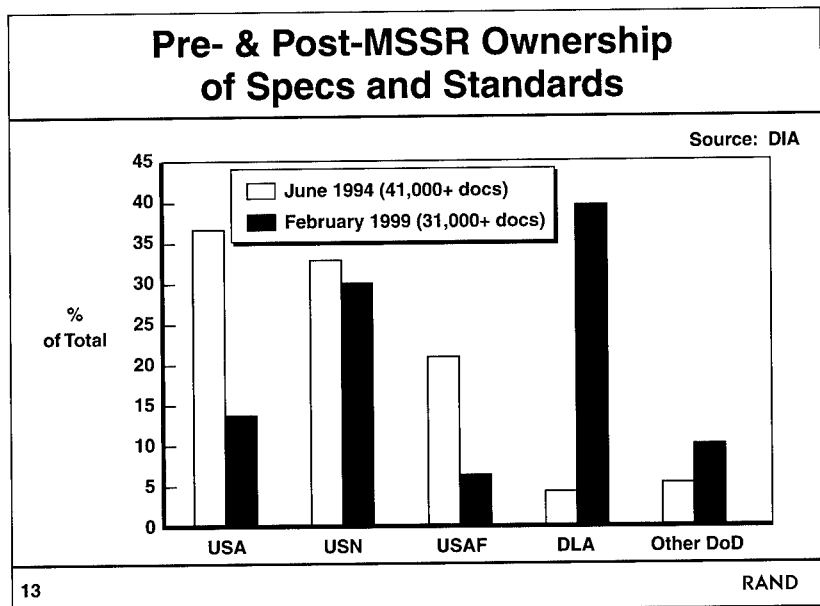
One outcome of the adoption of differing approaches to MSSR implementation, therefore, has been both a reduction and a redistribution of document preparing activity by and among the services and various DoD agencies. At the beginning of MSSR in June 1994, there were approximately 41,000 MSS documents. Of these, the largest percentage were owned by the Army (approximately 36 percent), followed by the Navy (33 percent), the Air Force (21 percent), and other DoD agencies (5 percent).[9] DLA owned the fewest number of MSS documents, with roughly 4 percent of the total.

By February 1999, this picture had changed dramatically. Out of roughly 31,000 technical documents still managed by DoD, the Army was responsible for 14 percent while the Air Force was managing just 6 percent. DLA's ownership of MSS documents had risen tenfold, to approximately 40 percent of the total. But the share managed by the Navy was almost unchanged at 30 percent.

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[9]These numbers, which were obtained from DLA, are slightly higher than those presented in the service databases, but they imply similar relative document responsibilities for the services.

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Hypotheses Explaining Differences in Outcomes

1. **Organizational and funding differences**

2. **Cultural differences**

3. **Differences in strategic approach**

4. **Significant differences in types of Mil-Spec/Stds and/or acquisition environment**

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To summarize, we observe three key differences in MSSR outcomes between NAVSEA and NAVAIR and the Air Force and Army:

1. NAVSEA and NAVAIR have retained control over a much larger percentage of their original MSS documents than the Air Force and Army;

2. Retaining control has meant that NAVSEA and NAVAIR put a much larger percentage of their original documents into high workload categories such as convert to NGS and convert to Mil-Prf; and

3. These high workload categories require more time and money than categories such as Inactivate or Transfer PA, with the result that, as of December 1, 1998, NAVSEA and NAVAIR were behind schedule and effectively out of money for MSSR completion while the Air Force and Army were essentially done.

Why have the Navy's document dispositions under MSSR differed so markedly from those chosen by the Air Force and Army? There are at least four hypotheses, not mutually exclusive.

The first hypothesis is based on differences in service organization and in

the control of budgets. The second focuses on differences in the acquisition "cultures" of the services. The third emphasizes differences in the strategic approach taken by service leadership toward MSSR. The fourth hypothesis points to cross-service differences in the types of Mil-Specs and Mil-Stds owned, as well as in the environment in which military acquisition takes place.

Hypothesis 1
Organization & Funding: Centralized Top-Down Management for USAF & USA

- **Centralized procurement organizations (AFMC, AMC) implement MSSR policy & control/protect funds**

- **Highest procurement authorities directly oversee efforts (SAF/AQ & SARDA, 4-Stars at AFMC/AMC)**

- **USAF examples:**
  - **AFMC team coordinates ALCs, R&D Centers**
  - **SAF/AQ Mil-Spec "scrub" teams for AFMC**

- **USA examples:**
  - **Standardized on ASSIST as sole benchmark**
  - **AMC Review & Analysis System: 2-Stars must report progress to Commander AMC**

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The first hypothesis is that differences in organization and control of budgets can account for the cross-service differences in MSSR outcomes. Several officials and observers with whom we spoke pointed to the centralized procurement organizations in the Air Force and Army that control and protect MSSR budgets, as well as implement MSSR policy, as fundamental to their ability to meet the October 1998 MSSR completion date.

In the Air Force, for example, the Assistant Secretary of the Air Force for Acquisition (SAF/AQ) directly oversees MSSR policy as part of the Air Force's broader AR efforts. SAF/AQ authorized "scrub teams" at Air Force Materiel Command (AFMC) to ensure that no Mil-Specs were being included in Air Force Requests for Proposals (RFPs). AFMC's responsibility for coordinating both the Air Logistics Centers (ALCs) and R&D centers put it in a position to make sure that MSSR implementation went forward. One factor contributing to the Air Force's willingness to relinquish control over so many documents was the engineering background of the Standards Improvement Executive (SIE), who was comfortable making difficult technical decisions. An even more important factor may have been the leadership of AFMC. Headed by a four-star general, its directives carried considerable weight. The centralized high-level Air Force leadership carefully

monitored budgets and the allocation of funds to make sure that MSSR was being carried out and completed within planned budget and schedule constraints.

In the Army, the Assistant Secretary of the Army for Research, Development and Acquisition (SARDA) played a role similar to that of SAF/AQ. As in the Air Force, Army Materiel Command (AMC) was key to MSSR implementation. Standardizing on the ASSIST database as the sole benchmark of progress, the Major Generals responsible for various aspects of Army MSSR were required to report regularly to the commander of AMC, a four-star general. An AMC review and analysis system, which included MSSR progress charts and clearly defined goals, gave the officers responsible for MSSR implementation strong incentives to meet their goals.

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│                    Hypothesis 1                           │
│    US Navy:  Decentralized Implementation and             │
│                   Funding Control                         │
├─────────────────────────────────────────────────────────┤
│                                                           │
│   •  SYSCOMS control implementation, fund expenditure     │
│        – No AFMC/AMC equivalent (NAVMAT)                   │
│                                                           │
│   •  An alleged NAVAIR problem                             │
│        – 1995:  plan and funding seem in place             │
│        – MSSR money to SYSCOMS in O&M accts,  not fenced in│
│        – Reductions at DoN level                          │
│        – NAVAIR reductions of over 50% as money moved to  │
│          other O&M activities                             │
│                                                           │
│   •  NAVSEA:  internal cost structure means adequate      │
│      funding never existed?                               │
│                                                           │
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│  16                                               RAND    │
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In contrast to the Army and Air Force, the Navy has had no equivalent to AFMC or AMC since the dissolution of Naval Materiel Command (NAVMAT) in 1985. With the advent of MSSR, each SYSCOM became responsible for devising its own implementation schedule and controlling its own funding. They had great flexibility because the MSSR monies resided in fairly unrestricted operations and maintenance (O&M) accounts.

In the case of NAVAIR, both the MSSR plan and its budget were generally perceived as adequate at the beginning of MSSR implementation in 1995. In response to budget cuts at the DoN level, however, NAVAIR began to seek ways to maintain existing O&M activities. By the beginning of FY97, over 50 percent of its MSSR budget had been transferred to other O&M activities. This was possible because no centralized NAVMAT organization existed to oversee implementation and enforce discipline on the SYSCOMs regarding their use of monies originally budgeted for MSSR.

In the case of NAVSEA, there is some question as to whether its internal cost structure precluded effective MSSR from the very beginning. Further investigation is needed to clarify the issues involved.

Hypothesis 2
NAVAIR/NAVSEA Acquisition Organizational "Cultures"

- **Working level resistance to revolutionary change**
- **Long established system engineering approach**
- **Training/capabilities to implement reform?**
- **High-work content for NGS & Perf Specs conversion = job slots, budget**
  - **Conversion cost est. per spec (NAVAIR/SEA)**
    - **NGS = $15K/$25K**
    - **Perf = $32K/$40K**
    - **Detail = $6-15K/?**
  - **NAVAIR total NGS workload = ~ 50 man/years**

17   RAND

A second hypothesis put forward to explain NAVAIR and NAVSEA's reluctance to relinquish preparing activity for many Mil-Spec and Mil-Std documents emphasizes the role of organizational "culture." According to this hypothesis, the SYSCOMs—and in particular NAVAIR and NAVSEA—have long had a working level resistance to revolutionary changes such as those introduced by MSSR. Their traditional system engineering approach to problem-solving tends to be slow and methodical, and dramatic departures from established practices are viewed with suspicion. Further, it has been argued that the SYSCOMs have insufficient technical personnel to undertake the technically demanding tasks of transforming Mil-Specs into performance specifications (Mil-Prfs), or of assessing NGSs to see whether they are appropriate for military applications. In many cases, the SYSCOMs' technical personnel either lack the training to make these types of conversions and assessments, and/or do not exist in sufficient numbers to expeditiously process the large number of documents placed in high workload categories.

However, a less generous version of the organizational culture hypothesis points to the large amount of work required to convert detailed Mil-Specs and Mil-Stds to NGS and Mil-Prfs. This means retaining or increasing jobs

and budgets in an era of downsizing and cutbacks. According to estimates provided by NAVAIR, to convert one Mil-Spec document to an NGS costs $15,000; to convert to a performance specification costs $32,000; and to update an existing detailed Mil-Spec costs between $6,000 and $15,000. For NAVSEA, the estimates are even higher: $25,000 per NGS conversion and $40,000 per performance specification conversion. Given these estimates, NAVAIR's NGS workload alone would require approximately 50 man-years for completion.

Hypothesis 3
Differences in Implementation Strategies: USAF's "Recoverable" Strategy

- **SIE concludes insufficient money, time & resources for NGS and PRF conversions**
- **Solution**
  - No NGS unless active outside interest; Centers pay for maintenance
  - Place MIL-PRF in Inactivate; convert/waiver later
  - Transfer to DLA (mostly commodities, reproc)
- **A "recoverable" strategy with manageable risk**
  - High quality performance based solicitations
  - Contractor specs, TDPs for reprocurement
  - Contracts vs. solicitations--SPM waiver authority
  - Concerns remain over DLA PA

RAND

The third hypothesis emphasizes differences in the strategic approach taken by the AR leadership in the different services. In the Air Force, for example, the SIE concluded quite early on that there was insufficient money, time, and resources to perform NGS and Mil-Prf conversions adequately. Therefore, the SIE directed that documents not be converted to NGS unless there was both active outside interest and Air Force centers with PA were willing to pay for maintenance of the NGS out of their own budgets. Similarly, most documents that were candidates for conversion to Mil-Prfs were inactivated, with the convert or retain decision simply put off until such time as it had to be made. And, as illustrated in previous charts, by far the majority of Air Force Mil-Spec and Mil-Std documents were simply transferred to DLA. Most of these, the Air Force claims, were essentially commodity goods, already managed and maintained by DLA.

Some of the Air Force officials we interviewed described their approach to MSSR as a "recoverable" strategy in which risks were recognized but considered manageable. Although there were concerns about transferring document ownership to DLA, these were mitigated by the belief that performance specifications could and would be carefully written on a system-by-system basis for future RFPs. Officials also assumed that existing contrac-

tor specifications and technical data packages (TDPs) would facilitate reprocurement. Further, while DoD policy directs that Mil-Specs and Mil-Stds may no longer be used in solicitations, it does not preclude contractors from using these documents in their proposals. The Air Force has received a waiver from OSD that allows System Program Managers (SPMs) to place processes on contract if, in their judgment, doing so represents the best business practice in that situation.

Hypothesis 3
Differences in Implementation Strategies:
USA's Variation on the Same Theme

- **NGS & PRF conversions kept to same minimum percentage as USAF**

- **Most commodity specs requested by DLA transferred**

- **Higher percentage of specs compared to USAF moved to "Inactivated" category**
    - **Remain under USA PA**
    - **Convert or waiver later if necessary**

19   RAND

The Army's MSSR implementation strategy was in most ways similar to that of the Air Force: NGS and Mil-Prf conversions were kept to a minimum, and most of the commodity specifications requested by DLA were transferred. However the Army moved an even higher percentage of documents to the "Inactivate" category, putting off until later the decision either to retain them through a waiver as detailed military specifications, or to convert them.

Differences in Implementation Strategies:
Some Observations on USAF/USA Approaches

- **MSSR completion within schedule/budget: highest priority for USAF & USA**

- **Centrally managed with strong advocacy leadership**

- **A certain degree of expediency is evident in solutions selected**

- **USAF especially admits risks involved**

- **Bottom line: both argue they adopted most cost-effective approach & risks are manageable**

20   RAND

For the Air Force and the Army, the highest priority for MSSR was to complete it within schedule and within budget. In both services the MSSR process was centrally managed, with an acquisition leadership that pushed hard to achieve schedule- and budget-related goals. Consequently, a certain degree of expediency is evident in the solutions they chose. The Air Force in particular acknowledges that, by transferring so many documents to DLA, they may have increased the risk of procuring some items that underperform. In particular, the Air Force worries that DLA lacks the technical expertise to properly assess its requirements. Or, even if DLA has the expertise, the resultant workload after MSSR might be too big to handle given current DLA staffing. Nevertheless, both the Air Force and the Army assert that their approach to MSSR was cost-effective, and that the risks are manageable.

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┌─────────────────────────────────────────────────┐
│                  Hypothesis 3                    │
│          NAVAIR & NAVSEA Strategies              │
├─────────────────────────────────────────────────┤
│                                                  │
│  • NAVAIR                                        │
│       – Retain influence:  < 30% canceled/transferred │
│       – Original emphasis on PRF, but too costly │
│       – Emphasize NGS; work closely with industry grps; │
│         many NGS are same/similar to MIL-SPECS   │
│                                                  │
│  • NAVSEA                                        │
│       – Retain influence:  <40% canceled/transferred │
│       – Minimal PA transfer                      │
│       – Emphasize PRF                            │
│                                                  │
├─────────────────────────────────────────────────┤
│  21                                      RAND    │
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The MSSR strategies adopted by NAVAIR and NAVSEA differed considerably from those adopted by the Air Force and Army. NAVAIR has chosen to retain control over the majority of its documents, canceling or transferring less than 30 percent of them. Originally, NAVAIR intended to convert many documents from detailed Mil-Specs to Mil-Prfs, but eventually concluded that this type of conversion would be too costly. Instead, NAVAIR has emphasized NGS conversion, working closely with industry groups to that end.
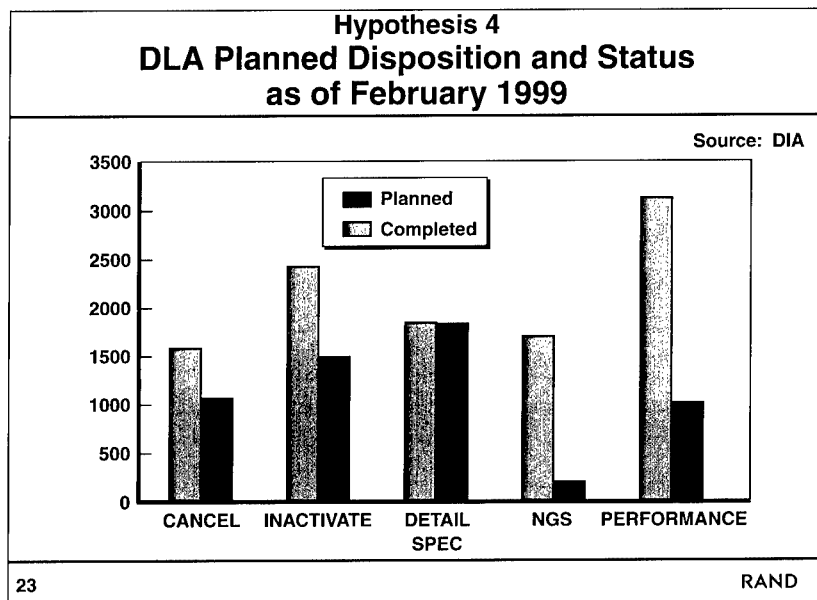
NAVSEA has been only slightly less willing to relinquish control over its documents than NAVAIR. In particular, NAVSEA's transfers of preparing activity to DLA have been minimal. Unlike NAVAIR, NAVSEA's MSSR strategy continues to emphasize Mil-Prf conversion.

Hypothesis 4
NAVAIR and NAVSEA Rationale: Claim Differences Based on Substantive Issues

- **Doing what we are supposed to do (NGS, PRF), but with inadequate funding from DoN**

- **USAF & USA strategies violate spirit of AR**
  - Gave NGS, PRF to DLA which hasn't done job
  - DLA will seek USAF/USA help anyway

- **High risk: DLA lacks system knowledge, buys to price, depends on industry info**

- **Naval materiel and industry are unique, especially for surface combatants**
  - Little competition, or commercial business
  - Limited combatant design capabilities
  - System prototyping not possible

22   RAND

When asked to justify why their progress on MSSR has been slow relative to the other services—and relative to other SYSCOMs within the Navy—NAVAIR and NAVSEA argue that their strategies, which for both SYSCOMs emphasized conversion rather than cancellation or transfer of documents, reflect the true spirit of MSSR. They believe that insufficient resources were made available for the task. They point out that, by transferring so many documents to DLA, the Air Force and Army have also effectively transferred most of their MSSR responsibility to DLA, which also has not yet completed MSSR. Further, because they believe DLA personnel lack the technical training necessary to perform MSSR, NAVAIR and NAVSEA argue that the burden of converting many of those documents will eventually fall back onto the Air Force and Army.

The two SYSCOMs also argue that document transfer to DLA is a high risk strategy. According to NAVAIR and NAVSEA, DLA's lack of system-specific knowledge, particularly in the uniquely demanding and stressful environment of naval combat, sometimes leads it to buy the cheapest, rather than the most cost-effective, items. And because of their lack of technical training, DLA personnel must rely on industry sources for information on the characteristics and capabilities of many items. This too can result in non-cost-effective procurement.

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The final rationale for NAVAIR's and especially NAVSEA's MSSR strategies is that the unique nature of naval materiel, and of the military shipbuilding industry in particular, makes acquisition reform measures in general—and not just MSSR—problematic to implement. For surface combatants in particular, where competition among suppliers is limited and commercial customers are almost nonexistent, NAVSEA argues that an independent commercial design capability does not and perhaps cannot exist. Combat ships are so large and expensive that competitive prototyping is infeasible. Furthermore, it is argued, commercial standards are often inappropriate for the highly stressful and demanding environment of modern naval warfare. Nuclear submarines are particularly unique, with no commercial equivalent on the system or sub-system levels.

Hypothesis 4
DLA Planned Disposition and Status
as of February 1999

Source: DIA

(Chart legend: Planned, Completed)

Categories: CANCEL, INACTIVATE, DETAIL SPEC, NGS, PERFORMANCE

23   RAND

As illustrated in the chart above, DLA does have a lot to do before its own MSSR process is complete. In particular, less than one-third of the document actions involving conversion to NGS and Mil-Prfs has been completed.

DLA, however, does not face the same types of schedule and budget constraints faced by the services. For example, DLA has not set a target date for completion of MSSR and it would be difficult for DLA to do so because it can not control the timing of document transfers from the services. DLA's budget structure is also quite different from the structure of the service budgets. Instead of covering its costs out of a fixed annual "pot," DLA passes them on to the services in the form of a higher "tax" on DLA-procured materiel. Costs associated with MSSR, therefore, will be covered as they are incurred.

Elements Affected by Determination of Correct Hypothesis(ses)

- **Level of additional funding required or desirable**

- **Source of funding**

- **Centralized or decentralized implementation**

- **Focus on in-house or contractor implementation**

- **Assessment of SYSCOM's planned dispositions**

24   RAND

The four hypotheses explaining why Navy MSSR had not yet been completed as of December 1998 could have quite different policy implications for the Navy. For example, the hypotheses could potentially imply differences in

- Whether or not additional MSSR funding is required or desirable;

- What the best source of funding for MSSR completion would be;

- Whether MSSR implementation should be centralized;

- Whether MSSR implementation should be conducted in-house or subcontracted out; and finally,

- Whether or not NAVAIR and NAVSEA's planned MSSR dispositions are appropriate.

Basic Options for USN AR Office and Some Potential Pitfalls

- **Do nothing; continue current funding plan, approach**
  - Slow, costly road to completion of MSSR
  - Risks preemptive OSD cancellation or placement in "Inactive" category

- **Seek add-on funding from OSD/DoN**
  - Low probability of success
  - Needs far more rigorous justification of current approach

- **Require SYSCOMS to resolve quickly with current funds**
  - No coherent USN implementation policy
  - Risks sub-optimal outcome for USN as whole

25   RAND

Given the different implications of each hypothesis, what are the options available to the USN AR office? One option is simply to do nothing and continue with the current funding and approach. The risk associated with this strategy is that OSD will preempt the process by pushing the Navy to either indiscriminately cancel all or most of its remaining documents outright or place them in the "Inactive" category.

A second option is also to keep the current dispositions as planned, but to seek add-on funding from OSD/DoN to speed up the completion process. Given OSD and DoN funding priorities and constraints, however, this option has a low probability of success. At minimum, for it to succeed would require a far more rigorous justification of NAVAIR and NAVSEA's approach to MSSR than they have yet been able to offer.

Finally, a third option is to require NAVAIR and NAVSEA each quickly to complete MSSR with funds that have already been budgeted. This option would require the SYSCOMs to trade off between expensive MSSR conversions and their other O&M priorities. However, as it would likely force NAVAIR and NAVSEA into making fast, ad-hoc decisions, this option would tend to compromise any consistent, coherent USN policy towards MSSR.

Next Steps

• **Continue assessment of 4 hypotheses**
 	
• **Explore possible options for reducing costs, speeding process of NGS, PRF conversion (eg. outsourcing)**
 	
• **Re-evaluate consequences of different dispositions in light of 4 hypotheses, especially increasing...**
    – Transfers to DLA, other PA
    – Inactivate category
    – Cancel category
 	
• **Examine MSSR implementation in AR pilot programs for cost-benefit assessment**
    – USN: DD-21, LPD-17, ASP, CVX, AAAV
    – USN/USAF: JDAM, JASSM, JPATS
    – USA/USAF: F-22/Comanche CNI

26   RAND

To help inform the Navy's choice among the options described above, we suggest four additional steps RAND might take in its research. One important step would be to further identify and collect data and information that would allow us to assess which hypothesis best explains the Navy's MSSR experience.

A second step would be to explore the options available for reducing the cost and speeding the process of converting documents to NGS and Mil-Prfs. For example, outsourcing of the document conversion process might be appropriate and efficient in some cases.

A third step would be to evaluate, in light of the hypothesis or hypotheses that best explain the Navy MSSR experience, the consequences of changing the NAVSEA and NAVAIR's original MSSR dispositions. In particular, it would be interesting to consider what might happen if the two SYSCOMs chose to reduce their MSSR costs by increasing the number of documents in the "Inactivate," "Cancel," and "Transfer PA" categories.

Finally, to better understand the costs and benefits of the various MSSR strategies, it would be useful to examine how well MSSR implementation has worked in some important AR pilot programs. Candidate programs

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include the Navy's Twenty-First Century Destroyer (DD-21), Amphibious Assault Ship (LPD-17), Arsenal Ship (ASP), Next Generation Aircraft Carrier (CVX), and Advanced Amphibious Assault Vehicle (AAAV) programs; the Navy/Air Force Joint Direct Attack Munition (JDAM), Joint Air-to-Surface Stand-Off Missile (JASSM), and Joint Primary Aircraft Training System (JPATS) programs; and the Army/Air Force Comanche/F-22 communications, navigation, and identification (CNI) program.[10]

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10 The Arsenal Ship Program has been canceled, but its lessons are still relevant.

CONCLUSION

The analysis and options presented here were briefed to the Navy Acquisition Reform Office on 5 March 1999. At that time, the sponsor concluded it had enough information to make a decision on MSSR. The sponsor invited RAND to attend a meeting of the SYSCOM standardization executives on 16 July 1999 in order to present the findings and assist in implementation approaches as needed. At that meeting, the decision was made to establish a September 1999 deadline for each SYSCOM to complete MSSR with already budgeted funds. The stated expectation was that the two SYSCOMs would probably choose to reduce their MSSR costs by increasing the number of documents in the "Inactivate," "Cancel," and "Transfer PA" categories.