The National Center for Advanced Technologies

An Evaluation and Assessment of the DoD Commercial Operations & Support Savings Initiative

Final Report of the DoD COSSI Program Independent Assessment Executive Roundtable

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The National Center for Advanced Technologies
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Executive Summary

Overview

The Department of Defense Commercial Operations and Support Savings Initiative (COSSI) Independent Assessment Executive Roundtable was sponsored by the Deputy Under Secretary of Defense for Science and Technology as well as by the Office of the Secretary of Defense (OSD) Office of Technology Transition. The members of the Executive Roundtable were requested to evaluate the Commercial Operations and Support Savings Initiative (COSSI) Program and recommend possible improvements.

The Executive Roundtable met to examine the COSSI Program in June 2001. Extensive background materials on the COSSI Program were provided to the Roundtable members and they also received a wide variety of briefings and materials on the COSSI Program from the Office of the Secretary of Defense during the Roundtable's meeting. Case study presentations of four COSSI exemplar projects were also presented.

The essence of the Executive Roundtable's findings is that the Program has been increasingly successful in meeting its goals, especially those of reducing Operations and Support (O&S) costs and involving commercial industry but that it has been prevented from reaching its full potential due both to insufficient funding and certain policy/legislative restrictions. The Executive Roundtable's recommendations center on:

- Increasing the available funding for COSSI Stage One projects,
- Enhancing the ease of transition from Stage One (development and qualification) to Stage Two (production),
- Continuing and expanding the use of innovative contracting methods (e.g., Other Transaction for Prototypes), and
- Changing DoD policies and congressional statutes that restrict COSSI Stage Two funding mechanisms and hamper the transition of COSSI technologies and products from development to production.

Findings

The overall findings presented below are divided into in two sections, the first dealing with the specific objectives of the COSSI Program (Achieving COSSI Program Objectives) and the second (Improvements to the COSSI Process) with overarching observations and conclusions developed by the members of the Executive Roundtable during their deliberations.

Achieving COSSI Program Objectives

The COSSI Program is meeting its three specific program objectives:

- It has been successful in reducing operations and support costs for legacy systems. However, its potential has been handicapped by a funding level that is less than a third of that which is needed to allow it to achieve its full potential.
- Prototype development has been simplified through extensive use of Other Transaction for Prototype (Section 845) Authorities (OTA). COSSI is the leader in the Department of Defense for use of this Authority—and continued use of OTAs is an enabling factor for the COSSI Program to meet its objective. In fact, the expansion of the use of OTAs from just prototype development to include the transition to production as well is essential to the COSSI Program being able to achieve its full potential. Regrettably, the use of OTAs may be somewhat curtailed by certain DOD policies restricting the use of cost sharing in research and development contracts, combined with new Congressional restrictions on the use of OTAs when cost sharing is not employed.
- COSSI has been successful in attracting commercial firms (either as prime contractors in their own right or teamed with traditional defense contractors) to the defense market, thus making advanced commercial technology available for insertion into legacy defense systems. However, certain DoD policies and legislative statutes may restrict the Programs full potential with respect to attracting new/more commercial participants to the COSSI Program.

Improvements to the COSSI Process

- The Roundtable was able to suggest several improvements that should be made in COSSI funding levels and methods; as well as to identify improvements that should be made to the COSSI Program in order to help it meet its objective of leveraging private sector research and development by inserting leading edge commercial technologies into fielded military systems to reduce operations and support costs.
- Due to Service reductions to their COSSI funding lines for Fiscal Year (FY) 2002 and later years, the Roundtable determined the COSSI Program was very far below the size required in order for it to achieve its potential. Even at its previous size it was well short of what was needed and funding should be increased by an order of magnitude from its current levels.
- Changes to DoD policy and the legislative statutes that guide and direct the COSSI Program would enhance the ability of the COSSI Program to meet its current objectives (including attracting more commercial firms), transition more projects to production, and increase the already impressive return-on-investment potential inherent in the COSSI Program.

Recommendations

In accordance with its Terms of Reference (See Appendix B), the Executive Roundtable has recommended a variety of legislative and policy enhancements to the COSSI Program to enhance its ability to meet its goals and increase the favorable effects it has had in reducing O&S costs. In general, COSSI Program recommendations are provided relative to (1) the formal objectives of the COSSI Program and (2) general changes in legislation and DoD policies which would benefit the COSSI Program and which have strong potential to further reduce DoD O&S costs.

The candidate DoD and Service organization(s) that would be responsible to take action regarding the Executive Roundtable's recommendations have also been suggested where appropriate.

Reducing Operations and Support (O&S) Costs for Legacy Systems

- Increase the emphasis and visibility of readiness by including measurement of and improvement in the readiness metrics applicable to the targeted legacy systems in the COSSI Project Call.

  ACTION: Office of the Principal Deputy Under Secretary of Defense for Logistics (OPDUSD(L)), Office of the Deputy Under Secretary of Defense for Science and Technology (ODUSD(S&T)), Service S&T Executives, Service Logistics and Materiel Commands/Agencies

Simplifying Prototype Development by Using Other Transaction Authority (OTA)

- OTAs should be used for the COSSI Program. If necessary, an exemption to the recent mandatory cost sharing legislation requirements (applicable when OTAs are employed) should be sought from the Congress. The Roundtable members believe that in general cost sharing should not be required when contracting for research and development; however, given the (recently enacted) current statutory requirement for cost sharing when using OTAs, DoD should permit cost sharing for research and development if OTAs are employed.

  ACTION: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD(ATL)), Office of the Director of Defense Research and Engineering (ODDRE), Office of the Assistant Secretary of Defense for Legislative Affairs (OASD(LA))

- Because the use of OTAs for COSSI is essential for the Program to achieve its full potential and gain the full benefit of Commercial Industry participation, DoD should seek legislation to allow the use of OTAs for COSSI Stage Two production contracts. This legislation should be sought in the context of a COSSI-only pilot initiative.

ACTION: ODDRE, OUSD(ATL), OASD(LA)

COSSI and Commercial Industry Participation

- The emphasis on the use of OTAs should be maintained for all COSSI participants. Use of the innovative COSSI Stage One contracting mechanisms (i.e., OTAs) is also useful in attracting defense firms or helping defense firms partner with commercial firms.

  ACTION: ODDRE, Services

- Metrics should be developed to determine (and track) if the COSSI Program's objective of bringing in non-DoD contractors is being fully achieved. Raw percentages regarding commercial industry participation are certainly useful and do show the Program is on the right track—however a smaller granularity is needed over a more lengthy timeline to fully establish this point.

  ACTION: ODDRE, Services

COSSI Funding Level/Size of COSSI Projects

- The DoD funding for the COSSI Program should be increased immediately to its original $50-60 million per year baseline average (the average of Service and OSD funding lines FY 1997-2001). The Department of Defense should then embark on a funding buildup, at a sustainable rate, to at least $150 million per year for COSSI (i.e., about $50 million per Service). This should be accompanied by submission to the Congress of a plan for COSSI that sets the future direction and vision for the COSSI Program.

  ACTION: OUSD(ATL), Office of the Assistant Secretary of Defense (Comptroller) (OASD(C))

- Due to lack of Service funding commitment to the COSSI Program, all COSSI funding should be consolidated in the Office of the Secretary of Defense while execution of the Program remains in Service hands.

  ACTION: OUSD(ATL), OASD(C)

Changes that Could Improve COSSI Program Results and Return on Investment

- Explore the possibility of setting up a mechanism such as a "revolving fund" to both funnel all of the COSSI-generated savings back to the sponsoring Military Service and to help fund the COSSI Program.

  ACTION: ODDRE, OASD(C)

- Continue to audit the Program to trace and validate the projected O&S savings to assist in measuring and justifying the Program.

ACTION: ODDRE, OPDUSD(L), Services

Cost Sharing Policies and Practices in the COSSI Program versus Use of OTAs

- The emphasis on cost sharing requirements in the COSSI Program within OSD and the Congress should be reduced.

  ACTION: ODDRE, OASD(LA)

- The use of Section 845 Other Transactions for Prototypes Agreements should continue to be very strongly encouraged in order to help encourage commercial industry participation and retention in the COSSI Program.

  ACTION: ODDRE

- Legislative relief should be sought to allow the COSSI Program to use Section 845 OTAs notwithstanding whether cost sharing is employed. This legislative relief would be sought only for COSSI and should note that cost sharing will still be sought where appropriate (e.g., there is a strong potential commercial market for the modified defense technology or product.) The rationale should be that since COSSI Program normally involves technology or product items that have already been developed and are being applied to a defense purpose, relief from the Section 803 cost sharing language would be appropriate.

  ACTION: ODDRE, OASD(LA)

COSSI Stage Two Contracting and Commercial Industry

- Competition is important. However, legislation should be enacted for the COSSI Program to ensure Stage One projects are selected competitively, while at the same time including target prices for Stage Two. The transition from prototype (Stage One) to Production (Stage Two) should be allowed without the requirement for recompetition if the pre-negotiated target prices are met.

  ACTION: OUSD(ATL), OASD(LA)

- Additional legislation should be sought to allow the COSSI Program use of the simplified Section 845 contracting authorities for Stage Two procurements. These new authorities and/or exemptions should be limited to the COSSI Program.

  ACTION: OUSD(ATL), OASD(LA)

- Where use of OTAs for COSSI Stage Two is not possible or appropriate, there should be statutory authority to transition directly into FAR Part 12 contracts without recompetition (i.e., transition directly from COSSI Stage One (development and test) to COSSI Stage Two (production) without recompetition using FAR Part 12 (Acquisition of Commercial Items))

ACTION: OUSD(ATL), OASD(LA)

Transition Funding and Funding Methods for COSSI

- The emphasis on obtaining Service "customer" funding commitments to COSSI Stage Two should be continued and even strengthened.

  ACTION: OUSD(ATL), Services

- An unallocated DoD-level budget program containing funding for COSSI technology transition should be implemented. This would be modeled on the Army's Warfighter Rapid Acquisition Program (WRAP). The funding would be allocated at Department of Defense level and the Department should provide full reporting to Congress on what it is doing in order to provide Congressional accountability. The amount of funding should be at least $100 million per Service (but controlled/allocated at DoD-level) to fund initial production and allow/encourage rapid transition from COSSI Stage One to Stage Two to maximize O&S cost savings.
- *ACTION: OUSD(ATL), OASD(C), OASD(LA)*

Introduction

Background

The Executive Roundtable Independent Assessment

The Deputy Under Secretary of Defense for Science and Technology, and the Office of the Secretary of Defense (OSD) Office of Technology Transition sponsored the Department of Defense Commercial Operations and Support Savings Initiative (COSSI) Independent Assessment Executive Roundtable ("the Roundtable").

The members of the Executive Roundtable were asked to:

- Evaluate the COSSI Programs' progress in achieving its objectives of:
  1. Reducing operations and support (O&S) costs for legacy systems (primarily by improving the sustainment/readiness of fielded systems and reducing total ownership costs),
  2. Simplifying prototype development by using Other Transaction Authority (thus helping implement acquisition reform), and
  3. Attracting commercial firms to the defense marketplace (thus helping promote military/civil integration).

- Identify to the Department of Defense improvements that could be made to the COSSI Program to help it meet its objective of leveraging private sector research and development by inserting leading edge commercial technologies into fielded military systems to reduce operations and support costs.

- Discuss what the appropriate size of the COSSI Program should be in light of both current goals and any potential changes in those goals identified by the Panel.

- Identify what if any changes should be made to the statutory provisions and DoD/Service policies and procedures that currently direct and guide the management and execution of the current COSSI Program.

A list of the Chairman and Members of the Executive Roundtable is at Appendix A. A copy of the approved Terms of Reference for the Executive Roundtable is at Appendix B.

The Commercial Operations and Support Savings Initiative (COSSI) Program

The COSSI Program was formally established under statute by Section 203 of *The National Defense Authorization Act for FY 1998* (Public Law 105-85 § 203(g)). Its origin can be

traced to efforts begun under the Joint Dual Use Applications Program (DUAP) Office in FY 1997 to provide "seed money" to insert leading edge commercial technologies into legacy defense systems.

Initially, the COSSI Program was managed by the Defense Advanced Research Projects Agency (DARPA) but was transitioned to the Military Services in FY 1999. It was initiated to introduce commercial technologies into already-fielded military systems in order to reduce operations and support costs.

The COSSI Program involves a two-stage process. Stage One projects are always targeted towards a specific legacy defense system. During Stage One, modifications are made to the existing core commercial technology product, which results in a prototype suitable for military use. Stage One normally lasts two to three years. The specific type of funding for COSSI Stage One is Research, Development, Test, and Evaluation (RDT&E) funding and is provided through the COSSI Program.

In Stage One of COSSI, a partnership between Industry and Government normally has been established in order to share the costs of performing the nonrecurring engineering and testing needed to adopt a commercial technology for military purposes.[1] The nonrecurring engineering is that needed to adapt the commercial technology item for use in a military system. It also includes any engineering required on the legacy system in order to prepare it to receive the COSSI-developed item. The qualification testing demonstrates to the Military Service "customer" (both the program office and the user) that the new item being inserted in the legacy defense system will not degrade system-level performance and does in fact yield the expected savings in operations and support costs.

COSSI Stage Two consists of the formal acquisition of production quantities of the item developed and qualified in Stage One. Given that the Stage One COSSI project is successful, a military customer purchases the resulting product and inserts it into the designated military system(s) in Stage Two. COSSI funds Stage One projects only. Procurement or Operations and Maintenance (O&M) funds from the Military Service's program office customer are used to fund Stage Two quantity procurement of the item developed and qualified for use during COSSI Stage One.

The COSSI Program has initiated 77 projects from FY 1997 through FY 2001. The COSSI Program has invested about $234 million in these 77 projects through FY 2000 and Industry has contributed about another $143 million over the same period. Most (58) of the projects have involved total government funding of $4 million or less for the individual Stage One COSSI projects. Yearly funding for the COSSI Program is shown below in Table 1 (See Next Page). Note the lack of Service funding currently programmed for FY 2002.

[1] Cost sharing between Industry and the Government was a consistent feature of the COSSI program from its inception until FY 2001. However, recent statutory and DoD policy restrictions have since reduced the emphasis on cost sharing effective with the FY 2002 COSSI program.

COSSI Program Funding FY 1997 - FY 2002 ($ Millions)						
	FY 1997	FY 1998	FY 1999	FY2000	FY 2001	FY 2002
Air Force	0	0	15.9	20.5	19.9	0
Navy	0	0	16.5	21.7	12.5	0
Army	0	0	16.6	30.6	9.9	0
OSD	0	0	8	12	9.6	10.8
DARPA	50	50	0	0	0	0
Total	50	50	55	84.8	51.9	10.8

Table 1. COSSI Program Funding by Fiscal Year

COSSI projects are solicited each year by means of a COSSI Project Call issued by the Director, Defense Research and Engineering (DDR&E). The proposals are evaluated by the Military Services based on six criteria:

- The amount of potential O&S cost savings
- Commitment from a military "customer" to transition the product of COSSI Stage One into a Stage Two procurement
- The technical and management approach
- The commercial technology being leveraged
- The amount of the proposed non-Government cost share[2]
- Equivalent system performance.

The COSSI Program normally expects to receive an aggregate number of proposals that exceed by at least a factor of two the funding available. Recently, the Program has received three times the number of proposals for which it has funding. This has allowed only the top proposals to be selected for funding.

A feature of the COSSI Program from its inception through FY 2001 has been the required use of the Other Transaction Authority for Prototype (OTA) for contractual agreements. This Authority was first authorized by Section 845 of the FY 1994 National Defense Authorization Act. This authority allows for a "clean sheet of paper" approach to defense contracting, wherein most of the complicated government contracting procedures can be deemed not to apply. This can vastly simplify the often-onerous contracting procedures required to be employed elsewhere in the Department of Defense. As these conventional contracting procedures have often been cited as a barrier to participation by commercial industry in defense projects, use of OTAs was thought to be an inducement for them to

[2] Starting in FY 2002, a non-Government cost share will no longer be required.

participate in the COSSI Program and thus facilitate the DoD's having access to the most current technologies.

The use of OTAs is restricted to COSSI Stage One efforts only. Currently, COSSI Stage Two efforts require the use of normal government contracting procedures under the Federal Acquisition Regulations (FAR) for volume procurement of the prototype item developed and tested in Stage One.

Approach

The Executive Roundtable met in June 2001. Extensive background materials on the COSSI Program (including a recent DoD IG Report on the COSSI Program and the most recent COSSI Project Call) were provided to the Roundtable members prior to the meeting for their review. The members of the Executive Roundtable also received extensive briefings and materials on the COSSI Program from the Office of the Secretary of Defense.

The members of the Executive Roundtable also received four presentations on COSSI exemplar projects. Each detailed experiences with the COSSI Program from either a Service's or commercial firm's viewpoint. These exemplar programs included:

- The Helicopter Health and Usage Monitoring System, or HUMS (Goodrich Aerospace). The HUMS program provided a viewpoint of the COSSI Program from a contractor with more commercial than defense business, and for whom the defense business was usually as a second-tier sub contractor. In this instance Goodrich operated as the prime contractor. In this case a defense contractor did a commercial application of the product/technology first, then spun it into the DoD (and is preparing to spin it out again to a commercial application).
- The Movement Tracking System (ComTech Mobile Datacom Corporation). The Movement Tracking System (MTS) involved a commercial contractor with little/no previous defense business background. The contractor took commercial MTS technology, improved it using COSSI funding, and then effectively applied it to a DoD need. Then they spun off the improved technology for use in the commercial sector, where there is a very much larger market. The Government COSSI funding in this case was used to reduce risk, and the reduction in risk helped make the business case.
- U.S. Navy COSSI Projects (Naval Air Systems Command). The Navy COSSI projects were all from the Naval Air Systems Command and showed the COSSI Program from a Service perspective that involved many individual projects—several of which were applicable to more than one Service and produced expanded savings accordingly.
- The MILSTAR Antenna Program (USAF Electronic Systems Center). The MILSTAR Antenna program also showed the COSSI Program from a Service viewpoint but involved just one project. It represented use of a commercial technology and set of commercial practices, versus using an already existing commercial technology/product as other COSSI projects have done. The commercial technology had not been previously used in a military application.

More complete summaries of the above projects and their experience with the COSSI Program are provided in Appendix C of this Final Report.

The Executive Roundtable members were all knowledgeable regarding the COSSI Program, in some cases extremely so. Members of the Roundtable had previous experience with and knowledge of the legislative history of the COSSI Program from its inception, how it had been administered and managed within the Office of the Secretary of Defense and the Military Services, and how Industry (commercial and defense) had reacted to and participated in the Program.

In addition to presentations on specific COSSI projects, the members of the Executive Roundtable received briefings and extensive materials on the COSSI Program from the Office of the Secretary of Defense (Office of Technology Transition) as well as from outside experts on such issues and areas as:

- Background and history of the COSSI Program
- Section 845 Other Transactions for Prototypes Authorities,
- Recent legislative changes that impact the COSSI Program,
- Results of recent reviews of the COSSI Program by the General Accounting Office and the Department of Defense Inspector General's Office, and
- Results of surveys of the companies (both commercial and traditional defense firms) and Government program offices that have participated in the COSSI Program.

After (and during) the presentations offered to the Executive Roundtable the members commented extensively on the results achieved and current status of the COSSI Program and also discussed the findings and recommendations that should be captured in their Final Report. This report presents the Roundtable members' considered observations and judgments, findings, and recommendations regarding the COSSI Program and its future.

Overview

The problem of increasing military operations and support (O&S) costs for legacy defense systems has been growing through the 1990's and has never been more severe. In recent years, relatively few new defense systems have been developed and acquired by the Military Services. As a result, and as would be expected, the portion of DoD's operations and support costs (e.g., dollars per flying hour, or dollars per sea day for the Navy's ships, or dollars per miles for Army tanks, etc.) devoted to legacy systems have substantially increased. These increases are above those that would be accounted for by simple inflation. Rather, they are in significant part the result of an ever-increasing age of vital defense systems, which causes them to require ever increasing amounts of repair and maintenance to remain operational and to prevent them from wearing out. As shown in Figure 1 (See Next Page) the overall operations and maintenance (O&M) costs for the Department (Note: O&M cost defined as O&S minus military personnel costs) has been taking an increasing share of the defense

budget, topping out at 37 percent in 2000. While legacy systems are not responsible for the entire amount of the increase, they are certainly a major direct and indirect contributor. As the DoD's legacy systems continue to age, it is expected that this trend will continue.

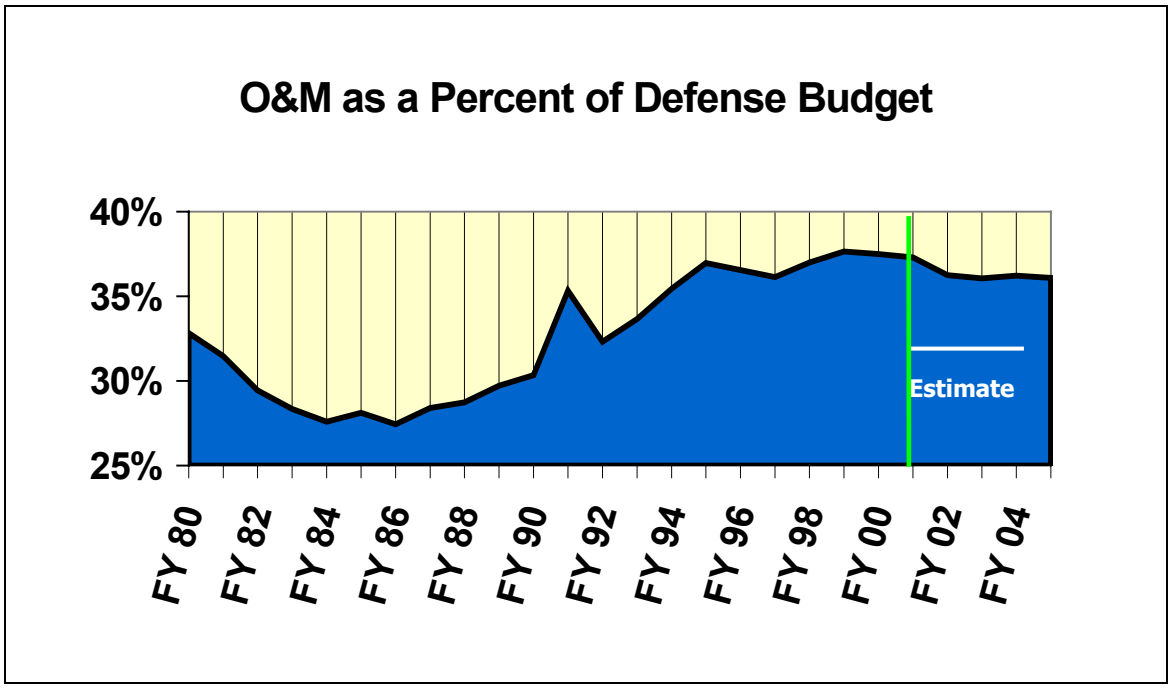

Figure 1. Why the Focus on O&S Costs in DoD. Note: the source for these figures is the *National Defense Budget Estimates for FY 2001*.

Also, it is worth noting that as defense systems increase in age, maintaining the performance edge of individual system types over those employed by the Nation's likely adversaries has grown more difficult. It is this performance edge that has enabled the Military Services to plan to "fight outnumbered and win decisively." It has also made possible the realization of the Nation's (apparently) strongly held desire to win swiftly with few or no friendly losses. The increasing share of the military's budget that is going to pay for the O&S costs of these legacy systems also makes it difficult to free up the needed investment funding needed to recapitalize the Armed Forces' aging force structure with newer, more capable systems in order to maintain our Nation's relative military advantages over its potential enemies. A conundrum of the current dilemma is that it is these newer, more capable systems that also hold the promise to reduce the Department's O&S costs (less maintenance/repair required, less expensive military personnel to perform the necessary maintenance and repair).

In the financial language of the Department of Defense, the operations and support (O&S) budget is normally construed to mean the sum of operations and maintenance (O&M) costs plus funding for military personnel (e.g., military pay and allowances, retirement pay and retirement pay accrual, etc.).[3] O&M funding is a very wide category that involves the costs of the day-to-day operation of the Department of Defense and includes costs for such things

as military healthcare, environmental programs, real property maintenance (e.g., hangers, docks, runways, repair shops, barracks, etc.), base operating support (everything from child care centers to mess halls and utility costs), communications, operation of management headquarters (such as the Office of the Secretary of Defense), etc. Of most interest to the COSSI Program, it also includes the operation and maintenance of the Services' numerous legacy weapon systems (repairs, consumables, depot overhauls, spare parts, etc.). According the Congressional Budget Office[3], about 20 percent of the DoD O&M budget is attributed to the cost of operating and maintaining these legacy systems (obviously, the personnel costs of the military maintainers and operators also form a significant cost to operate and maintain these legacy systems, but they are accounted for elsewhere in the DoD budget).

Of course, when O&M for legacy systems comprises about 20 percent of the overall DoD O&M budget, the overall increases in the DoD O&M budget cannot be wholly and directly laid at the door of legacy systems. The maintenance of the DoD's aging physical infrastructure has also extracted a price, as has the increases in military pay and benefits needed to compete for skilled personnel in the civilian market place. Military healthcare costs have skyrocketed and increased costs for required environmental remediation have also had an effect.

However, there can be little doubt, whether it is based on analytical evidence or pervasive anecdotal information, that the older systems (e.g., planes, ships, tanks, vehicles, etc.) cost increasingly more to operate and maintain. For example, the CBO[3] estimates that spending on O&M for aircraft increases by one to three percent over inflation for every additional year of age. The CBO report[3] also mentions that in the future, as some legacy defense systems reach unprecedented ages, the rate of cost growth could well accelerate. (Note: A combination of credible anecdotal and hard information—such as the 55 percent increase in time and 36 percent increase in labor hours required (much of it unplanned) to complete normal depot overhaul for the Air Force's large fleet of 35-40 year old KC-135 aerial tanker aircraft—indicates that the future may be closer than had been thought for some older legacy systems.)[3]

There is a relatively widespread recognition of the "vicious cycle" of increasing O&S costs that often can occur when the defense budget "topline" remains level or is even reduced in terms of real expenditures. Absent major reductions in force structure, aging defense systems require increasing amounts of funding for their operations and support, which in turn leave less funding for modernization, which in turn means even older equipment—and the cycle then begins again. Unless this vicious cycle—actually, more of a destructive downward spiral—can be ameliorated, this yields an ever-more expensive defense capability that produces the "same (or less) bang" for an "ever-larger buck."

Sometimes a different price is exacted. When funding is not available but operational tempo and weapons systems' readiness must be maintained, people work harder and longer hours to maintain the legacy systems. This does not show up directly as a higher O&S and/or O&M

[3] The Effects of Aging on the Costs of Operating and Maintaining Military Equipment, Congressional Budget Office, August 2001.

costs (military members do not receive overtime and cannibalized parts are moved around instead of money being spent to buy more parts) but the price in the average hours worked per week for military maintenance personnel (never even as low as 50 hours) increases sharply. Then, later, reenlistment rates fall as overworked maintenance personnel vote-out with their feet and expensively trained and developed maintainers and technicians leave the force. The price is still paid and the "ever-larger buck" remains—the cost (human and financial) is just shifted to less visible accounts and (sometimes) displaced in time.

The CBO study[3] recognizes this potential to mask the effects of aging systems and resultant increases in costs (for a while) by noting that the extent that age has increased the costs of maintaining a particular system may be compensated for by changes in management practices or maintenance policies or reduced levels of readiness.[3] Also, the Services can always compensate for increasing trends in O&S cost by reducing operational readiness rates. Indeed, whatever the cause, reduced readiness has already been the case for many legacy weapon systems in the 1990s.

Or, as the CBO Study points out, the effects of aging systems can be compensated for by extraordinary management actions and the efforts of dedicated maintenance personnel. These actions can include such techniques as moving spare parts and munitions from one ship or unit completing a deployment to another just starting out or simply forcing maintenance personnel to work longer hours. Or, as mentioned lower operational readiness levels for certain legacy defense systems can be accepted.

The COSSI Program's goal is to reduce operations and support costs by introducing commercial technologies or items into fielded military systems. This can have several benefits:

- First, systems, even older systems, employing newer technologies are often, as a rule, cheaper to operate. They tend to be more reliable, (an artifact of both having newer technology and having technology from commercial sources, which tend to place a high premium on reliability) which reduces maintenance costs. They also tend to be cheaper to repair when they do fail. Also, because the technology is more modern, the problem of diminished or non-existent manufacturing sources for spare parts is reduced.
- Also, commercial technologies can often be cheaper to buy than those integral to a generations-older military system that is employing older technologies with equal or even less performance. Indeed, sometimes, due to the problem of suppliers going out of business, there can be no reliable sources of supply for older systems and subsystems at any price.
- Finally, the insertion of newer technologies can increase the absolute performance of legacy military systems, helping them to meet increased threats or other military requirements.

The COSSI Program has recognized a reality of defense programming—that new and legacy systems require (rightly) a much different management focus and motivation. The managers of new acquisition defense systems have the mission of developing and acquiring new

systems, usually involving state-of-the-art technologies. These new-acquisition programs (as opposed to legacy programs) tend to have a higher priority and thus receive more attention within the Services' and DoD's acquisition systems.

Managers of legacy systems tend to be focused on the sustainment of those systems. Their mission is that of support and maintenance. In general, they receive less attention and a lower priority than do new acquisition systems. Compared to newer developmental systems they are less tolerant of risk. However, if a new technology can be inserted into their systems and reduce O&S costs while possibly increasing performance capability, they will be interested. If part of the R&D bill for the newer technology can be paid, and the technical and program risks reduced, by another program they will be very interested indeed—if, that is, the relatively small but often hard to find investment funds can be allocated.

The members of the Executive Roundtable noted the problem in a broad sense is also one of competing priorities between developing new systems and maintaining legacy systems. There is no single champion for life cycle cost savings at any level within the Defense Department. The logistics community focuses in large measure on parts availability. The RDT&E community focuses on the development of new systems and their enabling technologies. However, the real problem is (or should be) readiness. The community that should care most about the O&S cost is the readiness community, consisting of the warfighters (both planners and operators). Increased readiness rates can mean either more forces available for the same funding or, if forces are sufficient, sustainment of the same forces for less funding. Both are of interest to the warfighters and Congress and could help the COSSI Program garner more active support for funding.

Panel Findings and Recommendations

Overview

The members of the Executive Roundtable examined the Commercial Operations and Support Savings Initiative (COSSI) Program. The Roundtable's Findings and Recommendations are discussed below and are divided into two sections—a specific evaluation of the COSSI Program with respect to its stated goals and a set of general Findings and Recommendations generated by the Roundtable during its deliberations.

The COSSI Program is meeting its goals. However its continued success may be jeopardized unless funding is increased and certain policy and legislative changes are made (these changes, involving cost sharing and Section 845 Other Transactions for Prototype contracting methods, are addressed in various detailed sections relating to the COSSI's goals and in the general findings and recommendations). In accordance with its Terms of Reference, the Executive Roundtable has recommended a variety of legislative and policy enhancements to the COSSI Program to enhance its ability to meet its goals and increase the already favorable effects it has had in reducing O&S costs for the Department of Defense.

Evaluation of the Current COSSI Program's Success in Meeting Its Program Objectives

The Roundtable first examined the current Program with a view towards considering how well it was achieving its three stated goals of:

1. ***Reducing Operations and Support (O&S) Costs for Legacy Systems***
2. ***Simplifying Prototype Development by Using Other Transaction Authority***
3. ***Attracting Commercial Firms***

Reducing Operations and Support (O&S) Costs for Legacy Systems

Finding: The COSSI Program has reduced Operations and Support Costs and increased the readiness of affected legacy systems.

The COSSI Program seeks to reduce O&S costs by inserting new technology in legacy systems. The available evidence from COSSI Program officials indicates the COSSI projects that embark on and complete Stage Two do in fact succeed in markedly lowering sustainment costs for the targeted legacy system(s). This has the effect of also reducing total ownership cost for the system by direct cost savings and also (usually) by increasing the readiness of the legacy system. In fact, lowering O&S costs is inextricably linked to readiness improvements. The Roundtable noted that in a practical sense it is not possible to

have one without the other. The Roundtable was also informed that in the five years the COSSI Program has been in existence that COSSI has increased the readiness of every defense system for which a Stage Two COSSI project was implemented.

The available evidence indicates the COSSI Program has reduced support costs and also helped insert more capable technologies into fielded legacy systems. The program managers for legacy systems and new systems must compete for funding support. In general the legacy system's focus is on sustainment—system maintenance and support. This activity (which included upgrades) attracts less priority and attention (hence less funding) than does new systems development and acquisition.

Although there has not been previously an emphasis on readiness in the annual COSSI Project Call, as noted above, every COSSI project has ended up in fact enhancing the readiness of the legacy system to which it has been applied. The COSSI Program could probably receive more support from the broadly-defined readiness community (warfighters and operational planners) if improvements in Service weapon systems readiness measures were made a part of the desired outcomes specified in the Project Call.

> *Recommendation: Increase the emphasis and visibility of readiness by including measurement of and improvement in the readiness metrics applicable to the targeted legacy system in the COSSI Project Call.*

Simplifying Prototype Development by Using Other Transaction Authority

Finding: The COSSI Program has made effective use of Other Transactions for Prototype Authority (Section 845) contracting to simplify prototype development. COSSI currently leads the DoD in the use of Section 845 Other Transaction Authority. Also, the Roundtable believes that use of OTAs is enabling for the COSSI Program in terms of allowing it to meet its objective of attracting commercial firms to the defense marketplace.

One of the stated objectives of the COSSI Program has been to simplify prototype development by using the Other Transaction Authority. This has helped implement and institutionalize acquisition reform and, more important, helps attract commercial firms to do business with the Defense Department. Although the use of Other Transaction for Prototype Authorities (OTAs) is not limited to the COSSI Program, and other programs (e.g., the Dual Use Science and Technology Program) similarly emphasize their use, as of FY 2001 the COSSI Program leads the Department of Defense in the use of OTAs.

The Other Transaction for Prototypes Authority, one of the "Section 845" authorities provided by the Congress in 1994, provides an innovative and effective method to develop prototypes and to help attract commercial industry to defense work. Pioneered by DARPA, this authority allows the use of a "clean sheet of paper" approach to negotiating a contract

and makes government contracting procedures much simpler than if the usual FAR contracting procedures are employed.
The COSSI Program's use of Section 845 Agreements (Other Transactions for Prototypes) was not without initial difficulties:

- When the General Accounting Office (GAO) reviewed the use of all Section 845 Agreements, including those for the COSSI Program, it found a lack of conformity and omissions or errors in many cases. While the Roundtable did not consider "lack of conformity" to be a valid criticism for a contracting method intended to "start with a clean sheet of paper," some of the errors and omissions could have had significant effects. As the Services' contracting communities and acquisition program offices have become more experienced in the proper use of OTAs, these problems have been reduced.

- The survey of COSSI contractors indicated that early in the COSSI Program contract awards were not timely. This was attributed to a required learning curve in the use of the innovative new Section 845 contracting authorities that has since been largely overcome.

A survey of the 46 contractors involved in the FY 1997 and FY 1999 COSSI projects showed that most Government and contractor program officials recommended that the use of OTAs be continued. They noted OTAs were attractive and effective because they helped streamline program management and were quite flexible. They also indicated OTAs seemed to be a great improvement over other contracting methods. Non-traditional defense contractors led five of the OTAs and it is unlikely these firms would have entered into government business without the use of OTAs.

The Executive Roundtable was informed that the COSSI Program's goal of simplifying prototype development through the use of OTAs was considered very important, as it helped foster acquisition reform. The COSSI Program was designed from its inception to implement and encourage acquisition reform during Stage One through mandating the use of OTAs.

Although the members of the Executive Roundtable are very supportive of the DoD's efforts in Acquisition Reform, it was felt that the focus of the COSSI program should remain on reducing Total Ownership Costs and improving the DoD's access to the Commercial Industrial Base, rather than have it's purpose diluted by also attempting to alter the overall DoD Acquisition system. The Roundtable felt that such a diversion would be counterproductive, and strongly recommended keeping COSSI squarely aimed at its primary goal. The members of the Roundtable feel that OTAs are a means to an end—helping to attract commercial industry and its technology to the defense procurement arena. That notwithstanding, OTAs provide an innovative and very effective contracting tool, one that helps facilitate the DoD's use of commercial firms with little/no defense contracting experience. This in turn helps gain access to new commercial technologies. In fact, the Roundtable emphasizes that the use of OTAs in both stages of COSSI is essential for the DoD to successfully gain timely access to these new commercial technologies.

The Roundtable notes that to date Federal Acquisition Regulation (FAR) contracting has been used for COSSI Stage Two projects. This is a disincentive to commercial firms and defense firms alike. If the use of commercial firms and their products/technology is desired and considered a good tool with which to achieve O&S cost reductions, then it is essential that that tool must be fully enabled. FAR-type contracting at best is an unavoidable (and unattractive) feature of dealing with the Department of Defense. It will not attract commercial firms to the COSSI Program or any other Defense program.

The Roundtable also notes that the use of OTA for Prototypes has provided an innovative and effective way to develop prototypes and have helped attract commercial industry to defense work. However, OTAs may no longer be prescribed for the COSSI Program in the future. Recent legislation (Section 803 of *The National Defense Authorization Act for FY 2001*) requires traditional defense contractors to cost-share at least one third of the development cost if Section 845 Other Transaction Authority for Prototypes contacting procedures are employed. Also, the Department of Defense has recently instituted a policy that contractors will not be required to cost share on R&D contracts. These two provisions are in potential conflict with each other. (Note: The Executive Roundtable members also concur that in general cost sharing should not be required when contracting for research and development.) Accordingly, for FY 2002 there will be no mandated use of the Other Transactions for Prototypes (Section 845) Agreements for the COSSI Program, although their use will certainly not be precluded. The Roundtable notes that the use of OTAs is very attractive to defense firms as well as commercial firms, and thus the restrictions on OTAs caused by the cost sharing requirement may reduce the willingness of traditional defense firms to participate in the COSSI Program. (Note: Cost sharing for the COSSI Program is addressed in other sections of this report.)

The Roundtable supports the use of OTAs as by far the best way currently available to attract (and in a more practical sense, enable) commercial firms to do business with the Department of Defense. Accordingly, these streamlined acquisition practices should be allowed for both Stage One and Stage Two COSSI efforts. The Roundtable members noted that if use of OTAs for Production (i.e. COSSI Stage Two) is initially requested and justified only for the COSSI Program (i.e., as a "test" or "pilot" case) and the request includes appropriate and timely reporting mechanisms to assist Congress in fulfilling its oversight role, then the Congress would be more than likely to be supportive.

Recommendation: OTAs should be used to the maximum extent possible for the COSSI Program. If necessary, an exemption to the current mandatory cost sharing provisions of Section 803 (applicable when OTAs are employed) should be sought from Congress. As an alternative, the COSSI Program should be granted an exemption to the DoD policy of not permitting cost sharing for research development contracts.

Recommendation: Because the use of OTAs for COSSI Stage Two projects is essential for the COSSI Program to achieve its considerable full potential for O&S cost savings and providing access to commercial technologies, DoD should seek legislation to allow the use of OTAs for COSSI Program Stage Two production

contracts. This legislation should be sought in the context of a COSSI-only pilot initiative.

COSSI and Commercial Industry Participation

Finding: The COSSI Program is achieving its goal of attracting commercial firms to the defense marketplace. However, it is worth noting that COSSI can and does attract commercial technology through other sources including traditional defense contractors. Many defense firms have access to commercial technologies through commercial business units, partnerships, or sub-contractors.

When the COSSI Program was initiated in 1997, about 25 percent of the participating firms could be considered as being commercial. Since then the COSSI Program has been marketed more widely, through both formal methods and extensive word-of-mouth. This has effectively spread word of the advantages and opportunities the COSSI Program has to offer. For example, the COSSI Program has been able to offer the use of the Section 845 Other Transactions Authority to bring in commercial sources in a more rapid timeframe. As a result (see Figure 2 below) over two-thirds of the participating firms are now commercial. (Note: The percentage of commercial firms includes those partnering with traditional defense firms.)

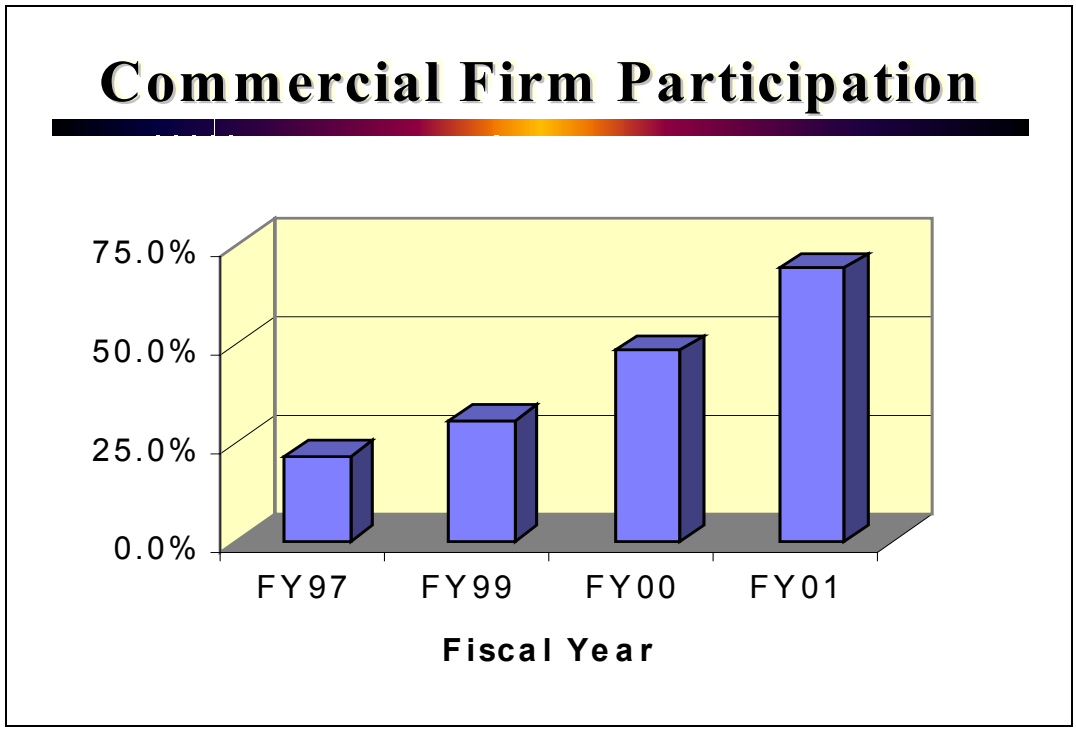

Figure 2. Commercial Industry Participation in COSSI

The Executive Roundtable approves of the growth of the participation rate of commercial firms in the COSSI Program. However there was concern as to whether the COSSI Program's objective of bringing non-DoD contractors was being fully achieved. That is, are commercial contractors participating (as primes, partners, or sub contractors) just once, or is there "repeat business?" The members of the Roundtable felt that there is a need to track the satisfaction of commercial industry and their willingness to continue participation in COSSI-type projects, based on their experience with the current COSSI Program. Raw percentages regarding commercial industry participation are certainly useful and do show the Program is on the right track—however a smaller granularity is needed over a more lengthy timeline to fully establish this point

Recommendation: The existing strong emphasis on the use of OTAs should be maintained for all COSSI participants because the innovative COSSI Stage One contracting mechanisms (i.e., OTAs) are useful in (1) attracting defense firms or (2) helping defense firms partner with commercial firms as well as (3) attracting commercial firms.

Recommendation: Metrics should be developed to determine (and track) if the COSSI Program's objective of bringing in non-DoD contractors is being fully achieved.

General Evaluation of the COSSI Program and Discussion of Other COSSI Issues

In addition to evaluating the COSSI Program's success in meeting its objectives (see previous section) the members of the Executive Roundtable were asked to assess the Program in other respects including:

- The appropriate size of the COSSI Program (i.e., funding level and size of individual COSSI projects).
- Identifying improvements that could be made to the COSSI Program to help it meet its objectives.
- Changes that should be made to the statutes and DoD policies that direct and guide the COSSI Program.

The Roundtable noted that almost all suggested improvements to the COSSI Program would require policy and/or legislative changes to implement. Accordingly, suggested policy enhancements or statutory changes are incorporated in the following sections as enabling criteria for the recommended changes in the COSSI Program.

In addition, the Roundtable took note of several aspects of the COSSI Program that deserved comment, recognition, and/or recommendations, including the results achieved to date from COSSI Program and the projected return on investment (ROI) for COSSI.

COSSI Funding Level/Size of COSSI Projects

The members of the Executive Roundtable were asked to discuss what the appropriate size of the COSSI Program should be in light of both current goals and any potential changes in those goals identified by the Roundtable.

Finding: The current size of the COSSI Program is small compared to what it was in FY 1997-FY 2001 and is much smaller than it should be. There is insufficient funding allocated for the COSSI Program in DoD's Future Years Defense Program (FYDP). Also, the Services have not provided the advocacy and FYDP funding needed for successful execution of the COSSI Program.

Finding: The size of individual COSSI projects is appropriate. If the COSSI Program's budget increases substantially above its previous baseline then larger COSSI Stage One projects can be considered.

In any discussion of program funding within the Department of Defense, funding level and where the funding should managed are two issues that have to be addressed. The Roundtable notes that the Military Services recently have not been supportive of the COSSI Program, responding to overall pressures within their overall budgets by zeroing out their individual Service COSSI Program funding lines for FY 2002 and the out years of the defense budget as well. The Office of the Secretary of Defense continues to strongly support the COSSI Program and has maintained its budget support at a constant $10-11 million per year throughout the FYDP.

Funding for the COSSI Program, as mentioned, has been carried in three separate Service budget lines as well as an OSD budget line. This has subjected the Program to four different budget processes and generated a "lack of critical mass" in terms of both advocacy and support for the COSSI Program. However, the Services have effectively executed the various COSSI projects under their purview.

The Roundtable reviewed the average size and distribution of size of individual COSSI projects within the overall COSSI "portfolio." In a "portfolio" program such as COSSI, it is important that no one project or set of projects take up a disproportionate share of the Program's resources. The Roundtable examined the distribution of the size of the projects in the COSSI Program (See Figure 3 on Next Page). In the opinion of the Roundtable the size distribution of the COSSI Program is appropriate given the overall size of the COSSI Program. However, if additional funding were made available for the COSSI Program as

recommended by the Roundtable, then increasing the size of individual COSSI projects would be appropriate.

The Roundtable also noted the Return on Investment (ROI) for the COSSI Program. The ROI was such (over 36:1, See Table 2 On Next Page) that failure to fund the COSSI Program at a higher level precluded achieving tens of billions of dollars in potential future O&S cost savings. The members of the Roundtable judged that sufficient "low hanging fruit" existed to readily justify at least a tripling of the COSSI baseline investment funding.

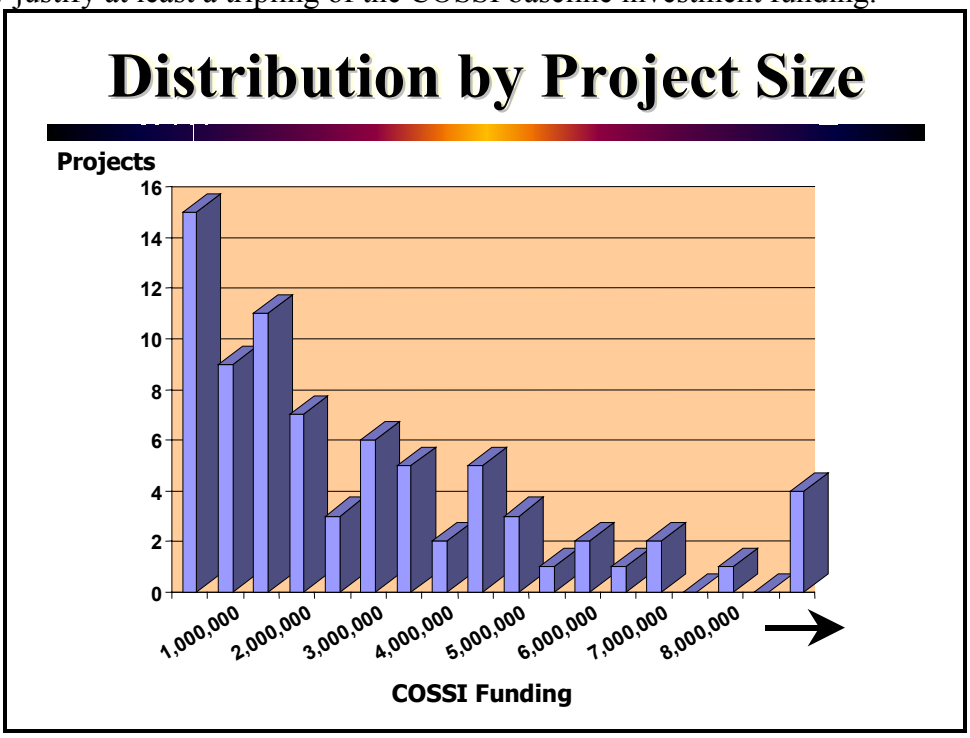

Figure 3. Distribution of COSSI Projects by Size FY 1997-FY2001. Note that over half of the COSSI projects are $3 million or less.

The members of the Roundtable note that the much higher budget for COSSI (on the order of $50 million per Service, not necessarily divided exactly equally) would be supported by the Congress if the request was accompanied by a submission of a clear plan and vision for the future of the COSSI Program so that Congress could see where the Program was going and the potential returns from the investment.

Recommendation: The DoD funding for the COSSI Program should be increased immediately to its original $50-60 million per year baseline average (the average of Service and OSD funding lines FY 1997-2001). The Department of Defense should then embark on a buildup, at a sustainable rate, to at least $150 million per year (about $50 million per Service) for COSSI. This should be accompanied by submission to the Congress of a plan for COSSI that sets the future direction and vision for the COSSI Program.

Recommendation: All COSSI Program funding should be consolidated in the Office of the Secretary of Defense while execution of the Program remains in the Services.

Changes that Could Enhance COSSI Program Results and Return on Investment

The COSSI Program has done a good job in satisfying its objectives. The projected return on the Government's investment in terms of net present value is excellent. However, the Executive Roundtable feels there are improvements that can be made to the Program to broaden its appeal to both Industry and Service legacy system program managers and further increase projected O&S savings. The Roundtable also notes that overall the COSSI Program payoff has been high considering the investment made—but it can be much higher in the future if certain structural changes are made in (1) funding levels and policies and (2) transition methods and policies.

Finding: The COSSI Program has been successful in readying its projects for transition from Stage One to Stage Two. Projected O&S savings exceed $5 Billion for the COSSI projects funded through FY 2000.

Finding: COSSI projects average a 4-6 year break-even point. This is longer than commercial firms regard as acceptable (they use a metric of 2-3 years at most) but is considered acceptable for defense programs, given the extended service lives of most military systems and the long-term average COSSI ROI of 36:1.

Finding: Given the high ROI from COSSI, support for and investment in the COSSI Program should be much higher than it actually is. This is in part due to DoD and Service policies that tend to dictate that savings from COSSI will not accrue to the Service entities (PEOs, Program Offices, etc.) taking the risk and making the investment of program funds.

The COSSI Program has a high ratio of savings to investment costs. As shown in Table 2 (See Below) the ratio of dollar savings to total COSSI investment (contractor and Government) exceeds 36:1 in terms of net present value (NPV).

Fiscal Year	COSSI Investment	NPV Savings	Ratio of NPV Savings/COSSI
1997	95,803,369	3,324,727,000	*34.70*
1999	34,156,378	1,456,865,000	*42.65*
2000	35,065,761	1,109,206,000	*31.63*

2001	**43,127,109**	**1,644,000,000**	***38.12***
Totals	**208,152,617**	**7,534,798,000**	***36.20***

Table 2. Relationship of COSSI Stage One Funding to Stage Two NPV Savings.

In general, the cumulative return on investment for COSSI projects is negative for the first 3-6 years as the cost of procurement of the Stage Two kits and modifying the target system is incurred. However after the additional ten to fifteen years the legacy system can expect to remain in service the return on investment is enormous. For example (See Figure 4, Next Page), the COSSI projects initiated in FY 2001 will probably yield a negative return on investment until about 2006. This is because of the requirement to invest in both the Stage One development/qualification and Stage Two production of the modification kits before the modified item enters service and begins generating O&S cost savings. However, ten years after that, the return of about $1.6 billion (Net Present Value) dwarfs the $43 million investment.

The members of the Executive Roundtable, many with lengthy Industry experience, commented on the COSSI Programs' 4-6 year breakeven point, noting Industry uses a shorter timeline (2-3 years, or even less in some high-tech areas) as an evaluation metric relative to gaining back its investment. However, they also noted that many commercial systems turn over much faster than military systems. The odds are that military systems may be in service for 20-50 years (even more in some cases) and, from the DoD point of view, a longer payback period can readily be justified with respect to ROI. Also, once the payback turns positive it pays dividends for 15-20 years or more.

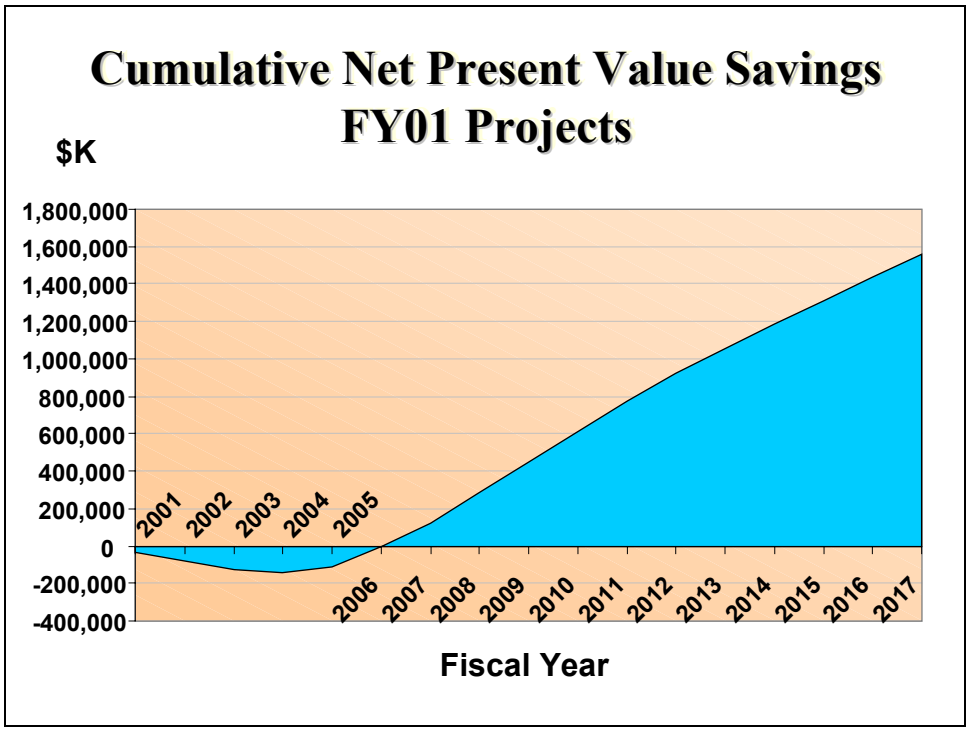

Figure 4. Expected Cumulative Net Present Value Savings for FY 2001 COSSI Projects

Given the high eventual return on investment from the COSSI projects, and the increase in readiness yielded, Service support for the Program should be automatic. However, it is not. This is, in the view of the Roundtable members, because the savings (or at least a portion of them) do not accrue to the interested parties such as the Program Executive Officers, the Service Acquisition Executives, the service program offices, and the system operators. If a portion of the validated savings yielded from COSSI projects could be directly returned to these interested parties for further investment, support would increase for COSSI. In any case, all or most of the COSSI savings should be retained by the Military Service(s) that sponsor the COSSI project that generates the savings (after all, it is the Service(s) that will be taking the investment risk). Of course, this would require a validated audit of the projected O&S savings to ensure they were real.

In principle, it can fairly be argued that the rough and tumble competition and requirements validation process which is an inherent feature of DoD's often maligned Planning Programming, and Budgeting System (PPBS) forces only the most worthy programs to be funded, which argues against "automatic" or "earmarked" savings flowing back in the direction of the programs that generated them. However, unless the interested parties are financially motivated to support investment programs, especially COSSI, that produce long term savings in return for a modest (but some times hard to find) upfront investment, there will be no savings (short or long term) to allocate or to share.

Recommendation: *Explore the possibility of setting up a mechanism such as a "revolving fund" to both funnel all of the COSSI-generated savings back to the sponsoring Military Services and to help fund the COSSI Program.*

Recommendation: *Continue to audit the Program to trace and validate the projected O&S savings to assist in measuring and justifying the Program.*

Cost Sharing Policies and Practices versus Use of OTAs in the COSSI Program

Finding: Cost sharing makes the COSSI Program less attractive to all participants. The amount of cost sharing benefit is dwarfed by the savings produced by a COSSI project that transitions successfully to Stage Two.

The Roundtable learned that cost sharing and the use of Other Transactions for Prototypes have become strongly linked with regard to the COSSI Program due to recent DoD policy changes and the "Section 803" legislative initiatives enacted by the Congress. Congress has consistently indicated in its Committee report language and legislation (Section 803 is only the latest form) that there should be a preference for cost sharing with Industry in development programs when there is a reasonable probability of commercial or DoD production. And, it is hard to argue against the concept when a contractor is being funded to develop a product for government application that also has substantial commercial potential.

However, in the case of a typical COSSI project the technology/product already is commercial and most likely already in production. The COSSI Program is intended to pull it into a DoD application. In general the COSSI Program is not developing commercial technology or increasing the commercial market. And, in comparison to the already existing commercial market, the additional DoD market may be quite small.

For example, one COSSI project presented to the Executive Roundtable showed a potential DoD market for 56,000 units through FY 2006 (only about 35,000 units were funded and subsequent Service resource allocation issues may reduce that further). This seems to be a substantial piece of business—until it is understood that the total number of units of this type in service worldwide is projected to exceed 12 million by 2004. Of these, only 100-200,000 will be in the Department of Defense (about one or two percent of the market). The percentage represented by the DoD market (even if it were to reach its full potential) is often not enough to motivate a strong desire on the part of Industry to share the cost of adapting a commercial technology or product for the defense market—unless it is administratively a simple task, without high contractual "walls" to climb over.

In general the COSSI Program has required cost sharing in its COSSI Stage One projects, engaging in "partnerships" with Industry to develop and qualify a commercial technology or product for defense application. However, very recent DoD acquisition policy has been that cost sharing with Industry shall not be required in developmental efforts funded by the Department. This conflicts with recent congressional direction as expressed in the "Section

803" legislation that programs using Section 845 OTAs must cost share (at least one third from the contractor) if a "non traditional defense contractor does not participate to a significant extent."

Given that one of the objectives of the COSSI Program is to draw in commercial firms, the congressional linkage of cost sharing and use of OTAs may not seem onerous. However, many past and on-going COSSI projects that have generated substantial O&S cost savings would have been adversely impacted by this legislative requirement. If this restriction had been in existence from FY 1997-2001, 35 percent of the COSSI projects would have been prevented from using OTAs. According to the survey data provided to the Executive Roundtable, OTAs were a strong incentive for traditional as well as non-traditional defense firms to participate in the COSSI Program.

The Roundtable notes that cost sharing in the COSSI Program is desirable from the Government's viewpoint, but it should not be a primary feature of the COSSI Program. The contractor cost share investment in COSSI Stage One projects of $143 million to date is dwarfed by the total projected savings to the Government (net present value) of over $7.5 billion accruing from COSSI. To date, cost sharing in the COSSI Program represents less than two percent of those savings. It is readily foreseeable that the amount of O&S cost savings forgone by an absolute insistence on cost sharing could far outweigh the possible benefits accruing from the cost share requirement itself.

In the view of the Executive Roundtable members, cost sharing should not be a required feature of the COSSI Program. As in other DoD programs (i.e., the ManTech program), cost sharing should be used where it makes sense to gain leverage and can be one of the selection criteria involved in contract award but it should not be an absolute requirement. Neither should it be precluded. And it certainly should not be a pre-condition to the use of Section 845 OTA contracting, even when using traditional defense firms. O&S savings are savings—whether traditional or non-traditional defense firms generate them. The use of OTAs is essential to achieving these savings and gaining timely access to commercial technologies.

Recommendation: The emphasis on cost sharing requirements in the COSSI Program within OSD and the Congress should be reduced.

Recommendation: The use of Section 845 Other Transactions for Prototypes Agreements should be very strongly encouraged in order to help encourage commercial industry participation and retention in the COSSI Program.

Recommendation: Legislative relief should be sought to allow the COSSI Program to use Section 845 OTAs notwithstanding whether cost sharing is employed. This legislative relief would be sought only for COSSI and should note that cost sharing will still be sought where appropriate (e.g., strong potential commercial market for the modified defense technology or product.) The rationale should be that since COSSI normally involves technology or product items that have already been

developed and are being applied to a defense purpose, relief from the Section 803 cost sharing language would be appropriate.

COSSI Transition Mechanisms and Transition Funding Issues

The Roundtable noted the pervasive effects, potential and actual, of achieving effective transition of COSSI-developed technologies and products from development to production. The interrelated issues of funding and contracting methods can and will have a substantial effect on the COSSI Program. These issues have been referenced in previous sections and thus there is some overlap. However, the members of the Executive Roundtable felt they should be highlighted in a section of their own in order to emphasize their importance.

COSSI Stage Two Contracting and Commercial Industry

Finding: The COSSI Program has been successful attracting commercial firms as primes and sub contractors to DoD business, in part due to the non-use of FAR contracting in Stage One. However, under current policies and statutes the COSSI Stage One winner can be frozen out of the Stage Two procurement. If this is not corrected, the DoD will lose much of the benefit of Commercial Industry's participation, especially timely access to fast-changing advanced commercial technologies. This also will discourage participation in the COSSI Program, by both defense and commercial firms.

Under current DoD policy and legislative statutes, COSSI Stage Two contracts must use FAR contracting procedures in most circumstances. This tends to discourage many, if not all, commercial firms from being "prime." In addition, under current statutes and policies, the COSSI Stage Two (i.e., production) contract can be let to a competitor to the successful Stage One contractor, even if the Stage One contractor(s) meet all of the pre-negotiated price and performance requirements. This means the winner of Stage One could be frozen out of the Stage Two effort, even if the original contractor met the price and performance requirements originally negotiated.

Contractors (commercial or defense) will not cost share without a reasonable expectation of recovering their Stage One investment. Policies that permit COSSI Stage One contractors to be frozen out of the Stage Two (where they would normally expect to recover their investment) are counterproductive in the long run. The possibility that successful COSSI Stage One contractors will not be permitted to recover their Stage One investment will be a deterrent for all firms, especially commercial firms, to participate in the COSSI Program.

The use of OTAs is a positive inducement for all contractors, especially non-traditional defense firms, to do business with the Department of Defense in general and with the COSSI Program in particular. Use of OTAs for Stage Two would be a further inducement for non-traditional and traditional defense contractors alike to participate in COSSI. It could increase competitive behavior in that more COSSI proposals would be submitted if prospective

participants knew that the COSSI Program had an "edge" over other programs due to its contracting procedures. Use of OTAs for COSSI Stage Two is essential to gaining the full benefits (potentially measured in tens of billions of dollars in O&S savings) of the COSSI Program for the Department of Defense.

It may be that the legislative barriers are too high to routinely permit the use of OTAs for COSSI Stage Two. If that is the case a simplified form of FAR contracting would be more likely to attract (or at least not discourage) commercial firms to still help attract commercial firms. FAR Part 12 [4] contracting, which is normally used for the procurement of commercial items, can fulfill that role. By definition, the COSSI Program involves commercial items or technology, which is normally modified only to the extent needed to insert it in a legacy defense system.

Recommendation: Competition is important. However, legislation should enacted for COSSI to ensure Stage One projects are selected competitively while at the same time including target prices for Stage Two. The transition from Prototype (Stage One) to Production (Stage Two) should be allowed without the requirement for recompetition if the target prices are met.

Recommendation: Additional legislation should be sought to allow the COSSI Program use of the simplified Section 845 contracting authorities for Stage Two procurements. These new authorities and/or exemptions should be limited to the COSSI Program.

Recommendation: Where use of OTAs for COSSI Stage Two is not possible or appropriate, there should be statutory authority to transition directly into FAR Part 12 contracts without recompetition (i.e., transition directly from COSSI Stage One to COSSI Stage Two without recompetition using FAR Part 12 (Acquisition of Commercial Items)).

Transition Funding and Funding Methods for COSSI

Finding: Early in the Program, especially for FY 1997 projects, a relatively high number of projects did not complete the transition to Stage Two due to lack of customer program office funding. The COSSI Program has taken action to alleviate this problem by requiring a stronger up front Service program office funding commitment for Stage Two prior to approving a Stage One project.

[4] FAR Part 12 prescribes policies and procedures unique to the acquisition of commercial items. It implements the Federal Government's preference for the acquisition of commercial items contained in Title VIII of the Federal Acquisition Streamlining Act of 1994 (Public Law 103-355) by establishing acquisition policies more closely resembling those of the commercial marketplace and encouraging the acquisition of commercial items and components

Finding: The COSSI Program has tended to exist "on the margin" within the universe of Service legacy system program offices and the Service logistics organizations. Reducing O&S costs and improving the readiness of legacy systems is of such importance, and the potential of the COSSI Program is sufficiently great, that the COSSI approach needs to be institutionalized and placed in the center of the Logistics and Support arena as the preferred method in upgrading legacy systems with commercial technologies.

Finding: Transition is a central issue to the success of the COSSI Program. In general, failure to transition has been a matter of the lack of Service-provided Stage Two funding availability, not the lack of technical success of Stage One. A lack of ready transition funding has hampered some successful COSSI Stage One projects from achieving their full potential or has delayed the realization of the substantial O&S cost savings originally projected. The lack of transition funding has also created the potential for successful Stage One contractors (including non-traditional defense contractors) to become discouraged from participating on the COSSI Program.

Finding: A viable and robust method of providing for transition funding will help ensure new cost saving technologies can be effectively and rapidly inserted in legacy systems. It would also encourage more commercial firms to seek out the COSSI Program as the enhanced prospect and shortened timelines for transition in effect increase their return on investment prospects.

The DoD's Office of the Inspector General has criticized the COSSI Program for a lack of success in transitioning its projects. This criticism relied on early and incomplete information and, in general, has been misplaced. In most cases the failures to transition have not been under the control of the COSSI Program. For example, of the 30 Stage One projects started with FY 1997/98 COSSI funding, at least 16 were technically successful and have transitioned to production or are budgeted to do so. Of the 14 that will not transition, 10 were technically successful but there was no funding made available for Stage Two production by the Service customer. Only four failed, either due to a lack of technical success or the modified commercial technology turned out to be too expensive.

The total projected savings for the FY 1997 COSSI projects that have or will transition is over $3.1 billion (present value) compared to total costs of $97 million (Government) and $87 million (contractor cost share). The savings achieved are both large and commendable. However, in the case of the 10 COSSI Stage One projects that were technically successful but failed to transition to Stage Two (production) due to a lack of Service transition funding, the potential O&S savings foregone were of the same magnitude—billions of dollars. Thus, because the Services were unable to provide a relatively small amount of upfront investment in transition funding for these successful projects an opportunity for enormous savings was wasted—along with the COSSI Stage One investment.

In order to increase the probability of a successful transition to COSSI Stage Two, for the FY 1999 and later years' COSSI Programs, a greater commitment from the Stage Two Service program office "customer" was required in the form of commitment letters. As a result, 14

of the 16 funded FY 1999 COSSI projects will transition to Stage Two. The total projected O&S savings for these 14 projects is over $1.4 billion (current value) as compared to the Government Stage One COSSI investment of just $34 million and a contractor investment during Stage One of $16 million. It is as yet too early to know what the results of the FY 2000 COSSI Program will be but initial results appear favorable and should better the results accumulated from the FY 1999 COSSI projects.

The members of the Executive Roundtable wish to emphasize that if a firm, especially a commercial company, is to make an investment of its own funds and human capital in a COSSI project, then "trust me" for the availability of Government funds for Stage Two (where the contractor can make a return on its investment) will not fly in view of COSSI's track record of not always making Stage Two funding available in a reasonable (from Industry's viewpoint) time frame (sometimes, not at all). Commercial firms will not look at such a project without a guarantee of being able to recoup their investment. They will accept technical risk. They will not accept the risk that they will invest, be technically and programmatically successful, but then be denied the opportunity to make back their investment.

The Executive Roundtable emphatically approves of the actions the COSSI Program has taken to require commitment letters from the Service customer. However it should be possible to employ a structural change in the resource allocation system for COSSI Stage Two to increase the prospect of Service transition, one that would have Service legacy system program offices seeking out the COSSI Program and using it as the "first choice option" to insert cost saving technologies in their systems.

Due to the nature of the DoD's annual programming and budgeting system (PPBS), the production funding for the production phase of a typical COSSI project usually has to be requested and programmed before the success of Stage One is known. Understandably, legacy system program managers are loath to do this, as they risk losing the funding from their budgets (or the Service could lose the funding as well) if the COSSI Stage One project is delayed or not successful. On the other hand, if they delay programming the production funding to implement the successful Stage One COSSI project there can be a several-year gap between the completion of COSSI Stage One and realizing the benefits—thus forfeiting years of potential O&S cost reductions. This extends the period used to figure return on investment and, in effect, reduces the ROI for the contractor.

The Executive Roundtable wishes to note that Industry's own internal investment/proposal review and decision process is highly dependent on internal project ROI projections and risk assessments, especially when cost sharing is involved. Uncertainty with respect to COSSI Stage Two funding contributes adversely to these projections and risk assessments. This uncertain ROI environment poses a substantial deterrent to future Industry cost sharing in general, and Commercial Industry participation in particular, as their own return on investment recedes with each delay.

The Executive Roundtable is well aware this "transition delay due to lack of near term FYDP funding" is not unique to the COSSI Program. It is endemic to Service and DoD Science and

Technology and ManTech programs as well—where successful technology projects with transition opportunities must often wait for the later years of the FYDP to be implemented. However, there is usually an "expected and normal delay" before S&T goes into potential new and legacy systems during the initial stages of systems development. On the other hand, COSSI projects can be implemented in production immediately—if funding is available.

The members of the Executive Roundtable reasoned that a set of unallocated funds should be made available to ease short-term transition from technology to production status. The Army's Warfighting Rapid Acquisition Program (WRAP) is an example of where it has been proven that it is possible to have a Service successfully propose a well thought out and justified "unallocated" source of funding for technology transition to the Congress. In that case, the Congress responded by accepting and implementing (with appropriate controls and reporting) the proposal and then providing the appropriated funds. The Air Force is now pursuing the same approach with good prospects of success.

A DoD-level program with unallocated funding for COSSI technology transition (including at least the initial two years of COSSI Stage Two production funding) would be of considerable benefit and save years of transition time. This would obviate the need for legacy system acquisition program managers to make a choice between (1) risking the loss of programmed production money by "betting on the come" as regards the technical success and schedule of a Stage One COSSI project or (2) delaying programming of Stage Two implementation funding until Stage One is complete and losing years of O&S cost savings. Also, the contractor team for Stage One is usually at a considerable disadvantage if it must wait years to receive production funding in terms of their internal ROI requirements. This discourages other contractors (especially commercial) from participation in the COSSI Program.

The Roundtable feels a competitive approach would be most appropriate, one where the Services would compete for the COSSI transition funding and use "normal" procedures (and timelines) for the remaining COSSI transitions. This unallocated funding would be exclusively for COSSI Stage Two implementation. It would be sufficient to fund at least half the transitioning COSSI projects each year and would cover only the first two years of Stage Two—sufficient for the Service concerned to program full production funding in the out years of the FYDP. This would enable the most pressing and higher-payoff COSSI transition opportunities to be rapidly moved into production.

In the judgment of the Executive Roundtable members, the amount of COSSI Stage Two transition funding needed would be at least $300 million per year in order to form a critical mass—at least twice and preferably three times the funding for the COSSI Stage One Program. This would not necessarily be additive to the current total O&S budget. Rather, it would form a relatively small portion of the operations and support budget, to be used to rapidly transition technologies and products from the commercial sector in order to "jump start" the transition of new technology into legacy systems and thus more rapidly bring down O&S costs.

Note: A necessary pre-condition to gain Congress' support for this concept will be to link the COSSI Stage Two "WRAP" funding to Service O&S programs to show (1) that the investments are not otherwise being duplicated in the budget and (2) tie them to the projected amounts of validated O&S cost savings.

> *<u>Recommendation:</u> The emphasis on obtaining Service commitments to COSSI Stage Two should be continued and even strengthened.*
>
> *<u>Recommendation:</u> A WRAP-like, DoD-level budget program containing funding for COSSI technology transition should be implemented. The funding would be allocated at Department of Defense level and the Department should provide full reporting to Congress on what it is doing in order to provide Congressional accountability. The amount of funding should be at least $100 million per Service (but controlled/allocated at DoD-level) to fund initial production and allow/encourage rapid transition to maximize O&S cost savings.*

Summary

In general the COSSI Program is meeting its current objectives in a commendable manner. However, the considerable potential of this innovative, high payoff, and deserving program is not being fulfilled due to funding limitations, various policy and legislative restrictions, and lack of Service support. These shortcomings can readily be corrected. As a reinforcement of their most important recommendations for change, the members of the Executive Roundtable strongly reiterate the following:

- **Overall funding for the COSSI Program must be increased. FY 2002 funding is about $10 million and should be increased immediately to at least $50 million. COSSI Program funding should then be increased (at a sustainable rate) to $150 million annually. This should be complemented by submission of a COSSI Vision and Plan to the Congress that clearly sets out where the Program is going and the results expected in terms of return on investment and readiness increases for the warfighters.**

- **Implement legislation and policy changes to allow Other Transaction for Prototype projects that meet certain criteria (e.g., previously agreed to cost targets, etc.) to go forward into production without competition using FAR contracts. (Note: This would apply to all programs including COSSI.)**

- **Implement legislation to allow the COSSI Program to use OTAs for transition to production. (Note: This would only apply to the COSSI Program, and would act as a pilot initiative for this concept.) This is essential to gain access to Commercial Industry and its technologies.**

- **Implement changes to the existing "Section 803" legislation to allow the relaxation of mandatory cost sharing requirements when OTAs are used. Until these changes are implemented, also relax current DoD restrictions that prevent cost sharing for development contracts as they apply to the COSSI Program. This will prevent a possible conflict with current Congressional direction that requires cost sharing under certain circumstances when OTAs are employed. Otherwise, some of the opportunities to gain the benefits from the cost savings offered by the COSSI Program will be wasted.**

- **Establish a "WRAP-like" program to provide for the "transition to production" funding of Stage One COSSI projects.**

APPENDIX A

Membership of the Department of Defense Commercial Operations and Support Savings Initiative Independent Assessment Executive Roundtable

COSSI Independent Assessment Executive Roundtable

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APPENDIX B

Terms of Reference
for the
Commercial Operations and Support
Savings Initiative (COSSI) Program
Independent Assessment Executive Roundtable

Terms of Reference
for the
Commercial Operations and Support Savings Initiative (COSSI) Program
Independent Assessment Executive Roundtable

The Executive Roundtable will evaluate the COSSI Program's success in meeting its stated objective of leveraging private sector research and development by inserting leading edge commercial technologies into fielded military systems to reduce operations and support costs,

The Executive Roundtable's independent assessment will represent a cross section of Industry views regarding the COSSI Program. The assessment will be documented in a report and briefing(s) presented to the Deputy Under Secretary of Defense (Science and Technology) and others for the DoD's use as appropriate. Distribution of and briefings regarding the Roundtable's assessment shall be only with the permission of and at the discretion of the Office of the Deputy Under Secretary of Defense (Science and Technology).

In developing its assessment the Executive Roundtable should meet with a selection of representative contractors and government program offices which have participated in the COSSI Program and should review the results of any assessments of the Program by the Office of the Department of Defense Inspector General and/or General Accounting Office if available.

The Executive Roundtable is being chartered to conduct an independent assessment of the Commercial Operations and Support Savings Initiative. Specifically, the primary goals of the Roundtable will be to:

1) Review the degree to which the COSSI Program has improved the sustainment/readiness of fielded systems, reduced total ownership costs, implemented acquisition reform, promoted and achieved technology transitions, and promoted military/civil integration.

2) Identify to the Department of Defense improvements that can be made to help the Program meets its objective of leveraging private sector research and development by inserting leading edge commercial technologies into fielded military systems to reduce operations and support costs.

3) Identify results, either actual or anticipated, as a result of the COSSI Program.

4) Discuss what the appropriate size of the COSSI Program should be in light of both current goals and changes in those goals identified by the Panel.

5) Identify what if any changes should be made to the legislation and DoD/Service policies and procedures that currently direct and guide the management and execution of the current COSSI Program.

6) Provide its initial assessment within 20 days after its meeting and its final assessment within 45 days.

The Executive Roundtable will operate under the sponsorship of the National Center for Advanced Technologies (NCAT) and will be assisted in its efforts by staff and advisors provided through other contractors as required.

The DoD's Office of Technology Transition (Office of the Deputy Under Secretary of Defense for Science and Technology) will be invited to observe/assist the Executive Roundtable's efforts by providing observers and advisors to the Roundtable as it feels appropriate.

APPENDIX C

EXEMPLAR CASE STUDIES FROM THE COSSI PROGRAM—BACKGROUND INFORMATION AND LESSONS LEARNED

Helicopter Health and Usage Monitoring Systems
BF Goodrich Aerospace

Many helicopters require numerous maintenance flights and other complex and expensive tests dedicated to main rotor track and balance activities. The Goodrich HUMS program eliminates most of these flights. It also provides for engine diagnostics, exceedence monitoring, mechanical diagnostics, usage monitoring, etc. Commercial helicopters using this system save large amounts of maintenance dollars and also are able to maintain a much higher in-commission rate.

The U.S. Navy estimates that, based upon demonstrations to date on the first applications to a CH-53E and SH-60B, tangible benefits will include a 50-75 percent reduction in vibration related maintenance actions, a 10-25 percent reduction in emergency repairs, a 10-15 percent reduction in scheduled maintenance, and a 50 percent reduction in Rotor Functional Check flights. Also, they predict intangible improvements in safety (a reduction in Class A mishaps), increased aircraft availability (i.e., increased readiness), reductions in needed maintenance man-hours, etc. (Note: While the commercial world actually does place a tangible value on these "intangible" improvements, the military, currently, does not.)

In developing the HUMS under the COSSI umbrella, Goodrich and the Navy initially envisioned a 50/50 cost share. The HUMS Project eventually cost over twice the amount initially estimated, with Goodrich increasing its cost share considerably. Reasons for the cost increases included:

- HUMS always planned to use a particular open architecture, but once the program was started an integrated product team (IPT) of the Navy and BFG was formed that led BFG to switch to a different open architecture (VME), supporting another DoD program initiative. Also, some military unique requirements also drove cost, such as application of military standards for wire marking, rather than using commercial standards.
- Goodrich has about a 40 percent defense business base. However, this business is usually through a defense prime contractor. In this case Goodrich was the prime contractor and did not completely understand the number of problems and cost drivers that would eventually present themselves as hurdles to transitioning to a COSSI Stage Two production contract.

The HUMS technology is also being developed for the U.S. Army for use on various versions of the UH-60 helicopter and the Marines for the AH-1Z and UH-1Y helicopter remanufacture program. In contrast to the 50/50 cost share with the initial Navy project, the cost share for these is 75 percent Government, 25 percent Goodrich. Unlike the Navy, the Army is planning a demonstration in an active fleet of 30 aircraft as their Stage Two effort prior to a production contract. Goodrich expects the entire COSSI Stage Two program to be funded by the Army.

The Navy HUMS program was the first COSSI project that Goodrich Aerospace has been involved with. It was a significant learning experience, especially as they had little recent experience as a military prime contractor. Lessons learned included:

- First, the technology transition path to the COSSI Stage Two needs to be worked hard in advance. Goodrich, without much experience as a prime contractor, did not understand the importance of having the ORD and/or Engineering Change Proposal (ECP) in place before the production decision could be made. The Navy did allocate funding in its FY 1997 POM for HUMS production in FY 1999. However there was no HUMS Operational Requirements Document (ORD) or related H-53 Engineering Change Proposal until the year 2000. Thus some of the intended production funding was diverted to other purposes. This delayed transition.
- Logistics and support data items were not envisioned as a part of the original effort. However they are necessary for production and became a cost/schedule driver, contributing to delays.
- Another problem was that COSSI Stage Two projects are supposed to be negotiated on the base of commercial value. However, although HUMS started as a commercial system, by the time they were ready to transition, additional cost drivers (e.g., the requirement for Mil Spec connectors and Mil Standard wire marking, etc.) had inflated Goodrich's production costs to the point where they were higher than a normal commercial system would have cost. The system was still negotiated as a commercial contract based upon commercial value, but the underlying costs were higher.
- A teaming arrangement with the Government works well when the proper program management techniques are applied. Originally there were eight Navy Integrated Project Teams (IPTs) involved. The process went on too long and many "finalized" decisions were revisited more than once as personnel rotated off the project and were replaced. This caused confusion, cost overruns, and schedule delays. Once solid program management discipline replaced numerous IPT committees the program progressed much more rapidly. This solid discipline is required regardless of the use of Section 845 agreements.
- The original two-year schedule while working with two different program offices (Navy H-53 and Army H-60) was overly optimistic considering the complexity of the systems being adapted to military use.
- Goodrich was somewhat familiar with military requirements from having been a subcontractor to military prime contractors and thus somewhat familiar with the FAR. Goodrich still found the experience difficult and expensive to navigate through. A pure commercial firm would have found the HUMS program, as it evolved, an impossible task under standard Government FAR contracting procedures.
- The Goodrich experience with HUMS showed that even when they start with innovative contracting tools such as OTAs, Government program management personnel (contracting officers, logistics personnel, and managers at all levels) tend to drive themselves back to traditional methodologies over time. In particular, as the Government program management leadership changed the focus of the COSSI innovative practices was lost.

- Goodrich noted that strong team relationships and flexibility were what made the program successful in the end. They were able to sit down with the Government team and work through the many issues that came up—and it was COSSI that helped allow this.
- Civil helicopter operators with HUMS are reaping large benefits but the military, even coming later to the use of the HUMS technology, has the potential to save more than civilian operators.
- The HUMS program has turned out well but it took extraordinary efforts. However, in the end, the HUMS program will be good for the Navy, for Goodrich, and for the entire Department of Defense.
- The HUMS technology went from the civilian world into the military through the COSSI Program. Now, somewhat upgraded, is making its way back into the civilian market.

Movement Tracking System
Comtech Mobile Datacom Corporation)

Comtech Mobile Datacom provides network operating systems and services for satellite based packet data communications to commercial industry. The Comtech division doing the Movement Tracking System (MTS) COSSI project is rapidly growing, projecting sales in 2002 of about $30 million, up from about $14 million in 2001. The company got involved with COSSI in 1999. The MTS reflects a very large (tens of millions of dollars) internal proprietary R&D investment. ComTech has noted that the firm's involvement with DoD has yielded a lower return on investment than they are used to, but the COSSI funding has also reduced risk.

The connection between MTS and COSSI, or at least between MTS and DoD can be traced back to 1995. In that year the company fielded a commercial satellite tracking and messaging system for the U.S. Army under a Concept Evaluation Program. This succeeded, establishing in turn the need for a Program Office and a Warfighter Rapid Acquisition Program (WRAP). At that time Mobile Datacom concluded that their existing commercial technology as well as all other technologies available had shortcomings relative to the Army's stated needs. However, Mobile Datacom determined that by iterating the existing commercial technology they could meet the Army's needs. In early 1997 they submitted a COSSI proposal with considerable Army support.

At the time of the COSSI proposal the return on investment timeline for the Army was projected to be one year or less. In hindsight, a 24-30 month time frame was more accurate. A nine-to-one improvement in O&S costs was projected for every dollar spent and a savings of over $900 million was projected over a 10-year period. If the situation had remained as envisioned in 1997, the company would have recovered its investment within two years, with a COSSI Stage Two program of $20-30 million projected. However, things did not remain the same.

Although Mobile Datacom was selected to receive a Stage One COSSI award in 1997, the Army program office concluded that new commercial off the shelf (COTS) technologies had overtaken the initial work done by Mobile Datacom. The Army changed over to another contractor using these "newer" COTS technologies. Mobile Datacom none-the-less proceeded with its Stage One COSSI effort, even though they realized Stage Two might not happen. Mobile Datacom had confidence in the technology and expected that the new technology would immediately "spin back" into the commercial venue.

As the COSSI Stage One project was on going the Army Program office struggled with the COTS technologies. Several other agencies elected to participate in the COSSI project, including the Air Force, Navy, National Security Agency, the Drug Enforcement Administration, and the Coast Guard. Many brought additional funding to the table. However, even with the additional funding the original contractor/government cost share, which started out at 50/50, ended up with Mobile Datacom picking up 80-85 percent of the

cost. The company's strategy had been to seek out DoD contractors with whom to partner. However Boeing and TRW elected not to continue because they did not see their desired ROI targets ever being met.

Although Mobile Datacom had won the Stage One competition, the Army conducted a full and open competition for the COSSI Stage Two contract among five bidders. In addition to Comtech Mobile Datacom other bidders included Northrop Grumman, ARINC, GE Americom, and Litton. The procurement required performance testing and the COSSI Stage One technologies developed by Comtech won based on superior demonstrated performance. In 2000 the commercial system underwent "near Mil-Std" testing and passed with very minor modifications. The cost penalties of meeting the Military Standards were equally minor.

The end result was an indefinite delivery, indefinite quantity contract with a ceiling of $418 million over eight years for terminals and worldwide satellite service to implement satellite-tracking capability. It also includes engineering and program support services. So far the Army plans to buy over 35 thousand MTS units, but the budget for that is under funded. The system has been under test for commercial use for over a year and several commercial clients have been signed. ComTech noted that the DoD market for movement tracking services is a small fraction of the commercial market. By 2004 there will be over 12 million units in service of which the DoD would comprise a maximum of 200 thousand (a little over one-and-a-half percent).

Mobile Datacom believes this is a COSSI success story. There were several lessons learned from their viewpoint:

- An important point in the MTS program regarding data rights was that the Government only had the right to take over the technology (rights in data) if they went bankrupt. This was a key point in agreeing to do business with the Government in his case.
- There were many problems along the way but his company went into the effort with its eyes open—they did not have unrealistic expectations regarding how the DoD did business. The Army worked closely with them in a cooperative relationship.
- MTS was the right type of system at the right time. There was a strong need. The commercial satellite industry had grown rapidly and there were military communications needs such as MTS that continued to be unserved effectively by military systems.
- There was an effective alignment between all parties and success was due to:
    - First, there was a commercial entity (Mobile Datacom) with the necessary vision and technological concepts.
    - Second, there were Government personnel (the user and the Army's Combat Development Office, or CASCOM) that were willing to take a chance.
    - Third, the new commercial technology exceeded military requirements and military technologies in a competition.

NAVAIR COSSI Projects
Naval Air Systems Command

The Naval Air Systems Command (NAVAIR) has shown it believes in the COSSI Program and considers it important to Navy Aviation. The Naval Aviation Systems Command (NAVAIR) is in the business of supporting the warfighter. The average age of Navy aircraft is increasing. For FY 2000 the average age for helicopters is over 20 years and for fixed wing aircraft it is over 17 years. This is projected to increase until at least FY 2005. Legacy systems will be a way of life for Navy aviation for the foreseeable future—and COSSI can make these systems less complex and easier and cheaper to maintain.

Savings in operations and support budgets are critical to the Navy's ability to accomplish its required recapitalization. For the Navy, the COSSI business model is considered ideal: fast technology insertion with both the contractor and the Government sharing the cost. The Navy will not put COSSI Stage Two funding in its budget until it has determined if the COSSI project will work (i.e., that qualification testing will be successful).

NAVAIR had garnered most of the COSSI projects within the Navy since the Program's inception. A sample of projects within the Navy's COSSI portfolio includes:

- There were several COSSI projects that improved O&S costs on the P-3 Orion maritime patrol aircraft. These included an Improved Electronic Propeller Control System, an Electrical System Upgrade, a joint (with the Air Force and Coast Guard) Hub Integrated Power and Switching System, and a Maintainer's Electronic Performance Support System. Together these COSSI projects showed cost savings or cost avoidance of over $130 million for a relatively small investment.
- The results of the COSSI P-3 Electronic Propeller Control System success will also be applied to 83 Navy and up to 680 Air Force C-130 aircraft for an additional combined savings of over $165 million.
- A COSSI project to replace the Multi-Functional Control and Display Unit will cure supportability and parts obsolescence problems and garner an O&S cost avoidance of almost $12 million in just eight years.
- Several COSSI projects on the Navy's T-45 pilot training aircraft will save over $25 million (net present value).
- The COSSI Program was used to adapt a commercial Helicopter Usage and Monitoring System (HUMS) for use on Navy H-53, H-60, and AH-1 helicopters. This COSSI project (also described from the contractor's viewpoint elsewhere in this appendix) is inserting commercially available automated diagnostic and decision-making systems aboard these helicopters using open architecture and commercial interfaces.

There were several important "keys to success," or lessons learned offered regarding Navy COSSI projects:

- Constant advocacy for COSSI was needed within NAVAIR and to/from NAVAIR management.
- Effective training and coaching for the NAVAIR COSSI proposal team was also important to keeping the effort focused.
- The program office and the industry vendor had to come together as an effective team.
- A minimum of 3-6 months to develop a credible and effective COSSI project proposal was the minimum required. This meant the process had to commence well in advance of the annual COSSI solicitation being released.
- Participation by the resource sponsor (the bill-payer for Stage Two) was vital. Within the Navy, for the COSSI project proposal to go forward the resource sponsor has to endorse the COSSI project, commit to funding Stage Two, and describe how it could be paid for. This sponsor participation and support has to continue throughout the POM development process.

MILSTAR Antenna Program
USAF Electronic Systems Center

This COSSI project involved using a commercial product to replace a highly maintenance-intensive satellite communications system major component. The COSSI project developed and tested an improved design of the commercial unit (to meet military requirements). The improvement will reduce MILSTAR total ownership costs.

- The component replaced was the "worst box in the MILSTAR terminal" and was depleting user funds through unbudgeted excessive repairs.
- The actual mean time between failures for the old component was less than 1,000 hours versus over 28,000 hours (predicted) for the new component.

The new MILSTAR component uses a commercial data bus standard and is being built using commercial practices and commercial parts. Raytheon has used this COSSI effort to standardize on a common design for tri-Service applications and is using several commercial vendors to produce the end item. Raytheon used to build the product in-house but the use of commercial standards makes the use of dual use commercial vendors practicable. This has in turn increased the viability of the industrial base support to DoD with respect to satellite communications systems.

The prime contractor for this COSSI Program, Raytheon, was a traditional DoD contractor. However the use of OTA helped in negotiating cost sharing, reduced DoD prototype development costs, and allowed Raytheon to develop a commercially viable state of the art antenna controller design. An interesting aspect to this MILSTAR COSSI project was that the new component was commercial in terms of its "plug and play" architecture with regard to its box and board designs. It used the VME commercial standard. However, it represented use of a commercial technology and set of commercial practices, versus using an already in existence commercial product as other COSSI projects have done. The commercial technology had not been previously used in a military application.

As mentioned, use of the Section 845 Agreements was a major benefit to using COSSI.

- It brought simplicity in the form of relief from the FAR and no drawbacks were experienced with using OTA.
- The negotiation of the OTA for MILSTAR paralleled a typical FAR process (Statement of Work, milestone schedules, cost analyses and technical evaluations) but were much more user friendly than a FAR contract would have been.
- Both the Government and the contractor ended up adding some additional funds to the program.
- OTA resulted in a more streamlined design process in that less oversight freed up the technical staff to concentrate on successful commercial technology implementation.
- The OTA facilitated excellent communication between the contractor/Government team

The Government program office involved noted a number of lessons-learned with respect to this MILSTAR COSSI project that are probably applicable to others:

- There can be a heavy reporting burden because of the "new way of doing business." COSSI Stage One project government proposers may not be aware of the full range of programmatic actions and reporting that may be required to their own higher headquarters and others.
- Significant activities are required on the part of the Government program office for: (1) Need assessment and prototype proposal development, (2) converting a winning proposal into an effective prototype program, (3) managing the prototype program, developing a user need assessment and a viable production proposal, (4) and running a production program that actually yields the planned O&S budget savings. The Government program office may not necessarily have budgeted for these manpower and budget resources going into the COSSI program.
- COSSI projects are not a place for new hires, either in contractor or government program office organizations. Given the innovative contract agreements being used, experienced Government and Industry managers are needed in order to minimize the risk of failing.
- The Statement of Work should be kept very simple. In this COSSI project the SOW was only one page and the deliverables consisted of quarterly status reports, a test plan, a test report, and the firmware description for the end item.