Revised Independent Validation and Verification of the Initial "Bridge" Project Cost-Benefit Analysis Plan to accommodate changed Statement of Work

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Independent Verification and Validation of the Initial CBA Plan: R-TOC Year 2

Executive Summary

This short report revises and amends the IV&V plan, dated November 19, 2010, and titled: "Independent Validation and Verification of the Initial "Bridge" Project Cost-Benefit Analysis Plan, Return on Total Ownership Cost Year 2", constitutes a plan for executing the Independent Validation and Verification of the Initial Cost-Benefit Analysis prepared by IDA for the R-TOC Bridge project. The purpose of the plan is to account for changes in the Statement of Work, dated January 2011, which, among other changes, refocuses the research from Instructor-led Training (ILT) to Computer-Based Training (CBT), as well as to define the scope, background and rationale, methods and deliverables associated with the IV&V of the ICBA. The plan is preliminary and subject to change with new findings and scope changes.

Independent Verification and Validation of the Initial CBA: R-TOC Year 2

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1. Introduction

The Institute for Defense Analyses (IDA) performed the initial cost-benefit analysis (ICBA) component (Levine, Horowitz, Gafford, & Fletcher, 2010)of a two-year project funded by the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics through the Reduction of Total Ownership Costs (R-TOC) program (R-TOC, 2010). The two-year project aims to improve Navy Integrated Logistics Support (ILS) using an integrated approach to the management and provisioning of technical information and training. The R-TOC project is referred to as the "Bridge" project, reflecting the integration of two relevant standards for technical data and training systems, S1000D and SCORM, respectively. The results of the ICBA indicate that the "Bridge" may achieve both a reduction in the cost of producing future technical manuals and training courses and an increase in future shipboard readiness defined as conformance with the Navy's policy to ensure preparedness and availability of appropriate logistics support concurrent with the fielding of new systems and equipment upgrades. These results suggest that the "Bridge" project fulfills the purpose of the R-TOC program "to achieve readiness improvements in weapon systems by improving the reliability of the systems or the efficiency of the processes used to support them" (R-TOC, 2010). In addition, the authors of this document prepared and provided other deliverables under the prior SOW.

Initially, the goal of this effort was to provide an Independent Verification and Validation (IV&V) of the IDA RTOC effort referenced above. This goal included the following objectives:

1. Validate the work breakdown structures (also called business process models) and cost and benefit elements (categories) identified in year 1 of R-TOC ICBA
2. Verify the estimated costs and benefits values of objective 1 business processes and capture new estimates for cost and benefit categories to reflect those at new sites studied, if any
3. Address risk and uncertainty with Monte Carlo Methods
4. Test the consistency between the ICBA and the IV&V results
5. Analyze the methods used in the ICBA to scale up the cost-benefit results

Under the twin urgencies of restrained finances and the inability to gain site visit accesses as previously planned, SOW 3 was generated, in which the objectives were restructured, and the following deliverables were agreed to:

1) Task CAA2.1:
   a) Updated literature review paper with NAVEDTRA documents and the LCS MM Mine Warfare Navy Training System Plan.
   b) Updated IV&V Plan, aligned with new scope
2) Task CAA2.2: Estimated completion date: Feb 7, 2011
   a) Implied work breakdown structure (IWBS) extracted from Navy guidance manuals for developing training material
   b) Comparative analysis of the IWBS and the IDA WBS underpinning the CBA

1.1 Purpose of this document

This purpose of this document was to provide revisions to the original *Independent Verification and Validation (IV&V) of the ICBA*, which are consistent with the revised SOW 3. Initially, this effort was to leverage information gained from site visits.

The R-TOC program has matured since its inception in 1999 and best practices for R-TOC projects have been established. For instance, Reed and Reed (2003) note that R-TOC cost estimation entails multistep process that includes base lining and characterizing total ownership costs, or at least the drivers of the status quo, defining objectives and meaningful metrics, implementing and tracking the metrics, and estimating the cost savings resulting from implementation These activities likely vary depending on which phase in the acquisition process the proposed intervention inserts. Further, best practices indicate that R-TOC cost estimation is an ongoing process where assumptions and methodologies used for cost-benefit analyses must be validated and verified and costs as well as metrics are updated throughout the implementation process (Reed and Reed, 2000, pg. 61).

Consistent with R-TOC best practices, the initial objectives of this task were to:

1. Validate the work breakdown structures (also called business process models) and cost and benefit elements (categories) identified in year 1 of R-TOC ICBA
2. Verify the estimated costs and benefits values of objective 1 business processes and capture new estimates for cost and benefit categories to reflect those at new sites studied, if any
3. Address risk and uncertainty with Monte Carlo Methods
4. Test the consistency between the ICBA and the IV&V results
5. Analyze the methods used in the ICBA to scale up the cost-benefit results

The change to SOW 3 caused the following questions to come to the foreground:

Determine if there are similarities between the process flows for developing training content from material in technical manuals which will be delivered in a CBT environment and the process flows for developing training content from material in technical manuals which will be delivered in an ILT environment.

If the answer to the above question is “yes” (i.e., there are similarities between the two process flows), then it will be possible to use the ICBA, which is based on an ILT process, as an analogous data point and to leverage it for insight into savings provided by the Bridge in a CBT environment.

If the answer to the above question is “no” (i.e., there are not similarities between the two process flows), then the Navy needs to think through the issue of how to perform a CBA to that provides insight into savings provided by the Bridge in a CBT environment, without the benefit of any analogous, historical data.

1.2 Scope and the Use of the Term “Independent Validation and Verification”

The term “Independent Validation and Verification” was applied to the task described above by management prior to the commencement of the project. The term appropriately describes the task in so far as it will entail validating that the systems identified for cost estimation in ICBA were the correct ones and verifying that the cost estimates applied to them are correct. The evaluation of the ICBA is being conducted by new personnel from organizations separate from

those involved in the ICBA and data will be collected from sources that did not figure into the ICBA. Thus, the new analysis can be considered independent.

The formally accepted definitions of the term (Independent) Validation and Verification (IV&V) are explained here both to distinguish the usage in this study from those formal definitions and also to elucidate how IV&V potentially applies to the Bridge project in this formal usage. As noted below, the application of the formal definition of IV&V to the Bridge will occur with implementation including piloting and is *outside the scope of this task*. However, cost estimates and metrics should be adjusted as the implementation evolves and formal V&V are applied to the design and the Concept of Operations.

According to Wikipedia, *Verification and Validation* is the process of checking that a product, service, or system meets specifications and that it fulfills its intended purpose. The term "Independent" indicates that the process must be performed by a disinterested third party, i.e., unrelated from a management, financial, or technical perspective. The formal definitions and standards are reviewed in Section 2.1.

1.3 Document Overview

Section 2 provides background information, including a review of relevant literature. Section 3 describes the methodologies expected to be employed in the IV&V ICBA, the rationale for their use, information and data needs and collection methods, and more detailed descriptions of the work activities. Section 4 offers a preliminary analysis of potential project risks and risk management strategies. Section 5 describes the deliverables from yielded from the execution of the IV&V plan.

2. Background and Relevant Literature

The methodologies used to perform the IV&V ICBA are all well established. To ensure these methods are employed correctly and to inform readers of the study who might otherwise not be familiar with these methods, background material including a review of the relevant literature will be provided in the final report. An overview of that material is provided here.

2.1 Independent Validation and Verification

As explained in section 1.2 above, the term V&V as used in this study is non-standard, however the standard usage may directly bear on the development of Bridge technology. So this section offer a brief review of the V&V literature to is briefly reviewed.

V&V, in its use as a systems engineering or quality assurance technique has prompted the definition of standards to ensure consistent application to a wide array of systems, products and services. Most relevant to this study is the *Institute of Electrical and Electronic Engineers (IEEE) Standard for Software Verification and Validation* (IEEE Std. 1012-2004), which defines international standards for both technical and management-based software development activities. These activities map directly into ISO/IEC 12207 Life Cycle Processes, i.e., acquisition, supply, development (incl. concept, requirements, design, implementation, test, installation, and checkout) operation, maintenance, organizational and other supporting. Standard practice applies V Other V&V processes apply to metrics and reusable software.

IV&V processes are mandated for federally subsidized system information technology projects and they loosely conform with IEEE 1012. Comprehensive assessment of the project processes and deliverables, concurrent reporting to state and federal stakeholders are among the standards-based requirements. Under federal regulations at 45 CFR 307.15(b)(10), an IV&V requirement is triggered for certain state automation system. Finally, DoDI 5000.61 for Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A) is DoD's instruction that implements policy, assigns responsibilities, and prescribes procedures for the verification, validation, & accreditation (VV&A) of DoD models, simulations, & associated data. The "M&S Guidance for the Acquisition Workforce" and the Defense Acquisition Guidebook (DAG) Chapter 4.5.8 both address V&V for modeling and simulation software (see http://www.acq.osd.mil/sse/docs/M-S-Guidance-Acquisition-Workforce.pdf).

The application of the formal definition of IV&V to the Bridge will occur with implementation, including piloting and is outside the scope of this task. However, cost estimates and metrics should be adjusted as the implementation evolves and V&V are applied to the design and the Concept of Operations. As the Defense Acquisition University states "Verification and validation of product design, early in the development lifecycle, is necessary to ensure that design changes do not adversely impact the production process and program cost. The appropriate mix of design verification and validation activities (e.g., critical design review) must be balanced with the program goals (e.g., cost, schedule) and product characteristics / requirements (e.g., complexity, safety) to ensure that technical problems are uncovered early and do not lead to costly retrofits and redesign of the production versions since these lead to increasing the product cost and significantly moving out the schedule" (DAU-BPC, 2010). Cost control must be exercised through development process by estimating, tracking and comparing with the original cost-benefit analysis. Deviations from expected may signal a defect or a misestimate. In either case, the earlier corrective action can be undertaken in the development phase, the more likely will be overall product cost containment.

2.2 Cost and Benefit Estimation

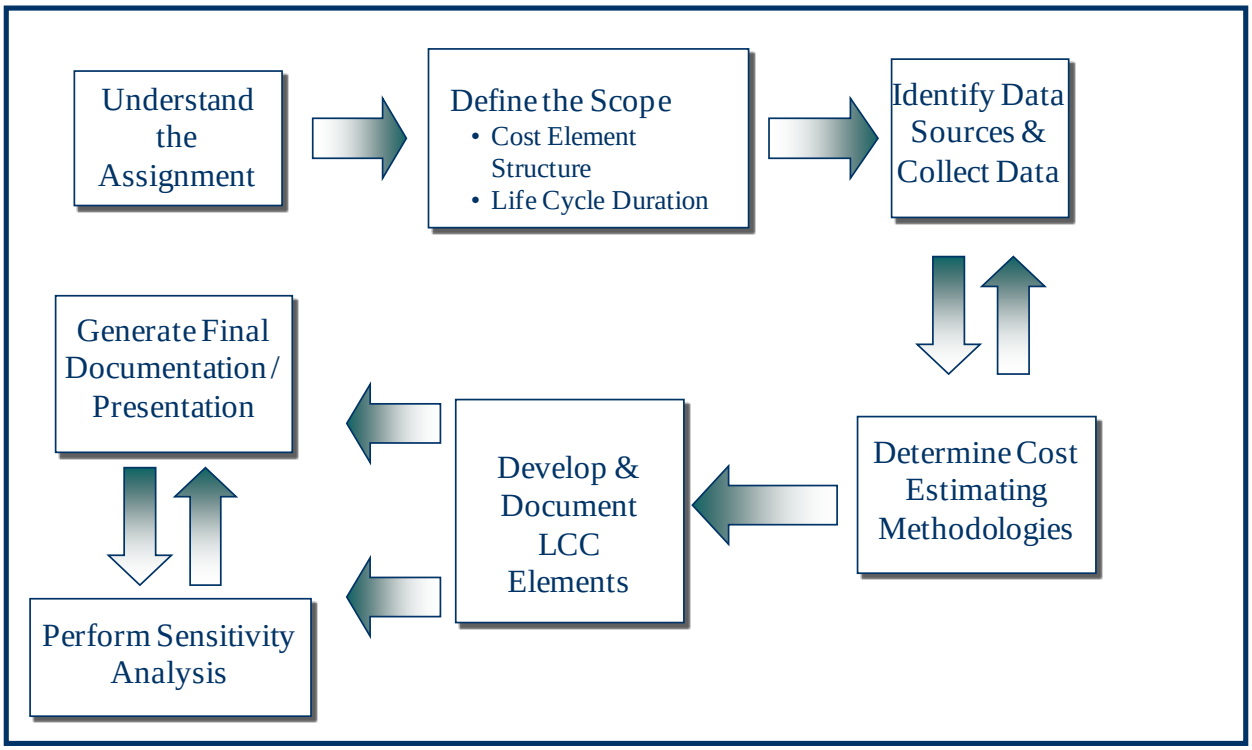
Several key sources provide the basis for the cost-benefit analysis methods used to validate and verify the ICBA. The cost estimation and analysis techniques used in this study will conform to those recognized by the Society of Cost Estimating and Analysis (SCEA), the leading professional society for cost estimators. SCEA methods are provided in their Cost Estimating Body of Knowledge (CEBoK™), which serves as a desktop reference and training courseware for SEAS certification (SCEA, 2010). Another source used in this endeavor includes the U.S. Government Accountability Office developed a Cost Guide (GAO, 2009). GAO's Cost Guide provides a consistent methodology based on best practices on oversight of the government's stewardship of public funds and support the Office of Management and Budget's (OMB) capital programming process. A twelve step process for high-quality cost estimation is offered. The attention directed at cost estimation stems from the fact that cost estimation is a measure of government program performance. Moreover, cost estimation is critical for the evaluation of new technologies, such as "The Bridge", as well as for the management of costs through the system life-cycle.

The management of a cost estimate involves continually updating the estimate with actual data as they become available, revising the estimate to reflect changes, and analyzing differences

between estimated and actual costs—for example, using data from a reliable earned value management (EVM) system.

We return to a question begun in paragraph 1.1. above, namely, whether the data developed in the IBCA (which addressed developing training content from material in technical manuals which will later be delivered in an ILT environment) is relevant to assessing the cost, savings and benefits provided by the Bridge in a CBT environment.

It is important to note the following about developing a cost estimate as part part of a CBA done in the CBT environment: Regardless of the answer to the question in nthe previous paragraph, there is basically no difference in the procedures that underpin a cost estimating. In general, the following is a standard process for developing a cost estimate, and this process is invariant under the ILT or CBT assumption.



2.3 Uncertainty Analysis

All life has uncertainties, and the world of modeling and analysis is not an exception. Cost estimation effectively relies on a model of reality, which defines the costs, e.g., different components and parameters. Models such as Work Breakdown Structures and their associated cost elements are considered best practice for estimating the costs of acquiring programs and managing them over their life cycle (GAO, 2009). These models are necessarily abstractions of reality and uncertainties in estimation can be expected in all three aspects of program management, namely, cost, performance and schedule across all life-cycle stages.

Examples of uncertainties associated with program management are:

1. Estimating the cost of creating a new technical manual using current systems
2. Estimating the how long it will take for an engineering change proposal to propagate into the appropriate training content using the current systems.
3. Estimating the efficacy of a new process.

These examples highlight the need to address uncertainty in IV&V task of estimating the return on investment of introducing the Bridge to integrate the technical information and training content production processes. In examples 1 and 2, there is likely historical data on which to base the estimate, possibly even a quantified probability distribution, which is referred to as risk. The third example poses additional uncertainties because a new process, i.e., the Bridge is introduced, for which no historical data exist, and which may impact the efficacy of other processes in the systems.

The purpose of introducing uncertainties and uncertainty analysis into cost estimation is to:

- Convey to decision makers the essential fact that all estimates are, in fact, uncertain.
- Ensure that decision makers are not misled into believing that point estimates of cost are more certain than they are, and thereby be misled into a false sense of security of their exactness or precision.
- Quantify the risks that are integral, but perhaps heretofore unstated, to the analysis
- Establish the foundation for developing risk mitigation strategies.

GAO has a twelve step process for high-quality cost estimation, which begins with a step for generating single point estimates but follows with a step for risk and uncertainty analysis (GAO, 2009). Organizations dealing with high-risk, large-scale weapons systems acquisition demand the use uncertainty analysis for cost estimation (NATO-RTO, 2007).

The findings of a RAND Project AIR FORCE study of various cost uncertainty assessment methodologies and their effect on total portfolio of programs resulted in the recommendation to analyze cost estimation uncertainties using various, and preferably a combination of historical, sensitivity, and probabilistic methods (Arena, et al., 2006).

A classic approach to quantifying and thereby understanding uncertainties is called Monte Carlo Analysis. Monte Carlo Analysis is actually a class of methods, an introduction to which can be found at http://en.wikipedia.org/wiki/Monte_Carlo_method. Below are three aspects of Monte Carlo Analysis.

- Monte Carlo methods are a class of computational algorithms that rely on repeated random sampling to compute their results. Monte Carlo methods are often used in simulating physical and mathematical systems (en.wikipedia.org/wiki/Monte_Carlo_analysis retrieved 11/12/2010).
- Monte Carlo is a technique that allows assessment of the consequences of simultaneous uncertainty about key inputs, taking account of correlations between these inputs (www.dfpni.gov.uk/eag-glossary retrieved 11/12/2010).

- Monte Carlo Analysis predicts how scenarios may work out given any number of variables. The process doesn't actually generate a specific answer, but a range of possible answers. (pmpbank.googlepages.com/glossary retrieved 11/12/2010).

2.4 Cost-Benefit Analysis of Adopting Information Technology Standards

Numerous examples exist of the application of cost-benefit/total return on investment analysis to the adoption of standards. Standards are specifically put forth as mechanisms to control cost by permitting interoperability, improve health, safety and the environment, limit risk, lower cost, improve efficiency – and other mechanisms for enhancing the quality of a product, system or service. Examples can be found on machinery/equipment, medical records systems, new drug testing, etc.

Thus far no cost-benefit analysis of the technical specification and training standards has been found in the literature. This work could therefore advance the use of cost estimation and provide a valuable analytical framework to programs considering the adoption of standards-based integrated production of technical manuals and training content.

3. Methods

The validation and verification of the initial cost-benefit analysis entails the five objectives overviewed in the Introduction. This section sets forth the plan for accomplishing these five objectives. The level of detail provided reflects the fact that this is a preliminary plan based largely on data to be collected at site visits of relevant facilities and interviews with subject matter experts. The expectation is that the plan will evolve and improve as it is executed.

The five objectives, with a little more detail are:

1. Validate the work breakdown structures (WBSs) and cost and benefit elements (CBEs) identified in year 1 of R-TOC ICBA
   - Capture variations in the WBSs across new sites studied, if necessary
   - Modify/add/delete CBEs based on new sites studied, if necessary
2. Verify the estimated costs and benefits values of objective 1 business processes and capture new estimates for cost and benefit categories to reflect those at new sites studied, if any
3. Address risk and uncertainty with Monte Carlo Methods (MCM)
4. Test the consistency between the ICBA and the IV&V results using the MCM applied to the production of a 500-page technical manual and one-hour of technical training content
5. Analyze the methods used in the ICBA to scale up the cost-benefit results for
   - An “aggregate” sample – the Navy’s yearly production of all Hull, Mechanical, and Electrical (HM&E) technical manuals produced by the Naval Ship System Engineering Station (NAVSSES) in Philadelphia and all Computer-Based Training (CBT) courses delivered by Navy eLearning (NeL), a part of the Naval Education and Training Command (NETC)) and
   - A single complete systems – the AN/AQS-20A mine hunting sonar for the Littoral Combat Ship (LCS).

Associated with each of these objectives are tasks and methods for accomplishing the objective. Each is explained below.

3.1 Site Visits

This section of the prior IV&V plan has been "overtaken by events ", specifically the decision to refocus the research from Instruction Led Training (ILT) to Computer-Based Training (CBT). As a result of the decision to, first, limit the site visit to one site, Panama City, and then to eliminate the site visits altogether, the decision was made to reconstruct workflows for training content from available Navy guidance documents

The primary source for cost and benefit information and data was going to be through four site visits. Activities at the site visits would have included:

- Briefings on operations (bi-directional)
- Questionnaires
- Interviews with subject matter experts using structured and unstructured techniques
- Walkthroughs and observations
- Examination of planning, technical, usage and other documents
- Calculations

3.2 Work Breakdown Structures, Cost Elements and Life-cycle Cost Categories

The first objective is that of validation and it entails determining that the notional systems are the correct ones. The ICBA is based on two notional systems:

- "As Is" system: partially dependent production of technical manuals and training content. The only dependence between the two systems is precedence: the technical information utilized in the production or update of technical training content is gotten from the technical manuals.
- "To Be" system: integrated production of technical manuals and training content, achieved through the development and use of the "Bridge".

The ramifications of this difference between the two systems is that response to an engineering change proposal (ECP) in the "As Is" system is serial, first affecting the technical manuals and then propagating to the training content. In the "To Be" case, notification of an ECP is accomplished in parallel, eliminating dependence of updating training content on updating the technical manuals.

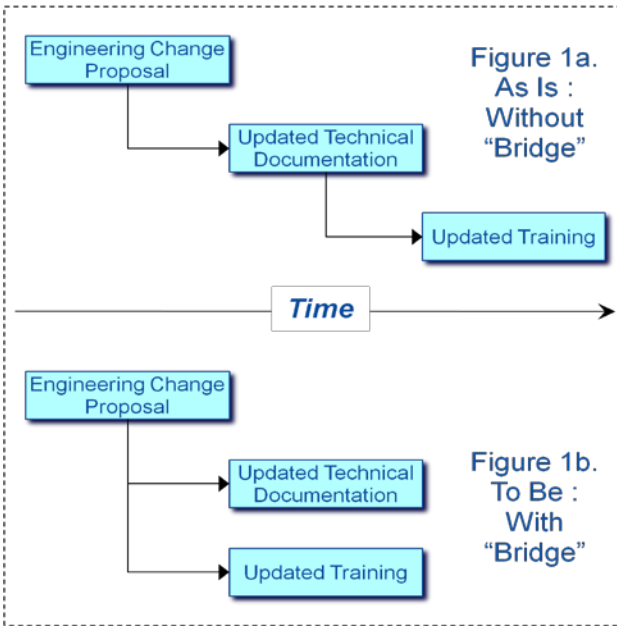
The responses in terms of workflow of the "As Is" and "To Be" systems to an ECP are depicted at a high level in Figures 1a. and 1b. below.

The work breakdown structure (WBS) is a key tool of cost estimation. The WBS encapsulates requirements information, the path to establishing a project or program, the foundation for resource identification and bottlenecks, and cost estimation (GAO, 2009).

The ICBA provided a substantially more detailed work breakdown structure of these two business processes. Specifically, a total of 35 unique tasks (21 Level 1 tasks and 17 Level 2 tasks) represented the technical manual production process. A total of 82 unique tasks describe the

technical training content generation process. In both cases, the formatting of the tasks does not readily allow one to distinguish tasks that a are unique the "As Is" and "To Be" cases (L. This information will be verified and clarified.

The WBS analysis methodology will also be employed to understand additional new business processes that might enter into the study scope. Such might be the case if the project were to shift focus or need to include to another training product, in which case new WBS will have to be constructed.



Of special importance is the transition that refocuses the research from Instructor-led Training (ILT) to Computer-Based Training (CBT). In another part of this deliverable, the authors provide a white paper that compares ILT with CBT and concludes, in general, that *"It would appear, that if feasible, the blended approach of incorporating CBT in an ILT classroom environment (real or virtual classrooms) would seem to be most effective. Where possible the up to date reference manuals should be provided through on-line access. The combination of pre-screening tests for students and scalable on-line content to match their needs should permit a more efficient and effective delivery of learning content* **".** Reuse of existing WBS for standard systems will be pursued as appropriate. For instance, the WBS for both technical manual and training content production have significant information technology components. The cost element structure for a standard DOD automated information system will be exploited as appropriate (DOD-WBS, 2005).

Total ownership costs (TOC) are defined over the life-cycle of a product, system or service. To address life-cycle costs, the WBS' CE will be viewed across the life-cycle cost categories, e.g., salvage value of equipment at its end of life and waste disposal costs.

3.3 Cost and Benefit Estimation: Data Collection

Cost data for real operations are very difficult to come by. The feasibility of inserting a cost survey into this IV&V study in terms of cost or schedule overruns will be examined. If conducting such a survey poses no threat to the project staying on budget and schedule, then the survey will be constructed, distributed, and the results will be analyzed and figured into this analysis.

Whether a survey is feasible or not, the expectation is that more in-depth estimates for the cost and benefits associated with the cost elements for each task identified in the WBS will be obtained from the site visits. To facilitate reproducibility of the estimates, tasks identified in Levine et al. (2010) will be annotated with additional bits information, e.g., information source, task description, business conditions, assumptions, precedence, etc., as they become available. If new tasks or processes are necessary to add, they will be annotated with such information as well.

Under the guidance of the prior SOW, the authors had intended to perform the actions in the next paragraph, but the change in study direction that refocuses the research from Instructor-led Training (ILT) to Computer-Based Training (CBT) has caused us to change direction too. For completeness of this report, we have included, in the paragraph below, the plan for the previously anticipated effort. A set of questions will be prepared preferably with the assistance of the site Point of Contact (POC). These questions will be sent out to the experts ahead of the site visit and discussed during the site visit interviews. A draft of what those questions regarding the tasks identified by Levine et al. (2010) might look like follows in order to model the correct and complete system, obtain cost point estimates and obtain measures of uncertainty.

For each task:

1. Where does the task fit in?
    - Is the task part of the sites' current production process, Bridge solution, both, or neither?
    - If neither, is there a different task that fulfills the same need? If no, why doesn't the site employ this task?
    - Do you have a workflow diagram for this production process that you can share with us?
2. Do you treat this task as part of an aggregation of other task(s)? If you could you share those aggregations?
3. How is this task best described?
    - Provide a brief description of the task or similar task unless it is obvious.
    - Estimate the average number of staff-hours needed to accomplish this task,
        - A one-hour course if the task is associated with training content
        - A 500-page manual if the task is associated with a technical manual
    - Estimate some range values (e.g., min and max) of the staff-hours needed to accomplish this task, which could represent
        - A one-hour course if the task is associated with training content
        - A 500-page manual if the task is associated with a technical manual

- Are there any other costs associated with this task, estimate (average and range, if possible) the
  - Capital costs (over what life-span?)
  - Operations and support costs (worksheet will be provided)

As new information about the production arrives, it is possible that the project will shift focus to another training product. If this occurs, new questions will need to be identified that are relevant to the new processes.

3.4 Treating Uncertainty with Monte Carlo Methods

Monte Carlo methods are used to capture and analyze uncertainty. The simulator to be used in this study developed in August-September 2010 and is intended for use in the classroom or for small to medium-sized problems. The application is written in Java and runs on all major Java-enabled platforms, including Microsoft Windows, Macintosh OS X, and most flavors of Linux. It is freely available with its user manual and may be downloaded from http://diana.nps.edu/cmcm/. The input is conveniently specified by a spreadsheet with a specific format. Currently the default format is Microsoft Excel on Windows and Macintosh computers and OpenOffice Calc on computers running Linux. Users can customize the input to facilitate experimentation.

The WBS from Levine et al. (2010) was the WBS we planned to use to establish a functional Monte Carlo model. Since all that is available from Levine et al. (2010), baselines for the separate technical manual and training content generation production processes really only replicates the point estimates. Cost variations can only be created hypothetically by varying the input and creating a sensitivity analysis, which over 80 + 40 tasks is unlikely to produce reliable results. If possible, MCM of the sensitivity analysis provided by Levine et al. will be attempted. If new estimates are provided, e.g., high and low estimates, then the MCM can be used to generate the cost probability curves.

An appropriate next step in the analysis is to analyze the data obtained from the site visits with the goal of identifying plausible cost probability distributions for both current operations and those associated with the Bridge implementation. These data can serve as input to Monte Carlo Model.

The output from the simulation represents a convolution of the many tasks and forms an overall cost distribution. The original point estimates can be tested against the cost distribution and a probability can be associated with it being correct. If the point estimate falls outside the range of the cost distribution, but if new data can be obtained to similarly generate a probability distribution, then a simple statistical F-test can determine whether the original ICBA is valid.

Aside from validity, more data for both the current and future system with the Bridge can provide much better cost estimates.

3.5 Scaling Up the Results

The two metrics, the "aggregate" sample and the single complete system, will be reviewed for their applicability to the current project. The methodology used will be examined as well. Recent interviews in the Year 2 project have forced the focus solely to Littoral Combat Ship. A review of technical training suggests that it is predominantly, 90% or more, instructor-led training (ILT). However, the sailors do received preliminary computer-based training (CBT) prior to receiving the ILT. It is not known whether the sailors have access to CBT for reference, refreshing, or performance aiding nor is it known whether they might in the future.

It will be imperative to understand the current and future training pathways for equipment-based (operations and maintenance) training, i.e., training based on technical information such as that which is published in technical manuals. Similarly, for scaled up estimates to be valid, there must be reliable data on the frequency of use of CBT and ILT as well as planned use.

4. Preliminary Plan of Action, Milestones and Deliverables (PPOA&M)

The preliminary POA&M provided in November 2010 is no longer valid, due to the change in SOW. Additionally, there is no longer a need for an updated POA&M, since this deliverable ends the current effort. We believe that the information herein constitutes an important portion of the foundation for future work.

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