

1 September 2004



CNO Guidance for 2004
Tasker Item 73
20% Cost Reduction of Navy T&E

Executive Summary

“We are creating a culture of readiness. However, readiness at any cost is not acceptable. We do not live in a risk free world. Our leaders will assess risk and determine how to create a balance between risk to mission accomplishment and excessive readiness costs. We will understand and attack costs at every level of our Navy. We will seek innovative means to improve productivity, leverage joint solutions and achieve the improvements necessary to ensure both our combat readiness and our capability now, and in the future.”

CNO Guidance for 2004

The Chief of Naval Operations (CNO) directed Commander, Operational Test and Evaluation Force (COMOPTEVFOR) to lead an effort to: “Streamline our testing and evaluation (T&E) processes through a collaborative effort among Navy, OSD, and contractor entities, using modeling and simulation where appropriate, with the goal of reducing the cost of Test and Evaluation (T&E) by 20 percent.” OPNAV N6/N7 and N4 along with NAVAIR, NAVSEA, and SPAWAR were directed to provide support for this effort. Unless otherwise stated, T&E in the context of this effort includes all variants of T&E (e.g., industry/contractor, developmental, operational).

Seven working groups (Requirements Development and Definition; Test Planning and Execution; Program Risk Management; Resource Costs; Modeling and Simulation; and Policy and Regulations) composed of T&E subject matter experts from across the OPNAV, System Commands, and PEO staffs were established. Each working group was focused on what was considered to be a primary cost driver area within Navy T&E. The Previous Studies working group was established to investigate and review work that had been accomplished by other organizations and agencies that directly or indirectly addressed the issue of T&E costs and best practices. A roadmap methodology is being utilized to accomplish this task. Within this methodology, each working group identifies specific subtasks necessary to develop specific budget line item (BLI) cost reduction recommendations. The roadmap for this effort will utilize both quantitative and qualitative data from 26 reference programs selected as being representative across Navy product acquisition lines (i.e., platforms, weapons, sensors, and networks). An Executive Committee (EXCOM) was also established to provide strategic level guidance and review to the working groups. The EXCOM is comprised of senior level personnel representing DOT&E, ASN(RDA), OPNAV N4, N6/N7, N8, FFC N7, NAVAIR, NAVSEA, SPAWAR, and OPTEVFOR.

The results of this effort will provide specific recommendations to the CNO for cost reductions at the BLI level within acquisition programs. These recommendations will be founded upon sensitivity analysis conducted on specific program costs enhanced by qualitative data obtained from Program Managers and Program Executive Officers that pertain to general perceptions of T&E cost drivers. Additional recommendations, of a more strategic consequence, will be provided that directly relate to the current holistic Navy T&E business model.

Contents

Executive Summary.....1

Functions and Processes3
 Test and Evaluation3

The Task4

Initial Findings5
 Scope of Task6
 External Influences7

Methodology.....8
 Quantitative Data9
 Qualitative Data9

Report Times and Recommendation Format 10

APPENDIX
 A. Navy RDT&E Activities

Functions and Processes

There are nine functions that form the baseline acquisition operational framework and six core processes span these nine primary functional areas. Figure 1. illustrates these primary functions and core processes. The core processes create the data that is used cross-functionally, between organizations, and throughout the entire acquisition community.

The nine primary functional areas of the operational framework establish the foundation for all acquisition-related activities. In support of these functions, program managers manage various activities, tasks, and sub-tasks to achieve the program's goals: an interoperable, producible, cost effective, sustainable weapon system to support the warfighter.



Figure 1: Acquisition functions and core processes

Test and Evaluation

The Test and Evaluation (T&E) function provides information regarding risk and risk mitigation, and empirical data to validate models and simulations. T&E allows the assessment of the attainment of technical performance, specifications, and system maturity to determine whether systems are operationally effective, suitable, and survivable for intended use. T&E provides the methodology for comparing the system under development to the system specifications and user requirements.

Figure 2 illustrates the primary tasks and activities performed within the T&E function.

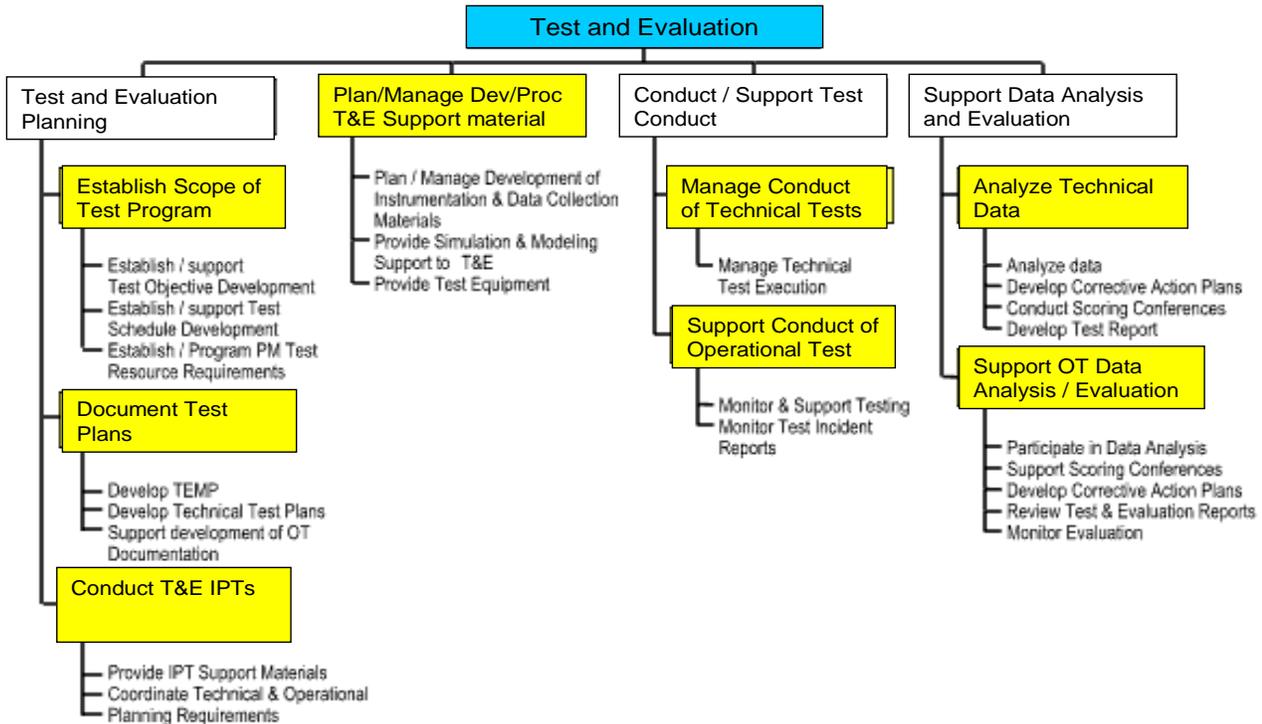


Figure 2: Test and evaluation functional areas of responsibility

Functions are the primary areas of activities that establish a program office’s main objectives. Activities, tasks, and sub-tasks are executed and managed within each functional area to produce the outputs that satisfy the objectives of the respective function. In contrast, core processes are the primary activities that span across each of the program office’s functional areas (not executed and managed within the boundaries and constructs of a single function). By defining the primary functions and core processes early in the development process, program managers are able to remain process-driven and "data-centric" to establish a baseline operational framework from which to build their product.

The Task

“... understanding of risks and costs, the willingness to challenge all of our notions, assumptions and equities, and most importantly, a commitment and desire to pursue continuous improvement in our institution. ...The opportunity to **accelerate the advantages** ... To meet that opportunity, we will define and deliver the right capabilities and processes – at the right costs – now, and in the future.”

CNO Guidance for 2004

The CNO’s Guidance for 2004 specifically states that all Echelon II Commands routinely apply eight Sea Enterprise principles to their business practices:

- Leverage technology to improve performance and minimize manpower costs
- Promote competition and reward innovation and efficiency
- Challenge institutional encumbrances that impede creativity and boldness in innovation
- Aggressively divest non-core, under-performing or unnecessary products, services and production capacity
- Merge repetitive, redundant, or superfluous efforts
- Minimize acquisition and life-cycle costs
- Maximize in-service capital equipment utilization
- Challenge every assumption, cost and requirement

Within the Sea Trials process COMOPTEVFOR was tasked to “Streamline our testing and evaluation (T&E) processes through a collaborative effort among Navy, OSD, and contractor entities, using modeling and simulation where appropriate, with the goal of reducing the cost of Test and Evaluation (T&E) by 20 percent.” As an integral yet independent part of the Navy’s acquisition process, OPTEVFOR is uniquely positioned at the “intersection” between product development and fleet usage for all Navy warfighting capability.

Before proceeding with the assigned primary task, it was necessary to accomplish several preliminary tasks. They were:

- (1) Solicit supporting and stakeholder activities for representation
- (2) Scope the depth and breadth of the task
- (3) Outline the approach methodology
- (4) Evaluate primary T&E cost drivers
- (5) Establish work groups to develop roadmap tasks within each cost driver area (Table 1)
- (6) Establish a Roadmap Development POA&M (Figure 3)
- (7) Establish an Executive Committee (EXCOM) to provide senior level oversight (Table 2)

The preliminary tasks were completed at a kick off meeting conducted at COMOPTEVFOR Headquarters, Norfolk VA on 10 March 2004 and attended by T&E subject matter experts from across the acquisition and T&E community. Seven workgroups were established that aligned with what were determined to be the primary cost driver areas within Navy T&E. Table 1 identifies the workgroups and their associated lead organization.

Requirements Development & Definition (N7)	Test Planning & Execution (COTF/PEO(T))
Program Risk Management (PEO W)	Modeling & Simulation (NAVSEA)
Policy and Regulations (N912)	Resource Costs (N43)
Previous Studies (NAVSEA)	

Table 1. Work Groups

Initial Findings

Defining the Baseline Reference Cost

The task to “Streamline our test and evaluation process... with a goal of reducing the cost of Test and Evaluation by 20%” did not identify a baseline or reference cost from which to

Test and Evaluation Cost Reduction Roadmap

determine the achievement of the goal. As such it was determined to pursue a course of action that would provide recommendations based on quantitative analysis of cost reduction percentages against specific T&E policies, procedures, and practices that effect program of record (POR) budget line item (BLI) costs. More holistic recommendations (e.g., establishment of a T&E Enterprise, organizational and chain of command modifications, etc) are under the purview of the executive committee (EXCOM), the members of which are listed in table 2.

Mr. Steven K. Whitehead	OPTEVFOR (chair)
Dr Michael McGrath	DASN(RDT&E)
Mr. Kenneth Miller	CNO N6/N7
Mr. Patrick Tamburrino	CNO N8
Ms. Ariane Whittemore	CNO N4
Mr. George Ryan	CNO N091
Mr Thomas Crabtree	CFFC N7
Mr. Edward Greer	NAVAIR
Mr. James Egeland	NAVSEA
Mr. Thomas Higbee	SPAWAR
Mr. David Duma	DOT&E (advisory)

Table 2. Executive Committee Membership

Scope of Task

During the course of the 10 March 2004 kickoff meeting the scope of the task was determined to be significantly greater than those developmental test (DT) and operational test (OT) events that are represented in a POR test and evaluation master plan (TEMP). Determining the cost, in terms of both resources and manhours, for conducting dedicated DT and OT is not a difficult task since dedicated test periods are well defined and documented. However, an extensive percentage (estimated at greater than 80 percent) of Navy T&E is conducted by system command (SYSCOM) working capital fund (NWCF) field activities (FA) and industry developers on a near continuous basis. This testing is supported by a T&E infrastructure, to include but not limited to, facilities, human resources, test equipment (both general and unique), test platforms, targets (real, virtual, constructive) who's specific cost is indeterminable due to incompatible financial planning, programming, budgeting and execution systems. It is these infrastructure costs and continuous NWCF FA and industry testing that constitute the greatest percentage of the breadth and depth of Navy T&E. It was therefore decided to accomplish the task by identifying potential cost reduction percentages within specific cost driver focus activities (see Methodology section). A list of Navy WCF FAs, as well as other Navy Research Development Test and Evaluation (RDT&E) activities, is included in Appendix A to this plan.

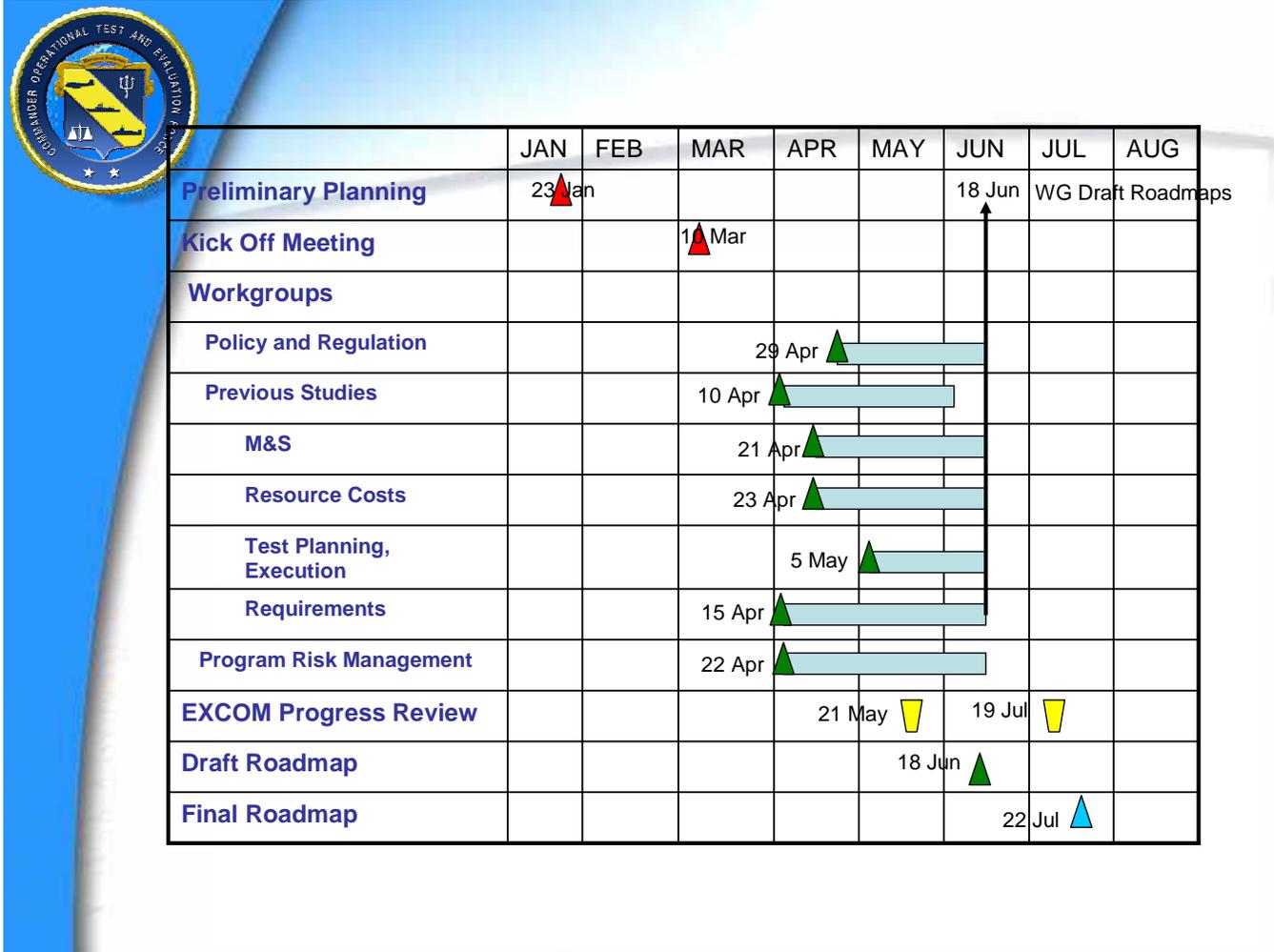


Figure 3: Roadmap Development POA&M

External Influences

During the development of this roadmap plan, it was identified that there are numerous external influences either recently completed or whose development is ongoing which introduce significant uncertainty in identifying future cost reductions. Within the past year there have been revisions to both DoD and Navy 5000 series acquisition documents. USD(AT&L) released a memorandum (Initial Systems Engineering Process Memo) requiring “all programs responding to a capabilities or requirements document ... shall develop a Systems Engineering Plan (SEP) for Milestone Decision Authority approval in conjunction with each Milestone Review”. The Secretary of Defense’s Strategic Planning Guidance (SPG) directed the Department to “provide new testing capabilities [for test and evaluation in a joint operational context] and institutionalize the evaluation of joint system effectiveness as part of new capabilities-based processes.” .” It tasked the Director, Operational Test and Evaluation to “develop a roadmap for the Deputy Secretary of Defense... that identifies the changes needed to ensure that test and evaluation is conducted in a joint environment and facilitates the fielding of needed joint capabilities.” That roadmap is currently in the final phase of approval. These revisions to

existing directives and policies as well as new policy memorandums will have an as yet indeterminable impact on the cost of Navy T&E.

Methodology

Each of the work groups was directed to initially research and review their specific focus area in a What, Why, How manner. Determine what it is in T&E the Navy does; determine why it is done, and if there is a valid need and determine how it is accomplished. Those “whats” that do not have a sufficiently supporting “why” are presumed to be uncalled for and subject for elimination. The roadmap methodology utilized for execution of this effort resulted in the development of the execution POA&M shown in figure 4. The two primary actions described by the activities listed in the figure are the collection of quantitative and qualitative data specific to 26 reference programs shown in table 3. These programs of record were selected for the compatibility to one or more of the following selection criteria; completion of their primary T&E events (e.g., post MS III), unique cost driver issue (e.g., requirements instability), ACAT level, product line (weapon, sensor, platform, network).

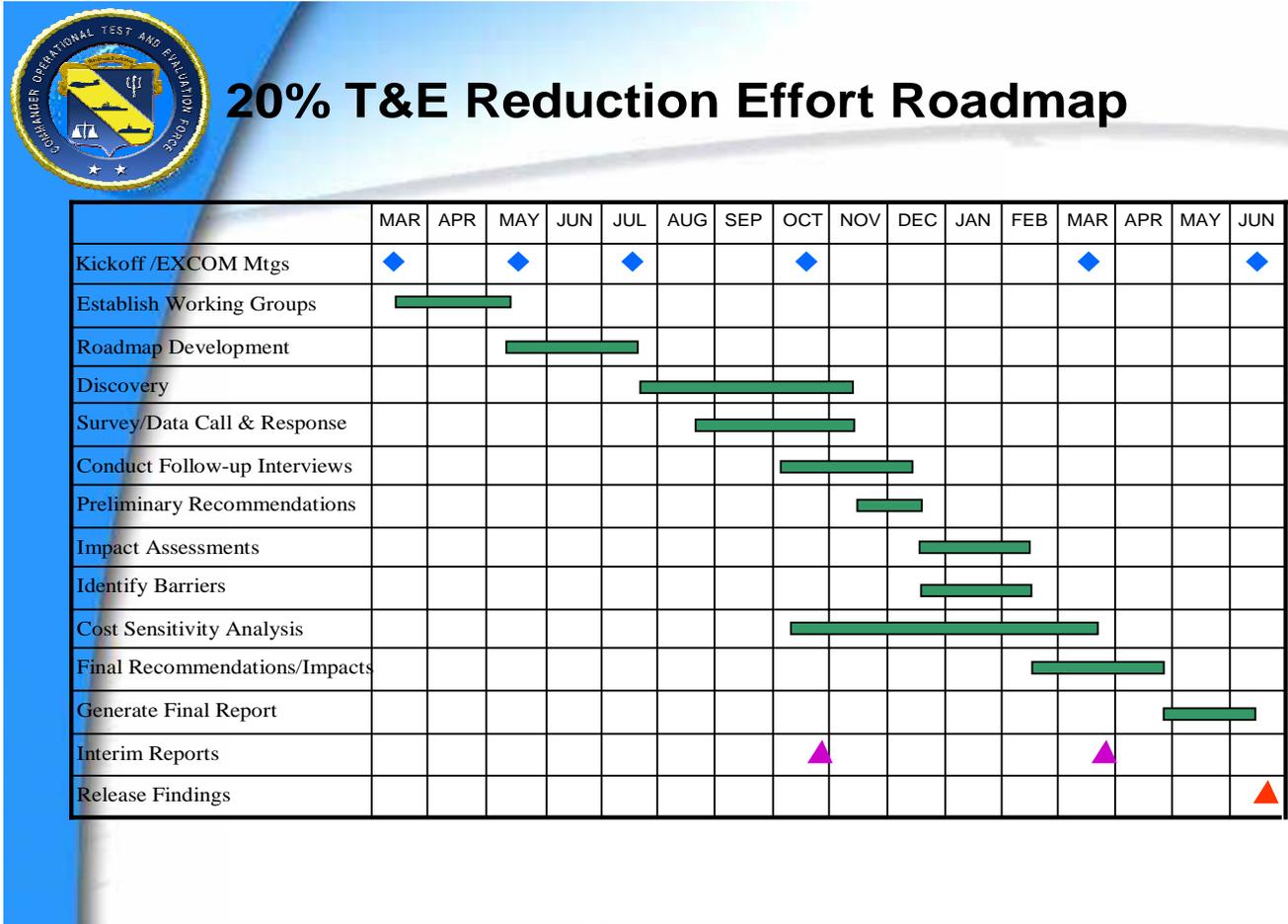


Figure 4. Roadmap Execution POA&M

Quantitative analysis

Table 3 identified the 26 cost reference programs that will be examined within this effort. By utilizing products that cross product line and ACAT level it will be possible to conduct a comparative trend analysis. This trend analysis will be achievable by comparing like budget line item (BLI) expenditures within product lines, across product lines, within ACAT levels and across ACAT levels. This will provide insight into whether a cost driver is unique to a product line or ACAT or both and whether there is a relationship between cost drivers and program size and complexity or both. This insight can then be extrapolated to similar current and future programs for potential cost reductions in specific cost driver areas. As an example, by reviewing the ACAT I platform programs a trend is observed that is related to requirements instability a sensitivity analysis model will be utilized to conduct “what if” analysis. What if the programs requirements had been more clearly defined or approved in a more expeditious manner, what percentage of T&E costs would have been eliminated? See figure 5.



Program	ACAT	Product Line	Program	ACAT	Product Line
SEAWOLF	I	Platform	ESSM	II	Weapon
F/A-18E/F	I	Platform	ATFLIR	III	Sensor
SH-60R	I	Platform	MIDS	II	Network
TACTOM	I	Weapon	ARCI	II	Sensor
AIM-9X	I	Weapon	ASDS	III	Platform
SPY-1D(V)	I	Sensor	SSDS MK1*	I	Network
CCS MK2 Blk 1C	IV-T	Network	DDG51*	I	Platform
DMS	I	Network	LPD 17*	I	Platform
NMCI	I	Network	NTCSS III	III	Network
BFEMAIL	IV	Network	TESS/NITES 2000	III	Network
MK 48 Mod 6	III	Weapon	TB-29 TLTA	III	Sensor
IUSS	III	Sensor	DMR	III	Network
CEC*	I	Network	SWEIP*	II	Sensor

* - Indicates program examined in WBB study

Table 3: Reference Program List

Qualitative Insight

In addition to the reference program quantitative BLI data gathered from the reference programs of table 3, a qualitative data survey will be developed and administered to a variety of T&E stakeholders and executors (i.e., PEOs, PMs, Field Activity personnel, Range Activity Personnel, testers, industry representatives). The information provided by this survey will be used as vector indicators in conjunction with the qualitative BLI data. The survey will provide insight in the decision-making process in a wide range of T&E practitioners. This information is

essential in determining “the what and why” some activity or event was executed. These data are expected to identify systemic decision drivers in the areas of policy and program risk management. If, for example, a test/certification event is conducted based upon the PM’s perceived understand that their program is a “spiral development” program, their risk management approach is potentially significantly different than a non-spiral program. Or, if a PEO believes that a program requirement is directed by policy (e.g., Systems Engineering Plan (SEP)) but the details of what constitutes an SEP are undefined, they may expend significant resources in developing an SEP that has little or no influence on their program.

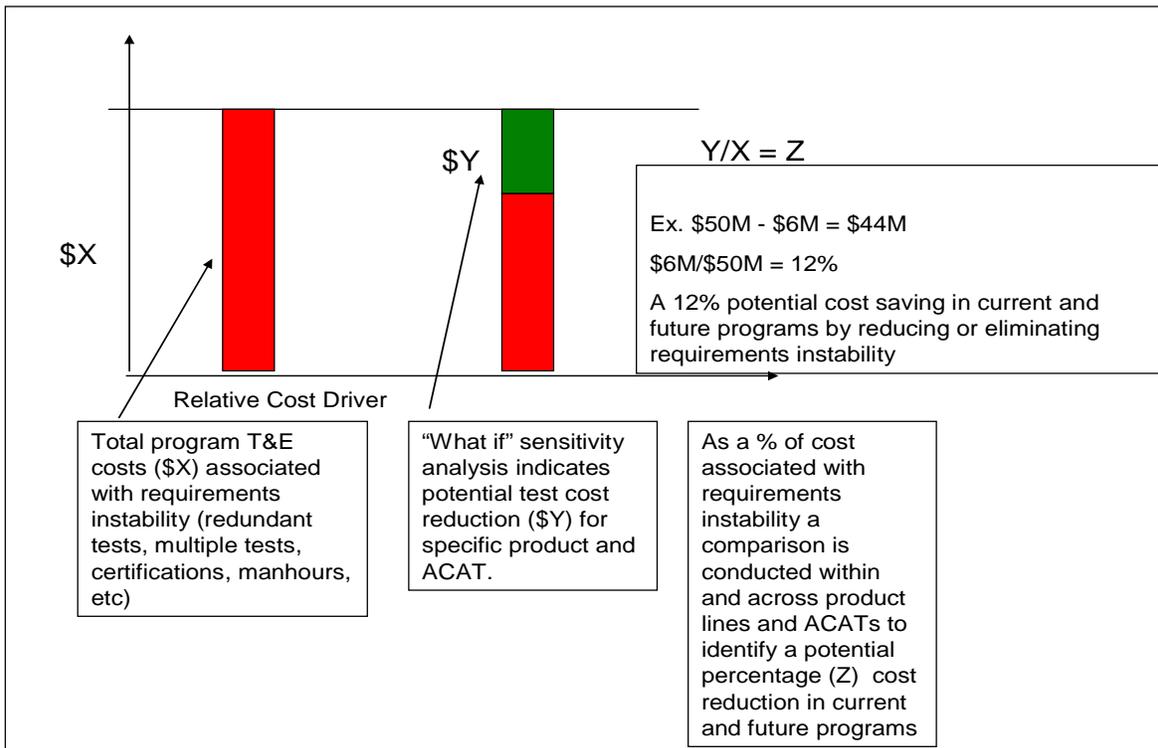


Figure 5: Sensitivity Analysis Example

Report Times and Recommendation Format

Progress and any preliminary findings will be published in interim reports scheduled for release in Oct 2004 and Mar 2005. A final report will be published in Jun 2005. Findings, both preliminary and final, will be presented and recommendations for corrective or modified action will be presented. The context of recommendations may be in the form of actions required or process improvements identified to include changes, amplifications/modification or deletion and will include recommended responsible agency, command or activity. An attempt will be made to develop and report on implications with regard to interdependencies across focus areas to include 2nd and 3rd order consequences of actions.

Test and Evaluation Cost Reduction Roadmap

Recommendations for cost reductions from this effort will be categorized in the following manner:

Expected Execution Time:

Near Term – FY05 – FY06

Mid Term – FY06 – FY08

Far Term – FY08 +

Ease of Implementation:

High – policies, practices and procedures wholly owned by Navy SYSCOMs and COMOPTEVFOR

Med - policies, practices and procedures owned at the SECNAV and CNO level

Low - policies, practices and procedures owned outside the Navy

Level of impact:

Moderate – having minimal impact on the Navy in general and T&E specifically. (conventional)

Aggressive – having marginal impact on Navy in general and moderate to extreme impact on T&E. (evolutionary)

Transformational – having far-reaching implications on current Navy generally and T&E specifically. (revolutionary)

U.S. Navy RDT&E Facilities
(as of 21 Jun 04)

Naval Air Systems Command

- (1) Commander, Naval Air Systems Command, Patuxent River, MD
(COMNAVAIRSYSCOM PATUXENT RIVER MD)
- (2) Commander, Naval Air Warfare Center Aircraft Division, Patuxent River, MD
(NAVAIRWARCENACDIV PATUXENT RIVER MD)
- (3) Naval Air Warfare Center Aircraft Division, Lakehurst, NJ
(NAVAIRWARCENACDIV LAKEHURST NJ)
- (4) Commanding Officer, Naval Air Warfare Center Training Systems Division, Orlando, FL
(NAVAIRWARCENTRASYSYSDIV ORLANDO FL)
- (5) Commader, Naval Air Warfare Center Weapons Division, China Lake, CA
(NAVAIRWARCENWPNDIV CHINA LAKE CA)
- (6) Commander, Naval Air Warfare Center Weapons Division, Point Mugu, CA
(NAVAIRWARCENWPNDIV PT MUGU CA)

Naval Sea Systems Command

- (7) Commander, Naval Sea Systems Command, Washington Navy Yard, Washington, DC
(COMNAVSEASYSYSCOM WNY DC)
- (8) Commanding Officer, Naval Ordnance Safety and Security Activity, Indian Head, MD
(NAVORDSAFSECACT INDIAN HEAD MD)
- (9) Commanding Officer, Naval Explosive Ordnance Disposal Technology Division, Indian Head, MD
(NAVEODTECHDIV INDIAN HEAD MD)
- (10) Commander, Naval Surface Warfare Center, Arlington, VA (COMNAVSURFWARCEN WASHINGTON DC)
- (11) Commanding Officer, Naval Experimental Diving Unit, Panama City, FL
(NAVXDIVINGU PANAMA CITY FL)
- (12) Commander, Naval Undersea Warfare Center, Newport, R.I.
(COMNAVUNSEAWARCEN NEWPORT RI)
- (13) Commanding Officer, Surface Combat Systems Center, Wallops Island, VA
(SURFCOMBATSYSYSCEN WALLOPS ISLAND VA)
- (14) Commander, Carderock Division, Naval Surface Warfare Center, West Bethesda, MD
(NAVSURFWARCEN CARDEROCKDIV BETHESDA MD)

Test and Evaluation Cost Reduction Roadmap

- (15) Commander, Crane Division, Naval Surface Warfare Center, Crane, IN
(NAVSURFWARCEN CRANE IN)
- (16) Commander, Dahlgren, Naval Surface Warfare Center, Dahlgren, VA
(NAVSURFWARCENDIV DAHLGREN VA)
- (17) Commanding Officer, Corona Division, Naval Surface Warfare Center, Corona, CA
(NAVSURFWARCENDIV CORONA CA)
- (18) Commander, Port Hueneme Division, Naval Surface Warfare Center, Port Hueneme, CA
(NAVSURFWARCEN PORT HUENEME CA)
- (19) Commander, Naval Undersea Warfare Center Division Keyport, WA
(NAVUNSEAWARCENDIV KEYPORT WA)
- (20) Commander, Naval Undersea Warfare Center Division, Newport, RI
(NAVUNSEAWARCENDIV NEWPORT RI)
- (21) Commanding Officer, Naval Ship Systems Engineering Station, Carderock Division,
Naval Surface Warfare Center, Philadelphia, PA
(NAVSURFWARCENSHIPSYSSENGSTA PHILADELPHIA PA)
- (22) Commanding Officer, Coastal Systems Station Dahlgren Division, Naval Surface
Warfare Center, Panama City, FL
(NAVSURFWARCEN COASTSYSSTA PANAMA CITY FL)
- (23) Commanding Officer, Combat Direction Systems Activity Dam Neck, Virginia Beach,
VA (CBTDIRSYSACT DAM NECK VA)
- (24) Commander, Indian Head Division, Naval Surface Warfare Center, Indian Head, MD
(NAVSURFWARCENDIV INDIAN HEAD MD)
- (25) Commanding Officer, AEGIS Technical Representative, Moorestown, NJ (AEGIS
TECHREP MOORESTOWN NJ)

Commander, Operational test and Evaluation

- (26) Commander, Operational Test and Evaluation Force, Norfolk, VA (COMOPTEVFOR
NORFOLK VA)

Chief of Naval Research

- (27) Chief of Naval Research, Arlington, VA (CNR ARLINGTON VA)

Test and Evaluation Cost Reduction Roadmap

(28) Commanding Officer, Naval Research Laboratory, Washington, DC
(NRL WASHINGTON DC)

Space and Naval Warfare Systems Command

(29) Commander, Space and Naval Warfare Systems Command, San Diego, CA
(SPAWARSYSCEN SAN DIEGO CA)

(30) Commanding Officer, Space and Naval Warfare Systems Center, San Diego, CA
(SPAWARSYSCEN SAN DIEGO CA)

(31) Commanding Officer, Space and Naval Warfare Systems Center, Charleston, SC
(SPAWARSYSCEN CHARLESTON SC)