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PM

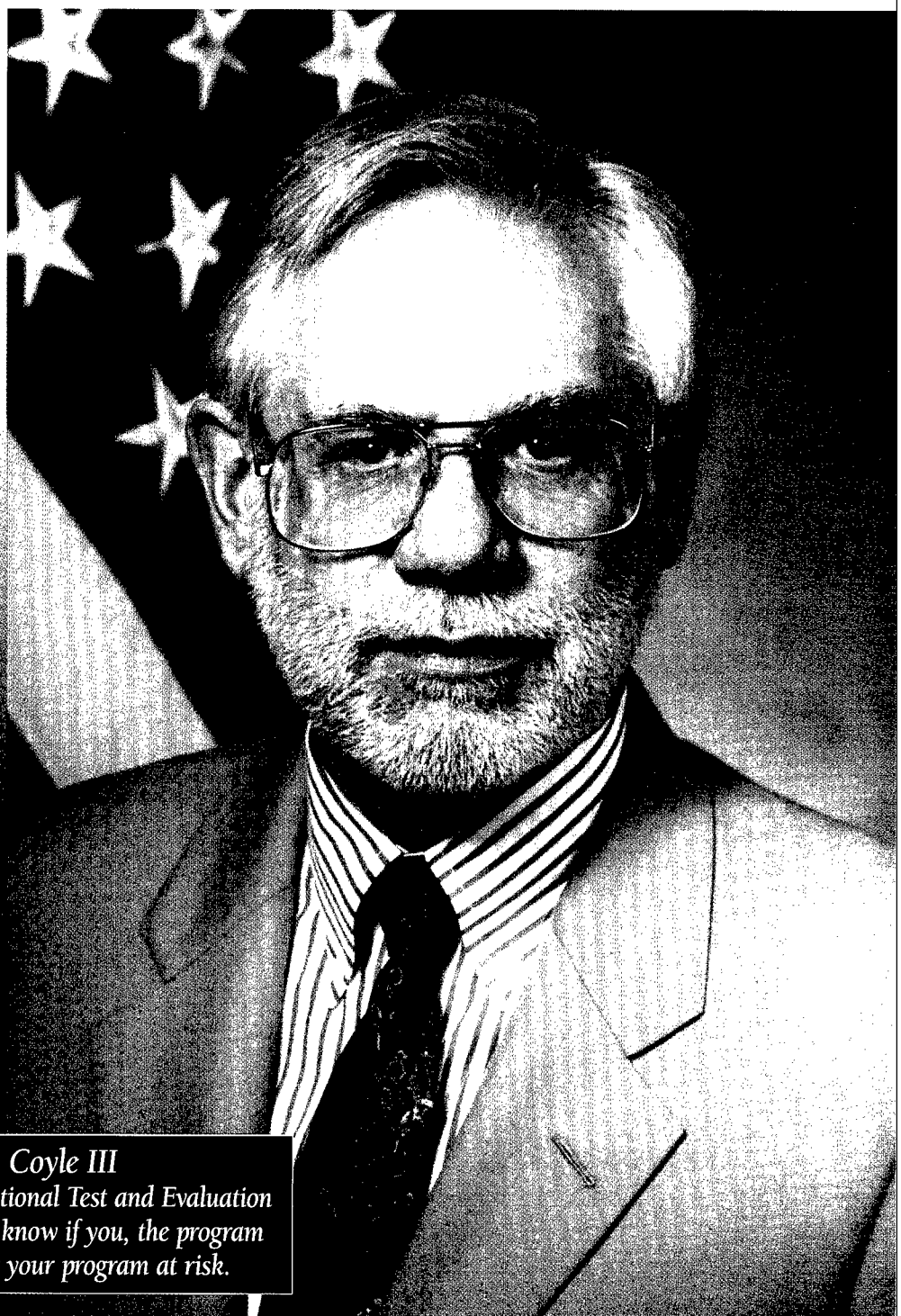
PROGRAM MANAGER

DR. SPIROS PALLAS ON REDUCTION OF TOTAL OWNERSHIP COST

Defense Acquisition University (DAU) Names New President

Retired Air Force Brig. Gen. Frank J. Anderson Jr.

DAU welcomes Frank Anderson, a known talent and familiar face [illegible] the defense acquisition [illegible]



ALSO IN THIS ISSUE:

Philip E. Coyle III
OSD's Director of Operational Test and Evaluation pinpoints seven ways to know if you, the program manager, are putting your program at risk.

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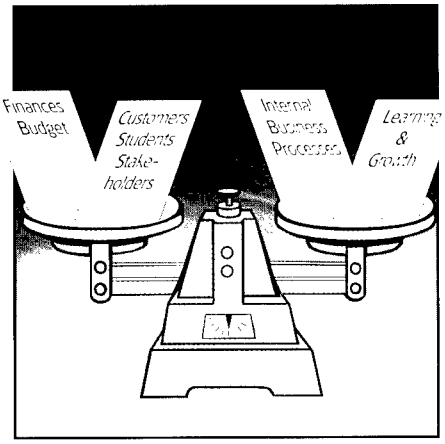

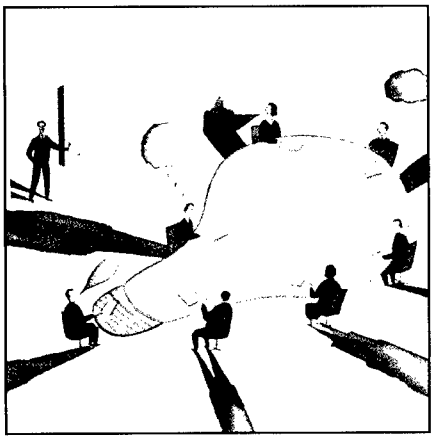

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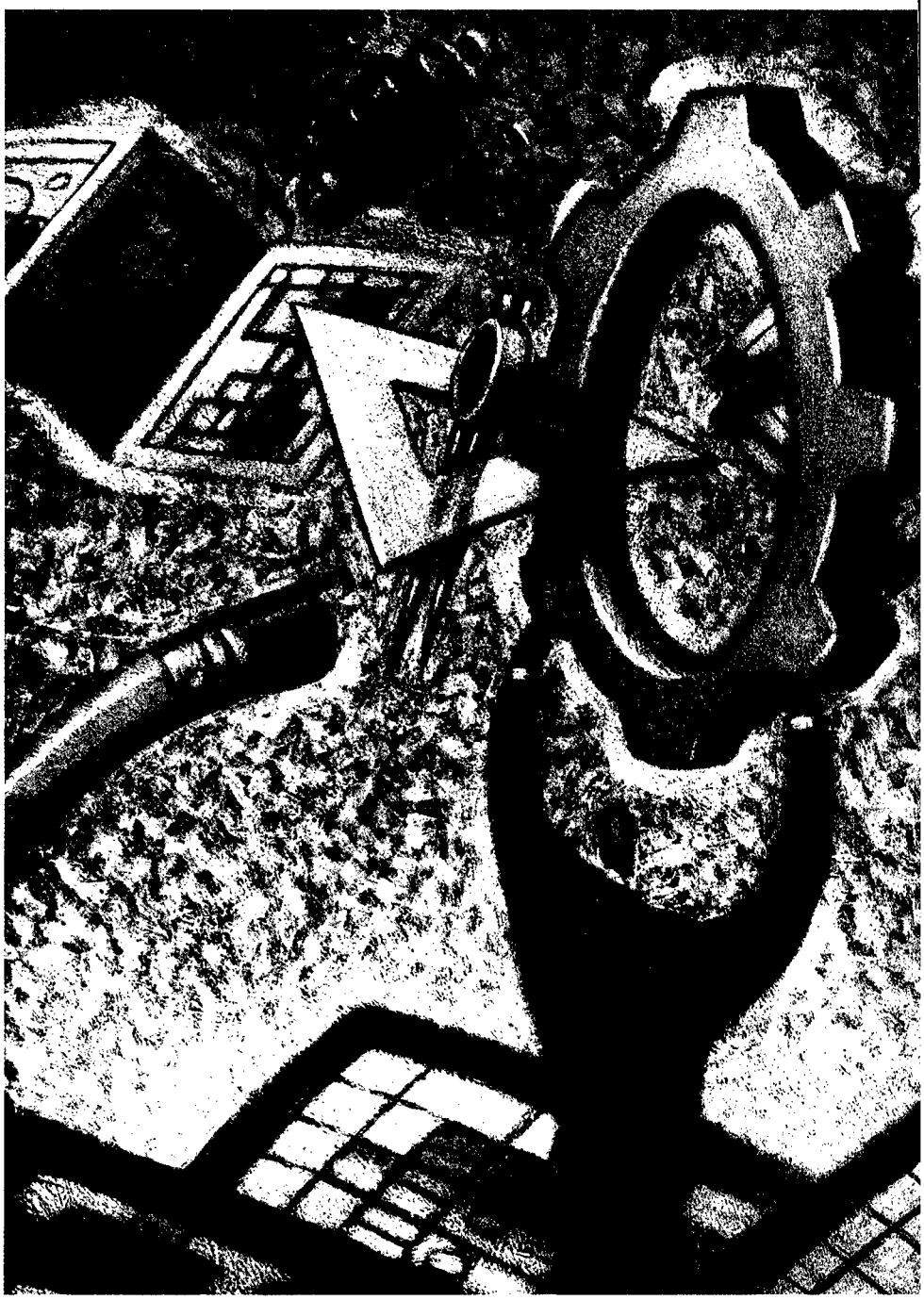
Evolutionary Acquisition

Seven Ways to Know If You Are Placing Your Program at Unnecessary Risk

PHILIP E. COYLE III

Evolutionary acquisition is designed to get new military capability from the laboratory to the warfighter as quickly as possible. The new draft DoD 5000 series provides that new technology can enter the acquisition process at any one of several points, not just one, and it requires continuous integrated test and evaluation. These are good things. However, like any policies, how you deal with them is key.



Risktaking and Operational Testing

The terms "evolutionary acquisition" and "acquisition reform" have engendered occasional misunderstandings and actions on the part of Program Managers (PM) that are counterproductive to their own success. For example, PMs have correctly understood that acquisition reform gives them the flexibility to take greater risk. In the old days, we spoke of cost, performance, and schedule. Now you often hear programs spoken of in terms of cost, performance, schedule, **and risk**, with distinctions between high, low, and moderate risk. Of course, risk is much harder to measure than cost or schedule, and honest, well-meaning people can disagree about whether risk is "high" or "moderate."

Nevertheless, acquisition programs are taking more risk, and it is showing up in operational testing. Over the past three years or so, the Army has seen that 80 percent of their systems have not met 50 percent of their reliability requirements in operational tests. In the Air Force, AFOTEC [Air Force Operational Test and

***Coyle** is the Director, Operational Test and Evaluation, Office of the Secretary of Defense. This article is based on an Oct. 13 speech given by Coyle at the PEO/SYSCOM Commander's Conference, Fort Belvoir, Va., entitled "Evolutionary Acquisition."*

Evaluation Center] has had to stop two-thirds of their operational tests because the systems were not ready. The Army also has had to stop many operational tests, or not let systems enter operational testing, because they weren't ready.

The greatest current concern of the Service Operational Test Agencies is the so-called "rush to failure," a phrase that was used by retired Air Force Gen. Larry Welch in his review of THAAD [Theater High Altitude Area Defense] and Theater Missile Defense. But all the Service Operational Test Agencies see a rush to failure too often now in many other programs – conventional programs – programs that have nothing to do with missile defense.

Q

Are you taking too much schedule risk?

A truism in defense acquisition is: "Never place your program at unnecessary risk by betting it on a single test." This may seem to you to be pretty obvious advice, but programs do just that all the time. The NMD [National Missile Defense] program just did this when their latest flight intercept test failed. They didn't mean to do it. Originally, there were two or three more opportunities for success in the test schedule. But the schedule slipped and the milestone didn't; suddenly, the program was in the position of having only a single test remaining. So one of the ways you can get into this situation is simply through schedule slips.

Evolutionary acquisition is designed to get new military capability from the laboratory to the warfighter as quickly as possible.

My advice is that you always consider the impact of schedule slips in these terms. As Air Force Lt. Gen. Ronald Kadish, Director of the Ballistics Missile Defense Organization says so wisely, any time you get into a "binary" situation, where the outcome is going to be all or nothing, black or white, you probably need to rethink your test program. Many acquisition programs don't do this.

Q

Are you going into operational testing before you are ready?

Another way you can place your program at unnecessary risk is to go into operational testing before you are ready. The F-22 program is balancing this issue, which is why I have urged them to be careful and take the time they need in developmental testing first.

When programs do poorly in operational tests, frequently it is because they permit themselves to encounter for the first time some operational environment or requirement that they have never tried before, or **have** tried before in developmental testing, but only **unsuccessfully**. This can include environments like rain, dirt, dust, or wind; or it can be countermeasures, realistic threats, or realistic operational environments.

For example the Army's SADARM [Sense and Destroy Armament/Armor] program was doing fine in developmental tests in the clean desert at Yuma Proving Ground. But when they got into the operational test with interesting terrain, trees, and realistic countermeasures, they didn't do so well.

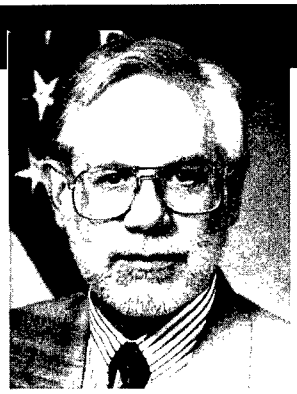
A model for how to do testing correctly is the Navy's F/A-18 E/F program. They were careful to selectively try each and every new environment and requirement **before** they got to OPEVAL [operational evaluation]. Long before OPEVAL, they did a series of small operational tests, what some would call DT/OT [Developmental Test/Operational Test], that helped them avoid any surprises in OPEVAL. Too often programs leave these steps out. The F/A-18 E/F OPEVAL was still very stressing, but did not expose the program to new environments or requirements.

Q

Are you loading your system realistically in developmental testing?

PHILIP E. COYLE III

Director
Operational Test and Evaluation
Office of the Secretary of Defense



The Director, Operational Test and Evaluation (DOT&E) is the principal staff assistant and senior advisor to the Secretary of Defense (SecDef) on operational test and evaluation (OT&E) in the Department of Defense. DOT&E is responsible for issuing DoD OT&E policy and procedures; reviewing and analyzing the results of OT&E conducted for each major DoD acquisition program; providing independent assessments to SecDef, the Under Secretary of Defense for Acquistion, Technology and Logistics, and Congress; making budgetary and financial recommendations to the SecDef regarding OT&E; and oversight to ensure OT&E for major DoD acquisition programs is adequate to confirm operational effectiveness and suitability of the defense system in combat use.

Another way to place your program at unnecessary risk is to wait until operational testing before you load the system fully. For example, computer systems are often load tested with simulations, and usually are not loaded realistically until operational testing. These days, practically everything has a computer in it, and often it is a challenge to handle realistic data loadings, message formats, and nominal human errors. All of the Military Departments are experiencing this with battlefield digitization, the global information grid, interoperability, and information assurance.

Q

Are the requirements for each block set properly?

Evolutionary acquisition means using time-phased requirements where increasing military capability comes in successive blocks or phases. If those blocks extend over many, many years – perhaps even decades – the requirements, including the expected threats, may change substantially over time. As testers, it is not our job to set requirements. But how evolutionary acquisition requirements **are** set is very important.

Naturally, we should not expect systems to meet the final objective requirements nor demonstrate final objective capability in the early blocks. But we will test to the requirements that are set for the early blocks as those early blocks reach test and evaluation. This includes the ability to meet expected threats as well as other operational requirements. If those requirements have not been set thoughtfully, you can have a situation where the bar has been set too high, too early, or conversely, where the bar has been set so low that the user has little interest in fielding the early blocks. Either extreme can place your program at unnecessary risk.

My advice is that you get with the testers and users early – very early – before the sequence of requirements for each block has been locked in. Yes, even before the RFP [Request for Proposal]. Those early conversations will pay great dividends as your program evolves toward better and better capability.

Q

Are you skimping on developmental testing?

Under acquisition reform and evolutionary acquisition, you have the freedom to decide how much developmental testing to do and who will do it. Your contractors may assert that they can do your developmental testing faster and cheaper than, say, Aberdeen Proving Ground, or Edwards Air Force Base, or Paxtuxent River. However, contractor testing is sometimes conducted with greater limitations and less realism than government developmental testing, and this can cause your programs to be even less prepared for **operational** testing when the time comes. Also, some program managers think that acquisition reform makes developmental testing **discretionary**, which some interpret as **optional**. Regarding developmental testing as optional is a recipe for failure when you get to operational testing.

Q

Are you using Modeling and Simulation effectively?

Finally, how you use Modeling and Simulation (M&S) is important. If you use it to **interpolate** between demonstrated test results, it can be quite effective. If you use it to **extrapolate**, beyond the bounds of known results, it practically never works. Another factor often overlooked by acquisition programs is the need to reconcile M&S with both real hardware and real software. First, there is how the system really works. Second, there is how the model predicts it will work. And third, there is how the software designer contemplated it would work. These are often quite different and require substantial early investment to ensure the models reflect reality.

For example, in the Crusader howitzer, there are many variables: how all those gears and conveyer belts actually move, the manufacturing tolerances in them, and how they change with wear. Then, there is the model of all that activity, which may not include all the variables. Added to that is how the software designer planned for it to work. Also, totally different contractors may have developed the software and the hardware, so the software designer may assume that the hardware will work differently than it was actually built to work.

Whether you are talking about howitzers, or aircraft, or ships, these interactions are central to effective use of M&S. Failing to understand them is another way in which you can be misled into placing your program at unnecessary risk by misunderstanding what models and simulations really predict.

Q

Are you including the operational testers up front?

Under evolutionary acquisition and the new DoD 5000 series, test and evaluation is to be integrated throughout the acquisition process, with up-front involvement of the T&E [test and evaluation] community in the requirements process and in the design of an integrated test and evaluation strategy.

The new DoD 5000 series creates integrated Service/OSD [Office of the Secretary of Defense] test teams and emphasizes early T&E involvement. Particularly important is that you include the Service Operational Test Agencies. They can help you early with requirements issues, with operational emphasis in the RFP, and with test and evaluation planning. Confronting such matters later will only increase costs and delay schedules, placing your program at unnecessary risk. If you follow the new DoD 5000 series, and involve the operational testers very early, it will help you avoid putting your program at unnecessary risk.

In Conclusion, "Don't Skimp"

So my advice for you is pretty simple. Don't skimp on DT, because if you do it will kill you when you get to OT. Don't assume that contractor DT is as good as government DT. Worry about realistic operational loadings and realistic operational environments. Don't believe that models and simulations tell you things they were never programmed to do. And don't wait until OT to try things for the first time. And ask yourselves again and again, "Am I betting my entire program on this one test?" "Am I placing my program at unnecessary risk?" If you are, you need more, and earlier testing – which is exactly what the new DoD 5000 series calls for.

Editor's Note: The author welcomes questions or comments on this article. Contact him at **director@dote.osd.mil.**

ATTENTION DAU STUDENTS

Important Information on Accreditation

Since its inception, the Defense Acquisition University (DAU) has been committed to maintaining the highest possible educational standards and providing the acquisition community with the right learning products and services to make smart business decisions. This commitment requires high standards for excellence and continual drive to improve everything we do.

With this in mind, DAU is now working in partnership with the DoD Chancellor for Education and Professional Development to comply with a recent directive from the Deputy Secretary of Defense stating: "DoD civilian education and professional development activities shall meet the standards established by external accreditation entities recognized by the Department of Education."

After researching several national institutional accreditation agencies recognized by the Department of Education, DAU chose the Council on Occupational Education (COE). COE's fundamental goals match DAU's in the areas of quality assurance, continuous improvement, and involving top leadership, staff, and faculty in supporting the DAU mission.

Accreditation requires DAU to evaluate itself against a set of 10 standards, referred to by COE as a *Self-Study*. This evaluation offers the opportunity to identify areas for improvement or assess and validate DAU's approach to education and training.

On Sept. 19, 2000, DAU sent a *Letter of Intent* seeking candidacy with COE to begin the process that will continue until February 2002 when the COE Commission will convene to review and grant accreditation based on the *Self-Study*. The Commission also sends visiting teams to each campus to determine if DAU is in compliance with its own policies and criteria as well as those of the Commission.

A Steering Committee led by the DAU Provost, Rich Reed, will be comprised of the four campus Deans. The Committee is empowered to develop strategies, goals, and milestones and establish working groups to assess DAU's strengths and areas for improvement in relationship to each of the 10 standards of the *Self-Study*. These working groups will consist of a cross-section of DAU's faculty and staff.

Through this rigorous criteria-based self-evaluation, DAU will have an opportunity to reinforce its training mission, strategic vision, and institutional value of academic excellence.

Dr. Lenore Sack (***sack_lenore@dau.mil***) and Evelyn Layton (***layton_evelyn@dau.mil***) will lead this initiative. Sack is Chief Administrative Officer and Layton is the Accreditation Liaison Officer. They have full responsibility to ensure an effective evaluation is conducted to meet DAU's accreditation goal.

Air Force Chief Information Officer Outlines IT Initiatives

SCOTT AIR FORCE BASE, Ill. (AFPN) – Dr. Lawrence J. Delaney, Assistant Secretary of the Air Force for Acquisition and the Air Force's Chief Information Officer, has embarked on a new strategy that has the Air Force on a fast track to modernize its information systems called "One Air Force – One Network."

Dr. Lawrence J. Delaney, Assistant Secretary of the Air Force for Acquisition and Air Force Chief Information Officer.

The strategy is based on adapting the latest information technologies, or IT, to give Air Force people quick and easy access to essential information wherever they are.

"The idea here is really to use the power of information technology to bring us all together and to make us more proficient, more productive, and carry out our mandate better," Delaney said.

A key IT initiative under development is "My.AF," the Air Force portal that will give users continuous single-point network access to hundreds of Air Force online information resources, and functional and self-service applications. While the portal will tie applications together into one view, it will also give airmen the ability to tailor it to a particular job. My.AF will serve as the primary entry point to current Web-enabled applications, as well as new IT features and capabilities under development.

"My.AF will give an individual the capability to carry out self-service functions that previously have been time-consuming and challenging," Delaney said. "In many cases, users will be able to carry out a lot of functions that before would require them to have to physically go from one place to another to gather data. The Web will make all of that information available online to make us much more efficient.

"We're going to institutionalize this Web-centric Air Force," he said. "Some of the steps that the Secretary of the Air Force [F. Whitten Peters] and the Air Force Chief of Staff [Gen. Michael E. Ryan] have made in strengthening the CIO function at Headquarters Air Force include establishing the position of a new Principal Deputy Assistant Secretary for Information and Business Systems Management, a three-star equivalent."

John Gilligan has been selected to fill the new position.

"We're very lucky to get John [Gilligan]," Delaney said. "He's a great guy. He's well known inside the Air Force and he came to us from the Department of Energy as the CIO for Energy. Now he's back in the Air Force. He will be the full-time person working CIO matters.

"Lt. Gen. John L. Woodward [Deputy Chief of Staff for Communications and Information], John Gilligan, and I are the CIO team at Air Force headquarters, he said. "Mr. Gilligan will have the day-to-day responsibility of putting together the budget, doing the standards, working on the architecture, and mak-

ing sure all of our systems are compatible and accessible.

"We'll be focusing on several key things," said Delaney. "One, of course, is information security – having all the procedures and policies in place to ensure that our systems are protected from intruders. The standards will be another very important area [where] Mr. Gilligan will work with the people implementing IT systems."

The IT revolution evolved after senior leaders conferred with industry experts earlier this year on tailoring current IT to Air Force requirements. The secretary and chief of staff convened an IT summit in July with major command leaders. They chartered 12 focus groups to lead the way for the Air Force in adopting best practices of industry.

"We believe it will empower individuals, and we believe it will empower them in such a way that we don't fully see yet," Delaney said. "What we experienced over and over again when we were talking to industry people was that they didn't have a totally structured vision of what impact this Web-centric operation would have on their business. But they knew this was the right way to go.

"Once they started, the creativity exploded," he said. "For example, they said, 'if I can file my own travel reports and get paid in less than three days, what else can I do to this operation to empower the individual?' When I look at the creativity in all the Air Force groups here, I think there are going to be ways of empowering the individual that we haven't thought of yet. We're putting in place the structure so that all of this can be enabled."

Delaney is excited about the possibilities that information technology brings. "It's really the future of the Air Force," he said. "There are two sides to this. One is obviously the administrative functions that we're doing, and that's already having an impact. We're reducing the number of servers, for instance, that we've had in place. That's going to create a lot more efficiencies.

"Information technology is going to have tremendous meaning to the warfighter," he said. "It's going to integrate many functions and reduce the time required to bring functions together in a warfighting operation. We're going to give the warfighter much greater access to a much larger amount of information and fuse various streams of information into a bigger picture – turning data into knowledge. That's going to allow the warfighter to do things like affect space targeting and respond rapidly to developing situations. The opportunity to leverage information technology to bring us to a new level of warfighting proficiency is what we're all about.

"What we're doing here requires the support of every individual in the Air Force," he said. "We believe it brings us into a totally new era of capability, where we actually provide the U.S. taxpayers and citizens a new level of assurance. I think we're all going to be very satisfied with the new capability this gives us. It's going to revolutionize the role of the Air Force."

Editor's Note: This information is in the public domain at **http://www.af.mil/news**.

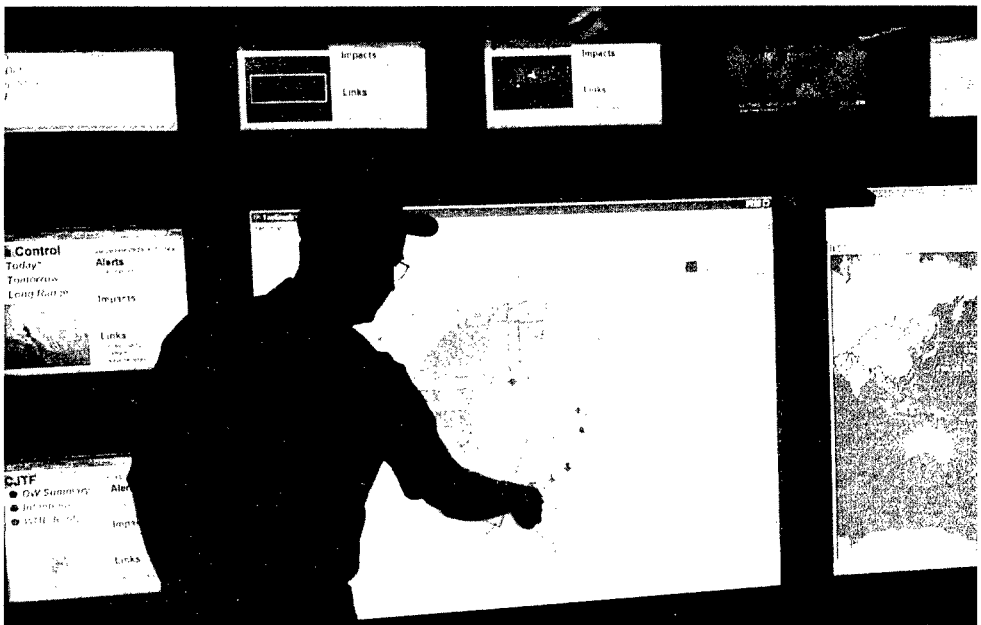
Research in a Mission Agency

ONR — Deep Institutional Commitment to Basic Research

VICE ADM. PAUL G. GAFFNEY II, USN • DR. FRED E. SAALFELD • JOHN F. PETRIK

Alphonso the Wise is famously reported to have said, after completing a study of Ptolemy's epicyclic system of astronomy, that he could have offered the Lord some useful suggestions had he been present at the creation. National science policy, which can also seem to be comprised of wheels within wheels, turning to serve a variety of eccentric purposes, is currently undergoing a kind of re-creation at the instigation of Congress.

Discussion of the structure that the policy will assume might benefit from suggestions offered by the agency that was present at the creation of the existing system. Between 1946 and the founding of the National Science Foundation in 1950, the Office of Naval Research (ONR) was the federal government's only agency whose principal mission was the support of research, and so it may well stand in as an institutional version of Alphonso the Wise.



Fleet decision makers often have too much data and not enough useful information. The Knowledge Wall is an ONR-funded concept that uses commercial-off-the-shelf technology to display on a single wall several screens of information that address issues requiring the decision makers' attention. An example of human-centric technology designed for the warfighter, the wall is currently installed onboard the *USS Coronado*, Third Fleet Flagship. The Knowledge Wall uses an IR-21 compliant workstation running Windows NT4.0 with dual Pentium-III, 750 MHz processors, one gigabyte of RAM, and two large-capacity hard drives. The display itself is composed of 10 21-inch Viewsonic G810 CRTs and two SmartBoard rear-projection large screen displays with internal Proxima LX-2 LCD projectors. U.S. Navy photo

ONR - First Agency of Its Kind

Congress passed legislation establishing the ONR on Aug. 1, 1946.[1] An immediate legacy of Vannevar Bush's comprehensive assessment of national science policy, ONR was the first permanent federal agency devoted to the support of scientific research. ONR is also a mission agency; it has a responsibility to sponsor scientific work in the interest of the Navy and Marine Corps. As the first organization of its kind, ONR developed policies and procedures 50 years ago that have become the organizational models for the National Science Foundation and other research agencies.

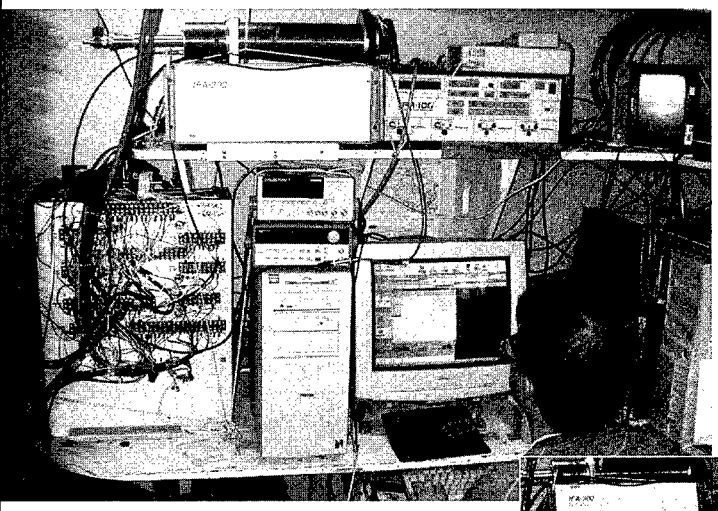
ONR continues to manage the Navy's scientific research resources. It maintains liaison with the scientific community both in this country and abroad, and it supports research in nearly every major field of science and technology. The purpose of this article is to discuss how and why a mission agency operates.

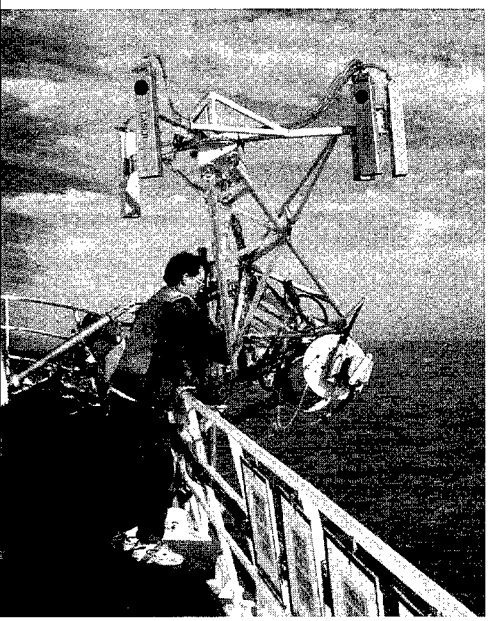
Historical Context

When Vannevar Bush wrote *Science, the Endless Frontier* for President Franklin

Gaffney, *a former Chief of Naval Research, is currently President of the National Defense University. A 1968 graduate of the U.S. Naval Academy, he holds an M.S. from Catholic University of America and an M.B.A. from Jacksonville University.* ***Saalfeld*** *is the Technical Director of the Office of Naval Research and Deputy Chief of Naval Research. He holds a B.S. from Southeast Missouri State University, and an M.S. and Ph.D. from Iowa State University.* ***Petrik*** *works for Noesis, Inc., Arlington, Va., and supports the Office of Naval Research as a member of its corporate staff. He holds a B.S. from Middleburg College and an M.S. from University of Chicago.*

Delano Roosevelt in 1945, he argued that federal support of basic research would be essential to continued American security, prosperity, and public health.[2] Bush did not, as many people believe, argue that basic science ought to be pursued merely for its own sake. He certainly believed that science was an inherently fulfilling human activity; however, that was not why he thought the federal government should support it.





Bush understood very clearly that science eventually enriched human life in directly practical ways. His three examples of this, for his 1945 audience, were radar, penicillin, and pay envelopes. He also understood that the specific benefits of basic research were imperfectly predictable at best, and that they were realized only in the relatively long term.

Bush also had the ruins of totalitarian science in Germany to provide a lurid example of what happens when you let ideologues and demagogues tell scientists and engineers what to think. That kind of political involvement strangles science. People say that totalitarian governments are more efficient than democracies, and that their scientific achievements are always ahead of our own. That's false.

Totalitarian regimes, by their nature, eliminate alternative sources of power, organization, and legitimacy – those parts of civil society we recognize as universities, foundations, professional societies, and even informal teams of like-minded investigators. Bush recognized the strength of dispersed authority. "Support of basic research," he advised the president, "in the public and private colleges, universities, and research institutes must leave the internal control of policy, personnel, and the method and scope of the research to the institutions themselves. This is of the utmost importance."

The national science policy Bush proposed was therefore open and institutionally pluralistic, a way of doing business that suited both science and democracy. The federal government would support scientists in a variety of institutions. It would choose whom to support mainly on the basis of the scientific merit of their work. The results would be applied to important public purposes, not all of them chosen or pursued by the government.

Combining Bush's foresight with their own wartime experience, a small group of Navy officers – some regulars and others wartime reservists who went on to distinguished civilian careers – invented ONR and modern research administration. Known as the "Bird Dogs," they took this name because their wartime duties had included making inspection visits to research facilities on behalf of the Secretary of the Navy's Coordinator of Research and Development – "bird-dogging" the labs for the Coordinator.[3] They were all relatively junior officers with a lot of talent and a lot of energy. Some of their names will be familiar; all of them ought to be: James Wakelin, Bruce Old, John Burwell, Ralph Krause, Thomas Wilson, James Parker, and Gordon Dyke. Their leader was the remarkable Capt. Robert Dexter Conrad, after whom the Department of Navy (DoN) named its top award for scientific achievement.

When the war ended, this resourceful group sought, largely on its own initia-

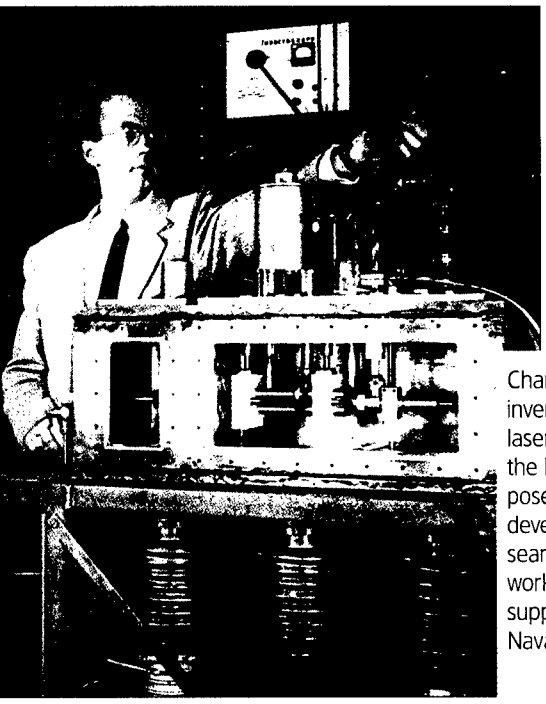
The Shoaling Waves Experiment (SHOWEX) is a five-year field-oriented departmental research initiative (DRI) by ONR to improve scientific understanding of the properties and evolution of surface gravity waves in intermediate and shallow water depths. These three photos depict researchers aboard the Canadian survey vessel *Frederick G. Creed,* collecting data off the North Carolina coast. The research serves a range of Navy needs: improving wave forecasts, understanding the interactions between waves and acoustical and optical processes; air and sea interaction; remote sensing; forces on vessels and structures; and sediment transport.

ONR photos

The "Bird Dogs," a small group of Navy officers — some regulars and others wartime reservists who went on to distinguished civilian careers — invented ONR in the late 1940s as well as research administration. They took this name because their wartime duties had included making inspection visits to research facilities on behalf of the Secretary of the Navy's Coordinator of Research and Development — "bird-dogging" the labs for the Coordinator. Five of the "Bird Dogs" are in this photo: Lt. James Wakelin (standing, third from left); Lt. Bruce Old (standing, second from right); Lt. Cmdr. John Burwell (standing, far right); Lt. Cmdr. Ralph Krause (seated, far left); and Lt. Cmdr. H. Gordon Dyke (seated, far right). The sixth Bird Dog, Lt. Thomas Wilson, is not in this picture. Cmdr. Robert Dexter Conrad, in whose honor the Navy's highest award for scientific achievement is named, is seated next to Gordon Dyke. ONR photo

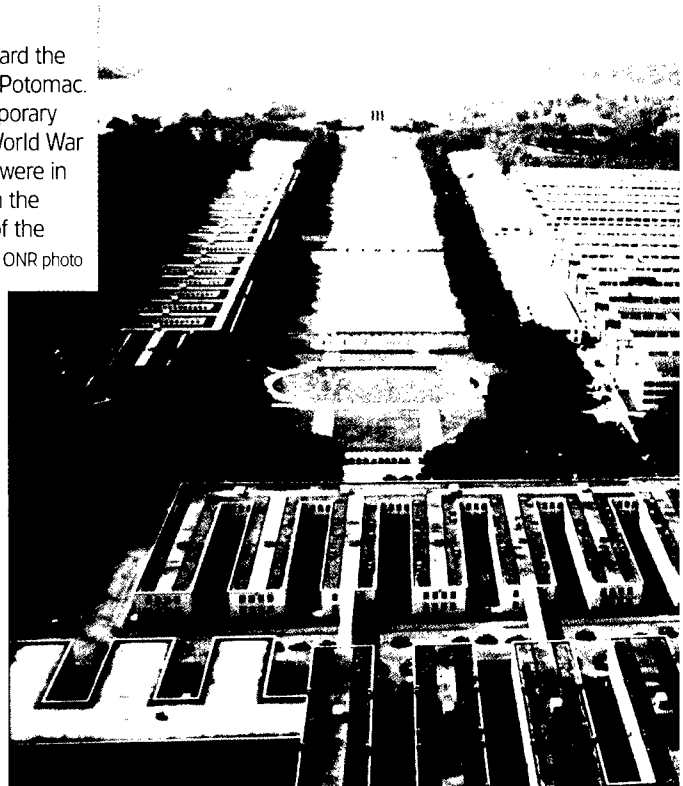
Vannevar Bush (center) photographed while visiting the National Advisory Committee on Aeronautics (NACA) research facility at Langley Field, Va., in 1938. Bush directed America's research efforts during World War II. His study, "Science, the Endless Frontier," has shaped national science policy since its publication in 1945. NASA photo

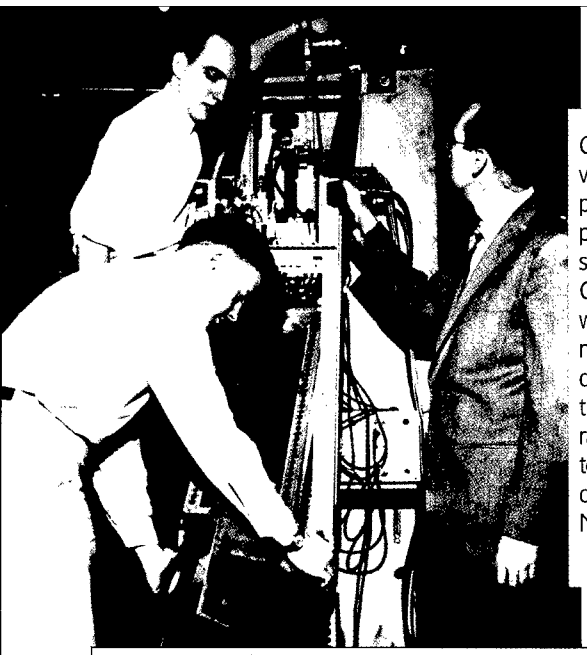
Roger Revelle (inevitable cigarette in hand) at work with a student at Scripps in the mid-1950s.
Scripps Institution of Oceanography photo



Charles Townes, whose inventions of the maser and laser were recognized with the Nobel Prize in physics, poses with an early maser he developed with the Naval Research Laboratory. Townes' work on the laser was long supported by the Office of Naval Research.
Columbia University photo

Looking west down the Washington, D.C., Mall toward the Lincoln Memorial and the Potomac. The Mall is covered in temporary buildings erected during World War II. ONR's original quarters were in Bureau of Ships spaces on the upper right-hand corner of the lower block of buildings. ONR photo



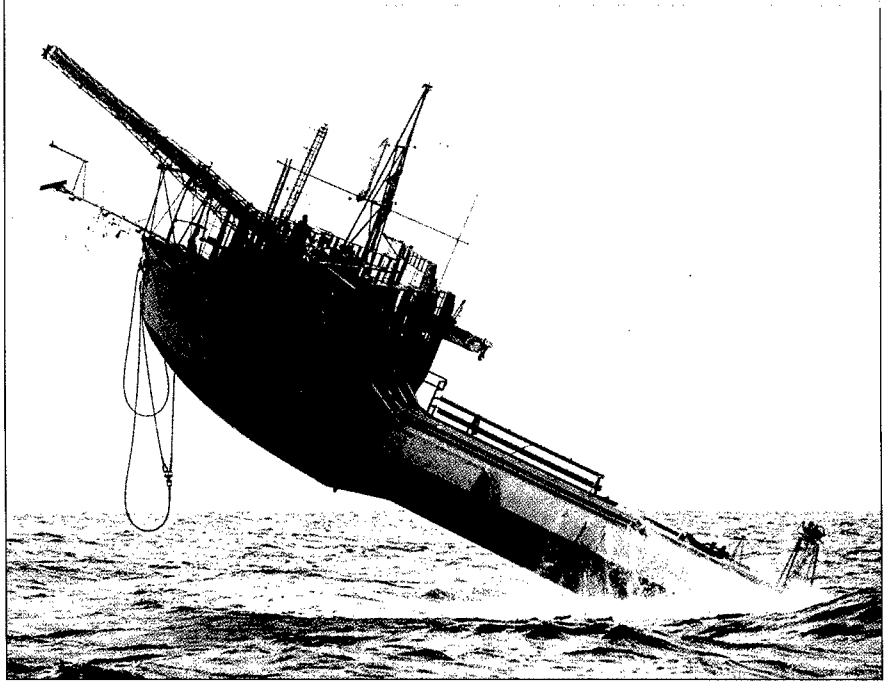


Charles Townes (right), inventor of the laser and its precursor, the maser, is pictured with graduate students L.E. Alsop and J.P. Giordmaine. They are working with an early ruby maser (circa 1957) designed for installation on the Naval Research Laboratory's 50-foot radar telescope. Townes collaborated with NRL's Cornell Mayer on the project.
Columbia University photo

A young Bruce Heezen on a Woods Hole scientific cruise in the early 1950s. With Marie Tharp, Heezen would produce the famous Heezen-Tharp map of the ocean floor. Their work received substantial naval support. In 1998, the Navy's newest T-AGS 60 class oceanographic vessel was named *USNS Bruce Heezen* in his honor. Nine fifth graders from Oak Lawn Elementary School in Cranston, R.I., suggested the name to the Secretary of the Navy.
Woods Hole Oceanographic Institution photo

Jacques Piccard (left) and Navy Lt. Don Walsh standing atop the bathyscaph "Trieste." On Jan. 23, 1960, Piccard and Walsh dove in Trieste to the ocean's deepest point– Challenger Deep in the Marianas Trench – 35,800 feet below sea level. ONR photo

Research Platform FLIP tilting into its working position. A ship-sized spar-buoy with accommodations for a scientific team on board, FLIP is owned by the Navy and operated by Scripps Institution of Oceanography. FLIP has been in service since the early 1960s. ONR owns several famous research vessels and platforms, including the famous submersible ALVIN, operated by Woods Hole Oceanographic Institution. Scripps Institution of Oceanography photo



tive, to make sure the Navy's beneficial relationship with academic scientists continued. They knew three crucial cultures well: the Fleet, the federal government, and the universities. These three groups not only have different interests, but they often seem to speak completely different dialects of English. Luckily the Bird Dogs proved fluent translators.

Recognizing that nothing in Washington gets done without legislation and a budget, Conrad succeeded in getting both. He and his people then had to develop a system whereby the government could support scientists in a way that met both the government's responsibility for fiscal accountability and the scientists' need for intellectual freedom – a seemingly impossible task.[4]

The government contracts that had been used until the end of World War II were cumbersome and restrictive instruments. The wartime collaboration between the DoN and various universities, while undeniably successful, had not been without friction, and many university researchers formed a set determination to forego further work on military research programs. In many cases, their reluctance to continue working with the military was founded on their experience with a cumbersome contracting system.

Conrad decided to develop a new kind of contracting system that would eliminate most of the restrictions that grated on university scientists during the war. He sold Congress, the DoN, and the universities on a system that would permit one overall contract to be issued to a university, with individual tasks for scientists attached. Such contracts would permit support of basic research. The work done under them would be unclassified, and the scientists could publish it. This was a new way of doing business, and it probably did as much as anything else to make federal support of science possible and successful.

One of ONR's early program officers, the great oceanographer Roger Revelle, formulated five typically curmudgeonly rules for ONR to follow – *Guiding Principles for Evaluating Research Proposals*:[5]

- Emphasis should be on the merit of the scientific approach. Navy relevance will follow.
- If the proposal emphasizes Navy relevance, turn it down.
- If it's fewer than $5,000, fund it.
- No peer review. It leads to the lowest common denominator. [That is, the lowest common denominator in a mission agency. Peer review works fine for the National Science Foundation, but they are not a mission agency.] Rely on good program managers.[6]
- Long-term individual and institutional support are essential if a field is to survive and grow.

If you make allowances for overstatement, these guiding principles are not a bad summary of that early approach to funding basic research. With due allowances for inflation and comptrollers' discipline, this is roughly speaking how ONR has done business for the last 54 years.

The original permanent research establishment, ONR has evolved over the last 54 years into something more diversified and in some respects closer to its operational customers than its founders envisioned. The greatest change occurred in fiscal 1992, when the Office of Naval Technology (ONT) and the Office of Advanced Technology (OAT), separate agencies that reported to the Chief of Naval Research, were folded into ONR. With the absorption of ONT and OAT, ONR picked up responsibility for applied research and technology development. Since then, ONR has worked to integrate the research it supports and to produce an investment portfolio that does justice to its several constituencies such as Congress, the Fleet, industry, and universities – all while retaining its deep institutional commitment to basic research.

Research in a Vertically Integrated Organization

As their names imply, ONT and OAT had been responsible for research that had a clear and relatively short-term payoff: hull coatings, radar masts, and missile control surfaces. Development of such items falls into the Department of Defense (DoD) budget activities known as 6.2 and 6.3 funding – applied research and advanced technology development respectively. ONR, by contrast, had been largely involved with 6.1 funding – basic research.

(It's worth noting here that our vocabulary has changed over the last half century. In 1946, when ONR was founded, "research" meant what we would nowadays call "science and technology." In the 1960s, "research" increasingly appeared in the phrase "research and development," which represented the later stages of technological development, and included such activities as prototyping and engineering development.)

Roughly speaking, in the DoD lexicon, basic research seeks to advance understanding of fundamental aspects of processes and properties. Applied research then seeks ways of altering, manipulating, or using those processes and properties in such ways as may meet a specific, recognized need. Advanced technology development involves taking the results of applied research and actually fabricating things that perform some useful function, that provide some desirable capability, and trying them out in *demonstrations* that judge their utility or feasibility.

Higher numbered budget activities, 6.4 and up, no longer belong to the administrative world of science and technology proper, but rather to acquisition, operations, and maintenance. They lie outside the scope of this discussion, but we should keep in mind that results from 6.1, 6.2, and 6.3 ultimately feed projects in those other categories as well.

The picture the budget activities suggest when one lays them out like this is an eminently rational one. Each level hands on the product to the next for refinement in a smooth, linear, efficient progression – a kind of assembly line that mills concepts into hardware. In fact, however, the research enterprise is so notoriously difficult to integrate in such a straightforward manner that counsel against naive optimism is common. Nobel laureate Joshua Lederberg is often quoted among

research managers as advising that "the best way to achieve scientific progress is to resist the temptation to control it."

Paul Nitze, Secretary of the Navy in the mid-1960s, encountered the perennial challenge of showing that research pays by demonstrating that basic work actually generated some particular weapon, tool, or system. He talked about this when he addressed ONR's vicennial celebration in 1966. "I would note," he said, "that the exercise of actually attempting to trace such parentage is often more academic than fruitful, for the trace quickly becomes dim, and no rational sequence seems to prevail. This is inevitably the nature of creative ideas, basic answers, and basic data for which, once we have them, applications are seen. Yet data by themselves are sterile; it is the ephemeral idea that makes them useful."[7]

Nitze' words were by no means a counsel of despair, and were not taken as such. ONR's assumption of responsibility for research, applied research, and advanced technology development suggested anew that efficiencies might be realized from vertical integration. If work supported from all three budget activities – 6.1, 6.2, and 6.3 – could become mutually supporting, all of the customers would win.

ONR believes it has found the appropriate agents of such integration in the staff scientists who serve as its project managers. They have the appropriate technical expertise and scientific credibility to administer awards and recognize quality; in the marketplace of science and technology, they are the Navy's ultimate smart buyers. They continue to work in the spirit of Roger Revelle (albeit with modifications to his third rule – there aren't that many $5,000 research proposals anymore).

Preserving Effectiveness, Showing Results, Making a Difference

Defense support for science and technology is no longer as dominant as it was in the palmy days of the late 1940s. Budgets have declined in relative terms, particularly since the Vietnam War brought with it both high operating costs and public disaffection with military-supported research. Even during the small renaissance the Defense establishment enjoyed in the waning days of the Cold War, Defense investment in research and development had begun to be eclipsed by industry investment. We must note that the growth in industry research and development has occurred largely in rapid product development, and less so in the research, or science and technology end of the spectrum.

ONR's goal is to keep naval science and technology healthy so that the United States retains a robust capability to work on long-term scientific and technological problems of importance to the Navy and Marine Corps.

Budgets have remained tight during the retrenchments of the past decade. Recently, however, there have been some positive signs: the President's requests for science and technology funding have improved, and Congress has spoken out loudly for real growth in this area.

A sensible investment strategy would be to aim first and most obviously at stabilizing funding. Stable funding, less obviously but most importantly, is essential to establishing a strong, solid 6.1 and 6.2 technical base. On this base, and only on this base, can one build an appropriately focused science and technology program that preserves a balance between long- and short-term objectives.

ONR, therefore, thinks of its work as divided broadly into two mutually supporting and integrated parts: the discovery and invention on the one hand and the exploitation and delivery on the other. In this discussion, we will concern ourselves mostly with discovery and invention, but as we do we must understand five principles:

- ONR's program is integrated. Discovery and invention not only feed exploitation and delivery, but are reciprocally guided by the awareness of operational needs that exploitation and delivery provide.
- ONR's program officers are the locus of integration. Only first-rate scientific and engineering talent, steeped in a naval mission organization, is capable of integrating science and technology.
- ONR exists to serve the Fleet and the Marines. It can do so by continuing the Bird Dogs' tradition of serving as translators between the very different worlds of academic science, military operations, and industrial production.
- ONR seeks to foster the development of "disruptive technologies" – new capabilities not envisioned by operators' requirements. In order to do so, it works closely with the Naval Warfare Development Command and the Marine Corps Combat Development Command.

Awareness – Key to Discovery and Invention

Two important elements of the DoN's discovery and invention program that rest immediately on the 6.1 and 6.2 technical base are the National Naval Responsibilities (NNR) and the Naval Science and Technology Grand Challenges (NSTGC). NNRs are research areas like ocean acoustics that the Navy has to cover because the nation expects and requires it, and because no other agency or private enterprise can be expected to do so. The NSTGCs, which help ensure that the Navy and Marine Corps are unlikely to be caught short 50 years hence, are a set of very difficult, but probably achievable, scientific and technical chal-

lenges ONR proposes to the research community. They are intended to be visionary, designed to meet what will in all likelihood prove to be compelling needs of the Navy and Marine Corps After Next, and to afford many participants (from a broad range of disciplines) multiple opportunities for exciting, creative, risky research.

The NNRs and the NSTGCs have an irreducible requirement for the highest quality basic and applied research, and the DoN is determined to sustain the technical base that can provide it. This technical base is also the locus of what might be called "vision" – the ability of a program officer to recognize a promising line of research even before it has been summoned by a formally declared requirement.

Such vision is more than serendipity. ONR's Mike Shlesinger, for example, saw the potential importance of chaos theory many years ago, and had the vision to invest in this new, and then high-risk, area. He was the first federal investor in chaos research. The DoN is currently well on its way to using the work he pushed in his capacity as a program officer in order to solve the problem of resupplying ships in sea state 3.

About half of the DoN's science and technology budget goes to the longer-term efforts of invention and discovery.

Executing a Balanced Program

ONR sponsors all of the Navy's science and technology. Any discussion of ONR's project selection process must recognize the fact that ONR is a mission-oriented sponsor of research. It encourages the acquisition of fundamental knowledge needed to solve future military problems for the Naval Services After Next in areas like communications, surveillance, targeting, propulsion, mobility, guidance and control, navigation, energy conversion, materials and structures, personnel support, and (again) the disruptive technologies needed for leap-ahead naval innovations.

Because of ONR's mission, project selection must be a two-step process. First,

Naval science and technology remains an irreplaceable national asset.

ONR must establish broad programmatic thrusts and priorities reflecting a suitable balance between naval need and relevant scientific opportunity. Next, it must select specific research projects and tasks to implement those broad thrusts and priorities. Both steps are essential.

ONR depends primarily on its program officers for the selection of specific research projects. Academic peer reviewers cannot be expected to be knowledgeable about the naval mission and its research implications. ONR's exceptional cadre of program officers made its past record of achievement possible. ONR program officers are encouraged, as a matter of policy, to be active researchers and to play a leadership role in the scientific and engineering communities while establishing and maintaining close communication with the naval acquisition and operations communities who will ultimately use the products of their research programs.

Partnership in Research

In 1998, Congress took a long look at Vannevar Bush's legacy and issued a thoughtful report on how that legacy might be preserved and enhanced. *Unlocking Our Future: Toward a New National Science Policy*, commonly called the Ehlers' Report, substantially endorses the vision of *Science, the Endless Frontier*. But it also adds a new concern for the environment, education, the importance of partnerships in science and technology, and the need to make the best science available for public debate and decision on policy.[8]

Collaboration among government, industry, and academia permits each partner to bring distinctive strengths to bear on common problems, and to discharge their distinctive responsibilities while they do so. The government can set requirements – in our case naval requirements – to catalyze science and technology, and to provide a degree of program stability. Program stability is very important when the sciences are being expected to inform national policy on matters that involve decadal trends. Industry knows commercial requirements and markets, brings considerable economies of scale, and above all contributes expertise in design to component and system production. And academia brings ideas, imagination, creativity, and a willingness to take intellectual risks.

ONR program officers play the key role in project selection and management. They are given broad discretion in the selection of external projects for support, and are then held responsible for their results. Although there is no formal peer review process of proposals at ONR, the program officers do seek the advice of associates within the DoN and of appropriate outside experts. The methods employed to seek expert advice, which may be highly structured or informal, are determined by the program officer to meet the particular needs of his or her program.

Since the whole point of peer review is to ensure technical integrity, ONR meets this important requirement through peer review, not of proposals from investigators, but of the program officer's portfolio. Thus the program officer, and not the individual scientist in a university, laboratory, or institute, undergoes the review. We have found that this policy – peer review of portfolios, not proposals – lets ONR take a chance on young investigators who haven't yet established the kind of reputation and publication record that peer reviewers commonly look for in proposals. It also permits ONR to take a shot at potentially disruptive technologies that have yet to find their way into mainstream thinking. This avoids sinking to the lowest common denominator that Roger Revelle warned mission agencies against back in the early 1950s.[9]

External and internal program reviews are both helpful. The program officers

are ultimately responsible for a project's contribution to naval goals. Department Directors, Division Directors, and external Boards of Visitors review their decisions, but their decisions on proposals are rarely second-guessed. The program officers themselves stay close to their investigators and performers through frequent contact, including site visits, and they are well prepared to answer for their programs.

Because of the requirement to select programs that have outstanding technical merit and fit into an overall set of programmatic priorities, program officers cannot be passive and simply react to proposals as received from the academic community. They must play a very active role in communicating ONR's programmatic interests and priorities to the academic community and in seeking out technical opportunities relevant to Navy priorities.

Not only do they spend considerable time visiting university laboratories, scientists, and engineers for this purpose, they also organize special workshops and conferences, and monitor and participate in relevant activities of the National Academy of Sciences, professional societies, and other organizations. To do this effectively, they must have established a certain level of visibility and stature in their research communities.

The program officers also belong to the DoN, and they very actively seek current awareness of what the Navy and Marine Corps need.

Final Thoughts

ONR certainly has the management tools in place to ensure that it supports high-quality science and technology on behalf of the DoN. While it stands on its founding principles, it works toward collaboration with national and international partners, alert for opportunities to better meet the needs of the DoN. But fundamentally, its record of accomplishment depends more on the outstanding quality of its program officers, and the authority given to them, than on any particular process for project review and selection.

Robert Frosch, a former Assistant Secretary of the Navy, who later served as a NASA Administrator, and more recently, Director of Research for General Motors, summed it up by saying, "Style is much more important than organizational detail and process, and style is what ONR always had."

ONR's goal is to keep naval science and technology healthy so that the United States retains a robust capability to work on long-term scientific and technological problems of importance to the Navy and Marine Corps. We seek to keep an adequate pipeline of new scientists and engineers in disciplines of uniquely naval importance, and to continue to provide the scientific and technological products necessary to ensure continued superiority in naval warfare.

What would happen if the DoN's science and technology budgets were eliminated? Would they be transferred to other agencies? History gives us little cause for optimism on this point. And even if the funds were to go elsewhere for application to research, it is unlikely that other agencies— no matter how competent, well-intentioned, and hard-working —would soon be able to replace the networks of support, communication, and cooperation that have evolved within the naval research community over the past 50 years. Naval science and technology remains an irreplaceable national asset.

Editor's Note: The authors welcome questions or comments on this article. Contact Gaffney at **gaffneyp@ndu.edu**; Saalfeld at **saalfef@onr.navy.mil**; and Petrik at **petrikj@onr.navy.mil**.

ENDNOTES

1. Public Law 588-79th Congress, Chapter 727-2nd Session (H.R. 5911). The Office of Naval Research is now authorized in 10 §5022, United States Code. Its present organizational form was established in SECNAVNOTE 5430, Dec. 4, 1992.
2. Bush, Vannevar, *Science, the Endless Frontier: A Report to the President*, Washington, D.C., July 1945.
3. This account of the Bird Dogs is drawn from ONR's institutional memory, confirmed by "The Evolution of the Office of Naval Research," *Physics Today*, Volume 14, No. 8, August 1961, pp. 30-35. The author of this article is given simply as "The Bird Dogs."
4. Harvey M. Sapolsky recounts this period of ONR's history in *Science and the Navy: the History of the Office of Naval Research*, Princeton: Princeton University Press, 1990. For a contemporary account of the system that evolved under Conrad's leadership, see Roger D. Reid, "Freedom and Finance in Research," *American Scientist*, Volume 41, No. 2, April 1953, pp. 286-292. For a somewhat earlier account of how ONR's success caused it to serve as the model for the National Science Foundation, see John E. Pfeiffer, "The Office of Naval Research," *Scientific American*, Volume 180, No. 2, February 1949, pp. 11-15.
5. Revelle, Roger, "Guiding Principles for Evaluating ONR Research Proposals," circa 1948, and preserved by Douglas L. Inman of the Scripps Institution of Oceanography.
6. And not only Revelle. Many reflective scientists and observers of science have commented on the stultifying effect of peer review. For a good presentation of this argument, see Deborah Shapley and Rustum Roy, *Lost at the Frontier: U.S. Science and Technology Policy Adrift* (Philadelphia: ISI Press, 1985), especially pp. 54-55 and 102-107. Roy's views on the subject appear at length in his "Alternatives to Review by Peers: A Contribution to the Theory of Scientific Choice," (*Minerva*, Volume XXII, No.3, 4, Autumn-Winter 1984, pp. 316-327).
7. Nitze, Paul A., "Perspectives on Naval Research," in *Research in the Service of National Purpose*, Washington: Office of Naval Research, 1966.
8. House Committee on Science, *Unlocking Our Future: Toward a New National Science Policy*. Washington: U.S. House of Representatives, Sept. 24, 1998.
9. Robert Frosch makes a related point about technological progress in "The Customer for R&D is Always Wrong!" *Research -Technology Management*, November-December 1996, pp. 22-27.

Gansler Issues Escalation Policy for Single Process Initiative

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-3010

AUG 30 2000

ACQUISITION, TECHNOLOGY AND LOGISTICS

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARY OF DEFENSE (COMPTROLLER)
ASSISTANT SECRETARY OF DEFENSE (COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE)
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
DIRECTOR, OPERATIONAL TEST AND EVALUATION
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: Escalation Policy for the Single Process Initiative

The Single Process Initiative (SPI) is an important tool for changing the way the Department of Defense (DOD) and industry do business. A key to the timely processing of SPI concept papers is having a method for resolving component differences. Establishment of a defined and expeditious escalation process will enhance the SPI as well as further the goal of Civil Military Integration (CMI). This memorandum expands upon existing SPI policy with the Defense Contract Management Agency as the DoD lead to implement this process. The policies and procedures outlined in the attachment are effective immediately.

The attachment outlines the escalation process for both internal component and cross-component disagreements on concept papers. This guidance should also be used as a framework for working and resolving CMI-related issues that are submitted through local, sector, or corporate Management Councils.

I strongly encourage each of you to give this policy your full support, to prepare necessary internal implementing guidance, and, through the SPI Executive Council, to advise me of your implementation progress and any issues that arise.

J.S. Gansler

Attachment:
As Stated

Editor's Note: This information is in the public domain. To download the attachment to Dr. Gansler's memorandum, go to the Defense Acquisition Reform Web site at **www.acq.osd.mil/ar/#spi.**

OASD PUBLIC AFFAIRS NEWS RELEASE

New Identification Card Uses "SMART" Technology

The Department of Defense today introduced its identification card of the future. Starting this month, the Department of Defense began issuing a new multi-purpose card for DoD personnel. Dubbed a "common access card," it will be more than just an identification card. The card will eventually allow physical access to secure areas, permit entry into the Department's computer networks, and serve as the authentication token for the Department's computerized public key infrastructure.

The common access card is an important example of the Department's efforts to use cutting-edge technologies to reform the Department's business processes, to eliminate paper-based activities, to ensure the security of its networks, and consequently to enhance military readiness.

The new ID is based on "smart card" technology that stores and processes information on an integrated microprocessor chip. Embedded within the card, this chip is a small computer without a monitor or power supply. It has the capability to read, write, and perform various operations on several thousand bytes of information. The common access card is about the size of an average credit card and will incorporate linear and two-dimensional bar codes and a magnetic stripe in order to enable the card to support other functions, either on a Department-wide or individual command basis.

Among the possible activities being considered on a Department-wide basis are processing food services charges in military mess halls and updating important manifest and deployment data. Local commands are also evaluating placing individual medical and dental information on the card, as well as student status, armory and property accountability, training, and rifle range performance.

"I applaud the fact this card gives our people a key technological tool to improve performance while protecting individual privacy," said Under Secretary of Defense (Personnel and Readiness) Bernard Rostker, whose office assisted in the development of the card.

To protect privacy, the card is designed with minimum information to support its identification, access and management features. It complies with the Geneva Convention for the Uniformed Services. While the card will not include a personal handwritten signature, it will store certificates to enable cardholders to digitally sign documents such as e-mail, encrypt information, and establish secure Web sessions to access and update information via the Internet. These provisions are intended to enhance individual privacy in the Department as computerized systems replace paper-based systems.

The common access card will become the standard identification card for approximately four million people affiliated with the Department. Included in this total are active duty uniformed services personnel, selected reserves, DoD civilian personnel, and eligible contractor personnel.

The card will be issued initially at selected sites in the Quantico and Tidewater areas of Virginia and overseas in Germany and Korea. The target date for completion of the initial new card issuance is the end of September 2002. Current uniformed services ID card infrastructure will support the common access card.

Each card is expected to cost approximately six to eight dollars. Costs are expected to decrease as larger quantities are purchased and technology and competition improves.

Development of the common access card culminates almost a decade of DoD interest in smart card applications. In fact, the Department of Defense has been exploring the use of smart card technology since 1993. Initially, it was seen as only a means of conveniently transporting small amounts of information, but now advances in technology allow increased storage as well as conducting secure data transfer and online transactions.

"In November 1999, the DoD leadership charged us to innovate by exploiting smart card applications throughout the Department. The common access card answers the mail by allowing us to realize the potential that technology offers," said Paul Brubaker, deputy chief information officer of the Department of Defense, whose office oversaw the technological development of the card.

Additional information on the common access card, including a picture of a "mock" card, is available at **www.dmdc.osd.mil/smartcard**.

Editor's Note: This information is in the public domain at **www.defenselink.mil/news**.

P3I BAT Preplanned Product Improvement

A Simulation-based Acquisition That Meets the Army's 2020 Vision

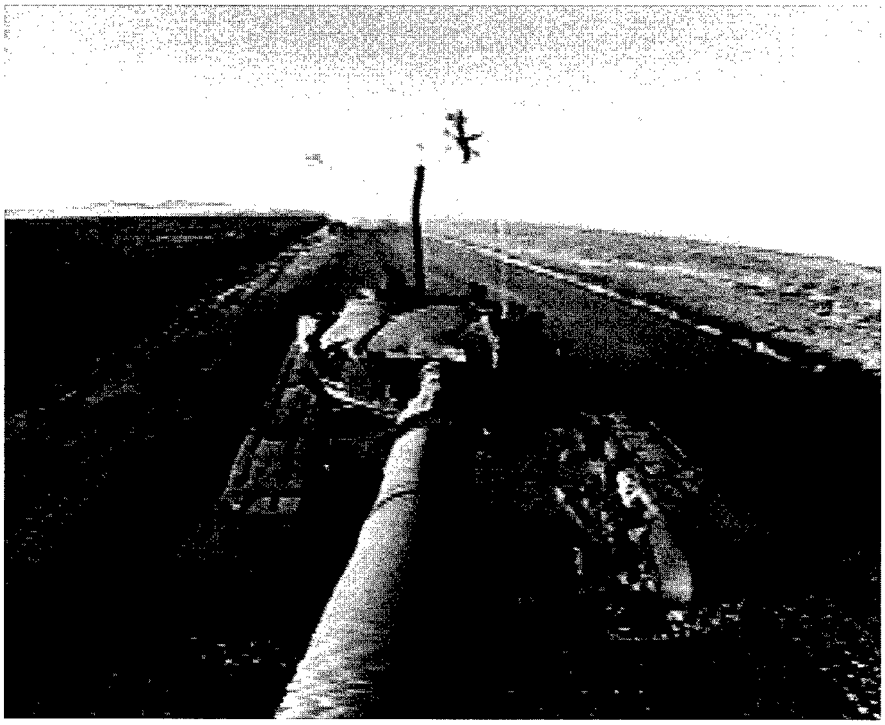
DEBORAH PINKSTON

Meeting the Army's 2020 Vision of "doing more with less" in today's changing environment places a challenge on the project/product manager (PM), who is developing a major acquisition system. How can a PM provide increased, reliable requirements with less money? How can a PM do this while maintaining the cost, schedule, and performance of a major acquisition system?

Modernizing Existing Systems

The Army Deputy for System Management and Horizontal Technology Integration, at the Army Management Staff College emphasized on July 7 that the Army needs to "recapitalize" legacy systems encompassing a number of platforms. Modernization of existing Army systems to technical levels capable of achieving combat readiness is critical not only to meet current Army needs, but also to achieve the Army's 2020 Vision of its weapon systems as a strong, objective force for the soldier. The Army can no longer waste budgets on items to be replaced; it cannot afford the lead times and budgets required to develop new systems.

One method to reach the Army goal of increased capability, increased reliability, and increased equipment life span is to upgrade existing (legacy) Army systems with preplanned product improvements (P3I). Developing a major acquisition system such as an ACAT ID program requires extensive testing and evaluation to "prove out" a system. This can cost millions of dollars if conventional or traditional tactical testing is pursued. For example, a typical captive flight test (CFT) of a major acquisition program can cost as much as $1-2 million each. These tests are developmental in nature and verify and validate the system's performance.



BAT — picture taken by a lipstick camera on a gun tube.

The Army test and evaluation community (Army Test and Evaluation Agency, Army Materiel Systems Analysis Activity, Office of the Deputy Chief of Staff for Operations, and the Training and Doctrine Command) want the PM to prove out the maximum capability of the developed system. This is prior to providing the system as an objective force for the Commanders-in-Chief and, certainly, for the soldier who uses the end item.

The Chief of the Army Tactical Missile System-BAT Project Office (ABPO), Test Division, and the P3I BAT test engineer indicated that the system can require as many as 10-20 CFTs, 6-8 Live Fire Tests, and some 10-15 Operational Tests.[1] A total cost for this range of testing can be as much as $30-50 million, or more. This estimate would include successfully completing a program's exit criteria, getting an Acquisition Decision Memorandum, or obtaining approval by the Sec-

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Photo Courtesy Northrop Grumman Electronic Sensors and Systems Sector (NGESSS)

retary of Defense to enter the production phase of the system's life cycle. Not included in this estimate is consideration/impacts for the sustaining base or deployment needs of the system in light of increased requirements, but reduced funding.

Some other challenges exist outside the PM's immediate control that impact the program. The PM has to satisfy concerns of not only the Army cost, schedule, and performance requirements, but also any industry-based impacts, and any political or congressional impacts that come with these changes. The "Iron Triangle," pointed out by the Army Deputy for System Management and Horizontal Technology, requires innovative and astute business and leadership qualities of the PM, while at the same time a certain degree of political prudence.

Simulation-based Acquisition Modeling

One method of meeting these challenges is using simulation-based acquisition modeling for development and production/deployment. Using this method can reduce the number of tests and save as much as one-fourth to two-thirds of the cost of conventionally testing a system. Additional savings can also be obtained with fielding and deploying the system by using the simulation-based research and development special tooling and special test equipment for acceptance test procedures.

An example of this application is the U.S. Army Program Executive Office-Tactical Missiles, ABPO P3I BAT program. This program is nearing a significant milestone in a simulation-based acquisition product development project for the Army Tactical Missile System TACMS-P3I BAT Brilliant Anti-Armor submunition. The ABPO, the manager of the P3I BAT program, is developing a unique Hardware-in-the-Loop (HWIL) simulation as a primary means of qualifying P3I BAT for developmental testing and production.

In 1995, the Missile Research, Development, and Engineering Center of the Army Aviation and Missile Command (AMCOM) began development of the P3I BAT HWIL simulation facility. In December 2000, the HWIL simulation laboratory becomes operational and begins full-scale support of the P3I BAT program. According to the P3I BAT Product Manager, the P3I BAT HWIL facility costs approximately $10 million to build, and is the only facility capable of "flying" a single aperture, dual-mode sensor submunition in the Army.[2] It tests the P3I BAT over the full spectrum of weather conditions, ensuring that long-range fire support is available to support the full spectrum of operations. Use of the HWIL furthers the acquisition initiatives of using state-of-the-art simulation to reduce the cost of testing and improve system reliability throughout the life cycle of the system.

"The Army can no longer waste budgets on items to be replaced; it cannot afford the lead times and budgets required to develop new systems. Modernization of existing Army systems, therefore, is critical to meet Army needs."

The P3I BAT

The P3I BAT is a state-of-the art submunition that uses highly advanced technology to improve the basic BAT capability and expand the target set to include cold, stationary armor; surface-to-surface missiles (SSM), including transporter erector launchers (TEL); and multiple rocket launchers (MRL).

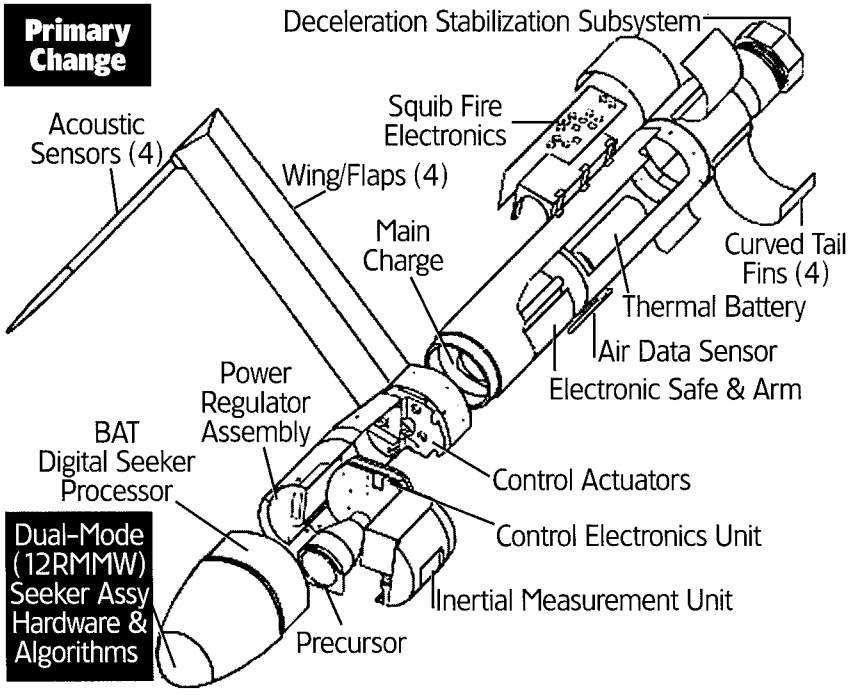


FIGURE 1. **View of the P3I BAT**

Like its basic BAT predecessor, the P3I BAT is a deep-strike weapon autonomous submunition once launched from the Multiple Launch Rocket System M270A1 launcher, and dispensed from the Army TACMS Block II missile in the proximity of known concentrations of enemy vehicles.

To determine the location of the hostile formations, the P3I BAT submunition, a tri-sensor system, uses acoustic, imaging infrared (I2R), and millimeter-wave (MMW) sensors. The new single aperture dual-mode seeker [I2R and MMW] autonomously searches for, detects, acquires, recognizes, tracks, and guides the submunition to impact independent of an acoustic signal. The P3I BAT submunition suite of sensors also provides the robustness to defeat a variety of countermeasures during engagement.

The MMW radar has excellent target acquisition capability at relatively long range, and can search a large area due to an inherently large field-of-view, and is not disabled by most weather conditions. The I2R sensor has excellent terminal accuracy and provides imagery that is useful for target classification. When used together in the P3I BAT submunition, target acquisition is significantly increased.

The P3I BAT, can attack both hard and soft targets [an improvement over the base BAT, which only attacks hard targets] making it an excellent weapon to defeat such targets as SSM MRLs and TELs at long ranges. Figure 1 shows an exploded view of the P3I BAT, reflecting the 80 percent commonality with the base BAT, including the airframe and most of the internal components. The unique portion of P3I BAT is the dual mode seeker.

Testing a Tactical Submunition

The engineer responsible for the P3I BAT HWIL from the AMCOM Research, Development and Engineering Center and SimTech, his support contractor, emphasized that the technical sophistication of the sensors and the autopilot software mandated an approach to testing.[3] The HWIL simulation provides the means of exercising the actual P3I BAT hardware and tactical software in a full, simulated flight. The acoustic, MMW, I2R sensors, and the inertial measurement unit are provided with input signals to make the system behave as though it is flying a real engagement.

High-speed, real-time computers are used to control the target, environment, and countermeasure signatures and battlefield scenarios. A six degree-of-freedom (6 DOF) flight dynamics simulation determines the flight trajectory. The HWIL test items, therefore, provide a true representation of the tactical system consisting of tactical hardware and the operational software used in an actual combat operation.

The functional diagram of the facility (Figure 2) identifies the major components of the facility, which are the anechoic chamber; flight table; antenna array and MMW signal generation hardware; I2R projector with optics; Computer Image Generator (CIG); dichroic beam combiner; and acoustic signal and aerodynamic data signal generators. The anechoic chamber provides a reflection-free environment, with the antenna array and MMW signal-generation chain simulating the radar return. The radar-transmitted pulse is modulated with the target and clutter signature, and transmitted from the antenna array across the anechoic chamber at the correct angle-of-arrival, where it is received by the radar and processed.

Simultaneously, the IR scene is computed by the CIG and projected into the seeker via the relay optics. The dichroic beam combiner is a dielectric that functions as a mirror for the IR while allowing the MMW signal to pass. The flight table moves the submunition seeker in pitch, yaw, and roll to simulate flight motion. A 6 DOF submunition airframe and aerodynamics simulation resident on the facility simulation computers continuously updates the relative geometry. A data collection system captures the real-time simulation data from both the submunition and facility for display during simulation execution, post processing, and archiving.

Simulation-based Testing and Production

According to the P3I BAT PM, the HWIL is a pertinent tool for the PM's use in removing much of the risk driven by design maturity. The HWIL uses test hardware over and over again, mitigating the need for producing more prove-out hardware to achieve the required level of verification and validation data. He cautioned, however, that the HWIL is not a replacement for full operational or end game, impact testing.

The HWIL supports the P3I BAT Continued Development (CD) program by validation of the submunition digital models, support of the production cut-

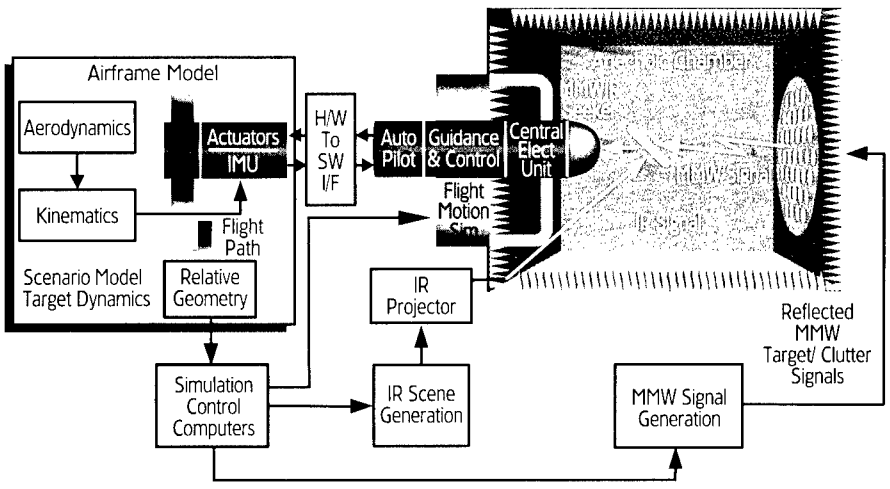


FIGURE 2. **HWIL P3I BAT Diagram**

in and full-rate production decisions, product improvements, and software maintainability. According to the P3I BAT simulation and systems engineer of the ABPO and AC, Inc. (the P3I BAT support contractor), during the CD program the HWIL supports seeker tactical software development and submunition performance assessment.[4] This includes the following:

- Hit point analysis.
- Pre-flight predictions.
- Post-flight reconstruction.
- Countermeasure analysis development and assessment of sensor fusion algorithms.
- Limited user readiness test and evaluation simulation support.
- Assessment and analysis of the effectiveness of the P3I BAT submunition against Operational Requirements Document-derived mission requirements.

The HWIL also reduces the costs associated with tactical testing of a major system prior to seeking a Defense Acquisition Board milestone decision. As an upgrade to an existing system, the HWIL is particularly appropriate with an 80 percent commonality with base BAT. Verifying and validating the peculiar components, software, and algorithms in the HWIL is very cost effective when compared to captive flight tests, drop tests, and other developmental testing normally required for a major acquisition system. The common components of the system are already qualified with no need to retest. Use of an HWIL streamlines the validation process of the unique seeker and saves range costs, target expense, and eliminates range variables.

Finally, the HWIL will be a valuable acquisition and sustaining base tool used during the production phase, eliminating the need to build a separate P3I BAT Simulation Test Acceptance Facility (STAF). On May 16, the Acting Assistant to the Project Manager for System Integration of the ABPO explained that checking out the complete tactical round using the HWIL special tooling and special test equipment will make the P3I BAT STAF facility a unique and essential acceptance test procedure (ATP). This ATP will sustain the life of the system.

"The HWIL supports the P3I BAT Continued Development (CD) program by validation of the submunition digital models, support of the production cut-in and full-rate production decisions, product improvements, and software maintainability."

Final Thoughts

The P3I BAT HWIL simulation facility is a life cycle tool that provides many benefits to the PM who experiences added program requirements with limited funding. Since P3I BAT is a near all-weather system, simulation is the only cost-effective method to assess the diverse battlespace scenarios in multivariable environments. Including the systems contractor, the test community, and the user as integrated product/process team (IPT) players when planning the use of the HWIL facility, is essential in getting their acceptance of the simulation-based acquisition concept.

A summary of important benefits to be gained from an HWIL simulation-based acquisition follows:

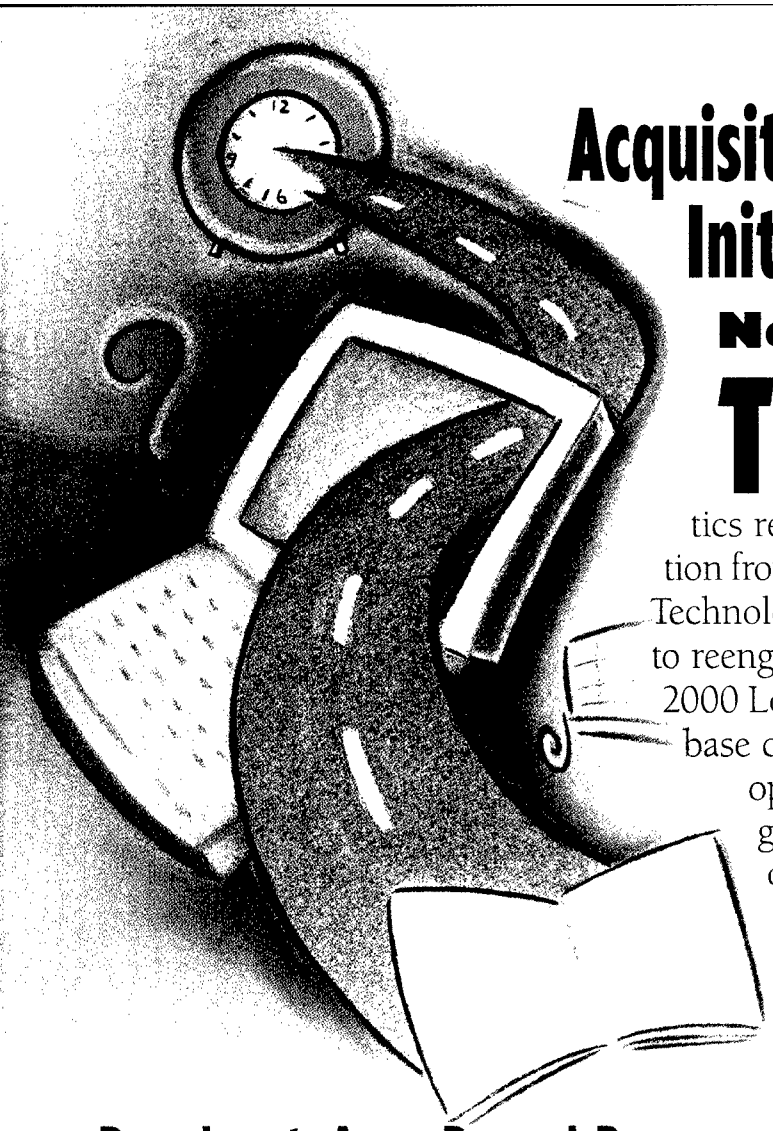
- A cost-effective means of verifying system performance.
- Comprehensive flight-test hardware and software readiness evaluation.
- Thorough post-test data analysis and test failure analysis.
- Full system integration, including functional verification of tactical hardware and software.
- Reduction in the number of flight tests required for system development.
- Closed loop tactical software development, checkout, and upgrades .
- Precise system performance assessment over flight envelopes and countermeasure scenarios.
- Thorough evaluation of system design and performance prior to production commitment.

These benefits meet the Army 2020 Vision of "more with less." An effective IPT effort, where the systems contractor, the test community, and the user work jointly to capitalize on this cost, schedule, and performance simulation-based capability, will provide the sustaining base life cycle of the system. It will also provide the Army, the Department of Defense, and members of Congress the rationale and importance of simulation-based modeling as a cost saving/cost avoidance method of keeping a system not only viable, but also a strong objective force for the soldier.

Editor's Note: The author welcomes questions or comments on this article. Contact her at **Debby.Pinkston@msl.redstone.army.mil**

Endnotes

1. Conversations between Chief of the Army Tactical Missile System – BAT Project Office, Test Division, and P3I BAT test engineer, May 2000.
2. Conversations between the author and P3I BAT PM, June 29, 2000.
3. E-mail message sent to the author from the P3I BAT HWIL engineer, AMCOM RDEC, and his support contractor, SimTech, Oct. 27, 1999.
4. Personal interview between the author and P3I BAT Simulation and Systems Engineer, ABPO, May 2000.



Acquisition/Logistics Reform Initiative Research Papers

Now Available Online

The Defense Systems Management College (DSMC) Logistics Management Department (LM) has developed an Acquisition/Logistics reform initiative database to support direction from Under Secretary of Defense (Acquisition, Technology and Logistics), Dr. Jacques S. Gansler to reengineer Product Support and implement the 2000 Logistics Strategic Plan. This electronic database consists of over 267 research papers developed by students attending the Advanced Program Management Course (APMC) as part of their curriculum. These concise research papers address over 52 different Acquisition/Logistics reform initiatives. This research information is now available to the Acquisition Workforce on the DSMC/LM Department's Home Page.

Procedures to Access Research Papers

1. Access DSMC's Home Page through your Web "Browser" by typing: ***www.dsmc.dsm.mil***, or: ***www.dau.mil***, and select DSMC Campus on the DAU Home Page.
2. Select "Information Dissemination."
3. Under "Logistics Resources," select "Student Research Papers" from the list of resources.
4. Enter the Acquisition/Logistics topic of interest and download student research paper(s) by clicking on the title of each paper you wish to view.

The student research papers follow a general format, which includes:

- Topic definition.
- Discussion on the importance of the topic to DoD and reasons for implementation.
- Impacts on the Logistics elements and any other significant factors.
- Programs where managers are implementing or attempting to implement the topic.
- Lessons learned. What benefits/obstacles were derived/encountered from implementation of the topic.
- Conclusions. Student topic implementation analysis/recommendations.
- List of resources/references. points of contact, policy documents, Web sites, programs engaged in the topic initiative, etc.

Additional Topic Areas of Interest

Although 300 Product Support initiatives are identified in the "Product Support for the 21st Century" report, additional Service or program-unique topics may be researched and published. If you would like a topic of particular interest added to the student list of potential topics to choose from, contact Dr. Tony Scafati at the following E-mail address: ***scafati_tony@dsmc.dau.mil***. Comments on this project are appreciated and should be directed to Scafati.

First Joint Strike Fighter Lands at Edwards

RAY JOHNSON

EDWARDS AIR FORCE BASE, Calif. (AFPN) – One version of the Joint Strike Fighter program made its first flight early Sept. 18.

Boeing's X-32A demonstrator landed here after making a 20-minute, 30-mile hop from the company's aircraft facility in nearby Palmdale.

The quick flight, which reached 10,000 feet, went smoothly, said Boeing JSF chief test pilot Fred Knox.

"The airplane is a pleasure to fly," Knox said after delivering the plane. "It is already showing the precise handling qualities we expected based on hundreds of hours of simulator work."

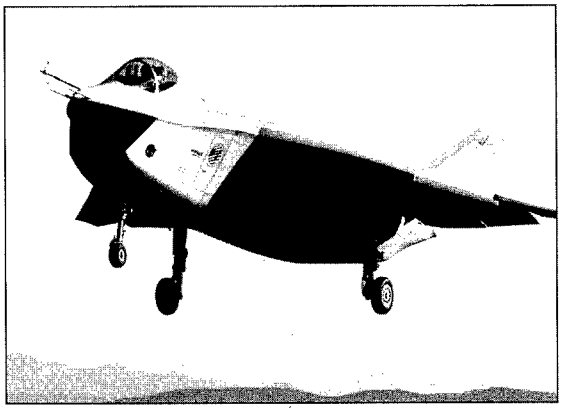
During the flight, Knox put the X-32A through several initial airworthiness tests, including flying qualities and sub-systems checkout.

Another demonstrator for the JSF program, Lockheed's X-35A, is expected to arrive here within a few weeks. However, when both aircraft are here, they will not compete in a fly-off. Rather, the Department of Defense is requiring that JSF X aircraft successfully meet three objectives: commonality and modularity among JSF variants; low-speed handling quality features for carrier flight; and short takeoff and vertical landing.

Both the X-32A and X-35A will be flown here for five months, with each making approximately 50 test flights totaling nearly 200 hours to validate the fighters' flying qualities and performance for conventional and aircraft carrier operations.

Following that initial phase of testing, an X-32B and X-35B, which are the short takeoff/vertical landing versions, will be tested at the Naval Air Station Patuxent River test site in Maryland.

The JSF concept aims to have a single tactical fighter to be used by the Air Force, Navy, Marines, and Britain's Royal Air Force and Royal Navy, and is meant to replace the aging F-16 Fighting Falcon, the A-10 Thunderbolt II, the AV-8B Harrier, and F/A-18 Hornet. Some 3,000 of the fighters will be built for U.S. and British forces. Another 3,000 will be built for various other allies.



Joint Strike Fighter test pilot for Boeing's X-32A, Fred Knox, lands the demonstrator aircraft at Edwards AFB, Calif., Sept. 18. During the flight, Knox put the plane through several initial airworthiness tests, including flying qualities and sub-systems checkout. The X-32A, along with Lockheed Martin's X-35A, will be tested here for five months before "B" models are tested at the Naval Air Station Patuxent River test site in Maryland.
Photo by Ron Bookout

The cornerstone of the JSF program is affordability by reducing development cost, production cost, and the cost of ownership.

Editor's Note: Johnson is with the Air Force Flight Test Center Public Affairs Office, Edwards AFB, Calif. This information is in the public domain at **www.af.mil/news**.

Bridging the Distance

Using the Balanced Scorecard to Move from Leadership Strategy to Employee Action and Organizational Results

DR. MARY-JO HALL

"The tremendous benefits of implementing the Balanced Scorecard far exceed the amount of effort required to create it for your organization. It provides a robust change framework that will help DoD to achieve the Revolution in Business Affairs."

–Michael Hall
APMC 00-2 Graduate

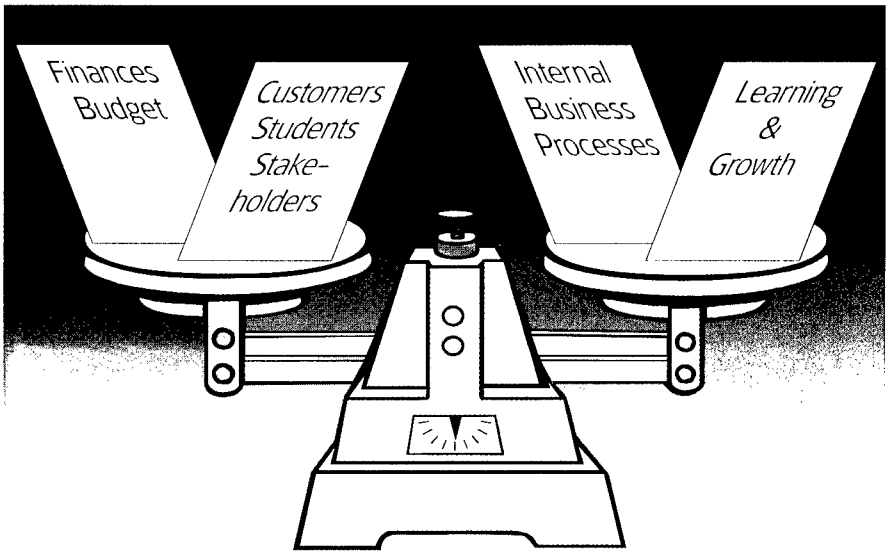


FIGURE 1. **The Balanced Scorecard**

Program Managers are schooled and savvy in a variety of management planning and control tools for projects, i.e. acquisition strategy, risk management, and earned value management. These tools offer a disciplined, structured way of tracking projects or programs from one milestone to another throughout the acquisition process.

Like all tools they have underlying theoretical constructs and implementation techniques. For example, in risk management, the first step is to assess all possible areas of risk within the parameters of cost, schedule, and performance. Once these are identified, they are assessed by two components. The first is the probability of occurrence and the second is the severity of the impact if it does occur.

From this analysis, probabilities are rated as, generally, low-, medium-, or high-risk areas. This can be viewed as a form of the cause-and-effect relationship analysis. For both high and medium risks, handling options are identified, generally under the categories of controlling, assigning, avoiding, or transferring.

The next step is monitoring the risk using a variety of metrics. This monitoring of the risk is done using a variety of software programs that allow for easy reporting. While most program offices use the risk management tool to track projects, they do not have a robust tracking system to manage strategic change such as the change needed to meet new customer demands or to improve programs in order to lower costs.

Many organizations around the world have found success with a relatively new mechanism or tool called the Balanced Scorecard (BSC). The value of this tool is that it acts as a bridge in helping an organization get from grand and lofty strategies developed by the leadership to the daily actions of employees.

The Balanced Scorecard — What Is It?

The Balanced Scorecard (Kaplan and Norton, 1996) is an organizational change framework designed to improve the ability of an organization to focus and improve results. This is accomplished by developing high-priority actions and resources (especially budget) to align with the strategies. The BSC is a mechanism to **drive change** by measuring future-oriented strategies that are tied to aggressive improvement targets. It builds on the strategic planning

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process and uses performance measures to track organizational performance. In this way, it bridges the distance between the strategies designed by leadership and the actions taken on a daily basis by employees to produce results for the organization.

The balanced scorecard also promotes increased communications within the organization. The communication process is enhanced because of a unique lexicon and the development of operational definitions.

Corporate performance historically has been measured by financial measures. The balanced scorecard started as a measurement concept, developed in the 1990s, to meet the need to measure organizational performance in both financial and non-financial ways.

The pioneering work on the balanced scorecard was completed under studies sponsored by a dozen or so U.S. companies concerned with success in a global and fast-changing internationally competitive environment (Kaplan and Norton, 1996). The genesis for research was the difficulty organizations have implementing strategic plans and the proclivity to focus on near-term financial results, rather than on the drivers of future growth and performance.

Most organizations have a standard process for developing a strategic plan and do this successfully, albeit not without angst and pain. Generally, however, these organizations do not have a mechanism to execute the plan or to bridge the distance between strategy and operational processes employees do everyday. The organization completes the plan through a grueling off-site process attended by the leadership and a follow-on "catch-ball" approach to create extensive feedback loops for the draft plan. Once the plan is finally developed and communicated, the leadership gets overwhelmed with daily "firefighting," and the plan goes on a shelf. A change in leadership causes another iteration of the planning cycle. This continues on and on ad nauseum without enhancing operational performance.

The extensive research on translating strategy into performance results performed by Robert Kaplan and David Norton at the Harvard Business School was published in a variety of articles and finally with the landmark book, *The Balanced Scorecard,* in 1996. The Kaplan and Norton approach started with a focus on performance measurement and evolved into a complete management system for translating strategy into action. With further experience, learning, and refinement, it is now a comprehensive organizational change framework

The BSC process is like a bridge linking the strategies developed by leadership to the work performed each day. The key is that the organization must do something to get from the ambiguity of strategy to the tasks and activities of daily work.

with over 500 organizations throughout the world benefiting from its use (**www.bscol.com**).

The basic Kaplan and Norton model for the Balanced Scorecard views the organization from four basic perspectives: *financial, customer, internal processes, and employee learning and growth.* Using these perspectives, the model asks the following questions (Kaplan and Norton, 1996):

Q
To succeed with our vision, how should we look to our customers?

Q
To succeed financially, how should we look to our shareholders?

Q
To satisfy our shareholders and customers, at what internal business processes must we excel?

Q
To succeed with our vision, how shall we sustain our capacity to learn and grow?

Implementation of balanced scorecard in the public sector usually places the customer perspective first, rather than the financial perspective as found in the private sector. This change to the model emphasizes the service nature of government programs.

Similar to a scorecard used in sports, the **SCORECARD** in balanced scorecard refers to a means of recording and communicating organizational performance and success. The **BALANCED** in the balanced scorecard has several meanings. These include balance among the types of measures, i.e., financial and non-financial; balance among leading and lagging performance indicators; balance among outcome (achieving results) and output (activities) measures; balance among horizontal measures (using resources and delivering what is required); and vertical accountability (producing and cultivating resources).

The balanced scorecard is built on this balance in reporting scores, but it goes a step further and focuses the organization through linking strategic objectives and themes that drive the organizational success. Additionally, the BSC approach focuses and consolidates activities by aligning organizational strategies and using a prioritization process to focus on the high-impact areas.

How Do We Build and Implement a Balanced Scorecard?

While this article talks about the BSC as a process, the BSC is, in fact, a scorecard (Figure 1).

There are several ways to build the BSC, and the answer to "Which one do I use?"

is the classic Program Management answer, "It depends." It depends on where the organization is in terms of strategic planning and implementation of the plan. As a bridge between the strategy and the employee actions, the BSC is neither the strategy, the strategic planning process, nor the business plan. It is a mechanism that forces cause-and-effect analysis and builds links between the strategy and the daily work. However, if there is no strategic plan and an organization is starting from scratch, it can force strategic planning (vision, values, mission, goals, and strategic processes).

BSC Stages

While there are several approaches to BSC, all are divided into phases or stages. Regardless of the approach selected, these stages are needed to build the BSC. Each stage has entry requirements and exit criteria. If the entry requirements have not been met, it is imperative to go back a step and enter there.

Building on the bridge analogy, you can not get from strategy to actions and results **WITHOUT** crossing the bridge or without doing the work involved in each of the stages. Nothing can save you from the learning, thinking, and actions required by the BSC framework. Without consciously going through all of the steps, the organization is not implementing the BSC.

The model used for this article is a hybrid six-stage approach used recently at the Defense Acquisition University (DAU). It is derived from the standard Kaplan and Norton (1996) approach. At DAU, the BSC was initiated after an intensive and thorough strategic planning visioning process.

The stages of this approach include:

1. Mobilizing the leadership.
2. Developing the architecture.
3. Linking and aligning the parts.
4. Mapping the initiatives.
5. Rolling-out and cascading throughout the organization.
6. Continuing to focus and improve the strategy.

Stage 1

Mobilizing the leadership (Stage 1) from the top implies that the most senior leader is committed to the structure and discipline required by the BSC. This means the top leadership is willing to cross the bridge and engage in the learning necessary to understand BSC at an implementation level. Reading, briefings, browsing the Web, seminars, and conferences are available to help with the learning. Leaders also need to understand their role in the change process. Active leadership and a *burning platform* (to highlight the sense of urgency) are needed to help the entire organization get over the bridge.

Stage 2

Making strategy everyone's job starts with the leadership developing the **strategic architecture** (Stage 2). Decisions must be made on what **perspectives** are appropriate for the organization. The standard four are financial, customers, internal processes, and learning and growth. Some organizations add "stakeholder." Many government organizations find that they use a budget perspective rather than a financial one. Many organizations are not clear about their customer segments and their stakeholders.

Part of building the architecture is to build reference points of reference for the perspectives. To "see" the organization as the customer sees it, leadership needs to articulate a **Value Proposition** (Kaplan and Norton, 1996). The Value Proposition is described as this equation:

Value = Product and Service Attributes + Image + Relationships.

The performance drivers for customer satisfaction include time (rapid response), quality (defect-free products and services), and price (not just at purchase, but over the lifetime) (Kaplan and Norton, 1996).

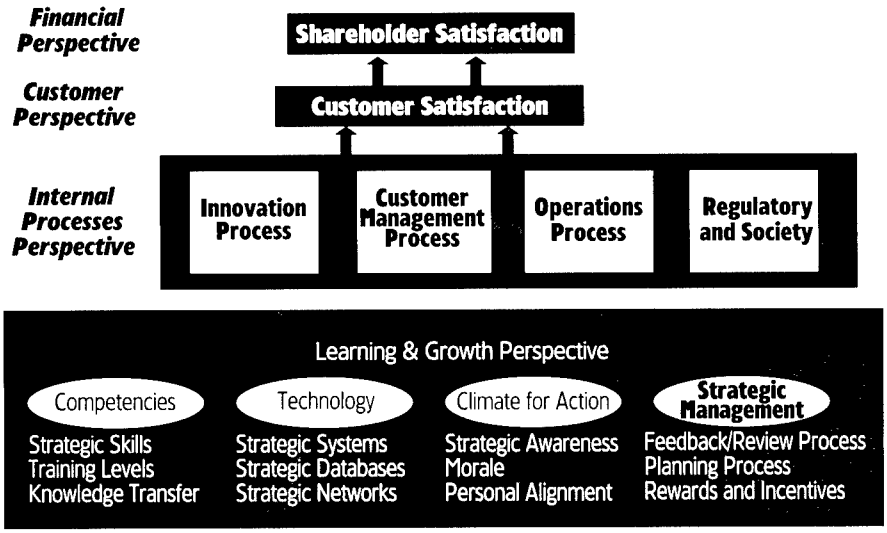
To understand how internal processes create value for customers, the leadership develops the organizational **Value Chain**. The value chain maps how work gets done in terms of processes. This includes developing new work, completing the work, and delivering the work.

To determine a reference point for enhancing the people, tools, and culture, those things that enable employees to learn and grow need to be identified, i.e., **Enablers**. These include core competencies, technologies, and organizational culture.

Finally, the reference point for the financial or budget perspective is the **Span**

FIGURE 2. **Strategic Map**

*The ability to execute strategy is ultimately based on the ability of the organization to **Learn, Adapt,** and **Grow**. This ability is found in the "infrastructure" of the organization.*



of Control. For government, this is the budget and its allocation parameters such as funding, costs, and savings.

The next step in this stage is determining **objectives** for each of the perspectives. The objectives are the basic building blocks for the strategy and enable the "sifting" to start. This is similar to panning for gold and helps develop an organizational focus. Objectives are brainstormed for each perspective. Synthesis and discussion assist in clarifying and narrowing the objectives. Through an interview and rank voting process with a cross section of leaders, the objectives are sifted to no more than three for each perspective.

Stage 3

Once each perspective has only three objectives, the **linking and aligning** (Stage 3) commences. This process continues narrowing the focus and the priorities. The perspectives are lined up horizontally, starting with the financial on the top and proceeding down through customer, internal process, and ending with Learning and Growth on the bottom.

Starting at the bottom with the Learning and Growth perspective, an interrelationship digraph is completed for all of the objectives. This determines if there is a critical path from the Learning and Growth objectives through the perspectives to the financial. (Note: For most nonprofit, the customer and the financial order are reversed.)

Analysis of the interrelationship digraph reveals the **HIGH IMPACT OBJECTIVES** (HIO). Focusing on the HIOs will enable the organization to leverage what is done to achieve the most "bang for the buck" in the shortest amount of time.

The next step in this stage is to assign both **leading and lagging** measures for each of the objectives. This includes defining the unit of measure, how it is collected, and when it is collected. Targets need to be assigned for at least the first and second years and maybe the third, depending on the strategic plan. Most organizations discover that some measures apply to two or more objectives. These strategic measures become key performance drivers and describe the intent of the strategy.

Stage 4

Once the objectives and the measures are clear, the next stage is developing and **mapping initiatives** (Stage 4). The work involved in the previous three stages is necessary to enter into the fourth stage. Initiatives are the action projects that are used to evaluate strategic direction and to test the strategic hypotheses. Each initiative needs an owner and resource commitments (time and money.) Initiatives may be further decomposed into tasks or actions. Once the initiatives are developed, the strategic map is basically complete (Figure 2).

Nothing can save you from the learning, thinking, and actions required by the Balanced Scorecard (BSC) framework. Without consciously going through all of the steps, the organization is not implementing the BSC.

Stage 5

The **rollout plan** (Stage 5) includes communication, implementation techniques, and feedback mechanisms. Some organizations cascade the BSC through individual business units; others do it by themes. Again, there are options, and each organization needs to consider the unique goals. Another aspect of the rollout is the linking of budget and resources to the initiatives. Still another linkage is to individual development plans (IDP) and personal learning.

Stage 6

The final stage for building the BSC is a **continual focus on strategy implementation and improvement** (Stage 6). This includes the feedback loops for reporting the status and for assessing the BSC process itself. It also includes continued testing of the hypothesis inherent in the objectives through a variety of feedback loops. If the organization meets the objective, will it have the outcome desired?

The Benefits of the Balanced Scorecard

What are the benefits of using the Balanced Scorecard as a management performance system or a change framework? Besides the simple statement that "It works!" the benefits of the Balanced Scorecard include an easier way to decompose the vision into strategies, objectives, measures, targets, and initiatives by examining each of the four perspectives.

The BSC is a comprehensive view of the entire organizational system with the financial measures looking at **yesterday**, the customer and internal measures looking at **today**, and the learning and growth measures looking at **tomorrow**. Moreover, the BSC provides a basis for extensive discussion about the future of the organization using a common language. There is an emphasis on creating and testing the hypotheses about the cause-and-effect relationships among and between objectives and consequent actions – and, as a result, the validity of the organizational strategies.

Lessons Learned from Implementation in DoD

Several DoD acquisition organizations have implemented tailored versions of the BSC. During the APMC 00-2 Elective program, APMC graduates and Navy employees Mike Hall and Harry Shelley presented an overview of the BSC and the lessons learned from their experiences. The highlights of their efforts include:

- Very early in the Balanced Scorecard process a clearly thought-out mission, vision, and top-level strategy emerges

that can be easily communicated and understood by everyone at all levels of the organization.

- The workforce begins to change their thinking from being "stovepiped" or focused at a department perspective, to thinking at a "program level." The program level thinking is balanced across the four BSC perspectives of customer, financial, internal process, and learning and growth.

- Once created by leadership, the top-level BSC Strategy map energizes people and serves as a strong communication vehicle that leadership can use to help everyone understand the key program objectives and how they interrelate. This sharing of leadership knowledge via the strategy map results in empowered action by people at the working level. An example from the Navy program was quickly structuring skill-based training and better understanding and action on implementing Acquisition Reform.

- The "Learning and Growth Perspective" is foundational to achieving the results desired from using the scorecard. A good notional set of scorecard objectives for this area includes Climate for Action, Invest in Ourselves, Knowledge Sharing, and Strategic Management.

- New and better processes will quickly be thought out and placed into action. An example from the Navy program is the creation of a "Customer Satisfaction" process that accomplished the "Customer Theme" objectives.

- Setting measures and targets for strategy map objectives will crystallize the understanding of the definitions and will communicate leadership expectations clearly to managers. Managers will then be able to create a lower-level scorecard for each objective at the task or initiative level that will help each employee understand expected performance, relationships between tasks, and how their efforts contribute to the overall program.

- Creative thinking and learning increase as employees work through the building of their first scorecard.

- Implementation of the Balanced Scorecard stimulates knowledge management efforts and helps employees "Embrace Change."

- Increased understanding by employees leads them to take the initiative to do things that are unexpected and to put extra effort into their daily work.

The Naval Undersea Warfare Center Division (NUWC) Newport has been using the Balanced Scorecard approach since early 1996. One lesson learned from the first iteration was that that it had too many measures, with some being tactical and many lagging rather than leading. The proof of the effectiveness of the BSC in increasing communications within NUWC is indicated by the results of recent employee opinion surveys.

One statement, *"I am sufficiently informed about the Division Newport's Strategic Plan,"* received a 74 percent affirmative rating. Another statement, *"I feel that I have the ability to make a contribution in building Division Newport to be an effective 21st century organization,"* had an 83 percent affirmative rating.

BSC Process — A Bridge

The BSC process is like a bridge linking the strategies developed by leadership to the work performed each day. The key is that the organization must do something to get from the ambiguity of strategy to the tasks and activities of daily work. The BSC has a proven history of getting from one side to the other. Unfortunately, crossing the bridge from strategy to tasks takes time, effort, and energy.

There is a great deal of learning that is required in getting across. However, once this learning takes place, the organization is more knowledgeable about their customers, their target goals, their direction, and their results. Additionally, this framework allows the organization to think differently about the services they provide. It encourages creativity and adaptability.

Editor's Note: The author welcomes questions or comments on this article. Contact her at **hall_maryjo@dau.mil**.

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Related Web Sites

http://wwwbscol.com
http://www.npr.gov
http://www.balancedscorecard.org
http://www.apqc.org
http://www.fpm.com
http://www.bsc4gov.com

BALANCED SCORECARD LEXICON

Customer — The recipients, user, and beneficiaries of a product or service. Customers can be internal and external.

Goal — A specific desired level of performance at a particular point in time. A goal includes the measure, the level of performance, and a time component.

HIOs — High Impact Objectives; the objectives that will result in leveraging the effort; they are based on the results of the interrelationship digraph between all objectives.

Initiative — Action projects that are used to evaluate strategic direction and test strategic hypotheses. Initiatives need time and resource commitments and should be aligned with the organization's strategy.

Measure — A performance metric, preferably quantitative, of an organization's relative success in achieving the desired results, objectives, and operational goals. Measures help communicate the behavior required to achieve objectives. Each measure should include the units of measurement. For each objective, there should be both a leading and a lagging measure. A lag measure provides historical data on what was accomplished. A leading measure predicts future performance and leads one to assume that success will be achieved.

Mission — A concise, inspirational statement of purpose, including fundamental values and beliefs, that reflects the unique nature of an organization. A mission statement is built from an understanding of an organization's products, services, customers, markets, values, and strengths.

Objective — A measurable statement of strategic intent that indicates how strategy will be made operational. Objectives are the basic building blocks for the overall organizational strategy and are critical to success.

Perspective — A view of an organization from a specific vantage point. Typically, financial, customer, learning and growth, and internal business processes are used to describe the organization's span of influence. A perspective is a component into which the strategy is decomposed to drive implementation.

SBU — Strategic Business Unit; an organizational division that focuses on individual business in a functional organization that has more than one business.

Scorecard — A graphic depiction of the Strategic Map in one dimension (it does not show cause-and-effect relationships specifically). Generally, it includes the perspectives, objectives, measures, initiatives, and owners. Some include tasks, themes, and budget.

Span of Control — The area(s) over which one has the ability to determine what will be done and how it will be done.

Strategy — "The relationship between the company's vision and the operational plans to be followed on a day-to-day basis ... the ground rules, events, and decisions required for the company to proceed from the present situation to the one desired in the future." (Olve, et al, p. 59)

Strategic planning — A collection of cause-and-effect relationships that show the linkage among key objectives.

Strategic thinking — Using analysis and a structured process to determine and document the decisions made about the future of the organization; a general road map to a future state.

Strategic thinking — Using synthesis and other critical thinking tools to design the future.

SWOT — Analysis focusing on Strengths, Weaknesses, Opportunities, and Threats

Target — The expected level of performance of a measure at a specific time. Thresholds (upper and lower control limits) should be specified for each measure. Stretch targets drive business to higher levels of performance.

Vision — A broad statement of future intent clearly defining the results that the organization is seeking to achieve.

NOW ONLINE!

PERFORMANCE SUPPORT AND LEARNING MODULES FOR THE AT&L WORKFORCE

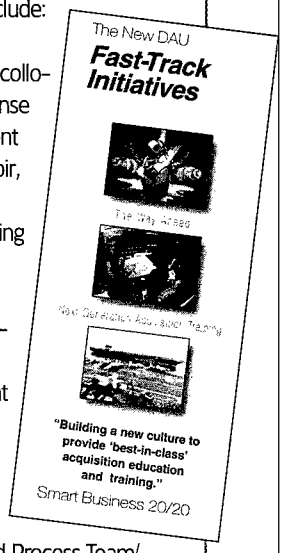
The Defense Acquisition University is developing a comprehensive set of online performance support and learning modules for the AT&L workforce that are accessible through the DAU Acquisition Support Center knowledge portal at: **http://center.dsmc.dsm.mil/job_support_and_CoPs/support_modules/acquisition_management_topics.htm**

The Balanced Scorecard module is an example of where the DAU is going to provide real tools to help the workforce do their jobs. The BSC module can be accessed directly at **http://leadership.dsmc.dsm.mil/** and through the Support Center in the Acquisition Program Management and Leadership area.

DAU Publishes *Fast-Track Initiatives*

The Defense Acquisition University (DAU) is restructuring and building a strategic plan to rethink DoD's business processes, reduce costs, improve efficiency, and prepare the Acquisition, Technology and Logistics Workforce for new ways of doing business.

To communicate their efforts, DAU has published a new *DAU Fast-Track Initiatives* brochure, which details how the University intends to go about developing new ways of doing business. These initiatives, once implemented, should lead to better business practices throughout DoD. Viewed as "The Way Ahead for Acquisition Training," the DAU's Fast-Track Initiatives include:



- Headquarters, DAU collocation with the Defense Systems Management College at Fort Belvoir, Va.
- Revision of PM Training Curriculum
- Critical Thinking and Case-Based Curriculum
- Faculty Development and Currency
- Budget Reassessment and Realignment
- Functional Integrated Process Team/ Overarching Integrated Process Team (FIPT/OIPT) Jump-Start
- Supporting the new "5000" Changes
- Knowledge Management
- Change Management Center
- Strategic Alliances

Through improved acquisition training and reorganization of DAU staff functions, DAU will offer the DoD acquisition community an acquisition education, training, and career development program that meets their educational needs well into the 21st century.

For Fast-Track Initiatives progress, visit our Web site at **www.dau.mil/pubs/misc/dau_fast-track.htm** or **www.dsmc.mil/pubs/misc/dau_fast-track.htm**.

THE WHITE HOUSE

Office of the Press Secretary

Statement by the President

Concerning Contracting Opportunities with Disadvantaged Businesses

I am pleased today to sign an Executive Order strengthening our efforts to increase contracting opportunities between the federal government and disadvantaged businesses -- in particular, Small Disadvantaged Businesses, 8(a) Businesses, and Minority Business Enterprises. These businesses play a vital role in our nation's economy, but historically have been underutilized and at times shut out of federal procurement opportunities.

Accordingly, this Executive Order directs federal departments and agencies with procurement authority to take aggressive and specific affirmative actions to ensure inclusion of disadvantaged businesses in federal contracting.

I want to thank Representatives Kilpatrick, Menendez, Velazquez, and Wynn, and the many others who have worked with us to ensure that the private sector recognizes the importance and utility of contracting with disadvantaged businesses. I particularly commend those members of the advertising community who are working to increase the representation of minorities within advertising – both on the creative end and in transmission to the public. It is critical that the private sector help lead this effort and take advantage of the diverse and creative views that underrepresented groups will bring to the advertising process. I want to commend the American Advertising Federation (AAF) for responding to the Vice President's challenge and working with interested parties to develop the Principles for Effective Advertising in the American Multicultural Marketplace, a strategic plan for boosting minority representation in the advertising industry.

Certainly, the federal government must play a leading role as well. Advertising and the broader information technology industries play an increasingly expansive role in our society. Therefore, in this Executive Order, I am directing each federal department and agency to ensure that all creation, placement, and transmission of federal advertising is fully reflective of the nation's diversity. Further, this Executive Order directs each federal department and agency to take clearly defined and aggressive steps to ensure small and disadvantaged business participation in procurement of information technology and telecommunications contracts.

This Executive Order will ensure that federal departments and agencies are held accountable on these issues. It does so by clearly listing the responsibilities and obligations of each agency to expand opportunities for disadvantaged businesses and requires the agencies to report to me within 90 days of the issuance of this order the steps they plan to take to increase contracting with disadvantaged businesses. Subsequently, the agencies will be required to submit annual reports on their ongoing efforts in this area to the Director of the Office of Management and Budget to ensure at the highest levels the Executive Branch will sustain unflagging and aggressive efforts to achieve this important goal.

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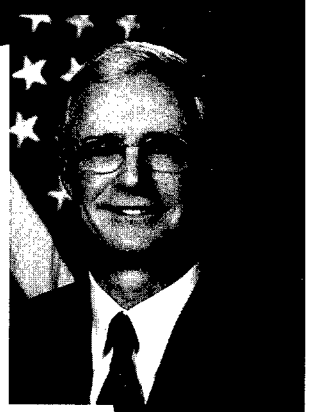
Gansler Calls for Packard Award Nominations — Due by Feb. 1, 2001



THE UNDER SECRETARY OF DEFENSE
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OCT 13 2000

ACQUISITION, TECHNOLOGY AND LOGISTICS

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: "Recognition and Awards for Acquisition Personnel" — David Packard Excellence in Acquisition Award Nominations

This memorandum serves two purposes: (1) to update and reissue the Under Secretary of Defense (Acquisition, Technology & Logistics) (USD[AT&L]) policy on "Recognition and Awards for Acquisition Personnel," originally published June 9, 1996, and revised November 3, 1997, and; (2) to solicit nominations for the annual David Packard Excellence in Acquisition Award.

The USD(AT&L) policy on "Recognition and Awards for Acquisition Personnel" (attached) is updated to incorporate the organizational name change of USD(AT&L) effective January 4, 2000, and to clarify administration and reporting processes. To the extent possible, widest dissemination of this updated policy is encouraged.

Nominations are solicited for the annual David Packard Excellence in Acquisition Award. This Award recognizes organizations, groups, and teams that have demonstrated exemplary innovation and best acquisition practices.

Each Military Department and the Defense Logistics Agency may submit nominations for up to five teams and all other Components, and OUSD(AT&L) principals may nominate two teams. Specific guidelines on the eligibility, nomination and selection criteria are provided at TAB 3 of the attached updated policy. Strict adherence to the nomination guidelines facilitates the review process, and is strongly encouraged.

Nominations for the David Packard Excellence in Acquisition Award must be submitted no later than February 1, 2001, to:

Office of Under Secretary of Defense (Acquisition, Technology & Logistics)
ATTN: Director for Administration, OUSD(AT&L)
3150 Defense Pentagon, Room 3D1020
Washington, DC 20301-3150

Points of contact for award administration are Mrs. Phyllis Goldsmith and Mrs. Vanessa Williams at (703) 697-2525 and for award policy, Ms. Carol Preston at (703) 614-3882.

J.S. Gansler

Attachment:
As stated

Editor's Note: This information is in the public domain. To download the attachment to Gansler's memorandum, go to the Defense Acquisition Reform Web site at **www.acq.osd.mil/ar/#packard.**

DoD Moving Toward Long-Term Goal of IM-Compliant Inventory

Acquisition Treatment of IM Now Defined Into Three Distinct Categories

HAROLD JURGENSEN

The acquisition treatment of insensitive munitions (IM) was the subject of a Jan. 26, 1999, memorandum from the Under Secretary of Defense for Acquisition, Technology and Logistics. It clearly stated the Department's long-term goal of having an "IM-compliant inventory." The overall intent of the memorandum was to focus scarce resources on forward-fit incorporation of IM-compliant technology rather than on back-fit of the existing (already produced) inventory.

As of Jan. 26, 1999, munitions are now defined into three categories with respect to acquisition treatment of Insensitive Munitions (IM).

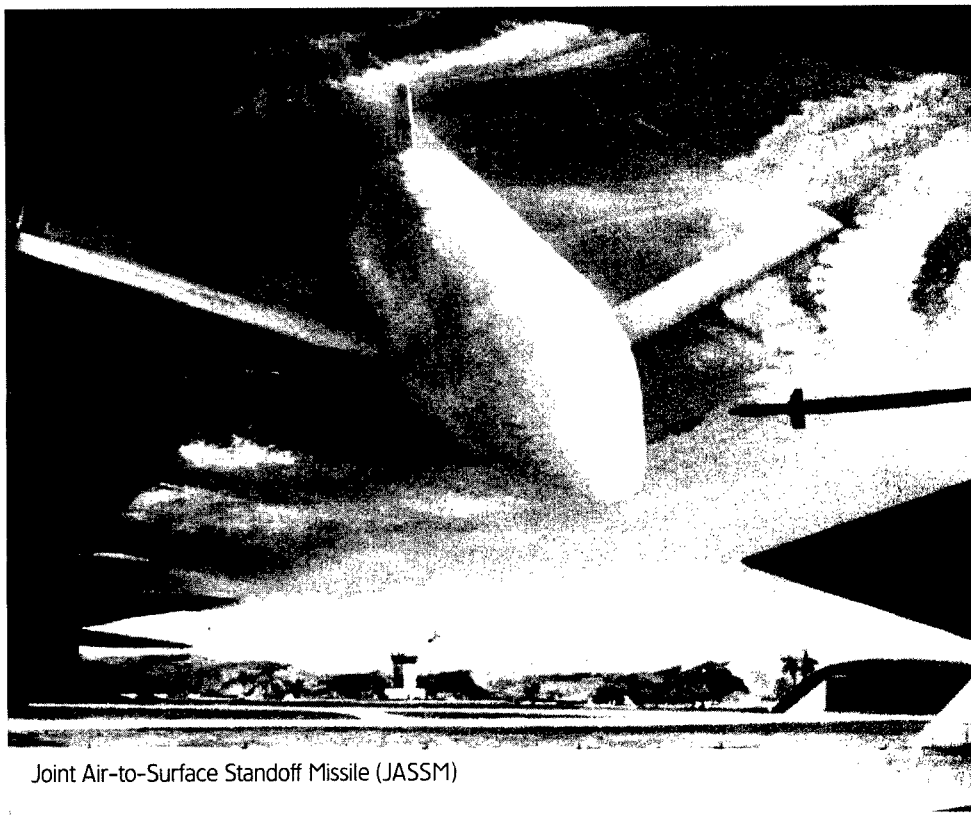
Category 1

All new munitions or munitions being produced on production contracts signed after Jan. 26, 1999, shall be fully IM-compliant or have an approved IM waiver.

Category 2

On all munitions produced on production contracts signed on or before Jan. 26, 1999, the "Services should look for every feasible window of opportunity to insert IM technology into weapons continuing in production," which includes exercising production contract options, modification programs, or engineering change proposals.

Jurgensen *is a munitions specialist in the Directorate for Strategic and Tactical Systems, Munitions, Office of the Under Secretary of Defense (Acquisition, Technology and Logistics), The Pentagon, Washington, D.C.*



Joint Air-to-Surface Standoff Missile (JASSM)

Category 3

All munitions that have been produced (in the inventory, awaiting acceptance) on or before Jan. 26, 1999, are automatically exempt from satisfying IM requirements. Exemption is based solely on criterion of munitions items' state of production (whether they were physically produced); no exemption is provided based on the use of existing National Stock Number or Technical Drawing Package.

DoD IM Integrated Product Team

The DoD IM Integrated Product Team was established June 5, 1997, to address within DoD IM policy, requirements, programs, and issues nationally and internationally. The chairperson is Anthony J. Melita (Deputy Director, Strategic and Tactical Systems, Munitions) at (703) 695-1382 (DSN 225-1382), e-mail address **melitaaj@acq.osd.mil**.

Joint Services IM Technical Panel

The Joint Services IM Technical Panel (JSIMTP) was established May 4, 1999, to assist DoD offices with respect to IM technology matters and the IM waiver process. JSIMTP also provides an annual assessment on the state of IM Compliance of DoD Munitions Inventory to the

Illustration courtesy Lockheed Martin

OSD Office of Munitions and the Joint Staff J-4. The chairperson is Donald M. Porada at (703) 602-8728 (DSN 332-8728), e-mail address **poradadm@navsea.navy.mil**.

DoD Explosives Safety Board

The DoD Explosives Safety Board (DDESB) is responsible for Hazard Classification (HC) matters for DoD. Point of contact for HC is Dr. Jerry M. Ward (Director, Technical Programs Division, DDESB) at (703) 325-2525 (DSN 221-2524), e-mail address **jerry.ward@hqda.army.mil**; the DDESB action officer for HC is Brent Knoblett at (703) 325-1375 (DSN 221-1375), e-mail address **brent.knoblett@hqda.army.mil**.

Military Services

The Services have set up their own regulations, procedures, and processes for handling IM matters, including IM technology development and insertion, and IM compliance review and Service approval. Points of contact follow (name, telephone number, e-mail address):

ARMY
Roman Llabres, (703) 617-4251 (DSN 767), **rllabres@hqamc.army.mil**.

NAVY
Dr. Richard E. Bowen, (703) 602-8728 (DSN 332), **bowenre@navsea.navy.mil**.

MARINE CORPS
Troy K. Wright, (703) 784-9393 (DSN 278), **wrighttk@mcsc.usmc.mil**.

AIR FORCE
Col. (S) Douglas C. Hayner, (703) 588-1201 (DSN 425), **Douglas.Hayner@pentagon.af.mil**.

SPECIAL OPERATIONS COMMAND (SOCOM)
Army Lt. Col. John Womack, (813) 828-9350 (DSN 299), **womackj@socom.mil**.

Editor's Note: The author welcomes questions or comments on this article. Contact him at (703) 695-1468 (DSN 225-1468); by fax at (703) 614-3496; or by e-mail at **jurgenhc@acq.osd.mil**.

INSENSITIVE MUNITIONS (IM) AND HAZARD CLASSIFICATION (HC)

IM and HC are specifically cited in DoD Regulation 5000.2-R. Personnel responsible for munitions (see Joint Publication 1-02 for definition) with respect to policy/executive review and oversight, program management, systems engineering, logistics, test and evaluation, international programs, and contracts need to be knowledgeable of the IM policy, requirements, and program.

IM save materiel and lives. IM definition (from STANAG 4439): "Munitions which reliably fulfill their performance, readiness and operational requirements on demand, but which minimize the probability of inadvertent initiation and severity of subsequent collateral damage to weapon platforms, logistics systems and personnel when subjected to unplanned stimuli." "Unplanned Stimuli" consists of thermal and mechanical impact threats of Fast Cook-Off (FCO), Slow Cook-Off (SCO), Bullet Impact (BI), Fragment Impact (FI), Sympathetic Detonation (SD), Shaped Charge Jet (SCJ), and Spall Impact (SI) as presented in MIL-STD-2105B. A Threat Hazard Assessment (THA) should be used to determine the precise application of these tests and the necessity for SCJ and SI or other additional tests. IM-compliant munitions will result in more safe, survivable munitions that have lower (better) Hazard Division Hazard Classifications and associated life cycle cost benefits. (See DoD Regulation 5000.2-R and Chairman, Joint Chiefs of Staff Instruction [CJCSI] 3170.01A.)

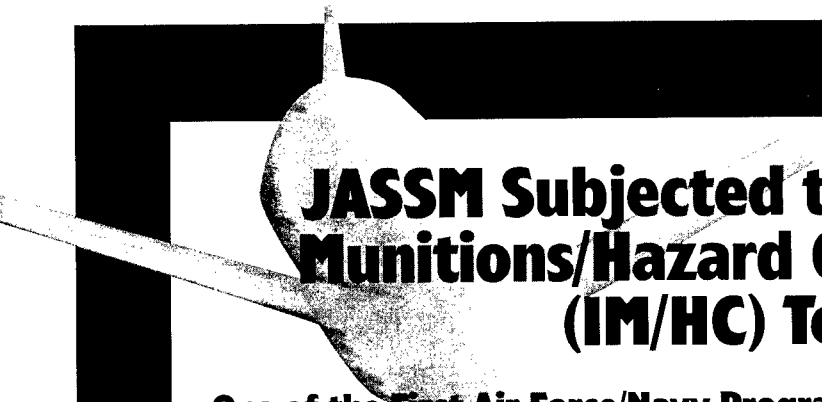
Explosives Safety. All munitions and explosives acquisition programs shall satisfactorily address explosives safety per DoDD 6055.9. Explosives safety management principles that ensure munitions and explosives are safely developed, manufactured, tested, transported, handled, stored, maintained, demilitarized, and disposed of shall apply in order to reduce the probability and the consequences of any munitions or explosives mishap. All munitions and explosives shall be hazard-classified in accordance with DoD 6055.9-STD using the procedures given in TB 700-2/NAVSEAINST 8020.8B/TO 11A-1-47/DLAR 8220.1 prior to release for operational service.

Insensitive Munitions. All munitions and weapons shall be designed to conform with insensitive munitions (unplanned stimuli) criteria and to use materials consistent with safety and interoperability requirements. Requirements shall be determined during the requirements validation process and shall be kept current throughout the acquisition cycle for all acquisition programs. Interoperability, to include insensitive munitions policies, shall be certified per CJCSI 3170.01A. Waivers for munitions/weapons, regardless of ACAT level and acquisition process (milestone) entry point, shall require Joint Requirements Oversight Council (JROC) approval, prior to committing production funds. The ultimate objective is to design and field munitions which have no adverse reaction to unplanned stimuli, analogous to Hazard Division 1.6 (TB 700-2/NAVSEAINST 8020.8B/T.O. 11A-1-47/DLAR 8220.1, "Department of Defense Ammunition and Explosives Hazard Classification Procedures").

CJCSI 3170.01A, "Requirements Generation System," Enclosure B, Page B-4, Paragraph 2.b(3) "Director, J-4, Joint Staff" states the following on IM:

"(b) Insensitive munitions. J-4 will certify that all ORDs for munitions, regardless of ACAT level, contain the requirement to conform with insensitive munitions (unplanned stimuli) criteria. As a minimum, these ORDs will contain the statement, "Munitions used in this system will be designed to resist insensitive munitions threats (unplanned stimuli)."

(c) Insensitive Munitions Waiver Requests. Insensitive munitions and cross-Service interoperability waiver requests require approval by the JROC. Waiver requests will be submitted to J-4 for review and then forwarded to the JROC secretariat for JROC consideration."



JASSM Subjected to Insensitive Munitions/Hazard Classification (IM/HC) Tests

One of the First Air Force/Navy Programs to Aspire to Both Full IM Certification and New Unit Risk 1.2 Hazard Classification

The Joint Air to Surface Standoff Missile (JASSM) system is an air-launched, conventional standoff weapon that can destroy heavily defended high-value, time-sensitive targets. Managed by Program Manager Terry Little, at Eglin AFB, Fla., the JASSM is being developed jointly for the U.S. Air Force and U.S. Navy for both land and carrier-based operations. Both Military Services require the missile to meet Insensitive Munitions (IM) requirements. The prime contractor is Lockheed Martin Integrated Systems (LMIS), Orlando, Fla., and the LMIS team is managed by Michael Inderhees. The program is in the 23rd month of the 62-month Engineering and Manufacturing Development effort. Production configuration missiles are being assembled on the production line at Troy, Ala., and flight-testing has begun.

The JASSM contains the WDU-42/B, a 1000-pound class, penetrating warhead with 240 pounds of AFX-757. AFX-757 is an extremely insensitive explosive developed by the Air Force Research Laboratory/High Explosives Research and Development Facility, Eglin AFB, Fla. The fuze is the FMU-156/B employing a 150-gram PBXN-9 booster. The warhead includes vents in the aft closure and a proprietary Thermally Reactive Retaining ring. The retaining ring releases at approximately 290 degrees Fahrenheit. This, in combination with the vents, provides for the expulsion of the main charge, which precludes excess pressure buildup and any reaction other than burning when exposed to hazardous stimuli.

The system is being subjected to a combination of MIL-STD-2105 Insensitive Munitions and United Nations Hazard Classification (Series 7) test requirements. A combined test approach has been implemented using a single test or test series to meet both the IM and the Hazard Classification (HC) requirements, with the more stringent requirements having precedence. Combined IM and HC testing helps reduce costs. JASSM is one of the first Air Force/Navy programs to aspire to both full IM certification and the new Unit Risk 1.2 Hazard Classification.

Testing progresses well for the program: Fast Cook-off and Slow Cook-off testing has been successfully accomplished at both the warhead and All-Up-Round levels. In two confined warhead Sympathetic Detonation tests, neither acceptor warhead (two in each test) detonated, giving the JASSM team high confidence that the system will pass its upcoming All-Up-Round Sympathetic Detonation tests without incident.

The warhead has been subjected to Bullet Impact and Fragment Impact tests without any reaction so far. The munitions configuration and lack of any reaction to fragment penetration during the warhead fragment impact tests have resulted in the U.S. Navy IM Office waiving that test for the All-Up-Round. Two final bullet impact tests at the warhead level and subsequent testing at the All-Up-Round level will complete the IM and HC test series. The JASSM project office and Lockheed Martin are driven to produce a truly insensitive round with the potential of attaining the first 1.6 and 1.2.3 Hazard Classifications in the U.S. munitions inventory.

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PM

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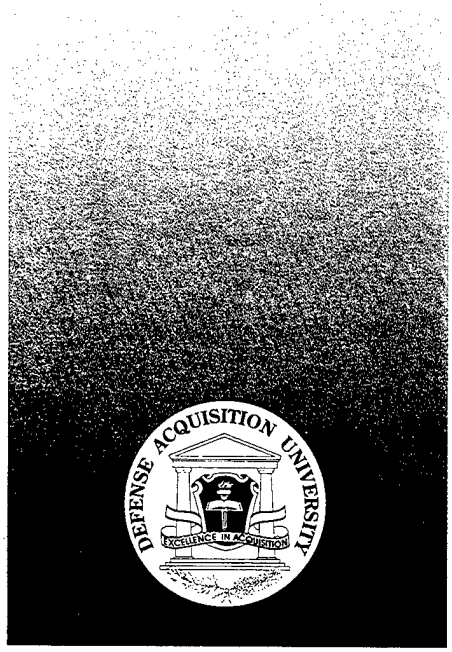

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AMERICAN FORCES PRESS SERVICE

Chiefs Tell Senate DoD Needs Money for Modernization

JIM GARAMONE

WASHINGTON, Sept. 29, 2000 – "We cannot mortgage future readiness," Chairman of the Joint Chiefs of Staff Army Gen. Henry Shelton told the Senate Armed Services Committee Sept. 27.

"We are collectively robbing Peter to pay Paul, or robbing modernization, which is long-term readiness, to pay for current readiness," Shelton said. The chairman testified along with other members of the Joint Chiefs of Staff. They stressed shortfalls in modernization accounts throughout DoD.

The members of the Joint Chiefs of Staff say current readiness is fine, but the military will need more money to fund modernization programs.

Shelton said the "first-to-fight" forces of the U.S. military are undoubtedly ready to fight. But, he said, many other units are not. "For example, the airborne tanker fleet, our strategic airlift fleet, and our intelligence, surveillance and reconnaissance units, all of which provide crucial capabilities to our warfighting forces, are not as ready," he told the senators.

He said these strategic units and other combat support and combat service support units – along with the training base – are "in some cases suffering the consequences of resources that have been redirected to sustain the near-term readiness of our first-to-fight forces."

Army Chief of Staff Gen. Eric Shinseki, Marine Corps Commandant Gen. James Jones, Chief of Naval Operations Adm. Vernon Clark, and Air Force Chief of Staff Gen. Michael Ryan echoed the chairman's remarks.

"The price for achieving that kind of readiness in our early deploying units has been to accept risk elsewhere in the force," Shinseki said. "First, we have diverted soldiers from other organizations to fill our high-priority warfighting formations. Second, we have for years mortgaged our future readiness – this modernization effort – in order to assure that our soldiers had in the near-term what it takes to fight and win decisively. And finally, given the increased operational tempo because of the more diffuse and more demanding strategic environment, we have leveraged our warfighting readiness on the backs of our soldiers and their families."

Shinseki also told lawmakers that preliminary data show the Army needs more people.

Clark said the Navy needs more ships and planes per year to maintain long-term readiness. He said the current rate of between six and seven ships per year is inadequate to sustain the rate called for in the 1997 Quadrennial Defense Review. The Navy needs about 10 ships per year, Clark said.

Ryan told the lawmakers that even with the money added to the DoD budget, "that our near-term readiness in the United States Air Force has not turned around. Combat unit readiness has dropped well over 20 percent, and our mission capability rates on our aircraft are down by 10 percent over the last decade."

He said these decreases in readiness can be attributed to past underfunding of spares, high operations tempo, loss of experienced airmen, and an aging aircraft fleet. He said retaining experienced people is a crucial concern to the Service as well as modernizing the fleet. "Our aircraft are aging out at a rate that has us very concerned," he said. "We must recapitalize this force."

He said the average age of Air Force aircraft is 22 years. "In 15 years it will be nearly 30, even if we execute every modernization program we currently have on the fiscally constrained books," Ryan said. "We've never dealt with a force this old. It has taken an inordinate amount of time, work, and money to keep the force airworthy and ready."

Ryan said the budget means the Air Force is buying about one-third of the aircraft needed to stop the aging of the force, "and we are on a 250-year replacement cycle for our infrastructure, where our people work and live."

Jones said that under the current budget the Marine Corps will reach a "steady state maintenance level," meaning the Marine Corps would never really get to modernize. He also said the way the Services buy new equipment means money is wasted. "With regard to acquiring some new systems, we also have to work hard to make sure that we buy them more efficiently," Jones said. "We tend to buy things and then spread them out over long periods of time; then it drives the unit cost up ... The V-22 is a good example of that. We can actually, by investing more money toward modernization, accelerate the full operational capability of some systems, and thereby save a lot of money as well."

Shelton said part of the problem is that Congress has not approved two new Base Realignment and Closure rounds. DoD estimates are that the Department would save about $3 billion per year from closures of unneeded bases. This is money that would go directly to modernization, Shelton said.

That said, even with BRAC money, DoD would need more money. The chiefs estimated that about $50 billion more per year is needed to fully fund modernization. Shelton said the next Quadrennial Defense Review, set for 2001, would be able to address these numbers better.

All of the chiefs spoke about modernizing the military while at the same time improving servicemembers' quality of life. All stressed that while modernization is important to future readiness, having quality people is crucial. All the chiefs addressed problems of increased operations tempo, and all praised the Senate for their work on pay raises, pay table reform, and retirement changes.

Editor's Note: Garamone is a public affairs specialist with the American Forces Press Service. This information is in the public domain at **www.defenselink.mil/news.**

DoD Financial Management

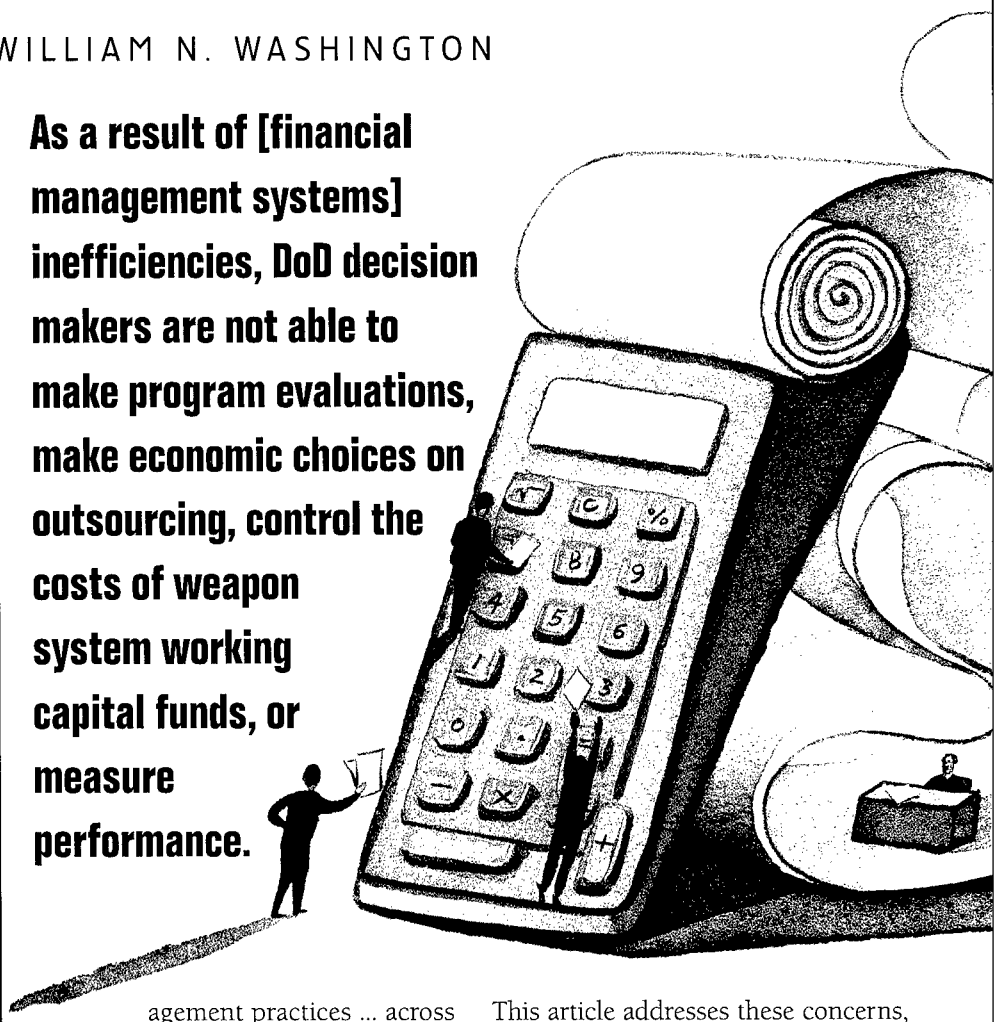
More Reliable Information for Decision Makers

WILLIAM N. WASHINGTON

A Word From the Author

The General Accounting Office (GAO) has recently outlined several problems with current DoD accounting and reporting procedures. I believe that these concerns can be resolved, in the depots, by the use of Activity Based Costing (ABC) and Enterprise Resource Planning (ERP). Furthermore, the implementation of an ERP process in the depots would allow for a significant reengineering of current business practices. This new process would integrate the logistics, manufacturing, financial, and human resource/payroll management functions within an organization, to provide a single, less fragmented reporting/information system. Consequently, through the use of additional software that uses standard bar coding to track and manage fixed assets and the use of Warehouse Management System software, asset management and reporting improvements can be achieved at the depots.

As a result of [financial management systems] inefficiencies, DoD decision makers are not able to make program evaluations, make economic choices on outsourcing, control the costs of weapon system working capital funds, or measure performance.



As we enter the 21st century, one of the problems from the past still remains with us in the financial community – are we realistically costing our products and accurately tracking our assets? This was highlighted recently by GAO in their January 1999 report, "Major Management Challenges and Program Risks," in which they discussed DoD's "inability to fully institute sound financial management practices ... across the full spectrum of recordkeeping and control systems." According to GAO's report, DoD has not properly accounted for and reported billions of dollars of property, equipment, inventory, and supplies. These problems, they pointed out, impair DoD's ability to:

- Know the location and condition of all its assets.
- Safeguard those assets from physical deterioration and loss.
- Prevent the unneeded purchase of assets already on hand.
- Determine the full costs of the programs that use those assets.

This article addresses these concerns, within the depot's financial environment.

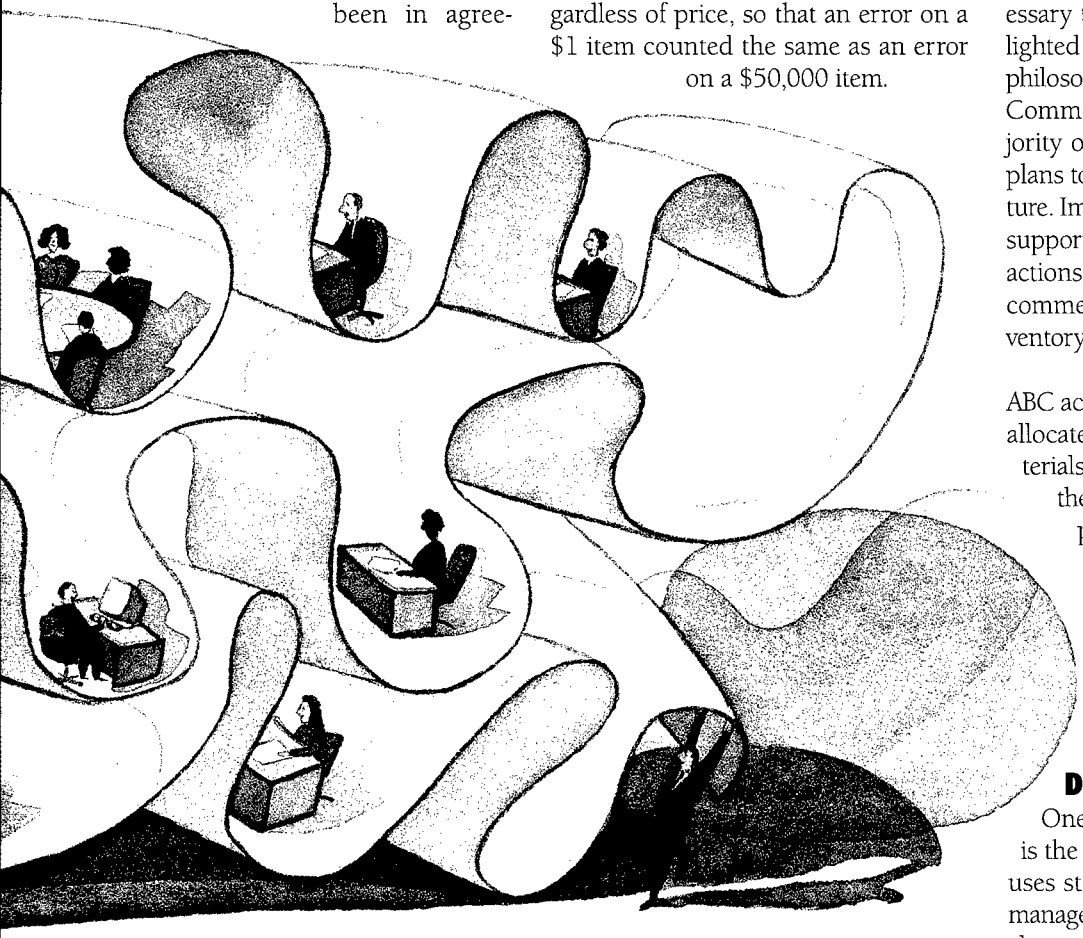
Financial Management

Some of the problems outlined by GAO relate to the reliability of DoD's cost information. They have stated that "DoD's financial management systems are not designed to capture the full cost of its activities and programs." As a result of these inefficiencies, DoD decision makers are not able to make program evaluations, make economic choices on outsourcing, control the costs of weapon system working capital funds, or measure performance. These problems have a direct relationship to the reporting of

Washington *is an operations research analyst with the Office of the Deputy Chief of Staff for Resource Management, Fort Monmouth, N.J.*

billions of dollars of inventory and infrastructure (plant and equipment) as well as the accurate reporting of net costs of operations.

For instance, the on-hand quantities of spare parts have generally not been in agreement with official records. (In 1998 only two depots had inventory accuracy rates of 90 percent.) "Night vision goggles" were one example of this. With a unit price of $1,300, 1,018 pair were found to be missing from the inventory at one depot. This shortage alone represented $1.3 million worth of potential loss and/or accounting misadjustments to the working capital fund.



Another example was pointed out by the Inspector General of the Department of Defense (Audit Report, 1997), where they looked at only chemical suits in the depot at Columbus, Ohio. The examination found that 696,380 suits were not included in the depot records, and that the value of the suits was also not recorded correctly. As a result, the inventory records were misstated by $122 million – out of a total inventory of $756.1 million.

Further, the sampling process depots used to check their inventory accuracy considered each type of item equally, regardless of price, so that an error on a $1 item counted the same as an error on a $50,000 item.

Lastly, contrary to federal accounting standards, the inventories were not based upon historical costs, but rather all the items were valued at standard cost or latest acquisition cost, which does not allow for reconciling items against their initial costs. These inaccuracies in accounting records can also lead to potential problems in ordering unnecessary spares.

One instance of that occurred in 1997, when $11.3 million in hydraulic pump valves and circuit card assemblies were ordered when there was already an excess supply of these items in the depots. Estimates reveal that excess inventories in 1999 (based upon DoD requirements) represented $39.4 billion, which might have been used for other program requirements.

Activity Based Costing and Enterprise Resource Planning

I believe that implementing Activity Based Costing (ABC) in the depots would provide DoD decision makers, from depot level to Army headquarters, with the information and control necessary to address these concerns highlighted by GAO. This would equal the philosophy of following industry's "Best Commercial Practices," since the majority of private industry either has or plans to implement ABC in the near future. Implementation of ABC would also support and complement congressional actions to encourage DoD to adopt best commercial practices in improving inventory management.

ABC accounting refers to a process that allocates the cost of overhead and materials directly to the products that use them, rather than the traditional approach of allocating overhead as a rough percentage measure of some proportion. Thus, costs are traced from resources to activities and processes, and then to specific products, services, and customers.

Development of Software

One of the first steps in the process is the development of software, which uses standard bar coding to track and manage fixed assets. The software would also track the location, organization, and financial information on each asset using desktop computers and bar coding equipment. This process would dramatically improve the accuracy of inventory records, require less time to perform inventory record accounting, and provide the type of financial information necessary to address the concerns outlined by GAO. It would also provide a transaction log record to track additions and deletions so that at any point in time, depot managers would know their on-hand inventory.

In addition to improvements in reporting, a better handle on assets has several possible cost benefits such as savings related to ordering unneeded parts and supplies, and general asset management savings that could range from 5 percent

to 35 percent. Lastly, it would also provide input to the ABC accounting system that could be used to gain a better picture of the true costs of repairs.

Another relatively recent software development that could aid in cost tracking within the depot system is termed Enterprise Resource Planning (ERP). These programs integrate the logistics, manufacturing, financial, and human resource management functions within an organization, to provide a single, less fragmented reporting information system. The use of ERPs in private industry, like ABC, is also increasing, with an estimate that 70 percent of Fortune 1000 firms have, or will soon have, ERP systems.

The principal reason for this sudden and widespread use of a new business approach is due to the potential benefits that companies perceive in an integrated reporting system, like quicker reaction times to business decisions, more flexible product configurations, reduced inventory, and tightened supply chain links. Consequently, it appears that all employees of a company would have access to the same information almost instantaneously, allowing for significant reengineering of business practices.

Considerations for Implementing an ERP System

The complexity of an ERP system, however, requires considerable forethought regarding its implementation, which can possibly take years to accomplish. What questions must you answer before implementing the system?

Who would implement the project? In several firms, this has been left to the Information Technology (IT) division. This doesn't necessarily seem to be the best choice; rather, management should form an integrated team from all the divisions involved, since it will require their coordination and input for the program to be successful.

Should the ERP software be implemented "as is," modified to meet the specific needs of the organization, or should different ERP packages for different divisions be selected and then integrated (since different vendors offer different capabilities within each functional area)? The selection of one of the three approaches just mentioned can considerably influence the subsequent performance of the package, and its time and personnel requirements. For instance, the average ERP implementation time runs about 14 months, and can take as many as 150 consultants for a large organization. However, modifying the software may offer the best fit for the function, but could drive up the cost of the project by 30 percent.

The least expensive (up-front cost) approach would be to implement packages piecemeal, with the thought that, at some point in the future, there would be an integrated system across all functions. However, the total costs for this type of approach would probably be just as high as the software modification approach.

Would one want to use a Warehouse Management System (WMS) in conjunction with the ERP system? Several companies tried it to bring ultimate benefit to a repair/manufacturing facility. However, the integration of these two types of software packages has proven to be a difficult process, since many of these packages do not adhere to a particular standard, and integrating their communications may not be easy.

Is there sufficient room on the main server? The software architecture requires considerable storage room, and the network should probably be expanded to accommodate the extra use that it will receive.

What needs to be done to use the current data information? The organization should standardize the data before implementing an ERP system; for, if one item is called by different names at different locations, or different items are called by the same name, then the full benefits of an ERP will not be achieved.

Do business practices need to be changed? While current business practices do not necessarily have to be changed to implement an ERP, it would make sense to do so in order to fully benefit from the integrated approach.

Recently, the process of acquiring new software, especially financial off-the-shelf software, was made easier with revisions to Office of Management and Budget Circular A-127, allowing agencies to purchase software if it meets federal requirements. The process will now be to notify the Joint Financial Management Improvement Program (JFMIP), which will then post a message on their Web site that will allow interested vendors to begin market research in anticipation of submitting a bid or proposal. The process was up-and-running Oct. 1, 1999, and showed which software products have been tested and certified under the new standards.

Final Thoughts

GAO has recently outlined several problems in the depots with current DoD accounting and reporting procedures. The use of ABC and the implementation of an ERP process in the depots would allow for a significant reengineering of current business practices. The addition of the new accounting and reporting software applications could go a long

"Shaping the Civilian Acquisition Workforce of the Future"

Dr. Jacques S. Gansler, Under Secretary of Defense (Acquisition, Technology and Logistics) and Dr. Bernard Rostker, Under Secretary of Defense (Personnel and Readiness) signed the Acquisition Career Management Task Force's final report, "Shaping the Civilian Acquistion Workforce of the Future," Oct. 11. View the entire report on the Defense Acquisition Reform Web site at **www. acq.osd.mil/ar/ #2005.**

way toward the improvement and accuracy of financial management reports for DoD depot activities.

Editor's Note: The author welcomes questions or comments on this article. Contact him at **washinwn@mail1.monmouth.army.mil.**

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Cisco Systems Chairman of the Board Receives David Packard Leadership Award

Air Force Secretary F. Whitten Peters Joins *Business Executives for National Security* in Honoring John P. Morgridge

Secretary of the Air Force F. Whitten Peters, joined by John T. Chambers and L. John Doerr, members of the *Business Executives for National Security*, presented John P. Morgridge with The David Packard Leadership Award Oct. 12. The black tie gala was held at the Hiller Aviation Museum, San Carlos, Calif.

Morgridge, Chairman of the Board at Cisco Systems, Inc., joined the company in 1988 as President and CEO and grew it from $5 million in sales to over $1 billion, from 34 employees to over 2,260. Fifteen years ago, Cisco Systems did not exist. Today, it is the fastest growing company in the history of the computer industry and the third highest valued company in the world.

Morgridge's selection for the award recognized not only his entrepreneurial spirit, but also his business achievements, generosity to countless nonprofit institutions, and his service to community and country.

About The David Packard Leadership Award

David Packard's garage is often called the birthplace of Silicon Valley. Certainly, the work he did with partner William Hewlett helped create a technological and computer revolution that affects all our lives.

To his roles of entrepreneur and management innovator, David Packard added philanthropist and public servant. David Packard remains the embodiment of business genius employed in service to the nation. As Deputy Secretary of Defense and as chair of two Presidential commissions on defense reform, he headed major efforts to change the way the Department of Defense acquires weapons and manages resources.

The David Packard Leadership Award is presented to a business leader whose contributions best reflect the vision, generosity, and spirit of David Packard.

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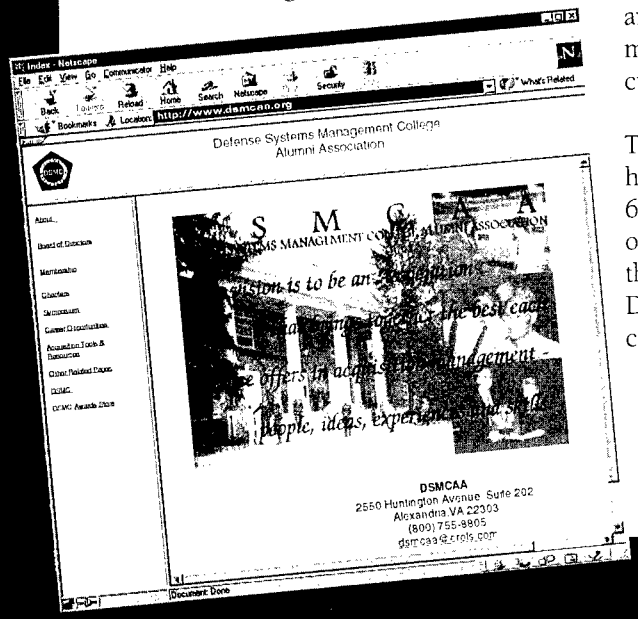

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DAU Names New President

Retired Air Force Brig. Gen. Frank J. Anderson Jr. was selected President of the Defense Acquisition University (DAU), Fort Belvoir, Va., effective Oct. 31. Congress established the Defense Acquisition University in 1992 to consolidate and integrate education and training for more than 140,000 people throughout the Defense Acquisition Workforce.

Prior to his retirement from the U.S. Air Force on Sept. 30, he held the position of Vice President, DAU, and Commandant, Defense Systems Management College (DSMC) from July 1999 until September 2000.

Anderson received his Air Force commission in 1973 as an honor graduate of Officer Training School at Lackland AFB, Texas. A graduate of Chapman College, Orange, Calif., he went on to receive a master's degree in management from Central Michigan University. His military education includes Squadron Officer School, Air Command and Staff College, Defense Systems Management College, and Industrial College of the Armed Forces.

Anderson's previous acquisition-related career assignments include duty as Chief, Subcontractor Management Division, and later, Deputy Chief, Contract Administration Division, General Electric Air Force Plant Representative Office; Commander, Air Force Plant Representative Office, Rockwell International; Director of Contracting, Electronic Combat and Reconnaissance Systems Program Office, Wright-Patterson AFB, Ohio; Director, Programs and Policy Implementation, Deputy Chief of Staff for Contracting, Headquarters Air Force Systems Command, and later, Executive Officer to the Commander, Headquarters Air Force Systems Command, Andrews Air Force Base, Md.; Systems Program Director, AGM-130 and GBU-15 Systems Program Office, Aeronautical Systems Center; and Director of Contracting, Aeronautical Systems Center, Eglin AFB, Fla.

Among his many military awards and decorations, he is the recipient of the Defense Distinguished Service Medal; Legion of Merit; Meritorious Service Medal with seven oak leaf clusters; and the Air Force Commendation Medal.

Anderson and his wife Bonnie have two children: a daughter Trina and son James.

ARCC Broadcast

Satellite Broadcast — "The Acquisition Workforce 2005: Managing Change, People, and Performance," Atlantic Video, Washington D.C., Sept. 12.

From left: Stan Soloway, Deputy Under Secretary of Defense (Acquisition Reform); Dr. Jacques Gansler, Under Secretary of Defense (Acquisition, Technology and Logistics).

Photo by Richard Mattox

AMERICAN FORCES PRESS SERVICE

DoD Presents Dual Use Technology Awards

LINDA D. KOZARYN

MCLEAN, Va., Nov. 9, 2000 -- DoD rewarded innovative thinking at a Nov. 8 award ceremony here recognizing science and technology projects that benefit both the military and civilian industry.

The Army's National Automotive Center, Tank-automotive and Armaments Command (TACOM), took top honors for working with Continental Teves to develop an electronically controlled active braking system for medium duty vehicles. The system can be used on HMMWVs and commercial trucks to improve safety and performance.

Brad McNett, TACOM's program manager, and Mark A. Mushenski, project engineer and team leader, received the Dual Use Science and Technology Achievement Award and a $5,000 cash award.

DoD oversees the Dual Use Science and Technology Program within the Army, Navy, and Air Force. The program links the military and civilian research and development communities, allowing the Services to leverage scarce research funds by forming partnerships with private industry and universities.

DoD's fiscal 2001 budget includes about $9 billion for basic, applied, and advanced science and technology research. About $60 million of that is allocated for the dual use technology program, a pilot program set up in 1997 to develop partnerships with private industry, according to Dan Petonito, program manager.

The overall goal, he noted, is to set up a process within the Services so that when funding for the pilot program ends in fiscal 2002, cooperative research projects will be an accepted way of doing business.

So far, he said, DoD has initiated 283 dual use projects, about 45 more have been selected, but not yet awarded. DoD set up the awards program this year to provide an incentive to encourage people to initiate projects and work with industry to develop needed technologies.

Delores M. Etter, Deputy Under Secretary of Defense for Science and Technology, presented program achievement awards at the start of the Commercial Technology for the Warfighter conference in McLean, Va. She told about 250 technology specialists that revolutionary capabilities give America's warfighters the winning edge.

"Our mission is to be sure that we are developing affordable and superior technology for the warfighter," she said.

Affordability must be a key consideration in the development process, she noted. "If things aren't affordable, we just aren't going to be able to purchase enough of them ... to make a difference."

The TACOM project involved developing and integrating the MK50 active braking system with low speed traction control on an M1097A2 HMMWV. The project aimed to advance the state-of-the-art technology for commercial vehicles and include the needs of the HMMWV. The goal, project officials said, was to provide a commercially available sent of components common to both commercial and military vehicles.

Two runners-up also received trophies and cash awards of $2,500: They were:

- Renewal of Legacy Software Systems: Charles D. Caposell, electronics engineer, led the Naval Air Systems Command project at Patuxent River, Md. Working with CPU Technology, the project developed a process for updating aging and obsolete hardware without requiring costly rewrite and validation of already proven software. The resulting savings from the project are estimated at up to $1 billion over the next decade. Initial applications are underway on the F-16.

- Future Air Navigation and Traffic Avoidance Through Integrated Communications, Navigation and Surveillance: Joel Arnold, project engineer, led the Air Research Laboratory project at Wright Patterson Air Force Base, Ohio. Working in partnership with Rockwell Collins, the project developed a cost-effective solution for upgrading tactical fighters and general aviation aircraft and business jets. The upgrade would allow compliance with requirements mandated by the Federal Aviation Administration that would require all aircraft to report their Global Positioning System position, altitude, heading, and air speed.

DoD officials selected the three winning projects from a total of 12 finalists nominated for the awards. The other nine are:

Army

- Infrared Imaging System for Medicine: Army Night Vision and Electronic Sensors Directorate, Fort Belvoir, Va.
- Smart Battery Initiative: Army Tank-automotive and Armaments Command in Warren, Mich.
- Voice Over ATM Testbeds: Army Space and Terrestrial Communications Directorate at Fort Monmouth, N.J.
- UL3 Sensor System: Night Vision and Electronic Sensors Directorate, Army Communications Electronics Command Research and Development Center, Fort Belvoir, Va.

Navy

- Freeform Manufacturing of Spares Using Laserforming: Office of Naval Research, Arlington, Va.

Air Force

- Advanced Motor Drive: Air Force Research Lab, Wright Patterson Air Force Base, Ohio.
- Affordable Dual Use Millimeter Wave Electronically Scanned Antenna: Air Force Research Lab, Wright Patterson Air Force Base, Ohio.
- Identification and Quantification of Structural • Damage in Aging Aircraft: Air Force Research Lab, Wright Patterson Air Force Base, Ohio.
- Integrated Media Analysis Tool: Air Force Research Lab, Rome, N.Y.

Editor's Note: Kozaryn is a public affairs specialist with the American Forces Press Service. This information is in the public domain at **www.defenselink.mil/news** on the Internet.

DAU Fort Belvoir Campus Stages Wargaming Simulation for Acquisition Workforce

AcqSim — Capstone of DSMC's New PMT-302N Course, Now Under Development

SGT. KENNETH E. LOWERY II, USA

Warfighters from all branches of service constantly prepare themselves and their equipment for real-world situations by evaluation and training. They go into the field, given a hypothetical situation, and test themselves and equipment for any flaws, or for enhancement of their technical and tactical skills.

Increasingly, civilian members of the government-industry acquisition workforce are becoming aware of, and involved in, the benefits of such evaluation and training. Modeling and simulation is emerging as a key player in exercises designed to simulate the real world in which soldiers (and sometimes civilians) must train and fight.

From left: Nicci-Ann Gervasoni, Raytheon Systems; William "Bill" Erie, Associate Dean of Faculty, DSMC; Dr. Kathleen Robertson, Athena Strategies; Rich Matzko, Strategic and Tactical Systems, Electronic Warfare, OUSD(AT&L).

Wargaming Comes to DAU

In September, the Defense Acquisition University Fort Belvoir campus participated in AcqSim, a wargaming simulation designed to model real-world Acquisition Simulation.

During the five-day exercise, Advanced Program Management Course (APMC) students, Defense Systems Management College (DSMC) faculty, Office of the Secretary of Defense (OSD) representatives, Department of Navy officials, and representatives from industry — Lockheed Martin, Raytheon, Northrop Grumman, Boeing, and Athena Strategies — all had a chance to deal with each other in a real-world scenario.

Briefly, AcqSim allowed them the opportunity to develop and examine the effectiveness of program acquisition strategy and baseline decisions over the developmental life of a program. In addition to affording them unique insight into the long-term effects and outcomes of negotiations with industry, Congress, and the Services, AcqSim also promoted the following objectives:

- Provide insights into contractor financial dynamics and decision making.
- Gain better sense of the acquisition process and how to relate to other government entities such as Congress.
- Foster team building within program management teams.

Teams in the simulation included three program offices, three contractors, DoD/OSD, and Congress. The three simulation Program Manager teams each included roles as the Program Manager, Deputy Program Manager, Business Financial Manager, engineer, contracting officer, and logistician. Three Virtual

***Lowery** is a staff writer and photojournalist for* Program Manager *magazine, Defense Acquisition University Press, Fort Belvoir, Va.*

Photos by Richard Mattox

From left: Ben Wosoogh, APMC student; Dr. John L. "Jack" Dwyer, Professor, Faculty Division, DSMC; Air Force Maj. Jim Lee, APMC student; Scott Kinney, APMC student.

From left: Jennifer Weaver, Applied Lojix; Walt Squire, Strategic and Tactical Systems, Land Warfare, OUSD(AT&L); Norm McDaniel, Chair, Program Management and Leadership Department, DSMC; Dr. Paris Genalis, Strategic and Tactical Systems, Naval Warfare, OUSD(AT&L).

Companies represented aircraft and electronics manufacturers and subcontractors. A review team representing DoD/OSD played the part as the review board for team status and provided executive-level guidance. The last simulation team represented congressional staffers, which incorporated the political importance of providing a strong aircraft industry, employment support in certain congressional districts, and a forum for congressional inquiries.

"The interaction between participant, government people, and industry representatives was probably the most fun," Erie said in retrospect. "Each side realistically played their role but was then able to discuss the 'why' of what they had done."

Erie also noted that there was a need for such an exercise to better assist the warfighter in the field. "Acquisition supports the warfighters by giving them the tools that they need. In the same way, warfighters learn from doing in training and simulation, the acquisition workforce learns by doing. It provides an environment where learning becomes a reality."

"AcqSim will be the capstone of a new course named PMT-302N ... This will become a part of the DSMC curriculum. Simulations may be used across other DAU coursework if applicable and useful."

— Bill Erie
DSMC Associate Dean of Faculty

The test of this simulation, according to feedback from the players, was considered a positive and successful exercise. Still under refinement, the AcqSim concept will be improved and incorporated as the capstone event into a new course for program managers, PMT-302N, that is currently under development.

Editor's Note: For more information about AcqSim, contact **erie_bill@dau.mil**.

OASD PUBLIC AFFAIRS NEWS RELEASE

DoD Honors First Graduates of the Defense Leadership and Management Program

The inaugural graduating class of the Defense Leadership and Management Program (DLAMP) was honored yesterday in a ceremony hosted by Under Secretary of Defense for Personnel and Readiness Bernard Rostker in the Hall of Heroes at the Pentagon. Deputy Secretary of Defense Rudy de Leon and Deputy Assistant Secretary of Defense for Civilian Personnel Policy Diane Disney presented the graduation certificates. Disney also read a congratulatory letter from President Bill Clinton.

The graduates were Robert L. Buhrkuhl, Department of the Air Force; Delia E. Donatelli, Department of the Air Force; Theresa A. Everett, National Security Agency; Donald D. Gregory, Department of the Air Force; Steven P. Manning, Department of the Air Force; David J. Russo, Department of the Army; David E. Servinsky, National Security Agency; and David K. Sloan, Defense Information Systems Agency.

Implementing recommendations of the Commission on Roles and Missions of the Armed Forces, DLAMP is the first systematic program of "joint" civilian leader training, education, and development within and across the Department of Defense. It provides the framework for developing civilians with a DoD-wide capability for key leadership positions. In addition, DLAMP fosters an environment that nurtures a shared understanding and sense of mission among civilian and military personnel. The first participants were admitted in December 1997.

Today there are currently more than 1,100 DLAMP participants throughout the Department of Defense. An additional 350 participants will join the program as the Class of 2001 in January. All candidates for acceptance into DLAMP must have reached at least the GS-13 level. Participants are selected competitively and then must demonstrate progress toward completing the program each year. While there is no specific time limit, participants will generally require six to 10 years to complete all the requirements, depending upon their individual situations. For further information on DLAMP requirements, please visit **http://www.cpms.osd.mil/dlamp**.

Editor's Note: This information is in the public domain at **www.defenselink.mil/news**.

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STandard for the Exchange of Product Model Data (STEP)

Why DoD Should Have an ISO 10303 (STEP) Migration Plan

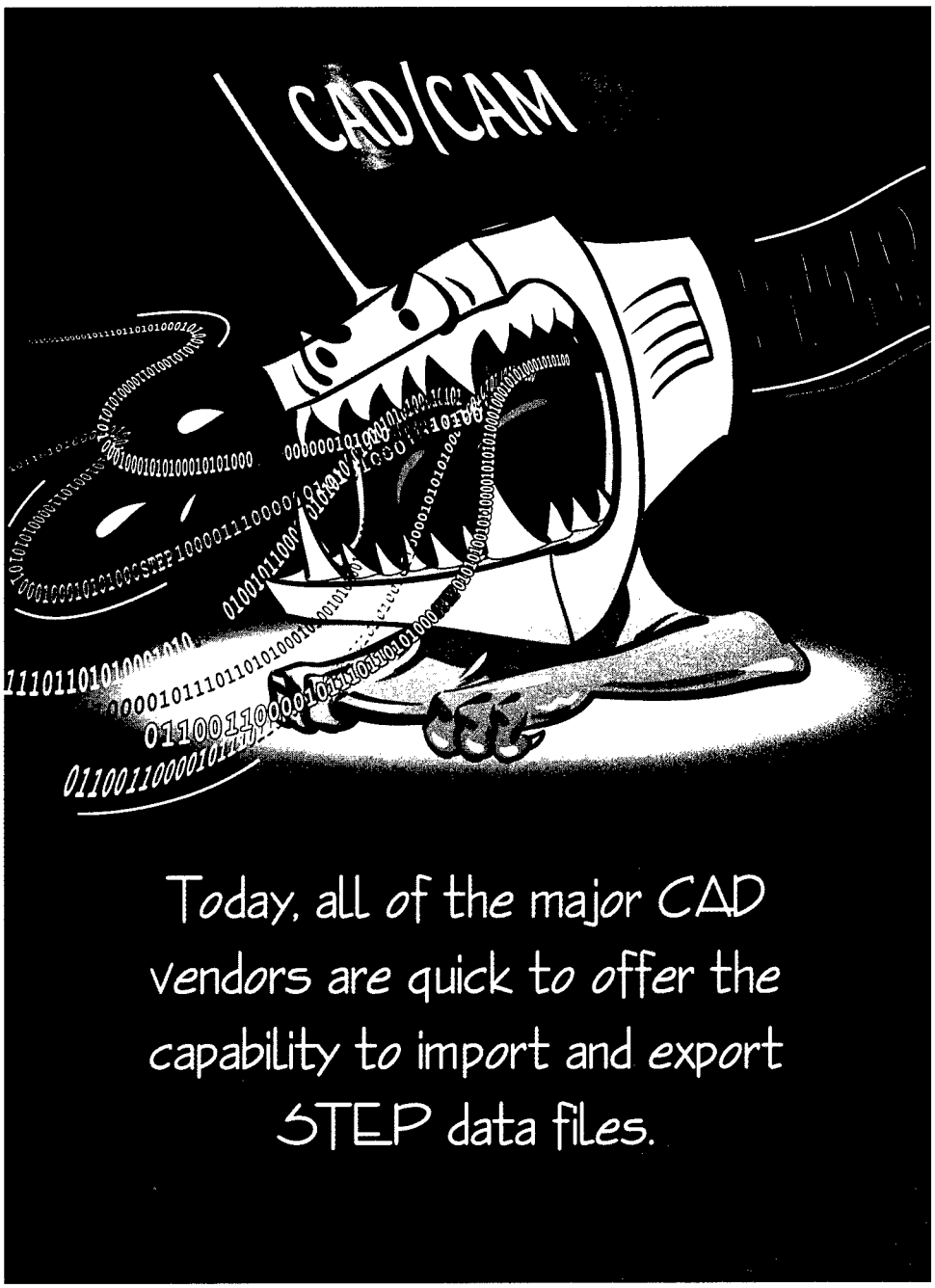
GERALD MOELLER

The DoD needs to implement a plan for assuring that the engineering data associated with procurement, distribution, and repair of its weapons systems will support interoperability and data reuse. The STandard for the Exchange of Product model data (STEP) structure is an emerging international standard that enables interoperability resulting in large cost savings.[1] This article provides some history on engineering data, reports on STEP development progress, and provides recommendations on implementing STEP within the DoD.

Evolution of the Engineering Environment And Associated Data

In the late 80s, DoD undertook an effort to convert engineering data into an electronic media to not only physically preserve this data, but also make it universally available. The approach taken by DoD was that of basically scanning existing drawings into electronic pictures called raster images.[2] While this approach is acceptable for preserving legacy data, it is not sufficient for helping create new or reengineering weapons systems using the computer-aided design/computer-aided manufacturing (CAD/CAM) tools available today.

CAD/CAM systems have experienced a tremendous growth in capability. Many of these systems initially started out as computer-aided drafting tools, offering essentially automated line and curve manipulation capabilities, which facilitated producing the conventional three-view



Moeller *is a general engineer in the Logistics Integration Office, U.S. Army Tank-automotive and Armaments Command, Rock Island Arsenal, Ill.*

(front, top, side) orthogonal parts drawings used by machinists.

Today's CAD/CAM systems provide many capabilities that speed up the parts design process. The biggest speed contributor is the ability to build solid models of parts as a composite of other solids like cubes, cylinders, or cones. Composite solid model structuring is accomplished by pick-and-place operations; the CAD/CAM user picks a basic solid shape out of a library of shapes, dimensions it to match the size of the feature on the new part being created, and then appropriately places it on the other composite features already structured for the new part. Solid modeling also provides a capability to freely roll the part around on the computer screen so it can be viewed from any angle. This facilitates adding new part features and checking part integrity.

Parts'designing is an iterative "trial-and-error process." The engineer is usually trying to minimize weight to enable meeting airlift constraints. In the typical partsdesign scenario, engineers develop an initial design, which they then test using simulation, stress, and fatigue analysis. These tests typically indicate a need to change some key feature, which often requires other modifications on the part, plus modifications of mating parts.

To aid the modification process, most CAD/CAM systems offer a capability to set up parametric relationships among key design parameters such as a constant hole size or a constant ratio between two or more dimensions on a part or among parts on mating assemblies. A change in a dimension on a part then automatically drives changes on mating parts within an assembly of parts. Additionally, design constraints can be applied so when the bumping effect of a change in a dimension occurs, the CAD/CAM user will be notified if a spatial constraint has been violated.

Today's CAD/CAM systems are rich in capability to support manufacturing operations. The most supportive manufacturing role is that of providing the input file required to drive automated Numerical Controlled (NC) processes. Additionally, most of these systems provide a capability to simulate conventional cutting operations to assure part manufacturability, i.e., some part surfaces may not be accessible for some cutting tools. These CAD/CAM capabilities, coupled with automated manufacturing layouts, have in many applications eliminated the need for a machinist.

CAD/CAM systems store their data in a variety of formats, collectively known as vector formats. Vector data are often referred to as intelligent data because they embody all the CAD/CAM background structure needed to rapidly change a design. Raster data unlike vector data are essentially a bit map picture of the part generally shown in the conventional 3-view format. They essentially require the engineer to start from ground zero and develop the solid models needed to change the design or do the changes by hand. For these reasons, raster data are often referred to as dumb data.

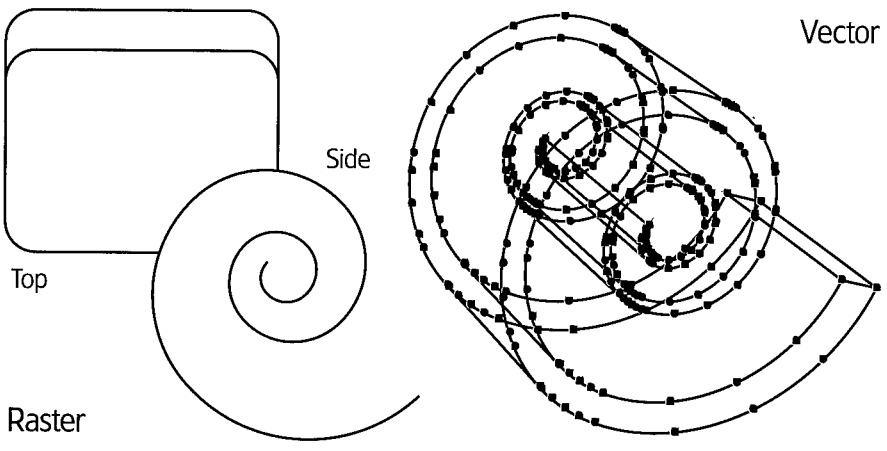
All the CAD/CAM vendors offering products in the marketplace today have their own proprietary format for creating and storing vector data. These proprietary formats make it very difficult to move the engineering data associated with the design of a part or assembly from one CAD/CAM vendor's system to another. Complex DoD weapons system designs today are frequently done in a collaborative distributive environment among a team of designers using heterogeneous CAD/CAM systems.[3] As design complexities increase and designers are becoming increasingly distributed throughout an expanding virtual enterprise, the quantity and quality of collaborative vector data exchanges become critical elements for effective, efficient design and manufacturing.

Origin of STEP

Considerable progress has been made in vector data exchange over the recent past. Initially, some CAD/CAM vendors offered direct translator software. There are several disadvantages to this approach, which include:

- A unique pair of translators is needed for every version of every combination of CAD/CAM systems available in the marketplace.
- The user is dependent on software vendors to maintain this almost infinite combination of version applications.
- The maintenance of all these combinations of transfer capabilities is costly, and that cost is ultimately passed on to the user.
- As a general rule, these translators passed low-quality solid geometry that was not adequate for driving NC operations without the CAD/CAM user having to aid the transfer process by doing a lot of geometry clean-up. Also, no attempt was made to transfer parametric model dependencies/constraints. As a result of these problems, most major weapons system developers and many large-scale commercial vendors such as Boeing, Ford, and GM

Raster/Vector Comparison



as well as many CAD/CAM vendors have abandoned or are phasing out direct translators. Rather, big business is helping to grow and is using an emerging neutral file – an international standard approach known as ISO 10303 (also known as STEP).[4]

The STEP community is in the process of defining and standardizing a number of domain-specific (mechanical or electrical) Application Protocols (AP) that will define neutral files readable by any CAD/CAM system. These neutral files will carry all the information needed for the development and life cycle maintenance of a new product. The neutral file structure will provide the much-needed standardization of DoD's technical data, thus enabling rapid and efficient modification, storage, and retrieval of the technical data.

Today, all of the major CAD vendors are quick to offer the capability to import and export STEP data files as the underlying STEP APs attain the ISO standard acceptance level.[5] Additionally, many large manufacturers who have their own CAD modeling systems to conduct special product studies and design efforts use STEP. The Army, for instance, has its Ballistics Research Laboratory (BRL) CAD system, which is used for conducting ballistics studies. At present, no one CAD/CAM vendor has the wherewithal to support all the CAD analytical requirements of an organization as complex as DoD. There is a need to integrate the "best" analytic point solutions together to develop the "best" affordable weapon systems. STEP can help DoD fulfill this need.

Industry-Developed STEP Capabilities

AP-203, Configuration Control for 3D Design of Mechanical Parts and Assemblies, provides a very robust mechanical parts product model geometry transfer capability. This capability has been slow in coming. The solid model capabilities and high numerical geometric precision possible in AP 203 (and all STEP models) required many of the CAD/CAM vendors to push the technology edge of their system's capabilities. CAD vendor's AP-203 geometry transfer capability quality level is now high enough that translated solid models are readily being used to construct NC operations driver files.

AP-203, along with AP-224, Mechanical Parts Definition for Process Planning Using Machining Features, has had a significant cost savings impact on mechanical parts manufacturing.[6] AP-224 defines a set of basic solids used for pick-and-place composite solid model structuring, which greatly facilitated parts design and generative process planning (GPP). GPP uses the underlying basic solid shapes of the composite solid to conduct extensive cost-reduction trade-off analysis over the many processing options typically available within a given machine shop.

Cost-reductions of 30 percent are fairly commonplace for GPP process planning relative to the traditional variant process planning. Variant process planning basically consists of using a process plan for a similar old part. Most old parts in DoD's inventory have not been run through a GPP trade-off analysis or anything close to its cost optimization process.

AP-203 and AP-224 provide the necessary capability for low-cost generation of mechanical parts CAD/CAM models and rapid transfer of the vector data among disparate CAD/CAM systems. STEP's transfer capabilities will result in creating more private sector competition for manufacturing weapons systems components, i.e., many 2nd and 3rd tier parts manufacturers will not bid on a job if the vector data are not compatible with their CAD/CAM system. DoD needs to develop a strategic plan for capturing this manufacturing benefit, especially for its legacy systems where the technical data reside in a wide variety of formats if, in fact, they exist.

A common complaint voiced in the end-item management and DoD parts manufacturing communities is that no technical data for many repair parts exist, especially for some of those weapons systems procured via the performance specifications method of acquisition. Engineering data tend to become a lost child in the merger, acquisition, and business failure environment of the private sector economy. It is costly to reengineer a part, but that is the only solution remaining once the technical data are lost. However, the combination of AP-203 and AP-224 provides a low-cost redemption option for mechanical parts.

STEP Capabilities Being Developed

STEP has made significant inroads in transferring some of the vector data, especially the data supporting NC manufacturing. However, a major roadblock to collaborative design in the defense industry exists today in the inability to exchange all the vector data, especially the construction history data.[7] There is a critical need in industry for a designer using one (native) CAD system to be able to transfer an "intelligent solid" model in a standard way to a different (target) CAD system, so that it is still an intelligent solid (modifiable) model in the target system. Currently, intelligent solids generally become "dumb solids" (non-modifiable) after exchange.

STEP data transfer today uses Boundary representation (B-rep) of the part geometry, i.e., B-rep uses boundary intersections and faces to define the CAD objects. B-rep is a necessity for high-precision manufacturing operations requiring exact boundary locations needed to drive NC cutting and quality checking processes. However, intelligent solid exchange will require CAD vendors to be able to exchange model tree data. The model tree is essentially the log of the construct steps used to develop the part. It carries all the parametric relationships, constraints, primitive solids, and each placement step used in making the composite solid model.

Composite solid modeling is often referred to as Constructive Solid Geometry (CSG) modeling. CSG is, computationally, several orders of magnitude faster than B-rep in performing the ray tracing needed for BRL CAD lethality analysis and is deemed a necessity for lethality work. It is relatively easy to convert from CSG to B-rep, but it is nearly

impossible to do the reverse. Construction history/model tree/CSG transfer capability is a paradigm shift for the STEP community. However, being able to efficiently move CAD data between lethality and manufacturing environments will provide significant labor savings and greatly speed up the process of conducting design/lethality/manufacturing trade-offs.

Leading e-commerce software providers and the auto/aerospace firms are pushing for intelligent solid model transfers. The ISO Parametrics Group has been working on developing the information model needed to exchange intelligent models as characterized by construction history. An ability to transfer construction history will greatly facilitate front-end lethality studies and provide the missing link for STEP being able to support data interoperability for the entire weapons system life cycle.

STEP in the 21st Century

Evolutionary CAD applications supporting design can be categorized into three types – traditional, knowledge-based, and immersive.[8] The present day traditional CAD system grew out of a need to automate drafting. These systems provide comprehensive tools for generating geometric forms, which encourages designers to come up with a form first and think about function later (i.e., form-to-function transformation). Knowledge-based tools that help a designer think in terms of function are now starting to evolve. In this paradigm, form results from function (i.e., function-to-form transformation). In immersive CAD applications, the human being becomes part of the design by using various immersive interfaces, including visual, speech, and haptic (special mechanical gloves, boots, etc.) devices. This evolutionary CAD development path will make great strides toward design optimization.

Interoperability among these evolving CAD systems, however, will continue to be an issue in our competitive free market environment that rapidly generates proprietary solutions. But, the most significant contribution STEP will provide is a bridge between the old and the new. Knowledge-based design tools concentrate on the generation of a symbolic structure, using various types of objects and relationships. Mapping from this symbolic structure to traditional CAD requires appropriate interface specifications. Immersive CAD systems generate certain process constraints such as trajectory and assembly mating constraints. The interface between immersive CAD and traditional CAD systems requires extensions to AP 203 and other STEP standards.

With DoD having many of the same suppliers as the industrial companies driving the STEP implementation, the lowest cost solution for DoD would be that of using this same STEP technology in providing and receiving vector data from its suppliers.

Why DoD Should Use STEP

STEP is not a completely finished product today, and considerable cost savings work remains to be completed.[9] However, STEP has progressed to the point where it has a very strong industrial user/developer base. Major U.S. original equipment manufacturers (OEM) in the Automotive, Aerospace, and Defense industries are jointly developing memoranda of understanding identifying STEP as their standard data exchange approach for domain-specific AP data. These firms, along with major firms around the world, in concert with ISO, are driving STEP development. With DoD having many of the same suppliers as the industrial companies driving STEP implementation, the lowest cost solution for DoD would be that of using this same STEP technology in providing and receiving vector data from its suppliers.

There are basic advantages in structuring an international standard for exchanging and maintaining product data.

- First, a standard format is the long-run salvation for archiving technical data for aging fleets, i.e., proprietary CAD formats come and go as the companies propelling them rise and fall in the marketplace.
- Second, everybody receiving technical data in a standard format immediately knows where to look for specific types of information within the exchange package. Data quality checks are easier to administer, resulting in very high-quality/completeness levels. Software and hardware vendors are quick to recognize they must develop the data transfer capabilities required to accommodate the standard in order to keep their products competitive.
- Third, standards generally spur innovation directly by codifying accumulated technological experience to form a baseline from which new technologies emerge. Standards also spur innovation indirectly because they increase global competitiveness, which, in turn, spurs innovation.[10]

STEP Launching Pad

In closing, to fully capture the benefits STEP offers, DoD needs to establish a STEP implementation plan. That plan should, as a minimum, address the following:

- Installing and/or requiring STEP-based weapons systems and parts manufacturing, i.e., there are immediate cost savings waiting to be captured.

- Establishing the guidance and infrastructure within its weapons system project management and logistics communities for requesting and maintaining technical data in the domain-specific AP formats as the APs mature to the ISO standard level.
- Developing a STEP-based archiving system that assures availability of engineering data in time of CAD/CAM vendor failure or OEM failure, i.e., no more parts reengineering because of a lack of technical data.
- Facilitating future STEP development efforts, especially construction history, to ensure engineering data interoperability over the entire weapons system life cycle.

Initially concentrating on these basic considerations should provide a good launching pad for STEP.

Editor's Note: The author welcomes questions or comments on this article. Contact him at **Moellerg@ria.army.mil.**

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CAS Board Comprehensive Review

On September 26, the Under Secretary of Defense for Acquisition, Technology and Logistics submitted a list of recommendations for the Cost Accounting Standards (CAS) Board to consider in formulating its comprehensive review of CAS requirements. The recommendations include a plan for how the CAS Board should conduct the review and some key areas the CAS Board should consider for possible revision or elimination.

In response to the CAS Board's announcement of the review and request for comment in the Aug. 9, 2000, *Federal Register*, the Director of Defense Procurement conducted a series of public meetings to obtain input of interested parties on how the CAS requirements could be modified, clarified, or eliminated. This input was used to develop a plan describing how the CAS Board should proceed with its comprehensive review. The plan recommends public discussion meetings, with the use of industry and government representatives to perform any necessary research and analysis.

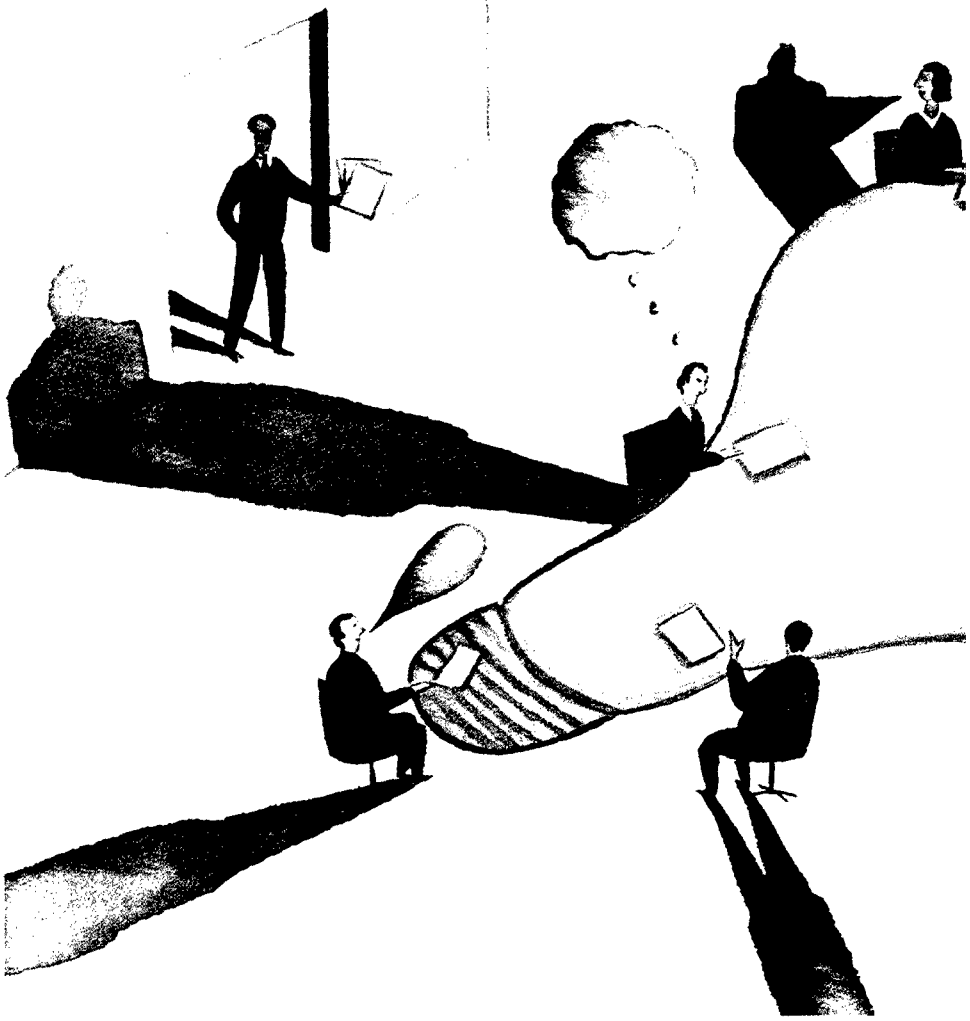
The input provided at the public meetings was also used to develop a list of recommendations on key areas the CAS Board should consider in conducting its comprehensive review. The recommendations focus on relying more upon commercial practices in those areas where there is not significant risk to the government.

A copy of the recommendations can be found at **http://www.acq.osd.mil/dp/cpf** (CAS Streamlining Review).

Reduction of Total Ownership Cost (R-TOC)

Recent History and Future Prospects

DR. SPIROS PALLAS • MIKE NOVAK



With the Cold War having run its course, significant new funding for DoD is not seen in the near future. But since the United States still maintains a worldwide role, weapons systems containing the latest new technologies are needed by our forces to replace aging systems.

DoD continues to look at a variety of methods to maintain its forces in a combat-ready status within budget limitations, but is having difficulty doing so. Thus, the common thread running through this article is that the Department is striving to maximize the use of modernization funds to improve operational readiness by making the entire Defense Life Cycle Cost system more efficient both in force readiness and in the use of scarce dollars.

Modernization Must Continue

There is an explicit recognition that DoD must continue to provide our forces with quality equipment to execute their missions even with reduced funding. Former Secretary of Defense Richard B. "Dick" Cheney, when talking about the Gulf War, gave praise to his predecessors who were responsible for development and acquisition of the equipment that ultimately resulted in a stunning victory for the United States.

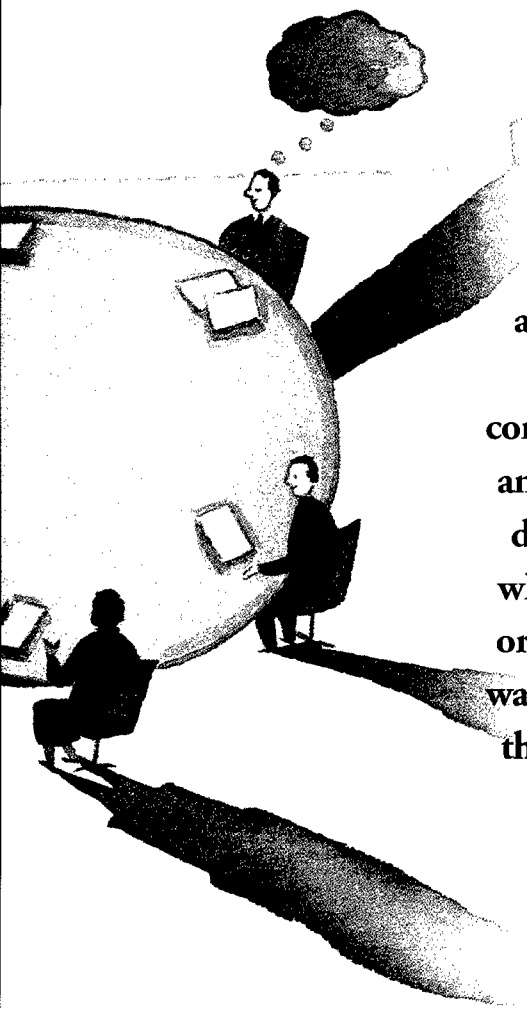
Modernization must continue during this time of relative calm. We must ensure that the next time our forces are needed to defend our national interests, they can do so with the appropriate equipment that will allow them to gain their objectives at the lowest possible cost in human life.

Improving the Acquisition System Began Years Ago

Efforts to improve the acquisition system extend backward in time for a considerable number of years and administrations. The situation mentioned pre-

Pallas *is the Principal Deputy Director, Strategic and Tactical Systems, Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (OUSD[AT&L]). His complete biography appears on p. 64.* ***Novak*** *is an action officer for air warfare systems, reporting to the Deputy Director, Air Warfare, Strategic & Tactical Systems, OUSD(AT&L). His duties include providing acquisition oversight and technical expertise, for such systems as the Joint Strike Fighter, Joint Primary Aircraft Training System, and T-45 aircraft. He is also Pallas's primary action officer for R-TOC and the development of cooperative international programs. His background includes serving as an operations officer at Naval Air Command for the F/A-18 aircraft; systems engineer for a support contractor involved in testing; and as an A-6 naval aviator aboard a U.S. carrier. He holds a bachelor's degree from the University of Maryland, and a master's degree from the Naval Postgraduate School.*

viously (lower budgets with the same or improved readiness) was recognized long ago, and there have been many great thinkers working the problem. One of the landmark initiatives was the 1986 Packard Commission Study. Prior to that, the Grace Commission (1983) looked at the DoD acquisition process. David Christensen et al, in a DSMC thesis entitled, "The Impact of the Packard Commission's Recommendations on Reducing Cost Overruns," listed some of the more important events, studies, and regulations (Figure 1).



The major thrust of the majority of these efforts was in the area of reducing acquisition costs. To be sure, total life cycle cost was explicitly mentioned in some of the initiatives (such as Department of Defense Directive [DoDD] 5000.28, Design to Cost), and "reliability and maintainability" were routinely considered in program reviews. However, the acquisition community wrote and promulgated the above regulations and instructions.

Unit costs were easily seen and tracked in an acquisition budget, but the costs of operating and supporting systems were generally outside the sight and control of the acquisition community. Therefore, intense focus remained on acquisition costs, and attempts to control life cycle costs were minimal.

The R-TOC Environment

Initially, Reduction of Total Ownership Cost (R-TOC) did not spring forth as an explicitly stated initiative. Rather, it evolved under deliberations in the Defense Manufacturing Council (DMC), which later was renamed the Defense Systems Affordability Council (DSAC). Leadership of the multiple efforts that eventually became R-TOC was split between various groups.

Efforts to improve the acquisition system extend backward in time for a considerable number of years and administrations. DoD's dilemma of lower budgets while maintaining the same or improved readiness levels was recognized long ago, and there have been many great thinkers working the problem.

The following discussion will attempt to track and document that path, including the events that shaped the environment within the Pentagon.[1]

Perry Mandate

One major event that contributed to the environment not captured in Figure 1 was the February 1994 memorandum, "The Problem - Why Change is Necessary," issued by then Secretary of Defense William J. Perry. That mandate appears to have started the most recent efforts to reduce DoD costs. Starting at this point in time, we will begin detailing a series of events leading to the initiative known as Reduction of Total Ownership Cost (R-TOC).

The Perry mandate made a number of excellent points. One of those points is restated here to frame this article:

> "Adopt business processes characteristic of world-class customers and suppliers (and encourage DoD's suppliers to do the same)."

This point is not simply a re-statement that the DoD must procure items less expensively. Rather, the point is a call for DoD to mimic businesses that are driven by the "bottom-line" metric. That metric ties the quality of the equipment to the total cost of ownership of the system.

Color or "Pots" of Money

One difference (among many) between a "real" business and DoD (related to the total cost of ownership) is that business has only one "color of money," while DoD has many. Business can easily answer the question: how much does a particular investment cost the business (bottom line)? Money is money, and that shows up in the earnings per share for a company.

The Department of Defense, on the other hand, has different "pots" of money, controlled by different sectors in DoD. Because of different accounting rules and since every controlling interest jealously guards their "pot" from other DoD interests, scoring total savings across all of DoD is difficult at best.

Further, with the Cold War at an end, not all of those "pots" are adequately filled to perform the mission of preparing for war in order to keep the peace, which, after all, is the real job of DoD. Thus, trying to shift funds from one "pot" to another, in order to improve readiness while reducing total DoD costs,

FIGURE 1. **Efforts to Improve Defense Acquisition**

Year	Regulation or Initiative Published
1969	Packard Initiatives
1971	Blue Ribbon Defense Panel (Fitzhugh Commission)
1972	DoDD 5000.1 (Major System Acquisitions); Commission on Government Procurement
1973	DoDD 5000.4 (CAIG); DoDD 5000.28 (T&E)
1975	DoDI 5000.2 (Major System Acquisitions) DoDD 5000.28 (Design to Cost)
1976	OMB Circular A-109
1978	Defense Science Board Acquisition Cycle Task Force
1979	Defense Resource Management Study
1981	Carlucci Initiatives; Defense Acquisition Improvement Program
1982	Nunn-McCurdy (thresholds)
1983	Grace Commission
1985	DoD 5000.43 (streamlining)
1986	Packard Commission
1987	DoDD 5134.1 (USD[A&T]); DoDD 5000.49 (DAB)
1989	Defense Management Review
1991	Revised DoDI 5000.2 (Major System Acquisition)
1994	Federal Acquisition Streamlining Act (FASA)
1995	Federal Acquisition Improvement Act (FASA II)
1995	Cost As an Independent Variable (CAIV) Policy
1998-9	Section 912c Studies

rapidly becomes a bureaucratic nightmare. Only when the mission of DoD becomes compromised through decreased readiness will money readily flow from "pot" to "pot." However, transfer of funds to meet a current "emergency" may not be the most cost-effective way to do business.

For a number of years, there was (is) a consistent leakage of money (estimated to be about $2 billion per year) from the modernization "pot" to the maintenance "pot." While this flow of money did help shore-up weapons system readiness, it had the impact of mortgaging future mission capabilities.

Money that was meant to improve future capabilities was being used to maintain the aging equipment that was needed to retain readiness. The resulting lack of modernization funds meant that the aging equipment would not be replaced as rapidly as desired. This, in turn, meant that more money would be needed to maintain the aging equipment.

The "Death Spiral"

Under Secretary of Defense for Acquisition, Technology, and Logistics Dr. Jacques S. Gansler termed this the "death spiral" after he took office in 1999. This short descriptor caught the attention of Defense and Congressional leadership and was a factor in accelerating efforts to reduce ownership costs.

A reasonable approach to reducing the overall cost for weapon systems is to look at what it costs to develop, buy, maintain, and dispose of systems, and then focus efforts on the cost drivers. For platforms (aircraft, ships, etc.), informal estimates have been used to indicate that the costs to use equipment can be on the order of 60 percent of the life cycle cost, with the rest of the total cost split up into the other areas.

While this percentage will vary with the specifics of the platform, clearly, the cost of using the systems has to be considered an important component in DoD's total expenditures. In addition, in order to modernize the force, the hemorrhage of modernization funds has to be reduced or stopped.

CAIV and Readiness

Dr. Paul G. Kaminski, then Under Secretary of Defense for Acquisition and Technology, issued a memorandum in December 1995, "Reducing Life Cycle Costs for New and Fielded Systems," addressing this concern. He stated that "reducing the cost to acquire and operate the Department's equipment while maintaining a high level of readiness for the user is my highest priority." (That memorandum is commonly referred to as the memorandum that directed the use of Cost As an Independent Variable [CAIV] in Defense acquisition.) There were two parts to the memorandum: one addressed developing systems that are in the acquisition cycle, and the other part addressed fielded systems.

In the implementation portion of the memorandum, he directed that for fielded systems, the Deputy Under Secretary of Defense for Logistics would:

- Implement an awards program to incentivize individuals and organizations to reduce life cycle costs.
- Develop a mechanism to reduce life cycle costs by making investments that result in high payback with Comptroller and Service Acquisition Executives working together.
- Implement a CAIV-based program of modernization through Form, Fit, and Function spares upgrades.
- Provide within six months a list of candidate programs within each Service, along with a plan for speedy implementation.

This direction eventually led to the organization of other groups by the Deputy Under Secretary of Defense for Logistics. These groups continued to address the difficult problem of improving readiness, while at the same time reducing the cost to maintain fielded equipment. (Note that there are other methods to do this such as closing facilities, but these are outside the scope of this article.)

Chronology of Events

Formal establishment of the reduction of total ownership cost (TOC) occurred in roughly mid-1997, although it was the topic of 1996 discussions at the DSAC, which were reported to the DSAC Executive Committee in 1997. This briefing was on the progress of what was then called the reduction of TOC.

In 1998, a series of related activities started that all focused on R-TOC and gave rise to the feeling that an integrating body should be formed.[2] Some of

these efforts came from the CAIV legacy; others were driven by the formation of study groups that were established in response to legislation (Section 912[c] of the 1998 Defense Authorization Act).

Eventually, all of the activities were morphed into a single effort under the leadership of a senior DoD official. This action ensured that all initiatives were fully coordinated, and data gathering and reporting did not unduly burden the Services. Figure 2 lists the major events that led to the current effort.

Key Event — R-TOC Working Group

Key among these events was establishment of an R-TOC Working Group (WG), chaired by an Office of the Secretary of Defense (OSD) official, to coordinate all of the Department's efforts. The June 1998 tasking by Gansler, "DoD Focal Point for Total Ownership Cost (TOC) Reduction," was to: 1) integrate the TOC reduction goals; and 2) provide a DoD focal point. It is at this point that all of the various activities that contributed to reduction of TOC began to be coordinated and duplication minimized. Clearly, a number of these ongoing activities provided valuable information and insights that were later melded into the current R-TOC effort.

Some of the more important of these include the following:

Initially, R-TOC did not spring forth as an explicitly stated initiative. Rather, it evolved under deliberations in the Defense Manufacturing Council (DMC), which later was renamed the Defense Systems Affordability Council (DSAC).

Section 912(c), NDAA, FY98

Section 912(c) of the National Defense Authorization Act for Fiscal Year 1998 was one impetus for the formation of other groups to look intensely at reducing the cost of maintaining fielded equipment. In Section 912(c), the Secretary of Defense was required to submit to Congress an implementation plan to streamline the acquisition organizations, workforce, and infrastructure.

The Secretary of Defense Report to Congress, in response to Section 912(c), was entitled, "Actions to Accelerate the Movement to the New Workforce Vision." An important section of that report dealt with the restructure of sustainment processes for DoD equipment:

- Re-engineer the Product Support Process to Use Best Commercial Practices
- Competitively Support Product Support
- Modernize Through Spares
- Establish Program Manager Oversight of Life Cycle Support
- Greatly Expand Prime Vendor and Virtual Prime Vendor

R-TOC Pilot Programs

In addition, Section 816 of the National Defense Authorization Act for Fiscal Year 1998 required the Secretary to designate 10 significant programs for which the program manager (PM) would be made responsible for ensuring that product support functions are properly carried out over each program's entire life cycle.

In Cohen's report to Congress, Gansler, as Under Secretary of Defense for Acquisition and Technology, was designated as the lead in these efforts. At the end of 1998, Gansler requested a list of 10 potential programs from each Service. He later stated in 1999 that although only 10 of the 30 programs that were nominated by the Military Departments would be sent to Congress, all 30 would be tracked internally to glean lessons learned.

These 30 programs became the set of programs for all "Pilot Program" efforts. This set was designated R-TOC Pilot Programs.

Study Groups

Two study groups, which became part of the overall R-TOC effort, as mentioned previously, were established to develop implementation plans in accordance with the Secretary's response to Congress. One study group was chartered by David Oliver, Principal Deputy to Gansler, in August 1998. Oliver's memorandum, "Establishment of a Study Group on Program Manager Oversight of Life Cycle Support," chartered the group to look at Program Manager Oversight of Life Cycle Support (PMOLCS).

FIGURE 2. **R-TOC Events**

Date	Event
July 10, 1997	Formal initiation of Reduction of TOC.
1998	Initiation of Section 912(c) studies.
June 30, 1998	USD(A&T) directs that R-TOC be tracked under the oversight of the R-TOC Working Group (WG) headed by an OSD Point of Contact.
Nov. 6, 1998	USD(A&T) requests 10 programs from each Service to potentially serve as Pilots to demonstrate expanded PM control of the logistics phase. This was prompted by Section 816 of the 1998 Defense Authorization Act.
Late December 1998	Thirty potential Pilot programs were provided to USD(A&T) together with a recommendation that 10 be forwarded to Congress under the provisions of Section 816.
Feb. 5, 1999	Ten programs were forwarded to Congress.
May 10, 1999	USD(A&T) directs the focus of the Pilot programs.
Aug. 31, 1999	R-TOC Forum held for all 30 Pilots.
Feb. 3, 2000	First Quarterly R-TOC Forum.
April 25, 2000	Second Quarterly R-TOC Forum.
Aug. 1-2, 2000	Third Quarterly R-TOC Forum.

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Dr. Spiros G. Pallas is the Principal Deputy Director, Strategic and Tactical Systems, Office of the Under Secretary of Defense (Acquisition, Technology and Logistics) (OUSD[AT&L]), a position he has held since 1994. In this capacity, he is responsible to the USD(AT&L) for oversight of all major weapons and support programs except for Space and Command, Control, Communications and Intelligence (C3I). In addition to his regular duties, he has been actively involved in acquisition reform and is the DoD focal point for integrating policy on Reduction of Total Ownership Cost (R-TOC); focal point for the Cost As an Independent Variable (CAIV) process; and Chairman of the International Cooperative Opportunities Group (ICOG) programs and processes.

From 1991 to 1994, Pallas served as the Deputy Director for Air Warfare, OUSD(A&T)/Tactical Warfare Programs (TWP). Prior to that assignment, he served as the Special Assistant (Chief Scientist), also in TWP – a position he held from 1987 to 1991.

As manager for Close Air Support and Battlefield Interdiction, Office of the Secretary of Defense, from 1982 to 1987, Pallas provided oversight and review of related programs. From 1976 until 1982, he was the Chief, Engineering Division, U.S. Air Force Precision Guided Weapons Program Office, responsible for development and developmental test of all Air Force air-to-surface smart bombs.

During his tenure from 1973 to 1976 as the Chief, U.S. Air Force Armaments Lab–Air-Launched Weapons, Pallas provided systems analysis support for six Direction of Flight (DOF) Hardware-in-the-Loop Simulations for Flight Test Support and design symthesis and evaluation for various weapons programs.

Pallas taught undergraduate and graduate-level courses from 1965-1973 at the University of Texas; at Auburn University; at University of Florida Extension; and, as guest lecturer at University of California at Los Angeles (UCLA). Courses taught included Propulsion; Aerodynamics; Astronautics; and Structures, Guidance, and Control. During the same period, he conducted research in related topics as well as in areas of biomedical engineering where he holds two patents.

Pallas holds a Ph.D. from the University of Texas at Austin, in Fluid Mechanics/Aero. He also holds a B.S. and an M.S. from Auburn University in Aero/Propulsion/Structures. Pallas is a graduate of the Defense Systems Management College 's premier course offering, the Program Management Course (now the Advanced Program Management Course), and has completed numerous DSMC short courses in Defense Systems Acquisition.

The group's final report was released in October 1999. The report identified the need for a substantive change in the role of PMs in the area of managing the sustainment processes of systems. It also recommended that the R-TOC Pilot Programs be designated to spearhead these efforts. Additionally, the report recommended that the chairperson of the Reduction in Total Ownership Costs (R-TOC) Working Group (the implementation arm of the DSAC, as discussed earlier in this article) monitor/oversee/facilitate the progress of these R-TOC Pilot Programs. (These latter two recommendations were implemented through the DSAC.)

The second study group was tasked by Gansler in a September 1998 memorandum, "Establishment of a Study Group to Implement Re-engineered Product Support Practices Within the Department of Defense," to determine how best to implement re-engineered product support activities within the DoD. That group also reported back to Gansler in July 1999, "Product Support for the 2st Century," with recommendations to improve the current processes. Notable in their report is the fact that they felt that their recommendations should be first tested in the 30 Pilot Programs before policy is proposed and promulgated. This was part of the initial discussions on the role of the R-TOC WG.

Senior Management Oversight

Senior management oversight of the efforts to improve readiness at reduced costs continues to be managed at a senior level through DSAC. This body is chaired by Gansler.

It became clear from discussions by the DSAC, as further evidenced in the two reports referenced earlier, that much depended on the implementation results of the 30 Pilot Programs that evolved from the Section 912 (c) studies. Given the importance of these Pilot Programs to DoD, Gansler outlined his expectations in a May 1999 memorandum, "Future Readiness," for the 30 Pilot Programs (which included the 10 Section 816 Pilots), and discussed the need for TOC reduction plans based on trade-off

studies in three large potential savings areas:

- Reduced demand from weapon systems via reliability and maintainability improvements.
- Reduced supply chain response times, leading to reduced spares, system support footprint, and depot needs.
- Competitive sourcing of product support, leading to streamlining and overhead reduction.

The current R-TOC WG is being used to support the DoD focal point's efforts to harmonize the various efforts across DoD. One of the early issues dealt with by the WG was the span of control of PMs for R-TOC. The PMOLCS Study Group had not yet published its final report, but it seemed clear that naming a PM responsible for things totally outside of his or her control was not reasonable. The Secretary of Defense did intend R-TOC to be a DoD-wide effort, but for the most part, the PM's authority was limited to the acquisition aspects of TOC.

For this reason, the WG recommended to Gansler that he re-affirm the overall goal of R-TOC for everyone in the acquisition chain, but give the PMs a primary focus on reducing Defense Systems TOC.

Gansler agreed with the WG in a November 1998 memorandum, "Definition of Total Ownership Cost (TOC), Life Cycle Cost (LCC), and the Responsibilities of Program Managers." For consistency with past initiatives, Defense Systems TOC is defined as Life Cycle Cost (LCC). LCC (per DoD 5000.4M) includes not only acquisition program direct costs, but also the indirect costs attributable to the acquisition program (i.e., costs that would not occur if the program did not exist).

For example, indirect costs would include the infrastructure that plans, manages, and executes a program over its full life and common support items and systems. Note, however, that the memorandum also points out that the reduction of TOC in its fuller definition is still the role of "each Service."

Another important initial issue addressed by the WG was the funding available for R-TOC. Although the Services were making strides in providing the funding needed to implement R-TOC plans, in some cases the funds were not visible to senior management. Two actions were pursued along these lines.

- First, words were put into the Defense Planning Guidance for 2001-2005 to ensure that reasonable funds were made available for R-TOC.
- Second, Program Budget Decision 721 for 1999 was drafted and eventually funded. This made new money available to each Service for R-TOC in order to provide funds for critical R-TOC initiatives and to demonstrate the commitment of OSD senior management.

Management of the R-TOC aspects for the 30 programs that were designated as R-TOC Pilot Programs was another task undertaken by the R-TOC WG. Working through the DSAC, it was decided that each of the 30 program managers would report orally once a year, and quarterly in writing.

The Pilot Programs submitted their R-TOC Plans, including baseline information, to the DoD (R-TOC WG) in October 1999. The initial Forum (before R-TOC Plans were submitted), which involved all of the Pilots, was held Aug. 31 - Sept. 2, 1999. Quarterly Forums, involving sub-sets of the 30 Pilots, are scheduled into the foreseeable future. All discussions at the Forums are held on a nonattribution basis, and only a given program can authorize release of program data, since in most cases reporting is made on work in progress. Figure 3 lists the programs that are currently designated as R-TOC Pilot Programs.

To date, three R-TOC Quarterly Forums have been held, in addition to the August 1999 Forum for all of the Pilot Programs. Despite the fact that designation as an R-TOC Pilot Program carries with it an increased workload for the program, the response and participation has been overwhelmingly positive. Factors in this willingness to participate include the benefits of cross-fertilization, new money, and visibility gained by the programs.

FIGURE 3. **List of Pilot Programs**

U.S. Army	**U.S. Navy**	**U.S. Air Force**
AH-64 Apache	*SLAM-ER - Standoff Land Attack Missile Expanded Response*	*F-16*
Abrams	*ASE - Aviation Support Equipment*	*C-5*
AFATDS - Advanced Field Artillery Tactical Data Systems	*H-60*	*B-1*
CH-47	LPD-17	*C/KC-135*
Crusader	AAAV - Advanced Amphibious Assault Vehicle	AWACS - Airborne Warning and Control System
HEMTT - Heavy Expanded Mobility Tactical Truck System	Aegis Cruisers	C-17
Comanche	EA-6B	F-117
Guardrail	MTVR - Medium Tactical Vehicle Replacement	SBIRS - Space-based Infrared System
HIMARS - High Mobility Artillery Rocket System	Common Ship	JSTARS - Joint Surveillance and Target Attack Radar System
TOW-ITAS - Tube-Launched, Optically Tracked, Wire-Guided Missile System— Improved Target Acquisition System	CVN-68 Class Carrier	CMC - Cheyenne Mountain Complex

**Section 816 Pilot Programs italicized.*

Interest by senior management has been keen. Gansler, Oliver, and Service officials have attended all of the forums.

Themes put forward at these Forums by Gansler and Oliver include the importance of sharing data and experiences from the Pilot Programs, and using those data to quantify the savings that result from the individual initiatives. With valid data, it was argued, it will be easier to convince those who are not intimately involved with the R-TOC effort that additional reforms in legislation and regulation are warranted. This could accelerate the rate at which savings are realized and simultaneously improve the readiness of our forces.

Savings

At this time, savings/cost avoidances are still in the future since initiatives are just now beginning. The date at which that measure will be taken is in Fiscal Year 2005, and all the programs are working toward "stretch" goals of 20 percent+ reductions in Operations and Support (O&S) costs. The R-TOC WG will track the program-generated metrics to see if the Pilot Programs are proceeding on course.

Projected savings in Fiscal Year 2005 vary according to program, but range from a few percent to over 35 percent. Some savings are "in the pipeline" with funds programmed for needed investments. Other savings await the identification of investment funds. That is one of the issues being worked by the Services and the Working Group.

One point that seems to have emerged from the data, thus far, is that the largest savings result from global changes to a weapons system that simultaneously address military readiness and cost. In other words, the way business is performed was changed, as called for by the Perry mandate, in order to maximize the return on the time and funds invested to reduce costs.

R-TOC — A Fertile Soil

The R-TOC Working Group has seen clearly that the policy on R-TOC is being embraced and institutionalized by all of the Service acquisition communities. The speed at which this transformation has taken place is gratifying, and points to the fact that the acquisition reform initiatives have created a fertile soil for concepts like these to flourish. Further, the use of CAIV as a tool for R-TOC has gained wide use by acquisition programs. This has been reported to the DSAC as a very positive sign.

DoD has different "pots" of money, controlled by different sectors in DoD. Because of different accounting rules and since every controlling interest jealously guards their "pot" from other DoD interests, scoring total savings across all of DoD is difficult at best.

On the other hand, both of these concepts (CAIV and R-TOC) need to be more fully employed across the entire DoD. Both policies are primarily acquisition policies. They enjoy strong support from that community, and funding and programmatic changes are being made to ensure that the policies can be implemented. However, it remains unclear if these policies enjoy the same support from communities outside of acquisition. This is an area that will need continued attention as implementation proceeds and tangible savings result.

Other changes may be needed, as well. The R-TOC Working Group continues to examine the advisability of trying to change both regulation and legislation to further speed R-TOC implementation. Regulation, which is under the control of the DoD, is being actively studied to see what changes make sense. Legislative changes, on the other hand, require that a strong business case be assembled to argue that changes are needed. Preparation of a business case will start as soon as hard data are obtained.

One of the intended outputs from the Pilot Programs are data that can be used to spark ideas beneficial to all DoD programs. Data from these various Forums and written Quarterly reports are currently being analyzed to provide generic "lessons learned" that can be shared with others. To date, these lessons learned are not really lessons. Often, what is reported at the Forums and in writing are approaches that are being tested The results will not be in for some time. Near-term (five years out) "stretch" goals of 20 percent savings in O&S costs appear to be attainable for many systems.

To the extent possible, summary data will be released. Currently, a Web site is under development to provide data on the overall effort and provide links to data maintained by the Military Departments. Full implementation of R-TOC initiatives within the Pilots and across other DoD programs will continue for some time into the future. Momentum for the R-TOC efforts will build as real, measurable results are obtained.

Editor's Note: The authors welcome questions or comments on this article. Contact Pallas at **pallassg@acq.osd.mil**; contact Novak at **novakmj@acq.osd.mil**.

ENDNOTES

1. Note that not all of the events can be captured neatly through documentation. In some cases, direction was given through the DSAC meetings, or through various working groups.
2. There are several acronyms for Reduction of Total Ownership Costs. R-TOC is used within the Office of the Secretary of Defense, while the Services have some literature that references TOC-R. These are the same.

OASD PUBLIC AFFAIRS NEWS RELEASE

New Systems Acquisition Process Announced

The Under Secretary of Defense for Acquisition, Technology and Logistics Jacques Gansler announced today a major change in the way DoD will develop and procure future weapon and information systems. The new policies, over a year in the making, are geared to modernize the way the Pentagon does business and are focused on delivering technology to the warfighter faster, at an affordable cost, and with significantly improved performance.

The new policies cover all aspects of how the Pentagon develops and purchases anything that is used by the Department of Defense. They are used by the Pentagon's acquisition workforce and apply to virtually all aspects of the research, development, production, deployment and logistics support of DoD systems.

"These new policies are a critical step forward in acquisition reform because they provide the program manager with far more flexibility than ever before," Gansler said. "It is the way we need to do business if we want to get the best technology we have to our warfighters more quickly and at a lower cost."

This new way of doing business replaces more traditional processes that were inconsistent with current, very rapid technology cycles and based on intractable requirements, many of them requiring technology leaps of unknown cost or timing. The old policies helped to drive the 15- to 20-year development cycles for systems seen traditionally and often causing DoD to spend significant portions of budgets for relatively small increments in performance.

The new policies establish an environment that emphasizes flexibility. Requirements will be more flexible and allow for reasonable, thoughtful trade-offs between cost and performance. Proposed programs may enter the acquisition process at various decision points, depending on concept and technological maturity.

Managers at every level are encouraged to tailor their acquisition strategies consistent with the particular conditions of their program and sound business management practice. Consequently, systems will be able to proceed through development more rapidly, and improved capability will be provided to the warfighter in far less time.

The policies also place increased emphasis on interoperability; give priority consideration to the use of commercial products, services and technologies to meet DoD requirements; stress the benefits of competition to innovation and cost reduction; and emphasize the integration of logistics and systems acquisition to produce more reliable systems and maintain them in a more timely and cost-effective way.

The new policies are codified in DoD Directive 5000.1, DoD Instruction 5000.2, and DoD Interim Regulation 5000.2R. Copies of these documents and related information are available on the Acquisition Resources and Analysis Web site (**http://www.acq.osd.mil/ara/**) and the Acquisition Reform Web site (**http://www.acq.osd.mil/ar**), and are included in the Department of Defense Acquisition Deskbook, an Internet-based reference document used by DoD's acquisition workforce.

Editor's Note: This information is in the public domain at **http://www.defenselink.mil/news**.

PEO C3S Knowledge Center Now Online

New Web Site Combines Technological Wizardry with Meaningful Content

MAJ. GEN. STEVEN W. BOUTELLE, USA • EMERSON KESLAR

The challenges inherent in managing an organization of nearly 1,600 government and contractor personnel are significant. Just as the challenges in commanding an Army unit revolve around the timely availability and application of information, so also the ability to harness and direct the development of major acquisition programs largely relies on the efficient management and use of knowledge.

The declining resources (personnel, time, and money) available to task managers, the diffusion of the workforce, and the necessity that the PEO's workforce stay abreast of the dizzying pace of technological evolution have a great impact on the need for collaboration and the use of knowledge management.

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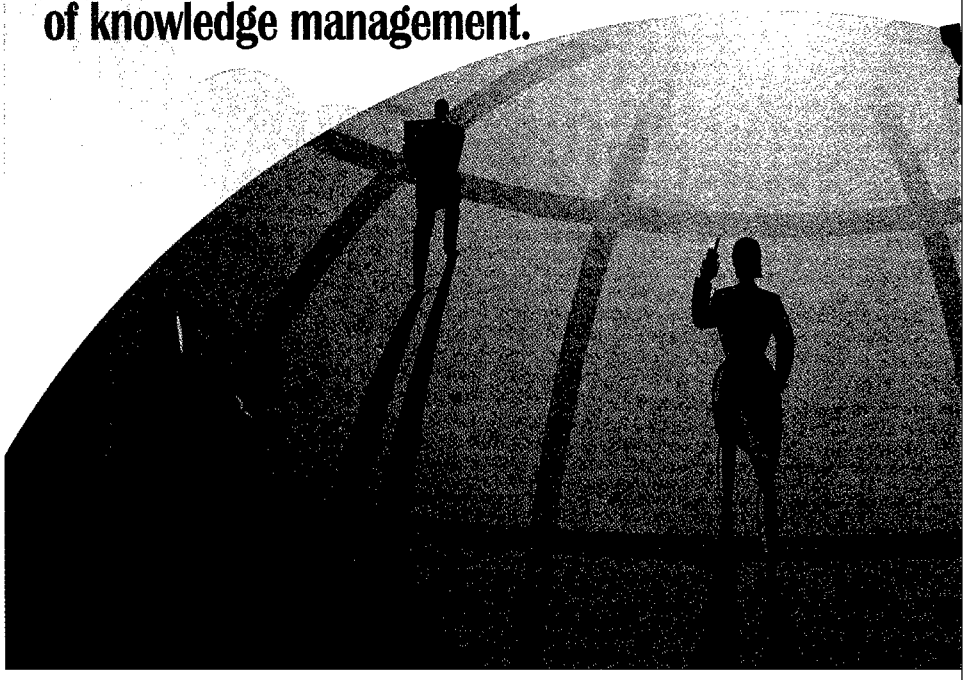

Keeping Pace with Technology Evolution

These factors caused the PEO C3S at Fort Monmouth, N.J., to undertake the creation of the PEO C3S Knowledge Center. As one of the three original pilot programs under the Army Chief of Staff's Knowledge Online program, the PEO formed a team with the mission to formulate and implement an Integrated Data Environment (IDE) that uses technology to leverage shared knowledge and improve work and communication efficiencies. This article focuses on the Web-based Knowledge Center portion of this effort, which also included multimedia conference rooms, desktop technologies, secure e-mail system, and policies for implementation.

In bringing the geographically dispersed organization together and integrating data and business processes, the PEO C3S Knowledge Center was designed to assemble sensitive but unclassified information that addressed the key questions shown in the chart (opposite page) and provide users with a portal to other associated sites. In doing so, it fills a niche between the Web pages that provide information to the general public (the Army Home Page), and the re-

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stricted locations (through Secure Internet Protocol Router Network connectivity) that contain classified information.

Knowledge Center

The two-year Knowledge Center effort focused on the development of an enterprise system that meets current needs and has the ability to keep pace with future requirements. The Knowledge Center configuration has over 600 applications and databases that have been assembled into a single information resource. At a macro level, the center provides the community with assistance and information in six areas:

Institutional Awareness

Institutional Awareness provides members with real time information on what is transpiring within their community. Daily broadcasts of Army and PEO C3S news, project updates, access to calendar events, meetings, human resources announcements, and instant messaging/chat are but a few of the features available to users. Additionally, this feature provides users with portals to other major Department of Defense and Army Web sites.

Information Exchange

Information Exchange applications bring together information that historically resided in subordinate offices and was rarely shared throughout the community. Various libraries serve as depositories of key information (such as briefings, policy, technical papers, and system information) from each project office, and enable the site user to answer questions dealing with requirements, policies, documents under review, comments submitted thereto, briefings, and points of contact.

Collaborations/Real Time Communications

Collaborations/Real Time Communications enable Knowledge Center users to share information and conduct "virtual" meetings and support group collaboration among widely dispersed team members. Shared applications, white boarding, and other online tools provide users with suites of technology tools to enhance performance. Virtual meetings between PEO C3S members based at Fort Monmouth and other CONUS sites, as well as supporting U.S. forces deployed in Bosnia and Kosovo, are routine. The provision of "24/7" global access to information and planning tools are particularly vital to that portion of the PEO C3S community that frequently travels (our "road warriors") to meet Army users, support Army and joint exercises, support system reviews and fieldings, and conduct decision briefings in Washington. This new channel for decision making, group interaction, and systems support has both contributed to team performance and significantly reduced travel and communications costs.

Knowledge Management

Knowledge Management applications provide users assistance on managing and controlling the entire acquisition development process – from drafting a requirements package through source selection and milestone decisions. Databases provide access to a library of "lessons learned," identify subject matter experts, and define functional knowledge areas/information requirements.

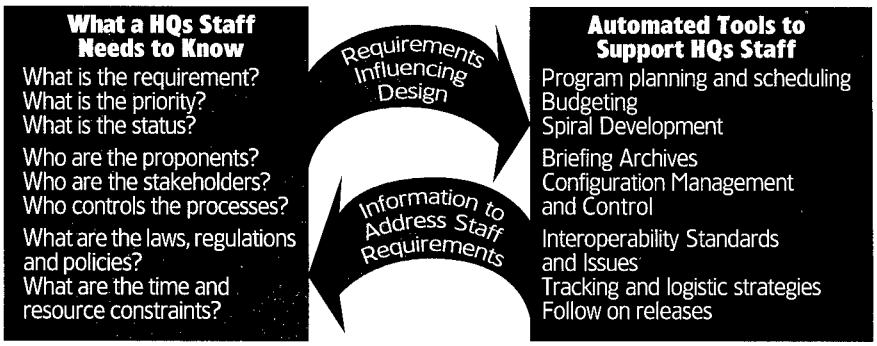
Workflow

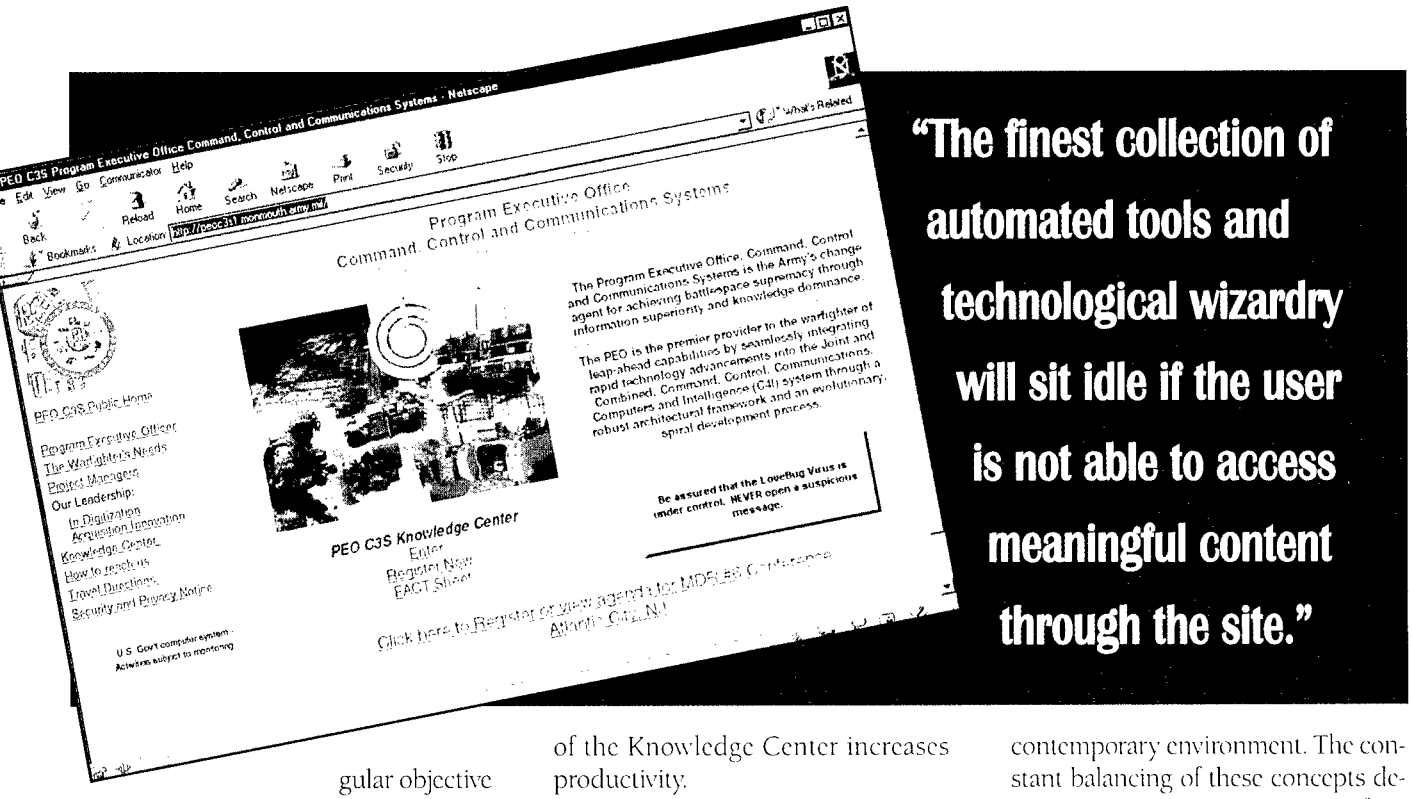
Workflow applications support the use of automated business processes such as suspense actions, warranty tracking, contract data delivery, and acceptance processes. The automated scheduling system and distributed workload features of the site support the automation of redundant processes, the reduction in the processing time for actions, and the analysis of time and productivity measures in the work process. Improved archiving and configuration management and the ability to better understand and focus on inefficient or broken business processes are but two of the benefits derived from these features.

Project Management/Team Tools

Project Management/Team Tools assemble specific tools that have the sin-

PEO CS3 Knowledge Center





"The finest collection of automated tools and technological wizardry will sit idle if the user is not able to access meaningful content through the site."

gular objective of assisting an Integrated Product Team or a Project/Product Manager in functioning across geographical boundaries and focusing on critical issues. Tools support the performance of action tracking, risk assessments, and scheduling actions. Team rooms provide mechanisms for the sharing of documents and calendars. The maintenance of master schedules and interoperability databases allow for the rapid dissemination and configuration management of this key information and the means to "audit trail" key documents and decisions.

On the Right Track

While the development of the Knowledge Center continues, sufficient feedback and experience now exist to conclude that the effort is "on the right track":

- Registration has soared, and there are now over 6,800 users.
- Between October 1998 and August 2000, the number of monthly hits increased from 16,500 to nearly 720,000 (and continues to grow at a rate of 15 percent every month); the number of documents available through the site increased from 300 (October 1998) to over 12,000 (August 2000).
- User feedback shows that nearly 75 percent of the users believe that use of the Knowledge Center increases productivity.
- A recent Return on Investment study concluded that the $2.5 million investment has generated a $23.5 million cost savings.

Lessons Learned

The development of this capability has not been without its challenges, and the experience has generated the following lessons learned that stand to benefit other organizations that move in this direction:

- Active "championing" by senior management is critical to both the development of the Knowledge Center and the fostering of the business processes, that allow for the realization of the benefits inherent in the IDE. The senior manager must provide the resources to address the requirements and be a vocal activist in prodding other community members to support the efforts of the Knowledge Center Team.
- Resolving the conflict between security and open data exchange is a challenge with no "golden key" to solve all issues. The Knowledge Center's development has occurred within the context of daily considerations of the seeming paradox between the need for data security and the premise that the free access and interchange of information, using digital technologies, is a positive contributor to work effectiveness in the contemporary environment. The constant balancing of these concepts demands the constant balancing of security policies, technology, and human factor considerations.
- Increased partnerships and linkages with external agencies are major contributors to the value of the Knowledge Center and the enterprise system users. The PEO C3S Knowledge Center presently has partnerships with the U.S. Army Communications and Electronics Command (CECOM); Research and Engineering Center; Program Executive Officer for Intelligence, Electronic Warfare and Surveillance (PEO IEW&S); the U.S. Army Materiel Command/CECOM Acquisition Center; and the Army Knowledge Online office. Because of these partnerships, the site increases the breadth and depth of information available within the password-protected Intranet, and mutually leverages investments in databases, applications, and technologies. Partnerships are an ideal way to buy increased functionality and utility at discount prices.
- The community must be responsible for providing the quality, quantity, and currency of the Knowledge Center's content, and supporting senior executives in pushing users to use the information and tools resident at the Center. The utility of this knowledge management initiative and its ability to contribute to increasing the effective-

ness and efficiency of the workforce is directly tied to the quality of the site. The finest collection of automated tools and technological wizardry will sit idle if the user is not able to access meaningful content through the site.

- Changing the culture of the using community may be the most challenging hurdle in the full implementation of the technical capability. The old adage that "knowledge is power" has often materialized in the drive to "privatize" information within the individual, section, or office. The use of Web applications to improve business processes is, conversely, built upon the premise that the sharing of information and experiences on achieving success and avoiding failure is the most effective means of improving organizational performance.

Some types of information such as financial status and existing technical challenges, have long been viewed as sensitive, and shared only with the trusted few who had a "need to know." Convincing organizational subscribers to provide this and other types of information seems to be a challenging task that will be accomplished only with time and the active involvement of senior leadership. Those looking for "quick fixes" through the use of Knowledge Center-type applications will be disappointed; those recognizing that the process of adopting and applying the human and organizational element is every bit as time- consuming as developing the technical approaches, will be rewarded for their diligence and patience.

- Secure e-mail must be integrated into the Web application. DoD's standards have established milestones for the encryption of all e-mail traffic and the use of Public Key Infrastructure (PKI) to secure and authenticate the exchange of information. Concurrent with the rollout of the Knowledge Center, the PEO implemented a secure e-mail system that meets DoD requirements. The Knowledge Center applications were integrated with e-mail capabilities so that all documents, even if received in the clear, are posted in a secure environment, and all subsequent transmissions are encrypted.

Final Thoughts

Development and improvement of the Knowledge Center capabilities proceed. Within the PEO C3S, the focus has moved from infrastructure (people and equipment) to leveraging these investments in the continual refinement of our business practices, processes, and the continual education of the workforce on how the Knowledge Center can be better used to do their jobs. Externally, the PEO CS3 Knowledge Center team is sharing its insights, technical acumen, and experience in an initiative and partnership to provide a similar capability to the communities within CECOM. The team is also available to discuss this program in greater detail and share information and insights with other communities that may be embarking on similar initiatives.

Editor's Note: For more information on the PEO CS3 Knowledge Center, go to **http://peoc3s1.monmouth.army.mil/**. For questions or comments on this article, contact Keslar at **ekeslar@c3smail.monmouth.army.mil.**

DSMC Commandant Retires, Relinquishes Command

DSMC Poised to Welcome New Commandant

SYLWIA TERESA GASIOREK

The Defense Systems Management College said farewell to its 15th Commandant Oct. 2, with the retirement of Air Force Brig. Gen. Frank J. Anderson Jr.

Anderson, who came to the college July 30, 1999, relinquished his command by formally passing the DSMC colors to Stan Z. Soloway, Deputy Under Secretary of Defense for Acquisition Reform at a ceremony in Howell Auditorium, Fort Belvoir, Va. Following the relinquishment of command, Anderson and his wife, Bonnie, were honored with a retirement ceremony, marking the culmination of Anderson's 34-year military career.

> It's never been about being in charge or about the rank — it's been about making a difference, and I have really worked to try to make a difference.
>
> —Brig. Gen. Frank J. Anderson Jr., USAF

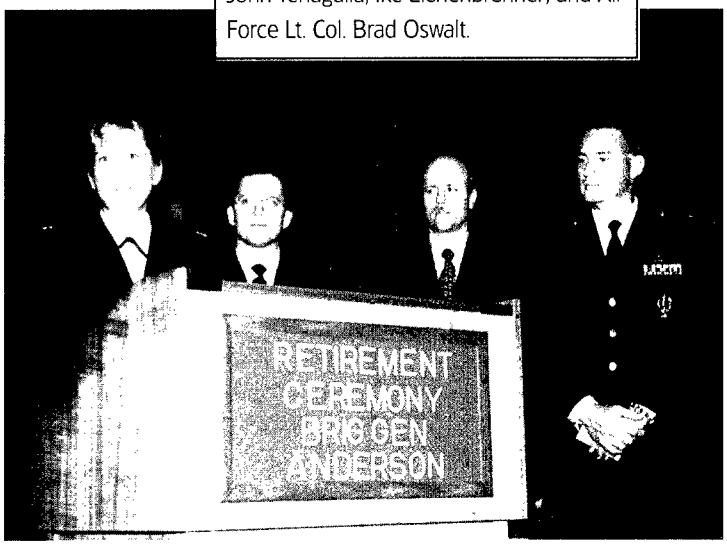
Making a Difference

Reflecting on the challenges Anderson confronted and met, and the many accomplishments he achieved during his 15 months of leadership at DSMC, Soloway emphasized Anderson's leadership qualities.

"Today we are here to recognize and salute the career of General Anderson ... a high-quality, committed, focused talent of the type that all the Services are always looking for. He has established himself as one of the Air Force's brightest, most creative, and most knowledgeable professors."

Soloway said that in every stage of his career, "Frank" had demonstrated a commitment to excellence and to making a real difference. Anderson, he said, brought to DSMC the same degree of commitment and enthusiasm, "for pursuing the art of the possible," which he had demonstrated throughout his entire career.

Recognizing Anderson's wife, Bonnie, Soloway noted that throughout his career, Anderson had been blessed with a dedicated, supportive



Air Force Maj. Rebecca Weirick speaks on behalf of Anderson's former Executive Officers. From left: Weirick; Air Force Maj. John Tenagalia; Ike Eichenbrenner; and Air Force Lt. Col. Brad Oswalt.

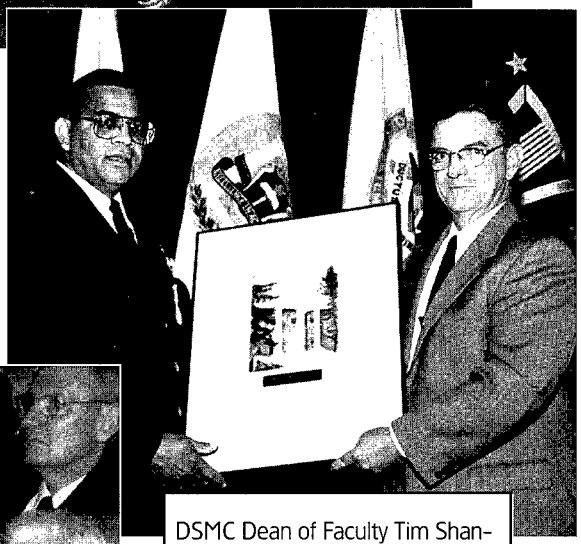
Navy AWCM Scott Russell, DAU Senior Enlisted Advisor (right) presents Anderson a shadow box containing the insignia he wore throughout his career and a flag flown over the U.S. Capitol.

Gasiorek *is a full-time contract editor for* Program Manager *magazine. A native of Poland, she holds an M.B.A. from Strayer University, where she graduated* Who's Who Among Students in American Universities and Colleges.

Photos by Richard Mattox

Anderson (right) receives congratulations from Stan Soloway, Deputy Under Secretary of Defense (Acquisition Reform) as he is awarded the Defense Distinguished Service Medal.

Grandson Josh reviews and approves the printed program for "Grandpa's" retirement.



DSMC Dean of Faculty Tim Shannon (right) presents Anderson a framed, matted photo of the DSMC Headquarters.

Distinguished visitors, from left: Donna Richbourg, Principal Assistant Deputy Under Secretary of Defense (Acquisition Reform); Ric Sylvester, Acting President, DAU; retired Navy Rear Adm. Leonard Vincent, former DSMC Commandant; Rich Reed, DAU Provost.

Wife Bonnie receives flowers from Anderson.

partner and spouse, "who sometimes had to remind Frank who is really in charge."

As Anderson retired from the Air Force after outstanding duty to his nation, Soloway expressed thanks and warmest wishes for an equally successful and rewarding second career. "Well done, general," he concluded.

Man in the Arena

Soloway's remarks were followed by award presentations and parting words from Anderson's staff, former teammates, friends, and others he encountered during his 34-year military career.

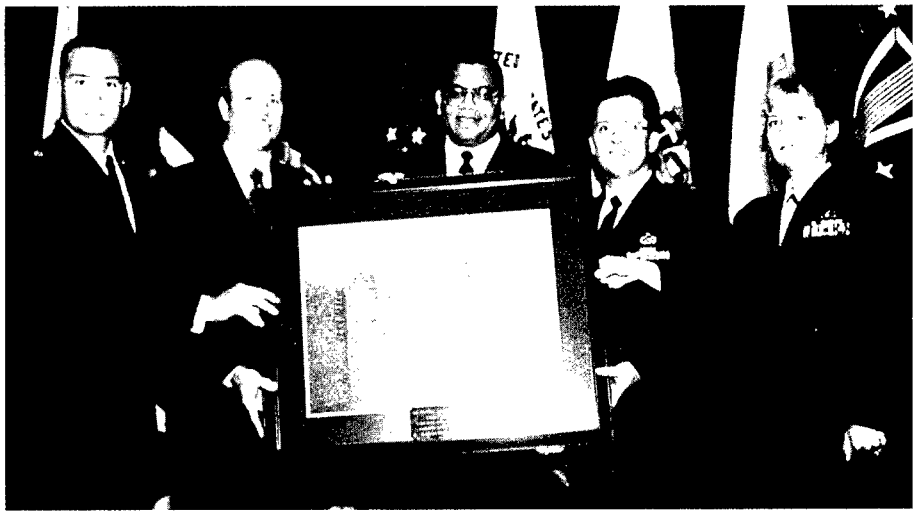
Presenting Anderson the Defense Distinguished Service Medal, Soloway cited his extraordinary leadership, which resulted in "dramatic improvements in the acquisition process and in the education of the entire acquisition workforce."

During Anderson's period as DSMC Commandant, Soloway said that he demonstrated exceptional capabilities in meeting the rapidly changing needs of the acquisition community. Soloway challenged the Defense Acquisition University to continue Anderson's legacy and capitalize its capabilities to reduce acquisition education and training costs.

Richard Graham, Dean of DAU's Norfolk campus, presented Anderson a plaque on behalf of the DAU Norfolk campus. "No one achieves a great success by taking a simple road," he said. Graham also said

DSMC COMMANDANT RETIRE

"It's Been a Great Ride"



Air Force Brig. Gen. Frank J. Anderson Jr., DSMC Commandant, receives a parting gift from several of his former executive officers: From left: Air Force Lt. Col. Brad Oswalt; Ike Eichenbrenner; Anderson; Air Force Maj. John Tenagalia; Air Force Maj. Rebecca Weirick.

Dr. John Matherne, Dean of DAU's Fort Lee, Va., campus (right) presents Anderson a photo album of a recent visit Anderson made to the Fort Lee campus.

Richard Graham, Dean of DAU's Norfolk, Va., campus (right) presents Anderson a plaque on behalf of the DAU Norfolk campus.

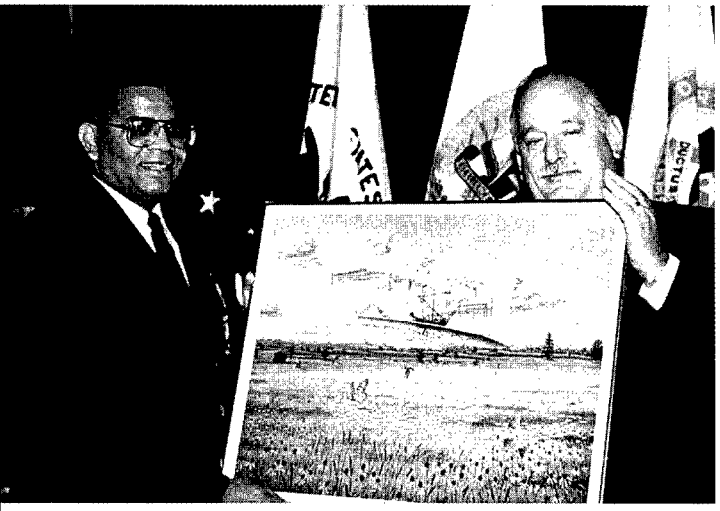
Anderson's wife and headquarters staff assist with the cake cutting. From left: Paulette Langlas; Janice Baker; Army Sgt. 1st Class Rickie Sampson; Anderson; wife Bonnie; Karen Teeple.

DAU Provost Rich Reed welcomes distinguished visitors prior to Anderson's retirement ceremony. From left: Stan Soloway, Deputy Under Secretary of Defense (Acqui-

Photos by Richard Mattox

S, RELINQUISHES COMMAND

Enlisted Contracting Professionals present Anderson an "Honorary Chief Induction Certificate," certifying him as an honorary Air Force Chief Master Sergeant. From left: Air Force Chief Master Sgt. Terry Durrett; Anderson; Air Force Chief Master Sgt. Robert Boone; Air Force Chief Master Sgt. Ronald "Sky" King.



Dr. Richard Murphy, Dean of DAU's Wright-Patterson Air Force Base, Ohio, campus, presents Anderson a lithograph of the Wright Brothers' successful machine-powered flight at Kitty Hawk, N.C.

Anderson (right) greets Blaise Durante, Deputy Assistant Secretary of the Air Force for Management Policy and Program Integration.

sition Reform); Reed; Peter DeMayo, DSMC Board of Visitors; retired Navy Rear Adm. Leonard Vincent, former DSMC Commandant.

The Anderson Family. From left: Daughter Trina; Anderson; wife Bonnie; granddaughter Aubrey; grandson Josh; son Jimmy.

that the joy of achievement comes from doing and not being, and that Anderson had continually reinforced that "our business is our future."

"May our future and yours be equally successful," he said.

Air Force Maj. Rebecca Weirick, Anderson's immediate former executive officer, quoted President Theodore Roosevelt – a quote often used by Anderson during his military career. "It's not the critic who counts, not the man who points out how the strong man stumbles ... the credit belongs to the man who is actually in the arena."

Today, the credit belongs to Anderson, she added, "for the leadership you taught us and for making a difference every day."

It's Been a Great Ride

Speaking to the crowd of friends, faculty, co-workers, staffers, and other well wishers for the last time in his position as DSMC Commandant, Anderson said, "We have a unique and special mission. We have an opportunity to really make a difference." Praising his DSMC and DAU "teammates," he emphasized that "We have absolutely fantastic people in our acquisition community; we have a great team who will do whatever we ask them to do."

Reflecting on his military career, Anderson returned to the theme of making a difference. "It's never been about being in charge or about the rank – it's been about making a difference, and I have really worked to try to make a difference."

"Leading is not being in charge – leading is about serving," he continued. And commenting on his tenure at DSMC, he said that he had been privileged to have an absolutely fantastic job.

"I love the Air Force, and I love the things I've done," he said.

Anderson expressed his gratitude to his family, friends, and associates throughout the professional acquisition workforce as well as to all attending the ceremony. "I'm in debt to all of you who made our lives so enriched. *It's been a great ride.*"

ELECTRONIC SIGNATURES NOV. 1, 2000

Today's *Federal Register* contains a proposed change to the *Federal Acquisition Regulation* (FAR) that supports the Administration's policy of giving electronic records and documents the same weight as their paper-based counterparts. The proposed change to the already electronic-friendly FAR will place electronic signatures on a par with hand-scribed signatures. According to Deidre A. Lee, Director of Defense Procurement, this change "supports the movement of federal business transactions from paper-based to online electronic-based processes, supporting our vision of 21st century American business."

Government contracting officers already may conduct the government's business online. The recently enacted "Electronic Signatures in Global and National Commerce Act" allows American consumers to choose to use electronic transactions when it makes good business sense to do so. Lee's proposed change to the FAR emphasizes the ability of government contracting officials to conduct government business using the method that makes the most sense. The proposed change clearly allows electronic signatures to be used in government contracting and clearly places electronic transactions on a par with paper-based transactions. The proposed change does not limit electronic signatures to any particular technology, allowing agencies to choose the signature format that best meets their needs and security concerns.

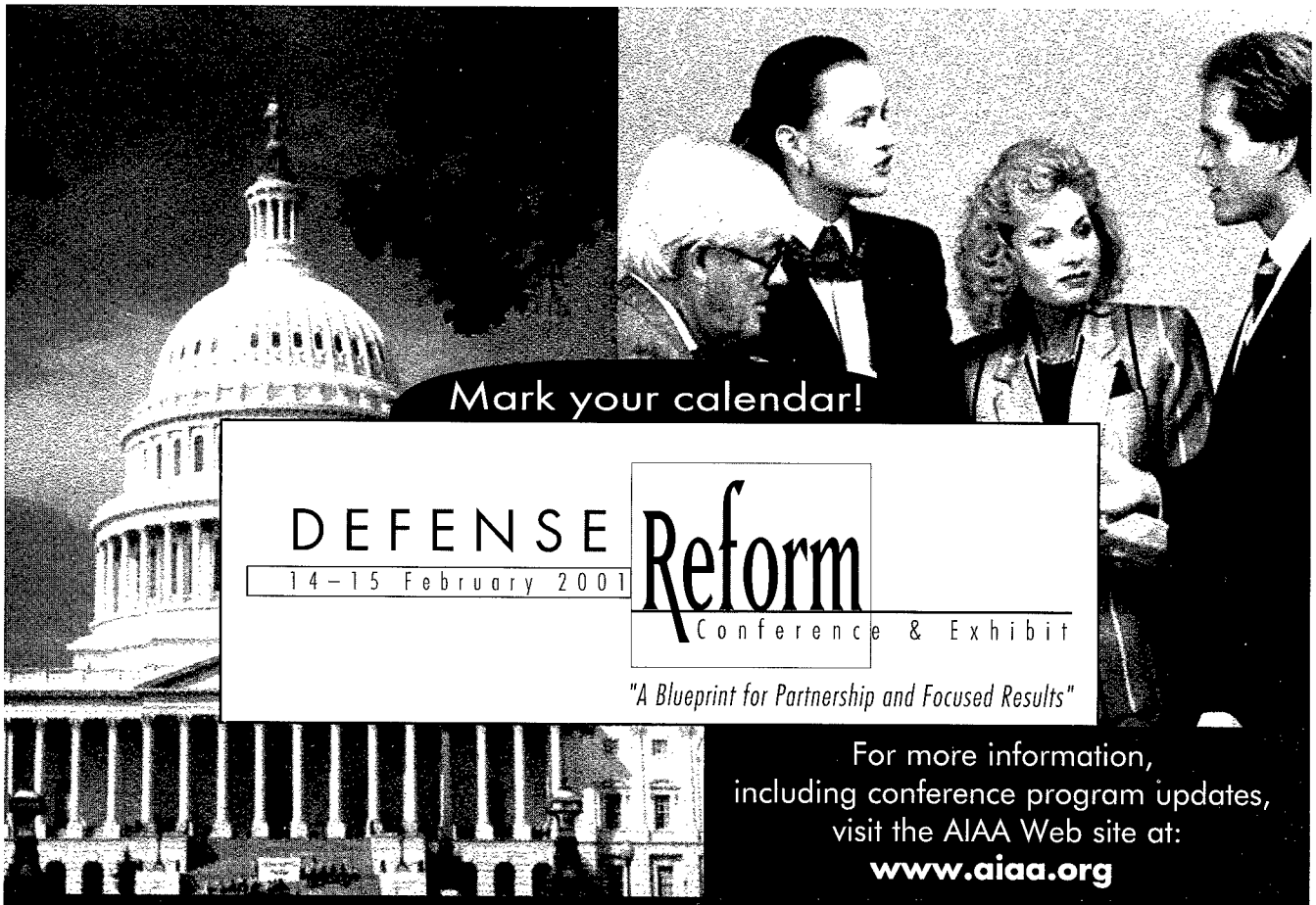
A copy of the proposed FAR change can be found online at **http://www.access.gpo.gov/su_docs/fedreg/a001101c.html**.

INCREASE IN THE TRUTH IN NEGOTIATIONS ACT (TINA) THRESHOLD

The Federal Acquisition Regulation has been changed to increase the threshold for obtaining cost or pricing data from prospective contractors. The threshold, commonly referred to as the Truth in Negotiations Act or "TINA" threshold, was increased from $500,000 to $550,000 effective Oct. 11, 2000. According to Deidre A. Lee, Director of Defense Procurement, "Inflation has increased the number of contracts that are subject to the TINA requirements. This 10 percent increase in the threshold restores the intended level of TINA coverage as required by statute."

Cost or pricing data generally must be provided for contracts over the threshold by prospective contractors selling noncommercial items to the government on a sole-source basis. The prospective contractor must certify that the cost or pricing data are current, complete, and accurate, and the government uses the data to help determine a fair and reasonable price. Cost or pricing data include historical accounting data and factors such as vendor quotations. Obtaining cost or pricing data is the least preferred method of determining a fair and reasonable price since it imposes significant burdens on prospective contractors. The U.S. code requires an adjustment to the threshold for inflation every five years.

A copy of the FAR revision can be found on the General Services Administration Web site at **http://www.arnet.gov/far/**.)



For more information, including conference program updates, visit the AIAA Web site at:
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VOL. 7 NO. 4

U.S. ARMY PUBLIC AFFAIRS NEWS RELEASE

Army Offers Free Online Tech Courses

JOE BURLAS

WASHINGTON, D.C. (Army News Service, Nov. 8, 2000) – Active-duty and reserve soldiers and Department of Army civilians can continue to take free online information technology courses thanks to a recently renewed contract between the Army and SmartForce, a commercial computer-based training company.

Since the Army first started offering the service in 1998, the course catalog has grown to offer training on more than 1,100 technical subjects.

"Rather than send people away from their jobs to half a dozen places for training, why not save time and money by having them sign up for online courses," said Lt. Col. Tom Loper, the program's project manager. "We opted to offer this education to both the civilian and soldier workforce. In an increasingly technology-based Army, these classes not only make students smarter at their jobs but give them more marketable skills for future jobs – inside or out of the military."

The program is offered on the **Web at www.armycbt.army.mil.** The classes range from how to use word-processor, database, and spreadsheet programs for beginner through advanced users to 70 certification-preparation courses for systems administrators and computer programmers.

While all the classes are free for registered users, the program does not offer actual certifications. Arrangements for certification testing and associated testing fees - often costing several hundred dollars – must be made through commercial vendors. Links to those vendors are posted on the Army CBT Web page.

Additionally, many of the offered courses may qualify for college credit. Loper recommended those interested in getting college credit for SmartForce classes check with their local Army Education Services office to determine which qualify and what costs may be involved through a college or university.

Currently, the instruction is primarily text-based with some graphics and photos. SmartForce plans to offer streaming video for instructor lectures in the future when available bandwidth is large enough, Loper said. Online mentoring service is also offered on a limited basis.

To date, 70,000-plus registered Army users have used the SmartForce instruction.

To register or view the course catalog, visit the Army CBT Web site. Registration must be made on a computer tied into an Army-wide area network using a military domain address. However, once the registration is complete, students may log on with a student number and password at home, a local library, or on any other computer connected to the Internet.

Editor's Note: This information is in the public domain at **http://www.dtic.mil/armylink/news** on the Internet.

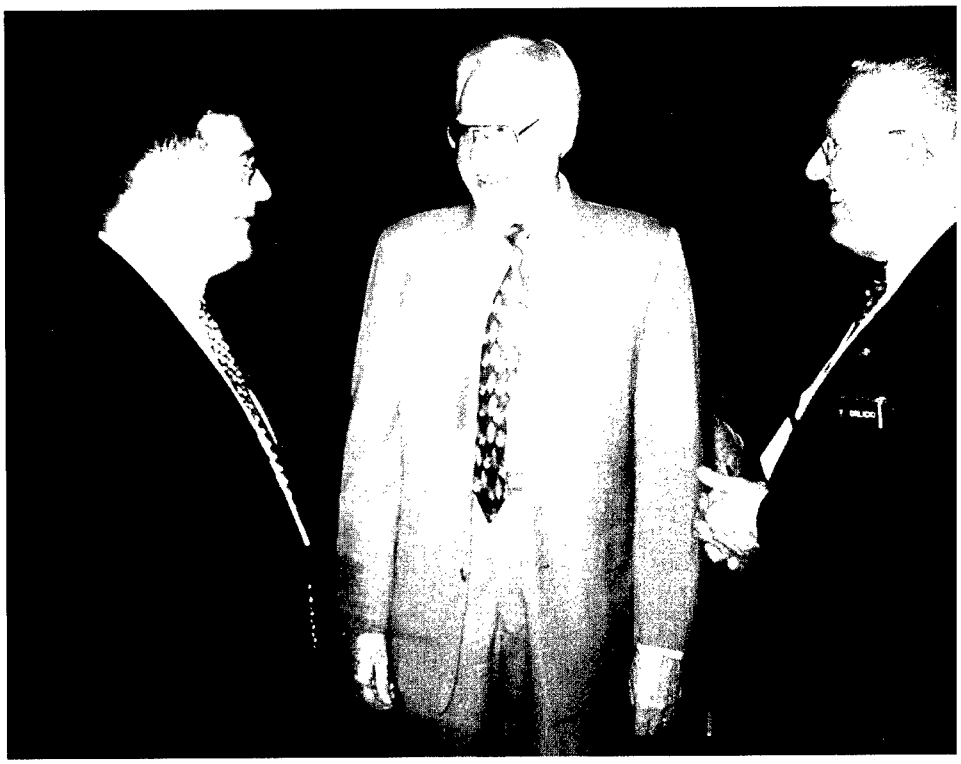
Third Annual Test and Training Symposium Convenes in Orlando

Test and Training Increasingly Being Combined and Brought Closer Together

COLLIE J. JOHNSON

"The number one reason and purpose of government is 'for the national defense'; yet, I find it interesting that in our current budget, defense spending has become what we call 'discretionary' spending, while several other programs have become entitlements. It's sort of upside down, in my view."

–James F. O'Bryon
Deputy Director, Operational Test and Evaluation/Live Fire Test



From left: James F. O'Bryon, Deputy Director, Operational Test and Evaluation/Live Fire Testing; Philip Coyle, Director, Operational Test and Evaluation; George A. Orlicki, U.S. Army Test and Evaluation Command, White Sands Missile Range, N.M.

James F. O'Bryon, Deputy Director, Operational Test and Evaluation/Live Fire Test, who also serves as Chairman, Test and Evaluation Division, National Defense Industrial Association (NDIA), cut to the chase when he opened the 3rd Annual Test and Training Symposium and Exhibition.

"You cannot look at T&E [test and evaluation] in isolation," O'Bryon said. "You have to look at it in the context of *why* we are testing, *why* we are evaluating. The answer is simple. It's because we're trying to equip the troops with the very best."

And equipping the troops with the very best, as all testers, trainers, and evaluators know for a certainty, can not be done in isolation. For that reason, organizers again selected the theme of "Test and Training: A National Partnership," for this year's event.

Over 108 different organizations were represented at the Symposium, held in Orlando, Fla., Aug. 15-17. "We've got a tremendously healthy mix of both what I call the in-house organizations – the Army, the Navy, the Air Force, and the Marine Corps – and also some emergent companies and a lot of software houses represented; also many C3 [command, control, and communications] types of companies and a number of test organizations," O'Bryon said. He also noted that this year's event hosted the largest number of exhibits in the Symposium's history.

O'Bryon asked the participants to focus on six areas as the conference progressed:

- Ways to work together on policy to improve the way the government does business. "Think about changes," O'Bryon urged, "that need to be made to instructions, directives, or other policies – perhaps even legislation –

***Johnson** is managing editor,* Program Manager *Magazine, Visual Arts and Press Department, Defense Acquisition University, Fort Belvoir, Va.*

that would help the government do a better job."

- Opportunities where the government can get some economies of scale from training or test data collection. "Are there people and equipment or a perceived threat to the systems that we could share?" O'Bryon asked. "Perhaps we could trade people back and forth. In other words, are there assets that we can share mutually?"

- Opportunities to share doctrines and tactics.

- Ways that would bring some commonality and efficiencies to the modeling and simulation business, where billions of dollars are now being spent annually.

- Ways that testers, trainers, and evaluators can share calendars and schedules of events so they all know from which events they may benefit, and plan accordingly.

- Cross-functional training, where those in the test community can go to the training community to learn how they do business and vice versa.

Although O'Bryon kept the conference focused, for the most part, on very broad policies across the entire defense acquisition process, the emphasis became more and more focused on specific issues where test and evaluation and training activities do or should intersect for mutual benefit.

He urged testers, trainers, and evaluators to "cross-pollinate" throughout the three-day symposium. "Make sure that you're learning as much as you possibly can. What you do here is important to the men and women who have to fight our nation's battles, and to freedom-loving people throughout the world."

Congressman John Mica

Florida Republican Congressman John L. Mica, the Symposium keynote speaker, expressed a clear, single-minded point of view when it comes to national defense. "If you don't have national security and the ability to defend yourself, all the rest really doesn't matter very much. You can have all the budgets and programs that you like, but they really get cast aside if, in fact, you don't have a national defense."

"If you don't have national security and the ability to defend yourself, all the rest really doesn't matter very much. You can have all the budgets and programs that you like, but they really get cast aside if, in fact, you don't have a national defense."

—Congressman John L. Mica

Taking his cue from the conference theme, "Test and Training: A National Partnership," Mica spoke on "The Imperatives of Strengthening the Test and Training Partnership." He noted that his district, East Central Florida, is home to many military activities, particularly training and simulation activities.

Mica, a former businessman, expressed a keen interest in economy, efficiency, and running a tight fiscal ship. And he believes most of today's Congress is like-minded. "The Congresses of late have been more business people—people interested in bringing commonsense practices to Washington. I'm part of a new generation of people in politics; I believe that's an advantage—bringing business skills and, hopefully, some fresh ideas to Congress."

Any time you're involved in government or business, he said, you look at ways in which you can do a better job more cost-effectively and more efficiently. "But the number one responsibility of our federal government, the number one responsibility most people have lost sight of, is actually to *secure the common defense.*"

Things Are Different Now

Mica noted dramatic change in the nature of the nation's defense mission since he first took office eight years ago. The nation is spending much smaller numbers of dollars, he said, for our most important mission—national security.

"We have a responsibility, not only as members of Congress, but also as stewards of this important national defense responsibility, to see that we ensure the nation's readiness in the most cost-effective manner possible."

Because of increased budget pressures, many programs are now falling by the wayside, Mica noted, and there are very few new initiatives.

Simulation and Live Fire Test and Training

Mica believes that simulation is an increasingly recognized way of doing business more cost effectively. Toward that end, he has helped author, at the national level, a Live Fire Test and Training Program, of which simulation is a natural counterpart.

"We put nearly twenty million dollars into this program, as some of you know," he said. "And I think it's created some great opportunities, not only for the military which I think is extremely important, but also for the private sector." Mica pointed out that often military technology has private sector application.

"I think it's extremely important that government and the military be a partner with the private sector," said Mica. And the Live Fire Test and Training program, he added, was developed with such a partnership in mind.

Another element Mica emphasized as important to the Live Fire Test and Training program was involving the educational and academic community – the nation's think tanks and universities – so the nation reaps the total benefit. The program has been carried out, he said, with some of the nation's finest thinkers and has had tremendous impact in various communities.

Mica stated that 56 percent of the Live Fire Test and Training program funding has ended up in Central Florida in government and industry. "The other 44 percent has gone across the country to many other deserving programs and activities," he added.

Advanced Distributed Learning

In addition to simulation as a means of saving taxpayers' dollars, Mica also has a keen interest in Advanced Distributive Learning, or ADL. Advanced Distributive Learning, he explained, is a very simple program. A technology that was virtually unknown five or six years ago, the active use of the Internet has brought ADL to the forefront of educational media. Quite simply, it incorporates use of technology with learning and distributing the opportunities for learning.

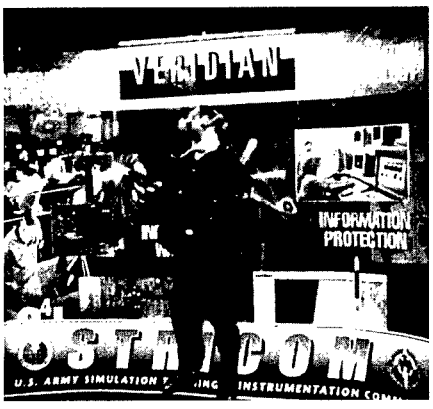
Learning and Military Retention

Today our military is faced with a number of challenges that concern Mica. And one of the major problems he sees with the nation's military is retention – *retaining* people and *training* people. "You learn very quickly, as a novice in government, how important it is to retain qualified people," he said, "and what a tremendous investment we, as custodians of your taxpayer dollars, make in individuals."

Today's military learns more than how to shine shoes and carry a light weapon. Instead, Mica said, they are more likely to be responsible for multi-million dollar machines.

"Today's military requires very advanced skills and technology that we didn't even dream about thirty or forty years ago. And to get those skills and that training, it's important that we have various methods of distributing learning and the capability to use the Internet in concert with Advanced Distributive Learning."

Mica wants to see ADL expanded overseas to remote areas so that all the nation's military forces, including Reserve and National Guard, can learn the highly complex and technical information that they will need to participate "in this new military that we have today."



Through the magic of virtual reality, DoD Deputy Director of Operational Test and Evaluation/Live Fire Testing, James O'Bryon is able to visualize and analyze a simulated combat scenario through technology developed by Veridian, Inc.

Photo courtesy Veridian, Inc.

Philip Coyle — Partners for the Future

Philip Coyle, DoD's Director of Operational Test and Evaluation, spoke on behalf of the DoD Testing Community. Coyle chose "Partners for the Future" as his topic because he does, in fact, see partnerships developing between the DoD Test and Training communities. And pushing test and training together, he said, are *Joint Vision 2010* and *Joint Vision 2020*.

"The Defense Science Board on training put it this way: 'The best way to improve military capability now is through training.' And we're seeing examples of that all the time in operational tests," said Coyle.

He pointed out four good examples where test and training, out of necessity, are increasingly being combined and brought closer together.

JSTARS

Using the Joint Surveillance Target Attack Radar System (JSTARS) as the first example, Coyle said the ability of soldiers to make the best of and correctly assess digitized information portrayed on a computer screen is very dependent on their training. "Let's say a soldier really needs to get the training of an intelligence officer to pull out of the system all the information that's there. We need much better training systems to help these young soldiers learn how to make the most of this kind of equipment."

Safety

Training is also important in other ways, he noted. The terrible crash of the V-22 Osprey is a case in point, according to Coyle, where the aircraft's true performance was not captured in the training models. "We found out that there were things about that aircraft, which now will need to be in the flight simulator, in the manuals, and in the embedded instrumentation on that aircraft – things that were not there in the past."

Close Combat Tactical Trainer

The Close Combat Tactical Trainer too, said Coyle, is a trainer that allows soldiers to work with all different kinds of equipment on any given day, but keeping the system current with new equipment and software developing all the time presents some real challenges.

Humanitarian Roles

Warfighters, said Coyle, are finding themselves facing all kinds of new roles as peacekeepers and, more recently, firefighters out West. The test and training communities, he said, must be better prepared to equip soldiers with the skills they need for those type situations.

Operational Test Agencies

The Service operational test agencies are also combining test and training, Coyle said. "The Navy, in particular, will not do a dedicated operational test anymore if they can find training situations in which to do operational tests. It doesn't mean they don't do dedicated operational tests; they do. Sometimes that's still the better way."

Coyle said that DOT&E, in their work of assessing systems for operational tests, is finding that training issues are arising more and more frequently. In last year's DOT&E Annual Report, for example, 28 major systems were identified where users indicated a need for training. This was especially true in systems that involved C4I [command, control, communications, computers and intelligence] and digitization.

"Every system has computers in it these days, and training is a very important feature for determining what works and what doesn't in military systems."

New Responsibilities

Coyle spoke of DOT&E's added responsibilities as a result of the reorganization of Test and Evaluation a little over a year ago. The most important piece of that new responsibility, he said, is stewardship for the test ranges and facilities. As a result, his office has looked at the test and training ranges in a new way. Their efforts fall mainly into three categories.

"I think you're eventually going to see the same instrumentation used again and again from cradle to grave in the same system."

—Philip Coyle
Director, Operational
Test and Evaluation

- Stewardship of the ranges, along with their partners on the training and readiness side, through the Defense Test and Training Steering Group.
- The Live Fire Test and Training program, which is bringing the test and training communities together.
- The Central Test and Evaluation Improvement Program, through which DOT&E is also looking for ways to bring the ranges together by investing in common instrumentation that will work together interchangeably.

Other DOT&E initiatives involving ranges include putting together joint test and training road maps and developing a strategy for sustainable ranges to help those ranges that face encroachment issues.

Together, the trainers and the testers are trying to incorporate the needs of the training community on the test side with the needs of the test community on the training side, Coyle said.

"But for ranges, what we're seeing on the test side is the resources for test going down at the same time that the workload is going up. In general, at all of the test ranges the workload is up, but the overall budget for ranges is going down. So we're trying to work together with our training partners to deal with these issues, and we're having some success in that regard."

Investing for the Future

Coyle identified several test and training initiatives DoD should consider for future investment:

- Instrumentation capability, which will withstand "Super High G" acceleration, for application in missile defense programs.
- Ground test facilities such as simulators, stimulators, hardware-in-the-loop facilities, and trainers that can test equipment and software on the ground as well as in the air.
- Sharing of more models and simulations.
- Embedded test and training.
- Linking test and training ranges electronically as well as functionally.
- Common instrumentation, which has both test and training missions.

Test and Training — Common Ground

Coyle emphasized that there is a tremendous amount of common ground between the test and training communities. "We both want as much realism as we can get ... We're both partnering with

the CINCs [Commanders in Chief] in order to bring the warfighter perspective in earlier and to achieve greater realism."

Both the test and training communities are also committed to getting real military capability early, Coyle said. And both test and training are about learning. "What we see in operational tests (when we grade the training pieces integrally)," said Coyle, "is that it [learning] helps the system develop much more successfully."

Both communities are using the training ranges for testing more and more, Coyle said. "It's a cost-effective thing to do. Training ranges are very valuable assets. This is happening more and more. We see examples all the time with the Navy, Army, and the Air Force as well."

One of the things upon which both the test and training communities should agree, Coyle emphasized, is to encourage program managers and PEOs to invest early in simulators and stimulators, and, in particular, to invest early in simulators, which really do represent how the system will be worked.

Regrettably, he noted, most information systems lag their development of realistic simulators. "They don't load the system the way it would be loaded in battle. They don't permit the same kinds of operator interactions that you would have, and they don't capture a realistic slice of the overall architecture."

Too often, Coyle believes, program managers wait until they're in trouble to turn to simulation, and then it's usually too late. "It's time consuming and expensive to develop these simulators after-the-fact," he added.

Coyle also discussed instrumentation as common ground. "There's going to be a lot more said in this conference about embedded instrumentation. I believe that it's the future ... I think we're going to see instrumentation more and more on military platforms."

Instrumentation, he said, is used during test, development, and training. Later, it is used to diagnose system failure. And still later, it supports sustainment and the equipment throughout its life cycle.

"You cannot look at T&E [test and evaluation] in isolation. You have to look at it in the context of *why* we are testing, *why* we are evaluating. The answer is simple. It's because we're trying to equip the troops with the very best."

–James F. O'Bryon
Deputy Director,
Operational Test and
Evaluation/Live Fire
Test

"I think you're eventually going to see the same instrumentation used again and again from cradle to grave in the same system," said Coyle.

About the Live Fire Test and Training Program

Coyle praised Mica and O'Bryon's work on, and support of, the Live Fire Test and Training program. "I think it's been a wonderfully successful program thanks to Jim [O'Bryon] and [Congressman] Mica, who literally bootstrapped its existence from nothing. The budget has gone up a little bit every year. It's still a relatively small program, certainly by DoD standards. But the [exhibits] are full of examples of success stories – things that are beginning to have a life of their own and which would not have happened if it hadn't been for this fine initiative."

Nature of Test and Training Changing

Coyle spoke of how the nature of test and evaluation is changing, along with the nature of training. There are new goals being set for new technology in computers and digitization; lasers, high-power microwaves, and other direct energy systems; multi-spectral sensors and detectors on all kinds of platforms; smarter weapons; and modeling and simulation space systems. A tremendous range of new technologies is emerging, which Coyle said is impacting what we [DoD] do in test and evaluation and in training.

And in some situations, Coyle added, the users are training the testers and evaluators. "More and more we often find when we go into a military setting, that the equipment is being used in a way that the designer never contemplated, or never even imagined."

Coyle said DOT&E is also seeing more and more evolutionary acquisition, or so-called spiral development – an area he emphasized was very important to do right, both from the training and the test point of view.

Quoting Dr. Jacques S. Gansler, Under Secretary of Defense (Acquisition, Technology and Logistics), Coyle said that Gansler's words, although directed to the test and evaluation community, apply equally to the training community.

"We'll begin to think of test as an integral part of the procurement process ... We realize that if we can begin operational user test much earlier, we can drastically shorten our weapon cycle times. Also, because of the rapid evolution of modern technology, we must be prepared for frequent and continuous updates for our existing systems. Finally, we must consider the fact that many of our systems will contain commercial elements. Each of these changes is a critical challenge to the test and evaluation community."

New DoD 5000 Series

Part of the new DoD 5000 series deals with making it possible to bring technology from the laboratory to the warfighter much more rapidly. This, Coyle said, is going to have a big impact on how DoD does test as well as training, and when it will be done.

Ending where he began, Coyle said, "Test and training, while they have lots of challenges, are partners for the future. We're doing tests on training ranges and training on test ranges virtually every day; we are, at least in OSD, rediscovering each other and the strengths that our partnerships can bring."

Military Research Fellows Update

2000-01 Report to Focus on Outsourcing

The 2000-01 Defense Acquisition University, Defense Systems Management College (DAU-DSMC) Military Research Fellows came on board in August 2000. This group of three military 0-5s will remain at DAU-DSMC, Fort Belvoir, Va., until June 2001.

During their tenure, they will seek answers to the topic of the effectiveness of DoD's implementation of outsourcing. The purpose of their study is to provide a strategic approach to assessing the effectiveness of outsourcing throughout DoD. This Fellows report is scheduled to be released during the Summer of 2001.

(To view previous Military Research Fellows reports, visit **www.dau.mil/news/whatsnew.htm** on the Internet.)

Message From Senator Connie Mack On Live Fire Test and Training Program

"As a member of the United States Senate, I have the opportunity to review many worthy defense programs, all competing for funding. One worthy program under review and germane to this conference is the Live Fire Test and Training Program. This program, currently funded by Congress in FY2001 for $7.5 million, combines efforts in the live fire test community with those of the training community in raising readiness to unprecedented levels. It uses impressive modeling and simulation technologies, examines casualty treatment issues, battle damage assessment repair, firefighting improvements, and many other solutions to problems such as gravitational loss of consciousness.

This outstanding program is conducted from military training commands in Orlando under the capable leadership of Jim O'Bryon of the Pentagon's office of Live Fire Test and Evaluation. As Jim will attest, I continue to encourage the Department of Defense to support this outstanding program.

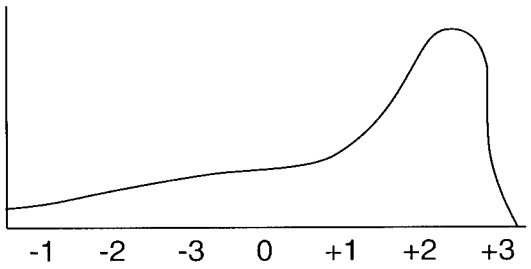
I think this work is so important that I believe the Department of Defense should permanently incorporate the program into its budget to provide continuity and stability. But I'm pleased that Congress has once again funded the Live Fire Test and Training program for fiscal 2001. This is a highly successful program, building and enhancing new test relationships and partnerships between modeling and simulation companies, academia, and the federal government today and beyond."

–Connie Mack

(In a show of bipartisan support, Democratic Congresswoman Tillie K. Fowler and Democratic Senator Bob Graham, both representing Florida, also support continued funding for the Live Fire Test and Training program.)

I read with interest the September-October 2000 issue of *Program Manager*. Enjoyed a number of fine articles; however, would like to comment on one entitled *Leveraging Diversity*, by David Breslin.

If I was a statistician – and I am – I would take serious issue with the conclusions. First, the use of the bell shaped curve assumes normal distribution – very hard to come by in the world of personnel ratings, whether military or civilian. Data from the Services and the Office of Personnel Management will show a very skewed distribution, with a curve for ratings of personnel that looks like the curve shown here.



This makes it difficult because the rater wanting to get his or her personnel promoted will push the ratings into the outstanding column. The same holds true of industry. Thus, you have a statistical problem in ensuring you have the "best and the brightest" and not a bunch of "nice to haves, but not really the ones you would like to look at." To correct the curve, your database would be astronomical and not very useful.

The rules in personnel selection are quite extensive, whether codified in law, federal regulations, state regulations, union-negotiated, or Human Resources Office-directed. They are designed to ensure equal opportunity for eligible employees (and this does not necessarily mean the best and the brightest). The program manager does not have a whole lot of flexibility, particularly at the higher grades, and particularly with the extensive grievance procedures available to those who believe they have not been properly considered. In addition, he or she is bound by very specific laws and regulations regarding the acquisition workforce.

Thus, to use your perfect bell curve, you will have to correct the rating system in industry and the Military Services – a rather formidable task. When you complete that, you will have the task of reviewing and canceling many laws, regulations, and rules governing personnel selection, U.S.-wide (not a bad idea as they need a comprehensive overhaul).

Next, the baseball case. I have a problem with mixing apples and oranges. The baseball problem resulted from racial discrimination, i.e., the exclusion of a whole race. After this problem was reasonably solved, the managers were very specific and limiting in filling holes in their lineup, i.e., pitchers, fielders, pinch hitters, and they only looked for people to fill those specific billets.

The personnel system, while not perfect, is a pretty fair system, even with a statistically skewed distribution. The article is aimed at broadening the area of consideration in something which is not a sport played for entertainment, but a very serious expenditure of taxpayer funds on programs affecting national security – hardly a fair statistical comparison. The Congress has taken a dim view of unqualified people in the acquisition field. Therefore, we are not looking for the best or brightest; we are specifically looking for a person to fill a very specific job description, i.e., logistician, flight test manager, financial manager, or configuration manager.

This leads to the third point. Take a hypothetical case in Service X. In the wisdom of the four-star boss, what was a medium-sized classified research and development project has been elevated to a project because of a technical breakthrough. Colonel "Ican Doit," a recent graduate of the PM course at DSMC, has been assigned. He has a

technical staff, but initially must depend on the functional organization for support until he can organize a completely integrated project. Meanwhile, the tasking from his four-star boss states that he must have an independent budget estimate ready for congressional hearings in six months. So the colonel sets, as his first priority, getting a real pro as a financial manager at the GS-15 level, with a possible upgrade to SES.

The forecast indicates that the program will be a Joint Service one, with an overseas partner, thus requiring a background in Service X, other Services, and overseas partner financial systems. Training was out of the question given the short time span. The colonel was very specific about the job requirements in advertising for this job: a B.A./M.B.A. in financial management; at least five years' experience in DoD financial programs, preferably in any Armed Services comptroller office; two years' supervisory experience; and a top secret security clearance. He also got a waiver to limit the advertising period to two weeks.

In the meantime, he went back to his boss and pled for the temporary assignment of a financial expert from within his command until he could select a permanent person. The colonel could have selected from the first three on the register, but wanted a broader base and selection of a person who could "hit the road running."

Now please do not tell me that excluding possible applicants because of specific job requirements is discrimination or limits the field. This is sound management. This is why people take certain jobs and training to get experience for future opportunities. They work hard to be the best qualified. Being the brightest is not necessarily a desirable attribute.

This was an actual case. The advertising resulted in 50 applications, reduced in screening to verify qualifications and clearance to 25. First-round interviews resulted in reduction of applicants to 10, with the top five presented to the colonel for his selection. The process took four months.

The statement in the article that "the overall quality of the workforce is lowered anytime a group is arbitrarily excluded from consideration" is flat out wrong. I agree that unreasonable restrictions are wrong, but this is what the Human Resources folks are supposed to check. I do not worry about the superstars – most of them need a little seasoning, and a short wait will not hurt them or the system. "Too far, too fast" has hurt a lot of good people.

Thus, the point of the article is unproved. More detailed research into actual cases in government and industry may prove that widening the competitive field for the sake of so-called "diversity," may lower rather than raise the quality of the workforce. This philosophy appears to have lowered the quality in schools and colleges, and in some businesses.

If we do the personnel selection properly, within current laws, regulations, and procedures, we will maintain a high-quality workforce.

–Ret. Navy Rear Adm. Rowland G. Freeman
Williamsburg, Va.
E-mail: rowlandf@aol.com

Continuous Improvement and Innovation — Everyone's Responsibility

Acquisition Community Gathers for 10th PEO/SYSCOM Commanders' Conference

LEON REED

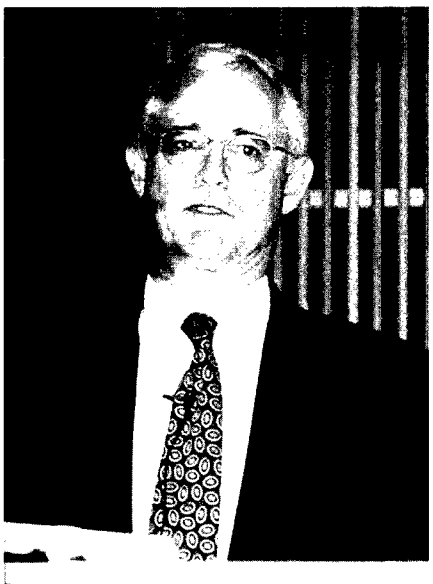
Over 400 members of the acquisition community gathered Oct. 11-13 at the Defense Systems Management College (DSMC) campus, Fort Belvoir, Va., for the 10th Program Executive Officers'/Systems Command (PEO/SYSCOM) Commanders' Conference. "Continuous Improvement and Innovation, Everyone's Responsibility" was the theme selected for the fall conference. Representatives from DoD's acquisition and logistics support communities as well as representatives from defense industry used the conference as a forum to not only assess 10 years of solid accomplishment, but also to look toward continuing challenges that will await the new Administration.

"One of the things that has most impressed me about this job is the quality of the people we have, civilian and military. I'm just awed when I go out in the field and think about how lucky this country is to have these people serving them."

USD(AT&L) Keynote Address

Dr. Jacques S. Gansler, Under Secretary of Defense for Acquisition, Technology and Logistics (USD[AT&L]) wrapped up his official participation in this conference series by delivering the keynote address. Gansler stated that one of his proudest accomplishments was "the joint memo Joe Ralston and I signed last year requiring interoperability as a Key Performance Parameter [KPP] in every new system and making cost a critical design factor."

Looking to the future, Gansler observed, "I can't imagine a future operation that won't involve coalition forces, and our new systems are worthless if they don't have interoperability." He also spoke of cost. "Without making cost a design factor, we'll never get off that curve of higher performance at an ever higher cost. We need to make cost a real engineering challenge, not just an accounting exercise."



Dr. Jacques S. Gansler
Under Secretary of Defense (Acquisition, Technology and Logistics)

Gansler expressed pride that there has been "some progress at addressing the next generation of non-traditional systems. Given the way the system works, there is never a problem of lack of support for the next generation fighter or tank; we're now seeing somewhat better support for things like the next generation of RPVs [remotely piloted vehicles]. We had some success in trying to think differently about future conflicts and the types of systems we need to have [in order] to address these future conflicts."

Gansler identified a final accomplishment as beginning to change the prevailing mindset about "the importance of how we train, organize, and use the acquisition workforce. Traditionally, we have done a great job of training and career planning for the military, but not so much with civilians. We have seen a set of very rapid advances in technology, which in many ways drives changes in the workforce. The acquisition world is really very different than it was a few years ago. In particular, the attitude of the people in the system has really been transformed."

Gansler described the budget process as one of the major continuing challenges for future DoD managers. "When I took this job, I thought we needed to fix three things. I think we've made good progress with the acquisition process and the requirements process, and after addressing those, I thought we needed to make

***Reed** is a member of the research staff, Institute for Defense Analyses, Alexandria, Va.*

Photos by Richard Mattox, Leon Reed, and Army Sgt. Kevin Moses

changes to make the budget process more responsive. We haven't been as successful in this area," although he noted that efforts to change the budget process are more constrained by congressional requirements and expectations.

He believes DoD has made some progress in "a compromise that provides some investment within the context of the existing budget process." He cited the Army's Warfighter Rapid Acquisition Program (WRAP) as a good example of an investment program that allows the Army to make investments in high-payoff, new technologies.

"We put in this year's guidance that all Services should have a similar fund," Gansler stated. "Investments in reliability improvement would be another good area. These investment funds are the best near-term fix to the budget process; they at least give some flexibility to the Services. The best long-range solution is long-term budgeting, where the fierce arguments are about the outyears, but we know what we'll have for the next few years."

Thanking members of the acquisition community for their dedication and cooperation, Gansler concluded by saying, "One of the things that has most impressed me about this job is the quality of the people we have, civilian and military. I'm just awed when I go out in the field and think about how lucky this country is to have these people serving them."

Activities Since Last Workshop

Stan Soloway, Deputy Under Secretary of Defense (Acquisition Reform), provided a report to the conference attendees on actions taken to follow up on recommendations from past PEO/SYSCOM Commanders' workshops and conferences. Soloway took particular note of the increasingly prominent role played by industry at PEO/SYSCOM Commanders' conferences and workshops, which results from a recommendation made at the 1999 Workshop.

He summarized actions that were taken to follow up on recommendations Gansler received from program managers during a special meeting he held with them at the Spring 2000 Workshop. The program managers had made recommendations on a wide range of issues, including workforce training and retention, expansion of the WRAP concept, and budgeting procedures and rules. Soloway reported that follow-up actions have been taken on all of the recommendations presented to Gansler during this exchange.

Soloway also summarized recommendations presented by the Breakout Groups at the Spring 2000 Workshop and actions taken by Office of the Secretary of Defense (OSD) and the Services to follow up on the recommendations. All of the recommendations were assigned to OSD staff members, and a formal tracking mechanism was established to monitor progress in implementing each one.

"If there's a commercial supply chain, grab it and use it. Where there isn't a solid supply chain, build alliances. Where you can't get that far, in a few cases you may have to buy and hold inventory"

Navy Rear Adm. Raymond Archer
Deputy Director, Defense Logistics Agency

Panel of DoD S&T Executives

Dr. Dolores Etter, Deputy Under Secretary of Defense (Science and Technology), chaired a panel of leading S&T executives. Panel members were: Dr. Jane Alexander, Deputy Director, DARPA; Dr. A. Michael Andrews, Deputy Assistant Secretary of the Army (Research and Technology); Navy Rear Adm. Jay M. Cohen, Chief of Naval Research; and Dr. Donald Daniel, Deputy Assistant Secretary of the Air Force (Science, Technology and Engineering).

In her introductory remarks, Etter stated, "The more we can tie together S&T with the acquisition community, the better off we will be." All of the panelists agreed and stated that current collaborative efforts between S&T and acquisition within their Services are the most effective they have ever experienced.

Andrews described the increasingly central role of science and technology in the Army's transformation initiative. He noted that Army Chief of Staff Gen. Eric K. Shinseki has identified technology as the key element in achieving the future vision for the Army. In the past nine months, over $600 million has been taken out of other Army programs and redirected toward S&T because of the importance attached to advanced technology by the Army's leadership. "That's a major commitment to S&T," he said, "and believe me, it ensures a high level of interest in what we're doing."

Daniel noted that interest in, and support for, S&T is equally high within the Air Force. He pointed out that the second-ever "Air Force S&T Summit" would be held within a few weeks, focused on transition of technologies from S&T into systems and capabilities. Every U.S. Air Force four-star general attended the first summit, an indication of the high level of importance given to S&T.

Within the Air Force, the Applied Technology Council (ATC) bridges the tech-

Retired Army Lt. Gen. Lawrence Skibbie, President, National Defense Industrial Association.

Paul Hoeper, Assistant Secretary of the Army (Acquisition, Logistics and Technology).

LeAntha Sumpter, Assistant Deputy Under Secretary of Defense (Acquisition Processes and Policies), leads panel on Balancing Risk with Innovation.

Representatives of the 30 R-TOC Pilot programs accepting awards from DoD. Presenting the awards are Dave Oliver, Principal Deputy Under Secretary of Defense for Acquisition, Technology and Logistics (front row center), and Dr. Spiros Pallas, Principal Deputy to the Director, Strategic and Tactical Systems (front row, seventh from left).

Retired Air Force Gen. Larry Welch, President and CEO of the Institute for Defense Analyses, speaks with Air Force Lt. Gen. Ronald Kadish, Director Ballistic Missile Defense Organization.

"R-TOC is Real" panel. From left: Air Force Brig. Gen. Jack Hudson, Deputy Program Director, Joint Strike Fighter; John Wenke, Head of Logistics Support Department, Naval Air Command; Glen Buttrey, Business Financial Manager, Army PEO Aviation; Louis Kratz, Assistant Deputy Under Secretary of Defense (Logistics Architecture); and Dr. Spiros Pallas, Principal Deputy to the Director, Strategic and Tactical Systems.

Army Lt. Col. Cynthia M. Bedell, an APMC 00-3 student at the Defense Systems Management College, receives an award from Stan Soloway (left), Deputy Under Secretary of Defense (Acquisition Reform) and David Oliver, Principal Deputy Under Secretary of Defense (Acquisition, Technology and Logistics).

Evolutionary Acquisition at Work panel. From left: Air Force Brig. Gen. Jack Hudson, Deputy Program Director, Joint Strike Fighter; Air Force Lt. Gen. Bruce Carlson, Director for Force Structure, Resources, and Assessments; Philip Coyle, Director, Operational Test and Evaluation; Air Force Lt. Gen. Ronald Kadish, Director, Ballistic Missile Defense Organization; Dr. George Schneiter, Director, Strategic and Tactical Systems; and John Landon, Director, Program Analysis and Integration, C3I.

Members of Evolutionary Acquisition panel. From left: Air Force Lt. Gen. Ronald Kadish, Director, Ballistic Missile Defense Organization; Philip Coyle, Director, Operational Test and Evaluation; and Air Force Lt. Gen. Bruce Carlson, Director for Force Structure, Resources, and Assessments.

Dr. Lee Buchanan, Assistant Secretary of the Navy (Research, Development and Acquisition) speaks with Gene Porter.

Science and Technology Executives panel. From left: Dr. Donald Daniel, Deputy Assistant Secretary of the Air Force (Science, Technology and Engineering); Navy Rear Adm. Jay M. Cohen, Chief of Naval Research; Dr. Dolores Etter, Deputy Under Secretary of Defense (Science and Technology); Dr. Jane Alexander, Deputy Director, Defense Advanced Research Projects Agency; and Dr. Michael Andrews, Deputy Assistant Secretary of the Army (Research and Technology).

John W. Douglass, President and CEO, Aerospace Industries Association of America, and retired Air Force Gen. Larry Welch, President and CEO of the Institute for Defense Analyses.

nology transition gap. The ATC is a partnership between the lab, the major command (user), and product centers (acquisition community), in which the partners work to develop new technologies, identify potential applications, and develop plans to ease the transition for these technologies from the lab into weapon systems.

CMI Panel — Commercially Developed Products

Ric Sylvester, ADUSD (Systems Acquisition) chaired a panel on "Civil-Military Integration (CMI) Perspectives." Panel members included: Navy Rear Adm. Raymond Archer, Deputy Director, Defense Logistics Agency; Barry Cohen, Director of Civil-Military Integration, Honeywell Inc.; Air Force Maj. Gen. Timothy Malishenko, Director, Defense Contract Management Agency; and Army Maj. Gen. Joseph Yakovac, PEO/Ground Combat and Support Systems.

Archer noted that to be successful integrating commercial capabilities, "You have to change the way you think. You have to understand how people 'outside the fence' think." Defense Logistics Agency has found that "every commodity has its own industrial base; how you work in the market is different for each one. If there's a commercial supply chain, grab it and use it. Where there isn't a solid supply chain, build alliances. Where you can't get that far, in a few cases you may have to buy and hold inventory."

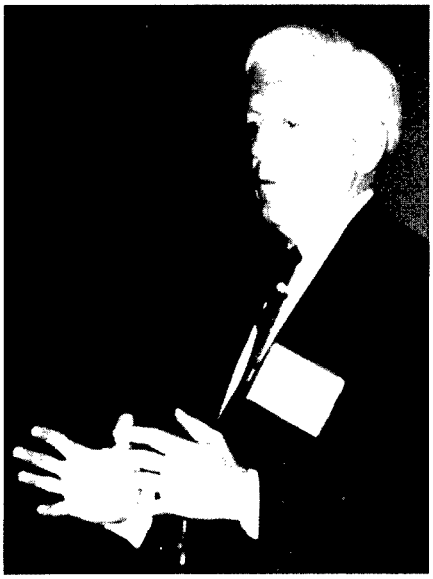
Malishenko reminded the audience of the findings of the 1994 Coopers & Lybrand/TASC study of the DoD regulatory cost premium. "If you look at that study's 'Top 10' list, we have systematically taken on those issues and made a lot of progress. For example, we can identify over 300 business segments that have migrated from MIL-Q-9858 to ISO 9000." But he believes a lot remains to be done. "We really need to migrate away from a local, single contract approach to corporate-wide initiatives."

All of the panelists agreed that considerable progress has been made in implementing CMI; however, a lot remains to be done. "There is much greater potential on the weapon system side," said Archer. "The only way we can get footprint reductions is to get out of the business of holding inventory." Malishenko agreed. "We have met the enemy, and it is us. We're the ones who set limits on our potential in achieving civil-military integration."

In a separate presentation, Rob Deadrick, Boeing's F/A-18E/F Advanced Mission Computer and Displays Program Manager, addressed "Lessons Learned on Use of Commercially Developed Products." His project involved integrating commercial Active Matrix Liquid Crystal Display panels with custom electronics. He reported that the process has worked reasonably well, but has required the design staff to make a major change in its way of approaching systems design, citing the following three lessons learned:

- Adapt requirements. "We have to change the way we develop requirements, from the traditional to an iterative process."
- Use what's available. "We need to follow technology, not push. Pushing technology can cause significant problems, including increased risk. Compromises allow us to use already-developed equipment."
- Use commercial standards, but carefully analyze the future directions of these standards. "You have to understand the commercial market —where it is headed as well as the viability of individual suppliers."

"My priority would be on program stability, and that means multiyear funding."



Lawrence Delaney
Assistant Secretary of the Air Force
(Acquisition)

R-TOC is Real

Reducing Total Ownership Costs (R-TOC) has been a major emphasis of OSD and the Services for the past two years. A panel co-chaired by Dr. Spiros Pallas, Principal Deputy to the Director, Strategic and Tactical Systems, and Louis Kratz, ADUSD (Logistics Architecture), discussed the status of R-TOC implementation within the Services. Other panel members were: Glen Buttrey, Business Financial Manager, Army Program Executive Officer (PEO) Aviation; Air Force Brig. Gen. Jack Hudson, Deputy Program Director, Joint Strike Fighter (JSF); and John Wenke, Head of the Logistics Support Department, Naval Air Systems Command.

Pallas described the genesis of the R-TOC program. Many DoD officials have become concerned that the aging inventory will continue to consume larger portions of the DoD budget, reducing the funds available for modernization. "Operations and Support [O&S] costs rise faster than we anticipate, and the bill payers often turn out to be the acquisition programs." The Services selected 30 Pilot programs to develop new approaches to reducing ownership costs, focusing on:

- Improvements in reliability, maintainability, and supportability.
- Logistics cycle time reduction.
- Competitive product support.

Each Pilot program developed a detailed baseline, and progress has been measured on a quarterly basis.

Pallas also stressed that the purpose of R-TOC goes further than cost reductions. "It isn't just about reducing ownership costs; we're also trying to improve system performance and increase readiness."

Kratz described efforts that have been made to improve the responsiveness of the logistics support process and reduce logistics cycle time. He said that the recommendations from two panels at the Spring 2000 PEO/SYSCOM Commanders' Workshop had been consolidated to develop an action plan, and that good progress had been made in the intervening six months on every initiative. "We have ongoing an independent assessment of 'core' requirements," he said, "which is due to be finished in March 2001. We were also able to coordinate with the outsourcing and privatization people, specific consideration of A-76 waivers. We will address those on a case-by-case basis. We did address it on Apache prime vendor support, for example, and we are willing to address others as we move forward."

Hudson described the efforts of the JSF to "design in" ownership cost reductions. He noted that the program has involved the warfighters in the design process "from the outset." The program has developed "realistic but aggressive cost objectives." The JSF program has gone through four rounds of Cost and Operational Support Trades, which have assessed all costs (acquisition as well as support) vs. performance. Of the system's seven KPPs, three are related to operations and support: mission reliability, logistics footprint, and sortie generation rate. Similarly, Buttrey stated that the user is deeply involved in Comanche design decisions. He also stressed the importance of designing the system for ease of maintenance.

All of the panelists agreed that the R-TOC program and other initiatives have helped foster the best working relationship between the acquisition community and the logistics support community in at least the past decade. "There was a definite problem 10 years ago," said Pallas, "but I think the situation has improved." Kratz agreed that relations between the acquisition and logistics support communities are "the best [they've] been for at least 10 years." Buttrey said that "the degree of interchange with my counterpart in logistics support is the highest it has ever been."

Kratz commended the Services and the Pilot programs for their efforts to reduce ownership costs. "We're really pleased with the progress the Pilot programs are making. We know they're struggling with a very complex problem. We know that (from OSD's perspective) we really asked them to 'slog through' the system, and I think in general the PMs pushed as hard as they could ... and in doing that, they really were able to highlight some of the more difficult roadblocks that we can go fight."

DoD Acquisition Workforce of the Future

Keith Charles, Director of the Acquisition 2005 Task Force, gave a presentation on "Shaping the Department of Defense Civilian Acquisition Workforce of the Future." The Task Force report concluded that the entire Federal Government faces a major shortage of acquisition professionals within less than a decade. Because of hiring freezes and personnel cutbacks in the past years, the acquisition workforce has aged significantly and is now approaching retirement age. "Half of the workforce will be gone by 2005, and three-quarters will be gone by 2008," said Charles.

"Half of the [acquisition] workforce will be gone by 2005, and three-quarters will be gone by 2008."

Keith Charles
Director, Acquisition, Technology and Logistics Workforce Management

However, Charles observed that this challenge also represents an opportunity to change the culture of how the Federal Government recruits, trains, and manages the workforce. The task force report identified that there is no employee recruitment strategy and little workforce planning and market analysis. "We're going to need to figure out how to recruit and hire in the private sector," he said. "We do an excellent job of career planning and training for our uniformed personnel, but not for our civilian workforce. We need to change this." Charles recommended that federal managers should address retirement planning with their senior employees, identify work that can be contracted out, and develop recruitment and training plans for their agencies.

R-TOC Pilot Program Awards

Before the evening session began, representatives of the 30 R-TOC Pilot programs were called forward to accept an award from DoD. In presenting the awards, Dave Oliver, Principal Deputy Under Secretary of Defense for Acquisition, Technology and Logistics commended the Pilot programs. "I commend all the people who got awards for carrying this very important program forward. You all do really deserve credit because I know this has been a real struggle for you to accomplish. But it is so very important to DoD's future, and your successes will help immeasurably."

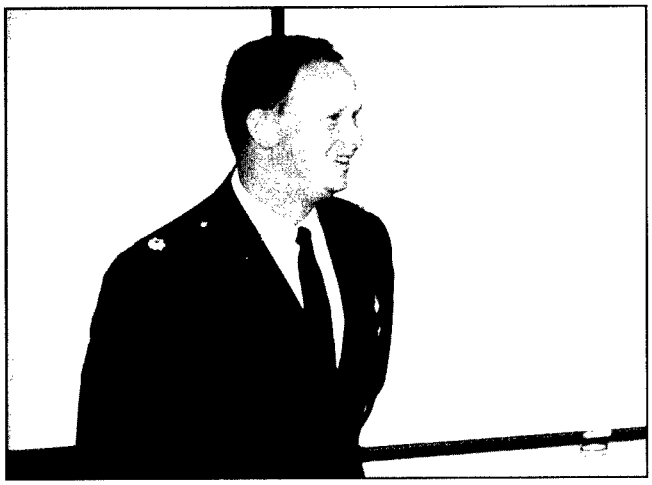
Acquisition Executives' Roundtable

The evening panel provided the most extensive opportunity for the audience to ask questions of senior DoD acquisition executives. An initial question put to all

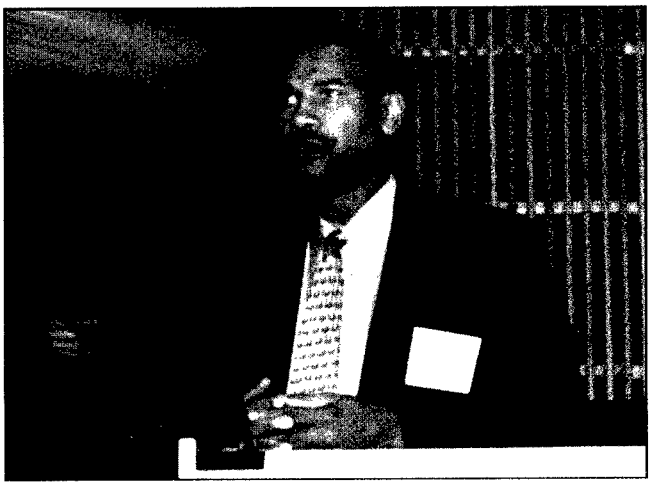
Pre-Conferen

From left: Air Force Col. Barry Wilson, Air Force Col. Cheryl Nilsson, and Joseph McDade, Air Force Associate General Counsel — Tutorial on Alternative Dispute Resolution.

Air Force Maj. Ross McNutt, Acquisition Management Policy Division — Tutorial on Cost of Delay, Evolutionary Acquisition, and Spiral Development.



Air Force Lt. Col. Russell Blaine — Tutorial on Reverse Auctioning.



William Jones, Navy Total Ownership Cost Team Leader — Tutorial on Knowledge Management.

Buoyed by strong attendance and positive feedback from the initial set of tutorials held in conjunction with the Spring 2000 PEO/SYSCOM Commanders' Workshop, conference organizers decided to include tutorials on the program for the Fall 2000 conference as well. Once again, the tutorials were focused on major new programs and emerging issues of substantial interest to the acquisition community. Sessions were held concurrently to allow the maximum number of presentations. The topics and presenters included:

Knowledge Management
Randy Adkins, U.S. Air Force Knowledge Management Program Manager; Alex Bennet, Deputy CIO for Navy Enterprise Integration; Dr. James Edgar Jr., Director, Army Procurement Policy and Acquisition Reform; William Jones, Navy Total Ownership Cost Team Leader; and Mary Lawson-Hines, Air Force Acquisition Reform Office.

Information Assurance
Understanding the Concept and the Threat: Navy Capt. J. Katharine Burton, Director Defense-wide Information Assurance Program; Dr. Michael J. Shore, Chief, Force Protection and Technology Applications, DTRA; and Rick A. Harvey, Research Staff Member, Institute for Defense Analyses.

Cost of Delay, Evolutionary Acquisition, and Spiral Development
Air Force Maj. Ross McNutt, Acquisition Management Policy Division.

Integrated Digital Environment
Navy Rear Adm. Gwilym Jenkins Jr., Deputy for Acquisition Business Management.

Commercial Practices
LeAntha Sumpter, Assistant Deputy Under Secretary of Defense (ADUSD), Acquisition Processes and Policies.

Implementing Performance Based Milestone Payments
Tim Frank, Contract Specialist, Defense Contract Management Agency; Dan Mor-

Photos by Richard Mattox, Leon Reed, and Army Sgt. Kevin Moses

ce Tutorials

Mary Lawson-Hines, Air Force Acquisition Reform Office — Tutorial on Knowledge Management.

Alex Bennet, Deputy CIO for Navy Enterprise Integration — Tutorial on Knowledge Management.

Dr. Michael J. Shore, Chief, Force Protection and Technology Applications, DTRA — Tutorial on Information Assurance.

Navy Capt. J. Katharine Burton, Director, Defense-wide Information Assurance Program — Tutorial on Information Assurance.

rison, C-17 Production Contracts and Pricing, Boeing; Jim Steggall, Manager, Government Acquisition Policy, Rockwell Collins, Inc.; and Craig Webster, Research Fellow, Logistics Management Institute.

Implementing Alternative Dispute Resolution (ADR)

Joseph McDade Jr., Associate General Counsel, U.S. Air Force; Air Force Col. Cheryl Nilsson, Chief ADR Division; and Air Force Col. Barry Wilson, Chief Contract Policy Division.

Reverse Auctioning

Robert Barnhart, Deputy Director of Contracting, Navy Inventory Control Point; Air Force Lt. Col. Russell Blaine, Office of the Deputy Assistant Secretary of the Air Force (Contracting); and Matthew Meinert, Army Communications-Electronics Command.

Integrated Project Management and Past Performance

Bob Kayuha and Rich Leclaire, Dayton Aerospace Corp., and William Basham, Senior Officer, Source Selection Office, Naval Air Systems Command.

Although the tutorials were held prior to the formal start of the conference, most conference participants arrived early to attend at least one of the tutorial sessions. The format of the tutorials allows presenters to address a technical topic in considerably more depth than is possible during a conference presentation, and the informal classroom setting also permits more dialogue between presenters and the audience.

panel members was what they would most like to make sure is kept by the next Administration.

Lee Buchanan, Assistant Secretary of the Navy (Research, Development and Acquisition), responded, "Other Transaction Authority is near and dear to me. It was originally created for DARPA but now has been extended throughout DoD. It's under attack all the time, but it's one of the cheapest ways to get reform because it's so flexible."

Lawrence Delaney, Assistant Secretary of the Air Force (Acquisition), stated that his priority would be on "program stability, and that means multiyear funding."

Army Lt. Gen. Paul Kern, Military Deputy to the Assistant Secretary of the Army (Acquisition, Logistics and Technology), commented, "I would like to see us stick with performance specs. Often, it is so easy to take comfort in MilSpecs, and we have made a lot of progress that I'd like to see continue."

Finally, Harry Schulte, Acquisition Executive and Senior Procurement Executive, Special Operations Command, added, "I have seen Evolutionary Acquisition work – the idea of getting a partial solution to the field quicker. If you have a user community that's willing to accept an 80 percent solution, you can get it quicker, with less risk, and that can still be far better than what they have."

In answer to another question, Delaney stated, "Logistics is just at the leading edge of a revolution brought about by information technology. The ability of networks is such that we're likely to see order of magnitude improvements in the responsiveness of our logistics systems."

"Visibility of O&S costs is a problem," Schulte observed. "It's hard to tell how to do it better without knowing what it costs."

Buchanan commented on the importance of a skilled acquisition workforce and commended DSMC and other educational institutions. "I'm pleased to see that the business of education such as goes on in this building has become incredibly more relevant to the business of buying stuff. That is a big help."

Schulte also identified the acquisition workforce as "the toughest issue we're going to face. The next five years will be critical."

Evolutionary Acquisition at Work

Dr. George Schneiter, Director, Strategic and Tactical Systems, opened the final day of the conference by chairing a panel on Evolutionary Acquisition. Other panel members were: Air Force Lt. Gen. Bruce Carlson, Director for Force Structure, Resources and Assessment, Joint Staff; Philip Coyle, Director, Operational Test and Evaluation; Air Force Brig. Gen. Jack Hudson, Deputy Program Director, Joint Strike Fighter; Air Force Lt. Gen. Ronald Kadish, Director, Ballistic Missile Defense Organization; and John Landon, Director, Program Analysis and Integration, Command, Control, Communications, and Intelligence.

"Evolutionary acquisition is a process whereby a system is developed in a step-wise manner, first providing an initially low-risk but militarily useful version, and subsequently providing versions with more capability..."

Dr. George Schneiter
Director, Strategic and Tactical Systems

In his introductory remarks, Schneiter observed that "evolutionary acquisition is a process whereby a system is developed in a step-wise manner, first providing an initially low-risk but militarily useful version, and subsequently providing versions with more capability... Adopting a time-phased, incremental approach can allow the Department to field new technology more quickly, especially for software-intensive systems, and do it with less risk."

While Evolutionary Acquisition is not new, recent DoD policy changes have put more emphasis on this technique. "Previous versions of the 5000 directives treated Evolutionary Acquisition as a non-traditional approach." The new version makes it a preferred approach, according to Schneiter.

Landon observed that the concept dates back at least as far as a 1978 Defense Science Board report. "We've developed a process where we field a product, use it, look at it, and improve it ... Of all the benefits of this approach, the one I want to emphasize above all is that it brings the user into the process much earlier. We all receive the benefits of getting the user into the process at a point where we can get some feedback, good user insight, and a different perspective."

Carlson noted the importance of the 1999 memorandum, signed jointly by Gansler and Air Force Gen. Joseph Ralston, [then] Vice Chairman of the Joint Chiefs of Staff, which required all new systems to place far more emphasis on evolutionary acquisition, interoperability, and cost. "The requirement for interoperability is probably even more remarkable than the requirement for Evolutionary Acquisition," he stated. "But all three are critical for future sys-

tems." While he stated that not every system is suitable for an evolutionary approach, it has considerable benefits. "If you think through a general road map of how you want to develop a system and field it in a logical manner, it will give us the ability to field a useful system quicker and then build on that affordable baseline capability."

Kadish stated that "in the missile defense area we are still dealing mainly with unprecedented technology ... some very challenging technical requirements. There is still a lot of doubt by many people whether we can do what we say we're going to do. This is why we need evolutionary approaches."

Coyle focused primarily on how the test community can support an evolutionary strategy. "The Evolutionary Acquisition policy requires integrated test. However, like any policy, how you deal with them is the key." Coyle emphasized that PMs understand that acquisition reform gives them the flexibility to take more risk. "Programs are taking more risk, and it is showing up in operational testing ... The biggest concern we often see is a 'rush to failure' on the part of many programs."

Coyle listed several key ways that program managers can subject their programs to unnecessary risk during the operational evaluation (OPEVAL) phase:

- "Betting the whole program" on a single test.
- Going into testing before the program is ready.
- Encountering environments in operational test that the program has never encountered before.
- Waiting until OPEVAL before loading the system realistically.

The model for how to do OPEVAL correctly, Coyle said, was the Navy's F/A-18E/F. "They were careful to selectively try each new environment and requirement before they got to OPEVAL. Long before OPEVAL, they did a series of small operational tests that helped them avoid surprises when they got to OPEVAL."

Said Coyle, "I think the system works best when the operational test community is invited in early. If you reach out early, you get better test – and the warfighter gets a better product." He urged the audience to also involve the Operational Testing community early. "If you get the Service Operational Testing community in early, they're in a *support* mode, not a *report* mode. They're very much a problem-solving team."

Industry Association Panel

The conference concluded with a panel of industry association executives, who gave their perspective on accomplishments and remaining challenges in acquisition reform. Retired Air Force Gen. Larry Welch, President and CEO of the Institute for Defense Analyses, was the panel moderator. Other panel members were: John W. Douglass, President and CEO, Aerospace Industries Association of America; Harris Miller, President, Information Technology Association of America; retired Army Lt. Gen. Lawrence Skibbie, President, National Defense Industrial Association; and retired Air Force Lt. Gen. C. Norman Wood, President and CEO, Armed Forces Communications and Electronics Association, International.

"Shifts away from defense are already happening. More than half the people who sat on my executive committee [AFCEA, Intl.] three years ago are now in the commercial part of their companies."

Retired Air Force Lt. Gen. Norman Wood
President and CEO, Armed Forces Communications and Electronics Association, International (AFCEA, Intl.)

While commending the progress already made, Douglass suggested that a great deal remains to be done in acquisition reform. "My industry thinks acquisition reform is a never-ending treadmill that you have to stay on all the time." In particular, he suggested that considerably more civil-military integration is required.

Skibbie agreed. "We've come a long way, but there is still a long way to go." He too noted the importance of capitalizing on civilian technologies. "Many of these asymmetric threats we face work with commercial cycle times, and that is 6-12 months, not 6-12 years. If we're going to be threatened by people who work with commercial cycle time, then it seems to me that it's mandatory for us to work with commercial Research and Development as well."

Several of the panelists suggested that DoD cannot take for granted the continuing access to technology and production capabilities from high-tech industries. Douglass noted that only a decade ago, his association's member companies were 80 percent dependent on sales to DoD. These same companies now rely on DoD for only about 20 percent of their sales. "The real future for the U.S. aerospace industry – where they're going to make their money – is selling airplanes on the global economy and selling spacecraft on the global economy. DoD is becoming very much a niche customer for us, and a customer that has some serious flaws in the way it does its planning.

"DoD has to look at a much longer haul for what it wants in aerospace," Douglass continued. "Right now, we have absolutely no tactical air programs after 2008. There's a 16-year hiatus in DoD's plans for tactical aircraft; there's simply no way Boeing and Lockheed Martin are going to keep a workforce of tactical aircraft design engineers through a 16-year gap."

Wood noted that these shifts away from defense are already happening. "More than half the people who sat on my executive committee three years ago are now in the commercial part of their companies."

Miller stressed the importance of improving the government's usage of information technologies. "We need to be in a position where there is no difference between all of the functions of government and doing those functions electronically. That's the way the commercial world is moving very quickly, and you all know that in your everyday lives. That is the way we hope we will have the government moving in the near future."

He noted that Americans expect Information Technology to reshape the public sector, as it is doing in the commercial sector, and maximize the efficiency and effectiveness of virtually all government functions. He noted that progress is being made, citing in particular activities such as progress in reverse auctioning and the approval of the Navy-Marine Corps Internet. But he noted that many challenges still exist, including funding, privacy and security, equal access, and the development of a basic "E-gov" culture.

Douglass had particular praise for "the work Dave Oliver has done to get export license procedures squared away. There is no question that this is the most significant event in the past few years."

Oliver closed the conference by thanking the panelists and attendees for their insightful comments and questions. He said that the PEO/SYSCOM Commanders' conferences had been enormously helpful over the years in identifying issues and setting the agenda for improvement of the acquisition process.

Editor's Note: The author welcomes questions and comments on this article. Contact him at **LReed@ida.org**. For information on past or upcoming PEO/SYSCOM conferences or workshops, refer to the DSAC Web site at **www.acq.osd.mil/dsac/**.

ROBERT W. BALL

The Defense Acquisition University (DAU) Press has received word of the death of Robert W. "Bob" Ball on Nov. 11. Bob had been a member of the publications staff at DSMC since July 1976, serving as Director of Publications from 1984 to 1993. In 1994, he became the first editor of *Acquisition Review Quarterly*, DAU's journal of defense acquisition. Bob retired to his native Tennessee on March 31, 1995, after 34 years of federal civilian service.

He is survived by his wife and two daughters.

YOU ARE INVITED!

Interested DoD–Industry Personnel, DSMC Graduates, Faculty, Staff

The Capital Area Chapter, Defense Systems Management College Alumni Association (DSMCAA) sponsors monthly "brown bag" acquisition seminars on timely acquisition subjects, featuring experts in the subject area. Seminars are open to interested DoD personnel; DSMC graduates/alumni and faculty; and DoD contractor personnel, subject to prior notification of attendance. Seminars are normally scheduled on the fourth Monday of each month from 11:30 a.m. to 12:45 p.m., and are held at the following *new* location:

ANSER, Inc.
Conference and Innovation Center
Suite 700
1550 Wilson Blvd.
Rosslyn, Va. 22209

Individuals planning to attend a seminar should E-mail Tod Beatrice at **beatrict@anser.org** or call (703) 588-7747 no later than one work day prior to the seminar. If replying by voice mail, please provide your name, company/organization, and phone number.

To learn more about the great benefits of DSMCAA membership, visit the DSMCAA Web site at **http://www.dsmcaa.org.**

DoD Technology Expo 2000

An important new feature at the fall PEO/SYSCOM Commanders' Conference was the Technology Expo, a set of 32 exhibits from the following leading DoD labs and research organizations:

- Various offices of the Defense Advanced Research Projects Agency (DARPA), the Defense Threat Reduction Agency (DTRA), and the Office of Technology Transition.
- U.S. Special Operations Command and the DoD Reliance Sub-Panel on Materials and Processes.
- Air Force Research Lab and Air Force Materiel Command.
- Army Center for Optics Manufacturing, Aviation and Missile Command, Communications-Electronics Command, and Tank-automotive and Armaments Command.
- Naval Research Lab, Naval Air Systems Command, and Naval Sea Systems Command.

With exhibits located throughout the DSMC campus, the Technology Expo served as a unique forum for conference participants to view state-of-the-art advanced technology and network, stimulating dialogue between S&T managers and acquisition managers.

U.S. Army Communications-Electronics Command (CECOM) exhibit. From left: Bob Tuohy, Office of the Deputy Under Secretary of Defense (Science and Technology) (ODUSD[S&T]); Delores Etter, DUSD(S&T); and Fred Wills, CECOM.

Larry Pollak explains the Defense Threat Reduction Agency (DTRA) exhibit to Dr. Jane Alexander, Deputy Director, Defense Advanced Research Projects Agency (DARPA).

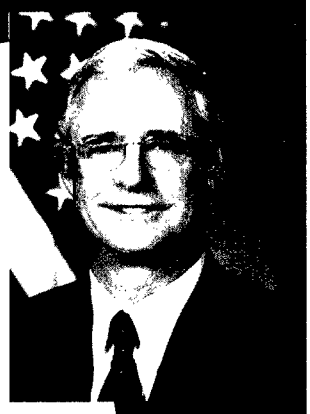
Dr. Aileen Huang-Saad, Institute for Defense Analyses (IDA) and Dan Cundiff, ODUSD(S&T) at Micro Electro-Mechanical Systems (MEMS) exhibit.

Army Sgt. 1st Class Willis Hemenway helps Rudy Trefny with portable controls at the U.S. Special Operations Command (USSOCOM) exhibit.

Dick Roemer, IDA, and Mark Buffler view the Title III Defense Production Act exhibit.

Photos by Richard Mattox, Leon Reed, and Army Sgt. Kevin Moses

Gansler Calls for Increased Use of Performance-Based Payments



THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-3010

NOV 13 2000

ACQUISITION, TECHNOLOGY AND LOGISTICS

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
COMPONENT ACQUISITION EXECUTIVES
DIRECTORS, DEFENSE AGENCIES

SUBJECT: Use of Performance-Based Payments (PBP)

The Department has had the authority to make performance-based payments to contractors under sole source fixed-price contracts for several years, but with the exception of their significant use with "other transactions," this financing technique has not been used widely. Recently, the Federal Acquisition Regulation was changed to remove the prohibition on using PBPs on research and development and competitively negotiated acquisitions, and to permit prime contractors with cost-type contracts to use PBPs on fixed-price subcontracts (FAC 97-16).

There are many significant advantages to be gained from the use of PBPs instead of cost-based progress payments. The Department must take maximum advantage of the benefits of performance-based payments as the preferred means of providing contract financing under fixed-price contracts by making this form of payment the primary and most commonly used form of contract financing. For fiscal year 2002, we must ensure PBP is the primary form of contract financing in at least 25 percent of contracts valued at $2 million or more. By fiscal year 2005, this method of financing should be the most prevalent form used in fixed-price contracts, such as those for complex services or for production efforts.

In fiscal year 1999, there were 195 contract actions valued at $5.6B that used this form of contract financing. By fiscal year 2005, this method of financing should be used in most contracts that provide financing. Exceptions to the use of this contract financing technique should only be agreed to by the contracting officer when supported by a sound business case justification. The attached summarizes PBP policy and lessons learned.

As with many of the acquisition reforms that we are pursuing, changing the predominant way we provide financing payments under fixed price contracts will require all of us to become more sophisticated customers. To that end, I have directed the Deputy Under Secretary of Defense for Acquisition Reform to lead the development and distribution of a guidance document that will assist contracting officers and program managers in the selection and valuation of meaningful technical progress indicators to use in conjunction with performance-based financing payments. I look forward to your enthusiastic and effective implementation of the actions necessary to successfully transition our contract financing practices to this new paradigm.

J.S. Gansler

Attachment:
As stated

Editor's Note: This information is in the public domain. To download the attachment to Gansler's memorandum, go to the Defense Acquisition Reform Web site at **www.acq.osd.mil/ar/.**

Making and Managing the Magic

"Imagineering" Presents Unique Challenge for Former Air Force Physics Professor Tom McCann

COLLIE J. JOHNSON

As a featured speaker at the National Defense Association's Testing and Training Conference in Orlando last summer, Dr. Tom McCann gave the audience a fascinating glimpse into the imaginative and intricate processes of program management, testing and evaluation, and modeling and simulation that help make – and manage – the Disney magic.

You could say that McCann has a program manager's dream job. As Senior Vice President of Engineering, he oversees the engineering divisions within Walt Disney Imagineering (WDI), the master planning, creative development, design, engineering, production, project management and research and development arm of The Walt Disney Company. Headquartered in Glendale, California, WDI is responsible for the creation – from conception through completion – of all Disney Resorts, theme parks and attractions, real estate developments, regional entertainment venues, and new media projects.

That's a far cry from the type of work the 20-year Air Force veteran and former physics professor had been doing until he joined Disney a year ago.

Today, McCann spends his days overseeing system engineering, show ride engineering, design assurance, technical documentation, and technology development programs at WDI. "It's been a real learning experience for me in the little over a year that I've been with Disney," said McCann. "The aerospace experience, of course, is extremely valable and I'm really enjoying this job."

Imagination + Engineering = Imagineering

Working with Imagineers representing more than 150 disciplines – from artists and architects to project estimators and construction managers – McCann's troops are brought on board projects from the very beginning, and the engineering teams are charged with capturing the concepts and turning them into tangible product. And although that may sound like fun to some people, for McCann with his straight-forward, no-nonsense military background, the creative element was a bit, well, foreign to say the least.

"The creative element is something I have never come in contact with before," he readily admitted. "It's sort of like, 'Hey team, give me your requirements. Stop all this arm waving and let's just get the requirements down on paper.' So getting from the creative input part to the requirements on paper part, so that the engineers can understand what it's all about, can be challenging."

From there, the creative collaboration continues throughout the development and construction of the project. And it doesn't end on opening day.

The Life Cycle

The life cycle of a WDI project is generally about five years, according to McCann. During the initial, or "Blue Sky," phase, creative teams of artists, architects, writers, and designers brainstorm story ideas, while Show/Ride engineers consider concepts for ride systems that will support the story.

Once an idea is born in the Blue Sky phase, it moves on to Concept Development. Here's where the "arm waving" stops and the calculators and CAD stations get fired up. Now it's time for the program managers to capture the creativity that was unleashed during the Blue Sky phase and work with the project team to translate it into buildable requirements preparing the project for the various feasibility studies and cost estimates that await. It's also time for the Show/Ride engineers to solidify the concept for the ride system, be it an adrenaline-pumping, 13-story free fall down an elevator shaft as in The Twilight Zone® Tower of Terror at the Disney-MGM Studios, or a whimsical, interactive space adventure such as Buzz Lightyear's Space Ranger Spin at the Magic Kingdom at Walt Disney World.

Once all the studies have been studied, the schedules scheduled, and the estimates estimated, the package is put together for capital authorization and funding.

"And we even get multi-year funding without going back to Congress," McCann says in jest (guess you can take the man out of the military, but...).

Details, Details

Once approved, the project moves on to the Schematics, or design phase. Every detail of the project, including the structural, mechanical, electrical and ride systems, are worked out in a diagrammatic form in preparation for the Construction Documentation phase. Then, with hard hats in hand, it's on to the job site.

Disney engineers are onsite throughout the construction phase ready to answer

***Johnson** is Managing Editor,* Program Manager *magazine, Visual Arts and Press Department, Defense Acquisition University, Fort Belvoir, Va.*

RFIs (Requests for Information), approve shop drawings, and review specifications and materials. And, when all systems are go, the teams conduct weeks of extensive testing to make sure everything is up to Disney standards during the aptly named Test and Adjust phase.

Quality and Quantity

Once an attraction or Park is open, the Imagineers don't just hand over the keys and move on to the next project. WDI's Show Quality Standards (SQS) group includes engineers, designers, and architects who maintain a presence at each Park and work with Operations to ensure the quality of the shows and attractions. Everything from the correct type of light fixture to the exact color of a carpet to the slightest movement of an Audio-Animatronics® figure is documented so that the SQS teams can keep the integrity of the original story intact and ensure that guests will enjoy the same magical experiences that the world has come to expect from Disney.

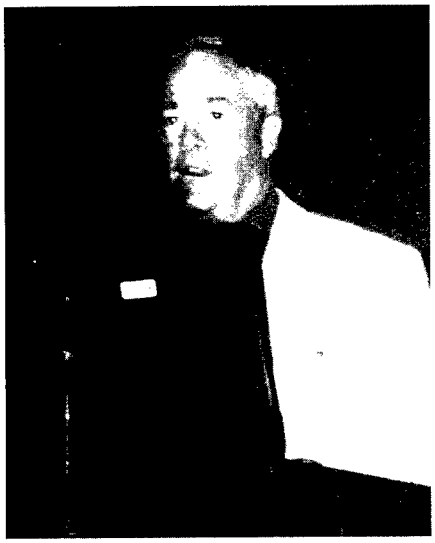
To that end, the technical performance measures that were used during the actual development of the systems are the same ones used to determine the Show Quality Standards.

Before the job of maintaining the standards of the elements in the Park begins, however, the design and engineering teams must come up with the right products that will meet the demanding life cycle requirements. Disneyland Park, for example has been operating some of the same attractions 365 days a year for 45 years, and it's the engineering teams' job to design and create systems that will meet these seemingly impossible demands. "More and more, WDI is partnering with certain vendors," says McCann, "and we're using their systems, but only after bringing them up to Disney's stringent standards to meet the life cycle requirements."

Teaming with Possibilities

From Blue Sky through opening day and beyond, there is one common thread that ties the entire process together and crosses all occupational borders: teamwork.

Once an idea is born in the [initial] "Blue Sky" phase, it moves on to Concept Development. Here's where the "arm waving" stops and the calculators and CAD stations get fired up.



Dr. Tom McCann
Senior Vice President of Engineering
Walt Disney Imagineering

"It's really about relationship building," says McCann. "It's a lot of teaming and a lot of involvement in the Blue Sky approach between systems engineers and creative people. That's what makes it work. That's what makes the magic."

Partnering with the various disciplines within WDI, the Parks and the outside vendors may sound challenging, but it comes almost naturally to the WDI Engineering group, since the division itself has an integrated team structure thanks to McCann's boss, Gil Decker. Before enlisting with Disney, Decker was the former Assistant Secretary of the Army for Acquisition, Research and Development, so getting fellow veteran McCann to support the integration idea was no problem.

"Gil is big on integrated project teams, as are all of us who come out of that Department of Defense acquisition environment," says Tom. "He instituted the Integrated Project Team way of thinking."

Tools of the Trade

That "way of thinking" is only one tool that the Imagineers rely on to get the job done efficiently as well as effectively. Project controls such as work breakdown structures are implemented to provide measurable quantities, and the company has made a concerted effort to put performance measures in place and use a systematic approach to how they actually measure progress.

"Gate reviews" at each stage of their projects is another innovative method. "We will have gate reviews where we review deliverables," says McCann. "That way, we can iterate back if there are certain things that aren't complete at that particular point in the project. Remember, these are roughly five-year projects for the most part, so tight controls and good management up front yield a big payoff in the long run."

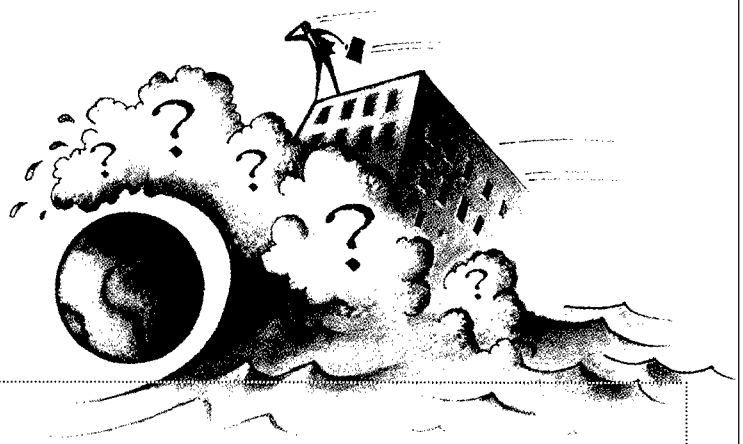
Other factors that McCann sees as aids to the engineering team are the simulation efforts, which are increasing in scope and complexity each year, and the fact that WDI uses all major computing platforms and source software packages. "We use those in all project phases and we now have simulation and modeling data transfer to virtually all of our divisions, plus new in-house tools to help us continue our efforts."

After all," he says, "It's all for the guests, and that means you."

Photo by Collie Johnson

ACQUISITION REFORM

An Internet Listing Tailored to the Professional Acquisition Workforce



Surfing the Net

DEPARTMENT OF DEFENSE

Under Secretary of Defense (Acquisition, Technology and Logistics) (USD[AT&L])
http://www.acq.osd.mil/
ACQWeb offers a library of USD(A&T) documents, a means to view streaming videos, and jump points to many other valuable sites.

Deputy Under Secretary of Defense (Acquisition Reform) (DUSD[AR])
http://www.acq.osd.mil/ar
AR news and events; reference library; DUSD(AR) organizational breakout; acquisition education and training policy and guidance.

DoD Inspector General
http://www.dodig.osd.mil/pubs/index.html
Search for audit and evaluation reports, Inspector General testimony, and planned and ongoing audit projects of interest to the acquisition community.

Deputy Director, Systems Engineering, USD (AT&L/IO/SE)
http://www.acq.osd.mil/io/se/index.htm
Systems engineering mission; Defense Acquisition Workforce Improvement Act information, training, and related sites; information on key areas of systems engineering responsibility.

Defense Acquisition Deskbook
http://www.deskbook.osd.mil
Automated acquisition reference tool covering mandatory and discretionary practices.

Defense Acquisition University (DAU)
http://www.dau.mil
DAU Course Catalog, course schedule, policy documents, and training news from the Defense Acquisition Workforce.

Defense Acquisition University Virtual Campus
https://dau.fedworld.gov
Take DAU courses online at your desk, at home, at your convenience!

Acquisition Reform Communications Center (ARCC)
http://www.acq.osd.mil/dau/arcc
Acquisition Reform training opportunities and materials; announcements of upcoming Acquisition Reform events, and Issues Forum for discussion.

Army Acquisition Corps (AAC)
http://dacm.sarda.army.mil
News; policy; publications; personnel demo; contacts; training opportunities.

Army Acquisition
http://acqnet.sarda.army.mil
A-MART; documents library; training and business opportunities; past performance; paperless contracting; labor rates.

Navy Acquisition Reform
http://www.acq-ref.navy.mil/
Acquisition policy and guidance; World-Class Practices; Acquisition Center of Excellence; training opportunities.

Navy Acquisition, Research and Development Information Center
http://nardic.onr.navy.mil
News and announcements; acronyms; publications and regulations; technical reports; "How to Do Business with the Navy"; much more!

Naval Sea Systems Command
http://www.navsea.navy.mil/sea017/toc.htm
Total Ownership Cost (TOC); documentation and policy; Reduction Plan; Implementation Timeline; TOC reporting templates; Frequently Asked Questions (FAQs).

Navy Acquisition and Business Management
http://www.abm.rda.hq.navy.mil
Policy documents; training opportunities; guides on areas such as risk management, acquisition environmental issues, past performance, and more; news and assistance for the Standardized Procurement System (SPS) community; notices of upcoming events.

Space and Naval Warfare Systems Command (SPAWAR)
https://e-commerce.spawar.navy.mil
Your source for SPAWAR business opportunities, acquisition news, solicitations, and small business information.

Air Force (Acquisition)
http://www.safaq.hq.af.mil/
Policy; career development and training opportunities; reducing TOC; library; links.

Air Force Materiel Command (AFMC) Contracting Laboratory's Federal Acquisition Regulation (FAR) Site
http://farsite.hill.af.mil/
FAR search tool; *Commerce Business Daily* Announcements (CBDNet); *Federal Register;* Electronic Forms Library.

Defense Systems Management College (DSMC)
http://www.dsmc.dsm.mil
DSMC educational products and services; course schedules; *Program Manager* magazine and *Acquisition Review Quarterly* journal; job opportunities.

Defense Advanced Research Projects Agency (DARPA)
http://www.darpa.mil
News releases; current solicitations; "Doing Business with DARPA."

Defense Information Systems Agency (DISA)
http://www.disa.mil
Structure and mission of DISA; Defense Information System Network; Defense Message System; Global Command and Control System; much more!

National Imagery and Mapping Agency [Formerly Defense Mapping Agency (DMA)]
http://www.nima.mil
Imagery; maps and geodata; Freedom of Information Act resources; publications.

Defense Modeling and Simulation Office (DMSO)
http://www.dmso.mil
DoD Modeling and Simulation Master Plan; document library; events; services.

Defense Technical Information Center (DTIC)
http://www.dtic.mil/
Technical reports; products and services; registration with DTIC; special programs; acronyms; DTIC FAQs.

Joint Electronic Commerce Program Office (JECPO)
http://www.acq.osd.mil/ec/
Policy; newsletters; Central Contractor Registration; assistance centers; DoD Electronic Commerce Partners.

Open Systems Joint Task Force
http://www.acq.osd.mil/osjtf
Open Systems education and training opportunities; studies and assessments; projects, initiatives and plans; reference library.

Government Education and Training Network (GETN) (For Department of Defense Only)
http://atn.afit.af.mil
Schedule of distance learning opportunities.

Government-Industry Data Exchange Program (GIDEP)
http://www.gidep.corona.navy.mil
Federally funded co-op of government and industry participants that provides an electronic forum to exchange technical information essential during research, design, development, production, and operational phases of the life cycle of systems, facilities, and equipment.

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Surfing the Net

FEDERAL CIVILIAN AGENCIES

Acquisition Reform Network (ARNET)
http://www.arnet.gov/
Virtual library; federal acquisition and procurement opportunities; best practices; electronic forums; business opportunities; acquisition training; Excluded Parties List.

Federal Acquisition Institute (FAI)
http://www.faionline.com
Virtual campus for learning opportunities as well as information access and performance support.

Federal Acquisition Jump Station
http://nais.nasa.gov/fedproc/home.html
Procurement and acquisition servers by contracting activity; CBDNet; Reference Library.

Federal Aviation Administration (FAA)
http://www.asu.faa.gov
Online policy and guidance for all aspects of the acquisition process.

General Accounting Office (GAO)
http://www.gao.gov
Access to GAO reports, policy and guidance, and FAQs.

General Services Administration (GSA)
http://www.gsa.gov
Online shopping for commercial items to support government interests.

Library of Congress
http://www.loc.gov
Research services; Congress at Work; Copyright Office; FAQs.

National Partnership for Reinventing Government (NPR)
http://www.npr.gov/
NPR accomplishments and initiatives; "how to" tools; library.

National Technical Information Service (NTIS)
http://chaos.fedworld.gov/onow/
Online service for purchasing technical reports, computer products, videotapes, audiocassettes, and more!

Small Business Administration (SBA)
http://www.SBAonline.SBA.gov
Communications network for small businesses.

U.S. Coast Guard
http://www.uscg.mil
News and current events; services; points of contact; FAQs.

TOPICAL LISTINGS

MANPRINT
http://www.MANPRINT.army.mil
Points of contact for program managers; relevant regulations; policy letters from the Army Acquisition Executive; as well as briefings on the MANPRINT program.

DoD Specifications and Standards Home Page
http://www.dsp.dla.mil
All about DoD standardization; key Points of Contact; FAQs; Military Specifications and Standards Reform; newsletters; training; nongovernment standards; links to related sites.

Joint Advanced Distributed Simulation (JADS) Joint Test Force
http://www.jads.abq.com
JADS is a one-stop shop for complete information on distributed simulation and its applicability to test and evaluation and acquisition.

Risk Management
http://www.acq.osd.mil/io/se/risk_management/index.htm
Risk policies and procedures; risk tools and products; events and ongoing efforts; related papers, speeches, publications, and Web sites.

Earned Value Management
http://www.acq.osd.mil/pm
Implementation of Earned Value Management; latest policy changes; standards; international developments; active noteboard.

Fedworld Information
http://www.fedworld.gov
Comprehensive central access point for searching, locating, ordering, and acquiring government and business information.

GSA Federal Supply Service
http://pub.fss.gsa.gov
The No. 1 resource for the latest services and products industry has to offer.

Commerce Business Daily
http://www.govcon.com/
Access to current and back issues with search capabilities; business opportunities; interactive yellow pages.

INDUSTRY AND PROFESSIONAL ORGANIZATIONS

DSMC Alumni Association
http://www.dsmcaa.org
Acquisition tools and resources; government and related links; career opportunities; member forums.

Electronic Industries Alliance (EIA)
http://www.eia.org
Government Relations Department; includes links to issue councils; market research assistance.

National Contract Management Association (NCMA)
http://www.ncmahq.org
"What's New in Contracting?"; educational products catalog; career center.

National Defense Industrial Association (NDIA)
http://www.ndia.org
Association news; events; government policy; *National Defense* Magazine.

International Society of Logistics
http://www.sole.org/
Online desk references that link to logistics problem-solving advice; Certified Professional Logistician certification.

Computer Assisted Technology Transfer (CATT) Program
http://catt.bus.okstate.edu
Collaborative effort between government, industry, and academia. Learn about CATT and how to participate.

Software Program Managers Network
http://www.spmn.com
Site supports project managers, software practitioners, and government contractors. Contains publications on highly effective software development best practices.

Association of Old Crows (AOC)
http://www.crows.org
Association news; conventions, conferences and courses; *Journal of Electronic Defense* magazine.

If you would like to add your acquisition or acquisition reform-related Web site to this list, please call the Acquisition Reform Communications Center (ARCC) at 1-888-747-ARCC. DAU encourages the reciprocal linking of its Home Page toother interested agencies. Contact the DAU Webmaster at **dau_webmaster@acq.osd.mil**

2001 ACQUISITION RESEARCH SYMPOSIUM

CALL FOR PAPERS

"2001 — An Acquisition Odyssey: The Next Stage in the Transformation"

Sponsored by the Deputy Under Secretary of Defense for Acquisition Reform (DUSD[AR])

Co-hosted by the Defense Acquisition University Defense Systems Management College (DAU-DSMC) and the National Contract Management Association (NCMA) Washington, D.C. Chapter

Visit www.dsmc.dsm.mil or www.ncmahq.org for updated information

JUNE 18-20, 2001 • ROCKVILLE, MARYLAND

THE CALL

Researchers, both national and international, interested in or involved with all aspects of acquisition are invited to submit papers. Papers should reflect well-documented research or empirically supported experience in one of the topic areas. Your paper should produce a new or revised theory of interest to the acquisition community using a reliable, valid instrument to provide your measured outcomes.

The theme, "2001 – An Acquisition Odyssey: The Next Stage in the Transformation," has been selected to address the issues brought forth in the Acquisition Reform Initiatives. The primary purpose for the Symposium is to develop candid, open discussions among government, industry, academe, and international communities of interest regarding major concepts, policy, issues, and procedures of concern to the acquisition community. Secondly, the Symposium provides a dynamic forum for the discussion of recent research efforts, best practices, incentives, and major thrusts in the field of acquisition reform management.

TOPIC AREAS

Acquisition Logistics Reform
Business-based Cost and Resource Management
Commerciality
Competitive Acquisition Strategies
Information Technology in Acquisition
Globalization
Integrated Product Teams' Successes
Outsourcing and Privatization
Partnerships
Performance Basing
Small Business Issues
Workforce Issues

PAPER SUBMISSION

Submit three publishable (edited and formatted) copies of your paper and electronic media on a 3-½" disk **not later than Jan. 31, 2001.** Submit to: *Alberta Ladymon, DSMC Program Chair ARS 01, 9820 Belvoir Road, Fort Belvoir, Va. 22060-5565 or E-mail to* ***ars01@dsmc.dsm.mil*** . If you have questions, please call (703) 805-5406/2525 or DSN 655. Include the *Title, Topic Area, Point of Contact's Name, Business Address, Telephone Numbers, and E-mail Address* on a cover sheet to accompany your paper. All correspondence will be communicated with the point of contact listed.

The *Book of Proceedings* will be published on a CD-ROM. Therefore, all research papers MUST be submitted on a 3-½" disk using the format and guidelines listed here.

FORMATS

DOC – Save your paper in Microsoft Word 97
PDF – Save your paper using Portable Document Format
RTF – Save your paper using Rich Text Format. (Provide graphic files in original format, i.e., PowerPoint.ppt.)

GUIDELINES

- 1" top, bottom, and side margins
- Title of paper centered on top of the first page
- Name(s) of author(s) centered under title; Business name(s) of author(s) centered under name(s) of author(s)
- The rest of the paper should have 2 columns of equal width.
- **Limit your paper to 15 pages or less.**
- Graphics and/or charts can either be whole page, half page, or quarter page.
- The font should be Times New Roman with a font size of 12.
- Elements of your paper: *One-page Abstract* that includes a concise statement of the problem/research question and the scope and method of your approach, *Introduction, Body of the Paper, Conclusions,* and *References/Endnotes.*