Leveraging Our Total Ownership Cost (TOC) Enterprise Knowledge Through the TOC Knowledge Share Space (TKSS)

By

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Current Environment

The Acquisition Workforce is experiencing dramatic changes to its personnel and operating environment. The end of the "cold war" has dictated drastic reductions in budgets and staffing requirements. Fewer people have had to do more work, with fewer resources. This has led to significant mission realignments and changes in lines of communication across all DoD organizations. Previously established communication channels and intra-organizational personal relationships across organizations are no longer commonplace – all too often people now are forced to engage in "seek and find" missions to access information critical to performing their job. To exacerbate this loss of talent and knowledge, over the next five years, 60% of the current acquisition workforce will be eligible for retirement.

Additionally, the size of the acquisition workforce has been shrinking steadily over the past few years - in fact, we're more than 50% fewer in number than just ten years ago. The decline in the number of people within the acquisition workforce has caused an increase in both; the demand for an individual's time, and the number of multiple commitments an individual must honor. This mass exodus from the acquisition workforce has seen the most experienced acquisition workers leave causing a decrease in worker proficiency and experience levels. These and other changes are affecting the Department of the Navy's (DoN) ability to operate and respond effectively in today's dynamic Acquisition environment. For the smaller, streamlined workforce that remains, it's critical, then, that they become both efficient and effective.

The acquisition workforce has taken a number of steps to deal with the current changes. Interoperability among both weapon systems and information networks has received a high priority with new and existing systems. The Integrated Digital Environment (IDE) initiative has made progress both on integrating government and industry systems, as well as transitioning to automated digital processes for data creation, storage and exchange. Changes in contracting and cost management practices have led to reduced costs for weapon systems that meet the mission requirements. This, combined with changes in systems engineering priorities has led to reductions in total ownership costs over a weapon system's life cycle. Additionally, many process improvement initiatives have resulted in reduced cycle times, lowered costs, and quality improvements. Still, more is required.

Secretary of Defense William S. Cohen announced in 1997 that Reducing TOC for our Defense systems not only made good sense but was the only way that the Department of Defense (DOD) would be able to afford to sustain and modernize its weapon systems in the near future. Reducing TOC for Defense systems is even more crucial in light of the extensive changes in the world of defense acquisition. Secretary Cohen charged the Defense Systems Affordability Council (DSAC), the successor to the Defense Manufacturing Council, with identifying, tracking, and reducing TOC for our weapon systems. The DSAC chartered a number of subgroups to investigate and report on promising methods of accounting for ownership costs, identifying total ownership cost-reduction tools, providing incentives to management and industry, and empowering managers at all levels to find and fix cost drivers.

Dr. Jacques S. Gansler stated in a letter dated 20 January 1999 "we are facing an unprecedented challenge to modernize our forces in a world that demands more efficient as well as more effective acquisition. To meet that challenge, we are engaged in the Revolution of Business Affairs. As articulated in the Defense Reform Initiative, the key elements of the Revolution in Business Affairs will help deliver needed, modern systems and support services to our Warfighters -- better, faster, and cheaper. The goal is to provide the resources and processes for effective warfighting capability in the next decade. For this next phase of Acquisition Reform, we must further adapt the best world-class business and technical practices to our needs, rationalize our infrastructure, restructure our support systems, and reduce cycle times and ownership costs while simultaneously improving readiness. The Defense Systems Affordability Council (DSAC) is our forum for setting and monitoring top level goals, objectives, and metrics for these areas...."

There have also been numerous policy statements and memorandums issued requiring the DOD and DON to develop TOC implementation plans. These memorandums also require program managers to

identify their best TOC concepts; develop TOC baselines; update their Acquisition Program Baseline (APB); provide Product Life Cycle Cost Estimates (PLCCE); identify their cost drivers; develop metrics and identify TOC reduction investment opportunities. The thrust of all these memorandums and initiatives is to move the DOD and DON into a position of acquiring and operating effective and affordable systems while providing the needed marginal savings for use in new system acquisition and force modernization enabling response to changing threats and evolving missions.

The following is a list of some of the TOC documents that provide guidance and pass requirements to the Department of the Navy to include the U.S. Navy and U.S. Marine Corps:

- **18 Dec 1997, Memo from ASN (RDA) D.E. Porter and R.T. Ginman, Subj: ACAT Program Life-Cycle Costs** (Develop an implementation plan that will require all Navy program managers to establish a life-cycle cost goal for their programs and subsequently collect and measure in a uniform manner life-cycle costs.).

- **24 Dec 1997, Memo from ASN (RDA) RADM M.P. Sullivan, Subj: ACAT Program Life-Cycle Costs** (Directs NAVSEA and NAVAIR to provide their best concepts, terms of reference and collection/reporting procedures on life-cycle costs to begin the process that will lead to the assignment of a life-cycle cost goal by each program manager of every ACAT program.).

- **13 Apr 1998, Memo from USD J.S. Gansler, Subj: Total Ownership Cost (TOC) Pilot Programs** (1. Directs ASN (RDA) to coordinate efforts on the TOC Pilot Programs with the Defense Acquisition Pilot Programs, Consulting Group on Metrics (PPCG); 2. Directs DUSD(L) and DUSD(AR) to serve as the lead functional proponent and to support the Services with regulatory and statutory relief, respectively; 3. Anticipates an array of TOC Pilot Programs from each Component that collectively span the entire life cycle; and 4. Directs DUSD(L) and DUSD(AR) to assist and facilitate common metrics across the Services through the PPCG.).

- **05 May 1998, Memo from ASN(RDA) J.W. Douglass, Subj: Implementation of Total Ownership Cost (TOC) Baselines in the Department of the Navy** (1. Directs the formulation and implementation of formal Total Ownership Cost (TOC) reduction efforts for all Department of the Navy programs, regardless of Acquisition Category (ACAT) designation, program dollar value or life cycle stage; 2. TOC Reduction Plans requires the establishment of a cost baseline, identification of cost drivers within the baseline, developing specific reduction initiatives and developing metrics which measure progress towards achieving stated goals; 3. Each Navy ACAT program will revise their current approved Acquisition Program Baseline and establish a TOC objective and threshold; 4. TOC reduction plans and Acquisition Program Baseline revisions shall be submitted to appropriate Milestone Decision Authority (MDA) for ACAT I/II programs by 31 December 1998, and for ACAT III/IV and Non-ACAT programs by 30 June 1999; and 5. Each Systems Commander shall make reports on implementing TOC programs for efforts under their cognizance at regularly scheduled metrics briefings. This process should be continuous and institutionalized within the Department as a long term cost reduction initiative.).

- **13 Nov 1998, Memo from USD J.S. Gansler, Subj: Definition of Total Ownership Cost (TOC), Life Cycle Cost (LCC), and the Responsibilities of Program Managers** (1. States the responsibility of program managers in support of reducing DOD TOC is the continuous reduction of LCC for their systems; and 2. Urges every program manager to work in close cooperation with all appropriate LCC-related activities and organizations to vigorously attack these costs.).

The objective of all of the TOC related activity is to ensure that future year defense plans (FYDP) experience growth in capital investment funds and reduction in operations and support costs, in an environment of zero to low real budget growth.

Program Managers (PM) within the Department of the Navy (DoN) are being asked to provide increased capability and lower Total Ownership Costs (TOC). Program Managers are also charged with converting written mission and performance requirements into physical platforms and systems capable of

satisfying stated mission performance requirements. As such, the PM must manage the creation of detailed requirements specifications, product support plans and budget/financial plans which support the execution and assessment of the program. In the current environment of low to near zero real growth in the defense budget, an important element of program execution is the integration of reduction of TOC (R-TOC) methods into the way a program does business from concept exploration through planning, production, product support, and finally, to disposal. According to the current strategic plans for DoD and ASN(RDA), Program Managers are expected to reduce the Total Ownership Cost of the systems under their management by 20% by FY2005. To achieve this reduction, the acquisition program staff must understand how their daily decisions regarding mission requirements, performance specifications, supportability, and system operation influence the TOC of the system(s), and of the overall Navy, and must take actions to reduce costs over the product life cycle. To effectively execute R-TOC in an acquisition program, a PM must:

- **Integrate R-TOC methodology into program business processes;**
- **Determine the current (baseline) TOC estimate and identify cost reduction targets;**
- **Identify metrics appropriate for measuring R-TOC process results;**
- **Identify and apply the tools needed to perform TOC analysis and reporting;**
- **Implement a process to collect, evaluate and prioritize R-TOC initiatives; and**
- **Continuously assess R-TOC performance, and take appropriate actions to improve the process when necessary.**

Previously a budget cut would result in salami slicing of each area to meet the reduction. Today the PM must make more complex decisions. In order to maximize the PM's capability to determine the best possible solution, a decision support capability must be made available in a manner that allows the PM to react in this dynamic environment as quickly as possible with as much information as possible. There has never been a greater need for better decision-making capability, than now.

The decision making process is also critical to support the political process. When tough questions are presented to a Program manager on why a decision was made, the rigorous decision support and analysis process used to reach the conclusion can support his/her conclusion. Budget cuts and congressional inquiries are continually imposed on programs. The best defense is for the program to have documented rigorous decision analysis supporting their recommendations.

Declining resources are providing significant incentives to better manage all costs. [i] The rising costs of maintaining current readiness via accounts such as fuel, manpower, pay, spare parts and maintenance, have eroded the budget increase and forced the Navy to make difficult trade-off decisions, including deep cuts to ship and aircraft construction plans. Budgets are continuing to shrink with increased emphasis on modernization. Recent quotes from senior DoD and DoN leadership shed light on acknowledgement of the complex environment Resource, Acquisition, and Warfighter communities live with everyday.

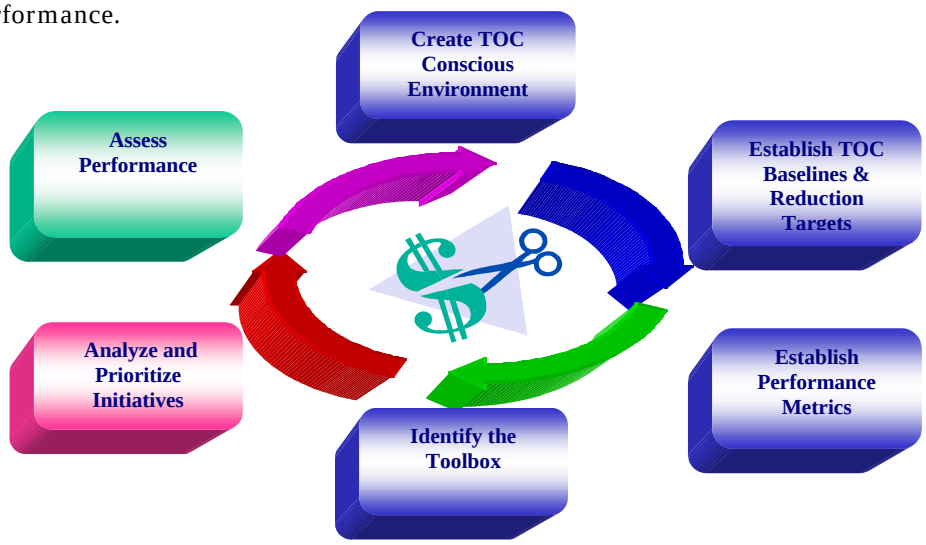
The Department of the Navy is asked to do more with less. This can only be achieved by improvements in operational efficiency and an efficient allocation of resources that is most consistent with overarching objectives. Operating in a constrained environment means that tradeoffs must often be made among important competing objectives. For example, cost constraints will limit the capabilities of future weapons systems. How desired capabilities are reviewed and accepted based on cost, performance and technical constraints is a complex decision problem that must be addressed by the requirements, acquisition, and warfighter communities in a cooperative way. Likewise, in the development of strategy and doctrine, capability shortfalls may be identified that increase the risk of unsuccessful execution. But these shortfalls are not equal in their importance and must be prioritized to ensure that critical needs are met first. Other very sensitive and visible initiatives like A76 require a well-formulated decision process that leads to clear, defensible recommendations. Additionally, unforecasted, high impact events occur. Examples such as the Kosovo campaign require a strategy for replenishment of expended warfighting assets.

PMs must implement an effective means for managing system Total Ownership Cost within their respective acquisition programs. To do this, the PM must ensure that the program staff is aware and understands the impact of design and support decisions on TOC. This is a continuous process that includes measuring the *existing* versus *desired* level of staff TOC awareness and understanding, ensuring cost-based decision-making is ingrained across the team, and instituting appropriate measures to raise and maintain staff TOC consciousness and execution. Additionally, there must be a well-understood

process for determining system ownership cost, analyzing alternatives, and assessing program results that includes measurement methods and targets, initiatives identification and evaluation, and results analysis and feedback. The final objective of these efforts is to deliver systems with lower Total Ownership Cost over the life cycle. These results may take many forms, e.g.,

- **Reduced Research And Development Costs,**
- **Lower Design And Acquisition Cost,**
- **Lower Fuel Costs,**
- **Lower Manpower Costs (Fewer Manhours/Manyears) Required To Operate And/Or Support,**
- **Less Maintenance/Higher Reliability,**
- **Decreased Documentation And/Or**
- **Lower Training Expenses For Operators, Maintainers And Trainers.**

The following workflow describes the activities associated with establishing and executing an effective TOCR process within a Navy Acquisition Program. The overall workflow consists of six primary activities: 1). Create TOC-Conscious Environment; 2). Establish TOC Baseline(s) and Reduction Target(s); 3). Establish Performance Metrics; 4). Identify the Toolbox; 5). Analyze and Prioritize Initiatives; and 6). Assess Performance.



All of these activities are continuously performed throughout the program life cycle. The first four activities are typically conducted concurrently, or nearly so, during the initial establishment and implementation of the TOCR process. Thereafter, these four activities occur as part of process sustainment and improvement. Items 5) and 6) are the continuing actions performed to achieve TOCR and assess the process results throughout the system lifecycle.

Problem Definition and Objectives

As you can see there are some challenges faced by the DoN in achieving the Defense Systems Affordability Council's (DSAC) goals. The shrinking size and experience level- in fact, we're more than 50% fewer in number than just ten years ago; demands on time and multiple commitments; decreased worker proficiency; and lack of mechanisms for information/knowledge creation, capture, reuse, and update are affecting the Department's ability to operate and respond effectively in today's dynamic Acquisition environment. Again, over 60% of today's acquisition workforce will be retirement eligible in the next 5yrs.

To address those challenges, The Department of the Navy's (DoN) Acquisition Reform Office (ARO) in partnership with the DoN Chief Information Office (DoN CIO), Office of the Assistant Secretary of the Navy (Research, Development and Acquisition) (OASN(RD&A)) Acquisition and Business Management (ABM) office, the Program Executive Office for Information Technology (PEO IT), and the Defense

Acquisition University Defense Systems Management College is currently working on a Knowledge Management initiative focusing on cultivating the growth and development of the TOC Knowledge Community enabled by the Total Ownership Cost Knowledge Share Space (TKSS).

Our combined Knowledge Management efforts will enable the acquisition workforce to realize the full potential of advanced collaboration, distributed learning methods and true management of knowledge in a networked, knowledge centric, enterprise.

While there are many areas that could benefit from the development of a knowledge management system, we knew we could only eat this elephant one bite at a time. So our fist focus is specifically on Total Ownership Cost. We believe that a tool such as the new TKSS will pay huge dividends as it is made available across the Department.

The primary objectives of this initiative are to: enable better decision making; overcome the loss of knowledge and experience; decrease the demands on time and the number of multiple commitments; raise worker proficiency; establish mechanisms for knowledge creation, capture, reuse, and update; and enable acquisition workers to operate in a knowledge-centric versus program-centric manner.

This knowledge management initiative has been designated a DoD Knowledge Management pilot, to be a model for the development of future Knowledge Management Systems. The lessons learned from this initiative will aid the development of future Knowledge Management Systems throughout DoD.

The use of a comprehensive, interactive knowledge-based technology solution; such as the TKSS, enables information/knowledge dissemination, and professional development and allows you to perform your work; better, faster, cheaper and smarter!

A People Focus

At the heart of this initiative is a focus on making Reduction of TOC (R-TOC) work for you – the acquisition community - by leveraging the TOC enterprise knowledge of the acquisition community. The people focus of this project naturally led to the tactical approach of establishing a formal TOC Knowledge Community enabled by the TKSS overcome the challenges faced by the acquisition community in achieving the DSAC's goals. Key to the approach is that the acquisition community will provide the leadership, subject matter experts, and content management to sustain the TOC knowledge community; and keep the TKSS content, graphical user interface and embedded tools [decision-making, learning, sharing, collaboration] current, accurate and relevant. Knowledge communities are designed to foster collaboration, create and grow a knowledge base from which community members can draw, and harvest the ongoing problem solving insights of the community.

This initiative was launched in response to queries of the acquisition community where they expressed the desire for access to a single location to find policy and guidance, tools, training, and expertise regarding implementation and execution of R-TOC.

There's so much information that exists in the area of R-TOC - There are lessons learned out there, there are best practices, subject matter experts, there's training, reference materials, and lots of tools. There's really no shortage of information. What the acquisition community didn't have, though, was a way to easily access all that information.

Additionally, the need for a knowledge-based solution; including, an engaged and interactive Knowledge community enabled by a TOC Knowledge Share Space, evolved in the acquisition community and was also identified and confirmed by the ARO through queries of the acquisition community over the past several years; through TOC workshops and symposiums, where participants articulated their need for practical knowledge on the R-TOC, as well as through periodic surveys of the acquisition community administered by the ARO.

This is fitting since R-TOC has been a key strategic initiative of acquisition reform since the establishment of the Acquisition Reform Office. And since, R-TOC is pervasive across all phases and levels of the acquisition process. R-TOC touches every acquisition worker, project, program, functional area, trade study and program/enterprise decision. ARO's efforts in this area have included: Program Assist Visits, Outreach, Pilots, Requirements Capture, Training and Mapping of the R-TOC processes. R-TOC also is championed as a strategic priority at the highest level in DoD and DoN. The new DoD 5000 series specifically addresses TOC as a significant program assessment requirement across all phases of acquisition. Additionally, R-TOC provides the framework, content, and context to navigate across all elements of acquisition, requirements development and the PPBS cycle. The bottom line: "R-TOC will be

the starting point to launch into all other areas of acquisition: requirements, systems engineering, design, production, sustainment, business & finance, contracting and program management".

The Total Ownership Cost Knowledge Share Space

The TOC Knowledge Share Space (TKSS) is a web-based knowledge resource that enables every member of the acquisition workforce to make better decisions and to increase their TOC consciousness. TKSS is intended to be the central hub supporting the growth and development of the TOC Knowledge Community. TKSS is a site where you can go to inquire, collaborate, seek and offer help to colleagues, and research Total Ownership Cost knowledge. TKSS will support both the TOC specialist and the generalist within the acquisition community. TKSS provides you with a gateway to the resources available to learn about, and apply, R-TOC best practices, lessons learned and process implementation successes.

TKSS is more than just another website. It has the standard features one would expect to see on a website including access to documents online and related website links, but it goes further, it gives you the ability to do work and learn at the same time. TKSS will continue to mature into a more comprehensive performance support system as user feedback is received during our multi-phased approach to TOC Knowledge Community development and TKSS roll out.

In Phase I of our rollout strategy, we target a Core Functional TOC Team. In Phase II, we reach out to a larger group of Stakeholders. And finally, in Phase III we reach out to the entire DoN Acquisition Workforce. This gradual inclusion of more and more stakeholders moves us from the Formal Communities of Practice to the Broader Communities of Interest.

The TKSS will be the enabler for the community and the acquisition workers to overcome time and geographic separation providing *acceleration* of knowledge discovery [what you know and what you do not know], knowledge sharing and linking of people (SMEs and colleagues). The TKSS, in conjunction with DoN CIO and ABM initiatives and the implementation of NMCI, will provide the *connectivity* to support synchronous and asynchronous teaming, collaboration and decision-making.

Key features of the TKSS include:

- **Collaboration tools such as; chat, discussion forums, and a project workspace that allows you to communicate and work interactively with colleagues, even if they are geographically separated;**
- **Access to a knowledgebase on-demand that provides information related to the development, implementation, and execution of reduction of TOC (R-TOC) programs and cost management methods and techniques;**
- **Real-time expert assistance from subject matter experts and colleagues throughout the acquisition community; and frequently asked questions on R-TOC, Activity based cost management (ABCM), earned value management (EVM) and Cost as an independent Variable (CAIV); and**
- **Access to TOC and TOC-related best practices, success stories, case studies and lessons learned from other acquisition and industry professionals**

The TOC Knowledge Share Space prototype was showcased at the DoN knowledge fair in Washington, DC on August 1, 2000. Additionally, the TKSS Team received a DoN eGov Award for "Linking Knowledge Management and eBusiness".

The TKSS prototype is currently undergoing usability testing and upgrade to expand the functionality and capabilities of TKSS to meet user needs. Additionally, we are developing web-based TOC training for TKSS. TKSS is being introduced to the small core group from across the TOC community of practice. And it will continue to be introduced in a stepwise manner to the entire acquisition community during CY 2001.

Our Knowledge Management Approach

In developing any knowledge management system, there are two major considerations. The first and foremost is the knowledge community or the people and the second is the implementation and the deployment of the hardware and software system to support that knowledge community.

We had strong, relevant experience with TOC research and the development of TOC business processes. Because of this advantage we felt that this initiative should be organized to support the rapid design and development of an information technology infrastructure that would support the community and partnership efforts required to create a place for sharing TOC knowledge.

With the help of our partners and through extensive market research, we have developed a KM Methodology that includes four primary phases: 1.) Plan, 2.) Design/Justify, 3.) Implement, and 4.) Operate/Maintain. This methodology incorporates the principles of DoN CIO's KM Framework parameters of content, process, culture, learning, and technology; and uses an industry standard process for iterative requirement analysis, system design, development and deployment.

Selecting the Rational Unified Process (RUP) for software engineering further refined the approach we took. With our approach modified by utilizing key features and aspects of RUP, we were able to rapidly collect and absorb requirements while prototyping an interface for TKSS that would support TOC processes.

RUP was chosen because if its iterative nature and rigorous knowledge capture processes in the form of analysis and design documentation. At the time the team adopted RUP, the RUP process had not been optimized for web based software engineering. RUP relies heavily on requirements capture and representation. This was highly desirable due to our objective to apply the processes to ourselves and capture knowledge at every level of the project. However to rapidly prototype applications in a web environment the project needed to focus early on the user interface earlier, both as a mechanism to elicit requirements and to explore what would be best to support the TOC community. This lesson was learned late in the project. The user interface-centric method was adopted and integrated with the approach.

Another lesson learned was that the team could have moved faster had all team members been trained in the application of the RUP tools and processes, rather than the small number of members that were trained in a few RUP areas.

Let's look at the four phases of our KM approach more closely:

Plan – From a KM process standpoint, we defined the problem and approach. We mapped critical knowledge needs, determined high-level functional requirements, conducted an initial technology scan, and developed a full life cycle KM Methodology. We briefed KM principles and helped establish and promulgate a KM vision. Members of the team completed a comprehensive KM certification program as well as extensive training in an iterative, dynamic, system development process called the Rationale Unified Process (RUP).

TKSS was envisioned to be a knowledge portal where users across the acquisition community could find knowledge, services, and expertise relative to the business processes they were performing on a daily basis. The design started with a set of known knowledge artifacts, i.e., documents that described processes and how to apply those processes. These artifacts included the DOD 5000 series and acquisition process material.

Design/Justify – In the design and justify phase, we modeled processes; mapped knowledge needs, and identified sources of best practices and other functional expertise. The experts have hailed our KM approach as a model approach to successfully setting up a Knowledge Management System. We are participating in a variety of knowledge sharing partnerships. For example, a partnership with the University of Arizona Center for the Management of Information, which specializes in collaboration methods and tools and has worked extensively with the USS Coronado, has been established. A partnership agreement with the Defense Acquisition University and their affiliates is also in place (In fact, the Defense Systems Management College will be a beta site for collecting user feedback on initial iterations of the TKSS). The team members have been involved with a pair of industry studies conducted by APQC (another partner) on "KM implementation" and "Building and Sustaining Communities of Practice". We are actively pursuing partnerships and we have benefited from myriad organizations and sources willing to share their KM experiences and knowledge.

The system was designed in three layers. The first layer represented the user perspective and incorporated the approach an acquisition user may take when looking for knowledge about a process or artifact.

The second layer incorporated the organization of information according to business process activities, organizations, and artifacts. Users can contribute artifacts and relate them to any number of

activities, organizational elements, and documents in the acquisition. This process is called codification. An important benefit of this capability is that the user states the value they perceive the contribution will have to other users in acquisition.

The third layer represented the technical infrastructure to support the knowledge repository. In this layer a knowledge management tool was implemented that provided codification, structure, and searching characteristics that would support the key responsibilities of the system. Implemented in a web environment with other commercial products, the infrastructure would support a wide variety of artifacts and processes.

In the world of business process automation, software development is often the greatest challenge. This initiative is not just a technology project; it is being managed to create a solution that utilizes technology as an enabler to support the creation and deployment of a TOC Community of Practice. As quickly as the requirements team designed user interfaces to support TKSS users for sharing knowledge, a small team of developers was prototyping in ColdFusion (a development environment) in order to "bring the user experience to life" as rapidly as possible. This allowed for a very quick turn around in requirements elicitation, where the end user representatives were able to express their vision for supporting the TOC community and then see that vision online in a few short days. An iterative approach was used in order to focus on those areas that would provide the most return on the investment first. This approach is described below:

1. **The Requirements team would work with end users to create an abstract conceptual user interface of several application areas;**
2. **The Design team would implement the user interface concepts online;**
3. **The Requirements team would review the instantiation with the user to obtain approval; and**
4. **The cycle would repeat itself until a viable graphical user interface (GUI) was implemented.**

Functionality of TKSS was broadly defined in order to enable the solicitation of a robust set of requirements. The most crucial elements were implemented first: 1). a knowledge tree, which is a hierarchical taxonomy of artifacts, processes, and organizations that are germane to organizing and finding acquisition knowledge; and 2). an information input, retrieval, and display that would be necessary to make a contribution, search for knowledge, and dig deep into an artifact. A key factor in developing a prototype for TKSS that was robust was to allow the user community to actually see TKSS in operation in order to capture meaningful feedback and a viable set of requirements for upgrade and refinement of TKSS.

Implement – The implementation phase is in the initial stages. The key emphasis during this phase is on developing the TOC knowledge community and rolling out the supporting technology and infrastructure. A detailed TOC knowledge community development strategy and plan will be developed and implemented during this phase.

The primary challenge of establishing a community of practice is deployment. The technical infrastructure and the business processes can be defined, but lacking a clear deployment model means the project is never implemented to its fullest potential.

This initiative focused and will focus deployment efforts in a number of key areas. First, strategic partnerships were forged with those organizations that work with the acquisition workforce and future program managers, and who could most affect change. For example, ARO and DSMC formed a partnership to develop TOC training material, and to use TKSS as part of that training curriculum in order to capture knowledge from the students as part of their training. Second, teaming arrangements were put in place and solidified with commercial organizations (such as the American Productivity and Quality Center (APQC) and Knowledge Management Consortium International (KMCI)) that supported the goals and efforts of this initiative. Third, we are working to outline the methods and metrics for reaching out to the TOC community and establishing them as a formal community of practice across the DoN.

Though people are the essential ingredients of a community, it is the relationships they form, and the methods they employ to achieve their ends that are the cornerstones of the successful community. Briefly, these cornerstones are:

- **Trust and Communication: such as mentor, coach and peer relationships**

- **Knowledge Processes and Techniques: such as Best Practices and lessons learned**
- **Sharing: such as collaboration and learning experiences**
- **Enabling Technologies and Tools: such as electronic networks**

Operate/Maintain – The operations and maintenance phase will include continual monitoring of community activity and system use and fine-tuning of performance. Innovation will be emphasized for continuous improvement, capitalizing on the knowledge sharing.

Implementation Insights

To be successful, a community must have developed some degree of trust among its members. Without trusting relationships, the quality and level of sharing cannot provide enough value to members to be attractive and compelling, and the shared knowledge will be superficial and of questionable value.

Not everything is perfect regarding implementation of this initiative to leverage the DoN TOC enterprise knowledge with the TOC knowledge Share Space. For starters, the overall TOC community, per se, is a group of people who do their TOC-related activities, somewhat independently of a "nucleus" group of TOC adherents. This is not the sort of tightly knit, functionally aligned group that is classically targeted for the formation of a CoP. On the other hand, the challenges presented by this community are more than offset by advantages of their situation.

The TOC community is geographically dispersed, and spread functionally throughout the Navy acquisition organization. With the notable exception of some seminars and DSMC course components, TOC practitioners do not meet in a face-to-face environment that facilitates networking and knowledge transfers. This geographic dispersion is exacerbated by a dispersion of TOC practitioners throughout the different functional areas of the acquisition organization. These factors combine to form the basic challenge of the TOC community; i.e., the members cannot interact well, absent a CoP-like environment. These factors provide compelling reasons to apply a technological infrastructure designed to foster collaboration among a community of remote participants. In practice, a dispersed community gains more benefit from the use of collaborative technologies than a physically close one because it is elevated to a par level with the closely-knit one.

As compared with program management or a similar functional area, TOC community members are not typically doing TOC related activities on a daily basis. This makes it difficult to keep participation levels consistent and high within the community. Users are likely to interact with other community members infrequently, and not participate otherwise. This makes it even more important that our core group provide an environment that makes interaction easy, painless, and even inviting. It is a goal of the community to encourage the inclusion of TOC thinking into everyday acquisition work, i.e. considering the TOC impact of a design decision.

With the signing of DoD 5000 the choice of TOC as an initial Community of Practice certainly makes sense because it has the advantages of: top-level support for the initiative, high potential for being of benefit to the acquisition community, and an existing base of knowledge and lessons learned. These attributes far outweigh any challenges that we face.

Listed below are some of the impediments we are facing:

- **Ideal technology solution not commercially available**
  - We addressed this barrier by rapid integration of existing COTS products to meet our needs, along with minimal additional coding.

- **TOC is still in the formative stage as a community**
  - Although this is an impediment in terms of fostering community growth, the lessons being learned during the growth period contributes to our understanding of the functionality that enables a community, and is necessary to build a robust share-space.

- **Loading of artifacts is a huge job that was initially underestimated**

- This was, indeed, a problem area. The process for loading artifacts and categorizing them in the defined taxonomy is time consuming and can be unwieldy for the community members. This effort was much larger than we anticipated and the process for contribution and categorization needed to be continually refined to better enable and foster member participation.

- **There is no enterprise-wide infrastructure available to use**
  - Some organizations or enterprises offer community templates, or standard community building methods and processes. As yet, these are not widely available in our organization so much of the design and development work of the community space was pioneered in our project. It was a time consuming endeavor. It is hoped that our initial efforts can be used by other communities/domains with minimal tailoring, and indeed, our project was designed to be scalable with this benefit in mind.

- **There were no precedent community efforts from our TOC culture, or lessons learned to draw upon**
  - As previously mentioned, we were fortunate to have access to many lessons learned and best practices from our strategic partners, and others. Though this proved to be an enormously helpful and efficient approach, documented experiences from within our own unique culture would have been even more helpful.

There are many implementation insights, in addition to those discussed above that will be discussed and documented in the remainder of this section of the paper. Take a few minutes to read through this section and gain valuable implementation insights that will assist you as you endeavor to implement a knowledge-based initiative similar to this initiative.

Supporting infrastructures for formal communities typically imply technology enablers followed by an overview of personnel infrastructures. These technology enablers may support generalized knowledge management needs, independent of the types of communities involved:

- **Search engines - for accessing and satisfying community needs for external information and knowledge not resident in the community's body of knowledge.**

- **Learning Technologies – for promoting more efficient knowledge transfer related to the community's domain and community building skills and personnel training and certification tools.**

- **Collaborative Tools – for fostering more efficient member interactions, from simple e-mail systems to various forms of teleconferencing (video), to highly sophisticated threaded-messaging systems.**

- **Knowledge Repositories – for quick, self-service access to community knowledge artifacts, whether complete documents or validated, detailed best practices and lessons learned from common activities.**

There are many community roles, but leadership is probably the most important role during community formation. Leaders must have a thorough understanding of the culture, social structure, demographics, political structure, and issues in the community. They are those respected individuals within the community that members will follow and listen to, who can motivate and act as spokespersons, and who can assume time-consuming leadership roles. Successful community building efforts include the means to produce new leaders and membership over time.

Facilitators energize the community. They actively encourage participation and are more likely to be successful when they are experienced in the many facets of working with communities.

When all is said and done, no matter the level of technology and personnel infrastructure, the members must see value in the community. This means that at different points in time some members who no longer see value will leave, and others will join, when they perceive the value-added of community membership.

It can be a major challenge to communities to provide support and maintain interest for newcomers, as well as established community members. This is because levels of understanding and knowledge about the community can vary widely. Sometimes established community members will split off and form a new community of their own, and evolve that community to the next level of sophistication.

Being a Sponsor, Leader, Coordinator, Moderator and Facilitator are all common community roles. These roles are so important at various stages of community evolution that they can be a key factor in the success or failure of a community.

Selecting roles for any particular community requires consideration of the existing cohesion and activity of the community or network in question. The more established and active an existing community, the less facilitation and support in terms of increasing participation, the community will need.

Current trends in knowledge management involve a number of different approaches for supporting knowledge communities. Most of the technologies involved deal with group communication and support, knowledge asset storage, or searching of knowledge assets.

There are a number of options for engaging in group-communication support. These include:

- **Community Areas: Community areas allow all functions one might associate with a community bulletin board, including asynchronous discussions, calendar and community events, news items, and most frequently viewed items by the community.**

- **Stand-alone community tools: Tools including those mentioned above are often provided as stand-alone tools. For instance, a Bulletin board that is used for posting of ideas or meeting times could be used as the only tool for group communication support.**

- **Group Deliberation tools: Tools that aid communities in engaging in online group deliberation, including brainstorming tools, voting tools, and categorization tools are**

A Knowledge Share Space provides the community with tools, methods and storage for the artifacts they find valuable. Ideally, a share space facilitates sharing by making it as effortless as possible. Share spaces can be either document repositories that store all valuable files in a single location, or clearing houses which link to valuable assets, independent of location. If well developed, share spaces can become a central infrastructure aid to community growth and knowledge sharing.

The organizing structure of a share space is a knowledge map of key community terms. A knowledge map is like an ontology of associated terms, organized in a hierarchical work-breakdown-like structure, created by the community that defines all the terms the community finds valuable. Knowledge assets, upon entry into the share space, can be related to multiple places within the knowledge map. This allows keyword searching and embedded searches (based on knowledge map location) in a community web space.

The share space becomes a primary vehicle for the community members to understand the information their community finds valuable. By associating the knowledge assets they find valuable, community members can form consensus on the most important concepts and artifacts, and can communicate them by either asset rating schemes or associated discussions attached to the artifacts. This additional “metadata” associated with the knowledge assets can become as valuable as the asset itself. Community members will begin to view this information as critical to understanding the place of particular knowledge assets in their community.

A key feature of share spaces is the ability to quickly, and easily, search through all assets in the share space to find the right information. Share space searches should provide at least two types of searching: keyword searching and full text searching. Keyword searching, often based on knowledge map location, allows the community member to search for knowledge assets based on community key words. The full text search option allows for detailed searching of all knowledge assets. This is necessary to allow unique and detailed searches by community members.

When building a knowledge share space (KSS), there are many important considerations that need to be made prior to writing the first line of code or installing the first piece of software. The primary concerns are audience, architecture, and technology.

It is vitally important to identify one's community before developing the architecture or building the share space. If the precise audience is not identified, and consulted prior to making design decisions, costly rework will result. Software engineering studies have shown that the cost of changing a system after it is in production is approximately 100 times that of changing the initial requirement.

Once the audience has been identified, one should use requirements analysis techniques to get a sense of the audience's need for a system. A representative sample of the audience should be interviewed, and the results of these interviews verified with a survey of a larger portion of the audience. If possible, enlisting people from the target audience to work with personnel on the project can help avoid misunderstandings and make the process go more smoothly.

Before starting out to build the system, it's helpful to have a good idea of what sort of architecture would be best for the audience's needs. Questions need to be asked, and answers received before committing to the final architecture. Some samples of typical issues are as follows: "Is the audience widely dispersed, or co-located?" If the former, a web-based solution would be best, but if the latter, it may be better to have a LAN-based solution that might offer more functionality. "Are there software constraints or pre-existing infrastructure that one needs to be aware of?"

Another primary goal in adopting an architectural approach is to design for scalability and growth. By thinking carefully about the long-term direction of a KSS, and building a flexible architecture, the impact of changes to the requirements can be minimized and handled more effectively. One is also less likely to find oneself backed into a corner technologically, and can avoid the rework associated with being in such a situation.

Many technologies are suitable for use in a share space. The question of which ones to use is best answered by looking at one's audience and architecture. If, for example, you are designing for people who are not technologically inclined, it would be wise to stick with the simplicity of a threaded bulletin board. With this in mind, most of the technology types fall into a few major categories.

What would a share space be like if the people using it never communicated with each other? Clearly, sharing would be impossible so it's important to put collaboration supporting technologies in place, thereby providing the opportunity for people to share their thoughts on the community, the subject matter, etc.

Some examples of collaboration tools being considered are:

- **Threaded bulletin board/messaging – It allows users to communicate asynchronously with one another in a public forum.**

- **Document sharing/management – These tools let users work together on shared documents.**

- **Real-time collaboration – The use of "virtual" meetings and communications can facilitate real-time knowledge sharing and working.**

Knowledge management technologies are often the heart of a KSS. These tools provide repositories for an organization's knowledge, retrieval capabilities- like searching and targeted automatic distribution, and a general structure for knowledge capture.

Some examples of Knowledge Management tools are:

- **Knowledge Engines – Taxonomies combined with repositories for the keeping of knowledge**

- **Information Spiders/Data Mining – Tools that assist in distilling the appropriate knowledge from a dispersed and uncategorized set of information resources.**

We offer a cautionary note based on our experience to date. If one considers audience, architecture, and technology, in that order, one's KSS is far more likely to succeed. Taking them out of order, or failing to balance the three, leads to rework, lack of clear direction, and systems that are not used.

After the identification of TOC as a target CoP, it was necessary to define the requirements for a TKSS to support the community's interactions. In developing any tool or set of tools, it is imperative that one begins with the end in mind. We elicited the TOC Community's requirements at the outset of the project. To this end, we used the following methods:

- **User Interviews**
- **Rapid Prototyping and Review Sessions**
- **Collation of Requirements from Literature**

It must be noted that user interviews were limited severely by the realities of the project. Given the large and disparate nature of the target audience, it was deemed inefficient to interview a broad cross-section of the potential end users. Rather, we did a small number of interviews with members of the team who had been part of the target user community (the acquisition workforce) earlier in their careers. The danger in interviewing team members is that they bring "biases" to the table from their former career that the "average" community member may not have. Successful adoption of the TKSS will depend on how well we were able to temper those biases.

The results of these requirements gathering methods were brought together under the framework of the Rational Unified Process (RUP). In RUP, the primary format of requirements is that of the "use" case, which describes a scenario that a user of the system (referred to as an actor) must be able to do. By describing the actions that actual user will take, these scenarios provide a clearer picture, in our opinion, of what the system needs to do than a long list of specification-like, "The system shall..." statements.

Any requirements that did not fit into the "use cases" were put into supplemental requirements documents, which when combined with the use cases, made up the entire requirements specification. This specification is, theoretically, enough to design and build a system.

In practice, we ran into the problem of stakeholder (the users) desires that were more detailed than simple descriptions of functions. There was also some difficulty with thinking about functions in the abstract. This led to the addition of a rapid prototyping method to the requirements generation process. By providing mock-up screens, and reviewing them in a group setting with the stakeholders, we were able to get a clearer picture of what they wanted, and add a level of detail that would be difficult to achieve using just use cases and other textual requirements capture methods.

In the end, the system was built using the RUP requirements in tandem with the results of the user interface review sessions. This advantageous approach allowed us to get a clearer view of stakeholder requirements, and use stakeholder input throughout the development process

The requirements generation process did surface controversial differences of opinion between the technologists and the process owners. Failure to bring the stakeholders into the process early in the game undoubtedly would have still resulted in a technologically workable system, but would not have resulted in one that is capable of meeting the needs of the end users, who ultimately have to take ownership of the system.

To the end user, the user interface <u>is</u> the system. That is, the end user does not see requirements documents, conceptual screens, design material, or implementation plans: they see the user interface and that alone forms their expectation, opinions, and decisions about an information system.

This initiative is no different from other information-driven projects in that it required a robust set of skills to capture requirements, relate them to activities that the end user was familiar with, and merge all that was learned about knowledge management and community development into a single experience that would be rich with knowledge and easy to navigate.

The key to implementing this initiative rapidly is two-fold. First, the requirements were captured by practitioners not information technologists, and therefore they were able to quickly assimilate their DoD knowledge and the system requirements into working abstracts and design. Secondly, we are focusing on two primary objectives: the user must be able to find knowledge that is relevant to their activity at all times, and the user must be able to get to that knowledge quickly. We incorporated requirements, abstract interfaces, and many focused user experience sessions with the end user to establish both the site navigation and the user interface designs. Using web standards and following the age-old practice of "don't reinvent the wheel", work was done to specifically research web sites to understand what elements of online communities and user interface would appeal to community members.

To construct the abstract interfaces the design team used a combination of tools. First, a computer program, Visio, was used to draw a site map that depicted navigation thru the site. Second, the site map was always kept up to date, and was printed on a large color plotter in order to capture all relevant information on a single page. That was printed and hung in the hallway of the project office space. Anyone on the team could, at any time, literally walk the hall and see the latest conceptual design and site navigation. These documents were also used to walk the user through the site and elicit requirements and changes.

One of the most difficult aspects of implementing this initiative is managing the content of TKSS. In a web environment, content refers to the information portrayed on a page. On a web site that has only static or unchanging information, managing the content is not difficult. However, on a site that has dynamically generated content specific to the activity or process the user has expressed an interest in, content management is key element in community success.

Early in the project it was clear that a strong content management strategy was key. And the most important aspect of building content was the need to support knowledge contributions. A contribution is the act a user performs to contribute an artifact to the repository. In many respects, TKSS' biggest challenge was "how to get the community members to contribute".

We initially underestimated what was really required here. Unfortunately, making a knowledge contribution was complex and wieldy for the end user, even the most sophisticated. Perhaps our biggest mistake – we let the vendor's products available drive the design in this area, and we should've stuck with our instincts and started there with a conceptual user interface development.

Most people don't understand what is required to connect knowledge and value to a business process – it's difficult to understand, in most cases, and the system and business process to support this activity must be simpler.

Artifact categorization was the most telling activity as it showed the multitude of solutions that could be devised and it also took a lot of effort. In the end, it is the user community that will tell if this categorization is right, not the SMEs or the site builders.

In order to determine the degree of success, one must specify the criteria that define success. KM and communities are notoriously difficult to measure in terms of initial impact on the organization and immediate return on investment (ROI). Some of the most successful companies required no hard ROI data initially to launch their KM effort because the organization recognized intuitively that the discipline of KM and the contributions of communities would eventually contribute to company goals, and with time, be reflected in the 'bottom line'.

In our case, the TOC KM implementation may be too immature, at this time, to determine ROI, or establish whether the TOC KM system has ultimately affected the goals and mission of the DoN or DOD. However, we did set out on this course with a specific set of well-defined goals by which we can now appropriately measure our success.

Metrics within KM and communities tend to change over time, evolving with the maturity of the KM system or communities, which are being measured. In this stage of implementation on our initiative, we assess our success by determining how well we have met our original goals to date. Ultimately, our KM system must prove that it has contributed to achieving the business goals of the organization, or it should not be sustained. As with any other management discipline or science, KM initiatives are not pursued for the sake of the pursuit, but to better achieve business goals.

In the case of our initiative, the ultimate goal is reduction of total ownership cost, measured throughout the entire life cycle of weapons systems and ships, and perhaps should be the ultimate metric by which our TOC knowledge community efforts are judged.

Summary

Today's Program Managers (PM) within the Department of the Navy (DoN) are being asked to provide increased capability and lower Total Ownership Costs (TOC). As such, the PM must manage the creation of detailed requirements specifications, product support plans and budget/financial plans which support the execution and assessment of the program. In the current environment of low to near zero real growth in the defense budget, an important element of program execution is the integration of reduction of TOC (R-TOC) methods into the way a program does business from concept exploration through planning, production, product support, and finally, to disposal. According to the current strategic plans for DoD and ASN(RDA), Program Managers are expected to reduce the Total Ownership Cost of the systems under their management by 20% by FY2005.

I also want to emphasize that the Acquisition Workforce is experiencing dramatic changes to its personnel and operating environment. The end of the "cold war" has dictated drastic reductions in budgets and staffing requirements. Fewer people have had to do more work, with fewer resources.

Additionally, the size of the acquisition workforce has been shrinking steadily over the past few years - in fact, we're more than 50% fewer in number than just ten years ago. Another result of the mass exodus that is and has taken place within the acquisition workforce has seen the most experienced acquisition

workers leave causing a decrease in worker proficiency and experience levels. These and other changes are affecting the Department of the Navy's (DoN) ability to operate and respond effectively in today's dynamic Acquisition environment. For the small, streamlined workforce that remains, it's critical, then, that they become both efficient and effective.

To address the challenges facing today's acquisition workforce we are currently working on a Knowledge Management initiative focusing on cultivating the growth and development of the TOC Knowledge Community enabled by the Total Ownership Cost Knowledge Share Space (TKSS).

Let me re-emphasize that at the heart of this initiative is a focus on making Reduction of TOC (R-TOC) work for you – the acquisition community - by leveraging the TOC enterprise knowledge of the acquisition community. The people focus of this project naturally led to the tactical approach of establishing a formal TOC Knowledge Community enabled by the TKSS overcome the challenges faced by the acquisition community in achieving the DSAC's goals. Key to the approach is that the acquisition community will provide the leadership, subject matter experts, and content management to sustain the TOC knowledge community; and keep the TKSS content, graphical user interface and embedded tools [decision-making, learning, sharing, collaboration] current, accurate and relevant. Knowledge communities are designed to foster collaboration, create and grow a knowledge base from which community members can draw, and harvest the ongoing problem solving insights of the community.

The TOC Knowledge Share Space (TKSS) is a web-based knowledge resource that enables every member of the acquisition workforce to make better decisions and to increase their TOC consciousness. TKSS is intended to be the central hub supporting the growth and development of the TOC Knowledge Community. TKSS is a site where you can go to inquire, collaborate, seek and offer help to colleagues, and research Total Ownership Cost knowledge. TKSS will support both the TOC specialist and the generalist within the acquisition community. TKSS provides you with a gateway to the resources available to learn about, and apply, R-TOC best practices, lessons learned and process implementation successes.

TKSS is more than just another website. It has the standard features one would expect to see on a website including access to documents online and related website links, but it goes further, it gives you the ability to do work and learn at the same time. TKSS will continue to mature into a more comprehensive performance support system as user feedback is received during our multi-phased approach to TOC Knowledge Community development and TKSS roll out.

In order for us to be successful we must develop a community that has some degree of trust among its members. Without trusting relationships, the quality and level of sharing cannot provide enough value to members to be attractive and compelling, and the shared knowledge will be superficial and of questionable value.

Upon completion of this initiative to leverage our TOC enterprise knowledge through the TKSS you will have access to a capability to locate TOC knowledge on demand, from any location, at any time, from your desktop with confidence that the information is current, accurate, relevant and usable.

The benefits of establishing a TOC knowledge community enabled by the TOC Knowledge Share Space are obvious:

- **We can overcome the demands on time and multiple commitments to non-local teams and projects.**
- **We can raise worker proficiency through the availability of "Best practices" and lessons learned of other acquisition professionals and other programs.**
- **We can Leverage intellectual capital**
- **We can Improve our decision-making**
- **We'll Promote innovation**
- **We'll have a mechanism for knowledge creation, capture, reuse, and update in a real-time, non-intrusive manner**
- **The DoN will operate in a knowledge-centric environment.**

An additional, but no less important benefit of what we have been able to create in the TOC Knowledge Share Space, is the capture of the process for creating such a tool. We've documented the approach, the challenges, the lessons; and we can now begin to replicate the TOC knowledge Share Space in other areas such as Logistics, Contracting, etc. and thereby facilitate the creation of other acquisition knowledge communities;

We are extremely pleased with the current version of our TOC Knowledge Share Space. While we've done much, much still remains to be done. As I mentioned, we've captured the process. So in the future, we plan to replicate that process to create additional Knowledge Share Spaces in other areas.

We're also working hard to get the word out about the TOC Knowledge Share Space. Any tool is only valuable if people use it and it helps them. So we're focused on a rollout plan that demonstrates this new tool, and collects your feedback on changes that need to be made to the tool.

We will continue to capture the user community requirements; add additional functionality and capability; and enhance the KM technology of the TOC knowledge Share Space.

In conclusion, our goal with this new TOC tool is to provide you the acquisition worker a capability to locate knowledge on demand, from any location, at any time, from your desktop with confidence that the information is accurate, timely and relevant. Harnessing the potential of integrated information is clearly the way of our future. We in the Acquisition Reform Office want you to know we are committed to developing the tools you need. To learn more about the Acquisition Reform Office and our many initiatives visit us at www.ar.navy.mil

Bibliography

1. ***Bellinger, Gene: "Principles of a Knowledge Leveraging Community Infrastructure", 2000.***

2. ***Davenport, Tom; "Think Tank: Making the most of an Information-rich Environment – The Future of Knowledge Management"; 2001***

3. ***DoD 5000.2-R Mandatory Procedures for major Defense Acquisition Programs (MDAPS) and Major Automated Information System (MAIS) Acquisition Programs***

4. ***DoD 5000.4M Cost Analysis Guidance and Procedures***

5. ***ASN(RDA) Memorandum of May 05, 1998, subject: Implementation of Total Ownership Cost (TOC) Baselines in the Department of the Navy***

6. ***Business Use Case Specification: Executing Total Ownership Cost reduction within an Acquisition Program; dated May, 19, 2000***

7. ***USD Memorandum of 13 Nov 1998, Subject: Definition of Total Ownership Cost (TOC), Life Cycle Cost (LCC), and the responsibilities of Program Managers***

8. ***USD (A&T) Memorandum of 9 Jul 1999, Subject: Defense-wide Implementation of Activity Based Management***

9. ***Inside the Navy, 20 September 1999***

10. ***Into the 21st Century: A Strategy for Affordability, developed by Defense Systems Affordability Council (DSAC)***

11. ***SECNAV Memorandum of 16 April 1998, Subject: Cost as an Independent Variable (CAIV) Policy Guidance***

12. ***SECNAVINST 5000.2B Implementation of Mandatory Procedures for Major and Non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs***

Biography
For
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Mr. William "Willie" Jones, Jr. is currently assigned as the Department of the Navy (DoN) Total Ownership Cost (TOC) Team Leader in the Acquisition Reform Office, Assistant Secretary of the Navy (Research, Development, and Acquisition). In this position he is responsible for leading the Department's TOC activities. These include directly assisting in the achievement of TOC reduction goals for the Department through implementation of key initiatives within ARO, representing the Navy at TOC forums, and keeping abreast of the numerous TOC efforts within the offices of the Program Executive Officers and Systems Commands. Mr. Jones graduated from the United States Air Force Academy with Bachelor of Science degree in Engineering and Biology. He also received a Master of Science degree in Bioenvironmental Engineering/Industrial Hygiene from Central Missouri State University and has completed work toward a Master of Business Administration in Quantitative Analysis from the University of Missouri.