NPS-AM-04-005

PROCEEDINGS

OF THE

FIRST ANNUAL ACQUISITION RESEARCH SYMPOSIUM

**Charting a Course for Change:
Acquisition Theory and Practice for a
Transforming Defense**

May 13, 2004

Published: 30 September 2004

Prepared for: Naval Postgraduate School, Monterey, California 93943

ACQUISITION RESEARCH
GRADUATE SCHOOL OF BUSINESS & PUBLIC POLICY
NAVAL POSTGRADUATE SCHOOL

The research presented at the symposium was supported by the Acquisition Chair of the Graduate School of Business & Public Policy at the Naval Postgraduate School.

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Preface and Acknowledgements

Many in the Department of Defense associate the phase "acquisition reform" with major policy and legislative initiatives of the past decade, for example, the shift away from reliance on military unique specifications and standards, the emphasis on teaming, the Federal Acquisition Streamlining Act (FASA), and the Clinger-Cohen Act. While we should never discount the significance of these measures, the view that the 1990s were the genesis of acquisition reform diminishes perspective of the long history of reform efforts linked to names such as Goldwater, Nichols, Grace, Carlucci, Packard, and Hoover, to name but a few. Indeed, these efforts extend back in our history to the Continental Congress' attempts to reform the buying practices of General Washington's Army. Considering this history, "reform" may well be acquisition's defining theme.

Of course, acquisition can never be truly and completely "reformed." As a process, acquisition continually evolves as military and political priorities shift, as economic and business conditions change, and as technology advances. Acquisition reform, then, must also be viewed as a process rather than as an end state. The slogan of 16th century Protestants, Reformata et Semper Reformandum ("Reformed and Always Reforming"), must apply in acquisition.

How may such a perspective take hold in acquisition? Elected and appointed leaders can provide the political will to pursue reform, but reform cannot simply conform to shifting political landscapes. Acquisition professionals have the expertise to implement reform measures, but as "owners" of acquisition processes they often have difficulty challenging the status quo.

We assert that a process of continual reform must include acquisition researchers. Only research can provide the type of critical and focused inquiry that informs acquisition's policies and practices and thus promotes its reform. It is in such a spirit of reform that the Acquisition Research Program at the Naval Postgraduate School seeks to engage research in the study of acquisition and its important issues.

The potential benefits of acquisition research are myriad. It can contribute to the effective practice of acquisition in DoD through development of an expanded knowledge base about the field. It can contribute to sound, scientifically-based proposals and recommendations for acquisition decision makers. Perhaps most significantly, it can provide a solid theoretical grounding for future training and educational programs that will enable the workforce to think more creatively and critically about the key issues and challenges of acquisition.

In pursuit of such possibilities, we are pleased to publish these Proceedings of the Naval Postgraduate School's inaugural Acquisition Research Symposium held on Thursday, May 13, 2004, in Monterey, CA. Titled "Charting a Course for Change: Acquisition Theory and Practice for a Transforming Defense," the symposium served successfully, in our view, as a forum for the exchange of ideas among a distinguished and diverse body of scholars and practitioners of public sector acquisition. The contents feature presentations on recently completed and on-going research projects conducted under the Acquisition Research Program, as well as an excellent keynote address by The Honorable Jacques S. Gansler, former Undersecretary of Defense (Acquisition, Technology & Logistics).

We are appreciative of and wish to recognize the support provided for this symposium and its research by the Program's sponsors:

- Commander, Naval Sea Systems Command
- Program Executive Officer, Ships
- Program Executive Officer, Integrated Warfare Systems
- Deputy Assistant Secretary of the Navy (Acquisition Management)

We also gratefully acknowledge the generous contributions of the Naval Postgraduate School Foundation in support of the symposium.

James B. Greene   Keith Snider, PhD
Rear Admiral, U.S Navy (ret)   Associate Professor

Announcement and Call for Proposals

The Graduate School of Business & Public Policy at the Naval Postgraduate School announces the **2nd Annual Acquisition Research Symposium** to be held **May 18-19, 2005 in Monterey, CA.**

This symposium serves as a forum for the presentation of acquisition research and the exchange of ideas among scholars and practitioners of public sector acquisition. We seek a diverse audience of influential attendees from academe, government, and industry who are well placed to shape and promote future research in acquisition.

The Symposium Program Committee solicits proposals for panels and/or papers from academicians, practitioners, students and others with interests in the study of acquisition. The following list of topics is provided to indicate the range of potential research areas of interest for this symposium: **acquisition and procurement policy, supply chain management, public budgeting and finance, cost management, project management, logistics management, engineering management, outsourcing, performance measurement.**

Proposals must be submitted by **December 1, 2004**. The Program Committee will make notifications of accepted proposals by **January 15, 2005**. Final papers must be submitted by **April 15, 2005** in order to be included in the Symposium Proceedings.

Proposals for papers should include an abstract along with identification, affiliation, and contact information for the author(s). Proposals for panels (plan for 90 minute duration) should describe the panel subject and format, along with participants' names, qualifications and the specific contributions each participant will make to the panel.

Send proposals via e-mail to the Program Committee chair, **Keith Snider, at ksnider@nps.edu.**

Further Symposium details (hotel, registration, etc.) will be posted at http://www.nps.navy.mil/gsbpp/ACQN/forums/symposium/ during the coming weeks.

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Keynote Address: Dr. Jacques S. Gansler

Dr. Jacques S. Gansler – former Under Secretary of Defense for Acquisition, Technology and Logistics; presently interim Dean and Roger C. Lipitz Chair in Public Policy and Private Enterprise in the School of Public Affairs, University of Maryland.

First of all, let me congratulate and thank Jim Greene and the Naval Postgraduate School. I think this is really a very important and significant event. Jim refers to it as the 'First Annual Acquisition Symposium' and I would hope that that is actually the case. Getting this group together, I think, is very important.

I should point out that it isn't my first attempt at trying to do things of this sort. Almost a dozen, maybe ten years ago, at the time, the Chairman of the Joint Chiefs asked a couple of us to go back and look at the schools. I got assigned ICAF and what was then the Defense Systems Management College. One of the things that came out very clearly and was actually put into the report that we did for Admiral Crowe was the fact that there really isn't any acquisition research being done, or very little, and that's such a shame.

Then I became head of the advisory board for the Defense Acquisition University and really pressed them to try to put aside some money for external research; put it into the budget. A little bit took place and then it kind of faded away. Again, I tried pushing them when I got to be Under Secretary. They actually did, in fact, introduce the acquisition senior course and wrote a hundred cases; and they tried to do some research but not really the kind that I think needs to be done, and not sponsoring a lot externally. It was almost all done internally.

So it's been sort of a career sponsorship on my part to try to push this whole area. It seems to me that doing research on improving the effectiveness and efficiency with which we do our overall acquisition, both from a theory and a practice perspective is absolutely essential. There is so much evidence of the potential for improvement that you can easily make the case, it seems to me.

The problem is that while we do spend over $200 billion a year now, I guess the budget has gone up: In my budget, I had $40 billion for R&D, $60 billion for procurement, and $80 billion for logistics, so, $180 billion. It's now over $200 billion for that same kind of pot. Think about it in terms of every working day, over a half a billion a year is spent on these three areas and we never seem to have enough money left to even spend a very tiny percentage to try to improve it. We use it all up and we are always short, by the way, in all three categories - - in terms of what we need.

I thought about it in terms of putting some notes together for this meeting. It struck me that now you can make the argument that there are so many changes happening in the process, which influence the acquisition process. It is almost a crime for us not to be figuring out ways to enhance that process, to improve the efficiency and effectiveness of it. We should not be willing to settle; the government, the nation, the taxpayer really, shouldn't be willing to settle. So what I thought of doing was trying to highlight what I think are *the six major changes that are effecting the acquisition process today*, and suggest that these may be at least six areas *where we should be doing a significant amount of research that, frankly, is not being done today.*

The first of these is the changing nature of what the government itself does. This is going from the government as a monopoly "doer" of things to the competitive sourcing of this work; *as we have begun to do*. Regardless of whether the public and private sector win these competitions, we're introducing market forces to improve the performance and lower the cost. This is done through A76, and other processes like that, including outsourcing sometimes, privatization sometimes, public/private partnerships, etc. You will hear about some of these examples later today.

The interesting part of this is that the Defense Department has taken the lead in doing these things without much research on how it's done or how to do it more effectively. How to apply best practices? How to actually put together the results? How to do enough cases so that people would understand it better? Yet, overwhelmingly the data that are available tend to show that we significantly improve performance (in some

cases by orders of magnitude) and at the same time, on average, lower the cost by over 30%. Now why wouldn't one want to do things like that? If you can dramatically improve performance and dramatically lower cost, why aren't we doing it?

Research into overcoming barriers, developing best practices, worrying about the government workforce in terms of soft landings; this overall area needs to just simply get more visibility. With data - - hopefully facts do have some influence sometimes in this area - - it can actually make a big difference. That's number one. It's the changing nature of the government's role. Clearly, right now, you hear this in terms of civilianizing some of the military slots, for example. In terms of work that's not inherently governmental that people in uniform are doing instead of carrying guns, when we have real shortages of people in the military. All of that area, I think, is the first one I would highlight.

The second one I'd highlight **is the impact of e-government** or the transformation to information-based management and control systems; but much more than from a management perspective, almost from a leadership perspective. Sort of end-to-end; from procurement, finance, logistics, and so forth. Here again, huge benefits in terms of higher performance and dramatically lower costs, if you're willing to change the process. It's not the people that are the problem; it's the process that's the problem - throughout the whole acquisition domain, in my opinion.

The classic example is logistics. You will also hear more about that as we go through the day. We spend over $80 billion a year on logistics. We do not do a world-class job by any measure that you can come up with. We pile up enough metal and put enough people on it so that we can do it. But if you want to compare our performance to any world-class operation, whether it be Caterpillar, FedEx, pick anyone, they deliver 24 hours domestically, 48 hours internationally with 99.99% probability. We, from the first Gulf War, had an average of 36 days. We've reduced that (this is when things were on the shelf) to an average of 22 days, with an uncertainty of one to two years. So, we order three times as much, in order to make sure that we get it. Thus, we have a $60 billion inventory floating around, of which about half of it is obsolete. We simply do not

do a world-class job - - in terms of responsiveness, dependability, or cost. This really matters to war fighters. This is really where the business side meets the war-fighting side. Modern logistics systems, information technology systems, are obviously the way to go here. You can have the desired effect when you link in finance and procurement. So it's an end-to-end system. Very clearly, this is an area in which the DoD is lagging what has been demonstrated commercially on a worldwide basis. And the biggest challenge here is overcoming institutional hurdles. Research into how it's been done, and into what results have been achieved, can make a huge difference in overcoming the institutional inertia to the needed changes.

Now, if you put together those two, the changing nature of what the government does and the impact of e-government, what you see is a clouding of the separation of lines between the private and public sectors. In the past it's been relatively differentiated. Now you're seeing a fuzzing of those lines. And that's good. Take advantage of what is best in each one and figure out a way to use market forces or competition to maximize performance, while minimizing cost. Everybody knows we need that extra money. If we could even achieve 10% savings on logistics (at $80 billion a year) here's $8 billion annually that could be put into modernization, which we so badly need.

The third area comes from the revolution in military affair. The changing nature of warfare and the changing nature of the technology used for it. Bill Perry called it "reconnaissance/strike" warfare. You can call it "a transformation in military operations". Whatever you want to name it, the reality is we have multiple, distributed sensors and distributed shooters, all "joint" (multi-service) and all interconnected by communication, command and control systems, fused data, etc.

Now, what does this mean for the acquisition community? The first thing that it means is that we must learn how to manage "systems-of-systems". We have always set up our procurements, our program offices, and so forth, around systems platforms; basically ships, planes, tanks, even radios. Now what we have is the challenge of managing a system-of-systems, an integrated program. We aren't organized to do that.

We don't have management practices to do that. And we have got to learn how to do that if we're going to learn how to manage these very complex systems-of-systems, which is what the revolution in military affairs is all about - - all on a joint basis and (as I'll explain in a minute), on a multinational basis.

In addition, because the system-of-systems, and the revolution military affairs, and the technology are all so heavily dependent on information technology, we now introduce the whole question of cyber security; as well as privacy in many of these areas (in terms of protection of cost data, and things like that). Security of the information systems, and the vulnerability of those information systems, now becomes an area for very important research that has to get done. In a certain sense, you also introduce the added unreliability associated with complexity, when you get into systems of this sort.

There is a lot of very critical analysis simply associated with the technology of these systems. The systems have to be, for example, open architecture. This idea of "plug-and-play" has to be realized; as contrasted to just being in the speeches. And it has to be nonproprietary. How do we structure this from a procurement perspective? It all needs to be linked with "middleware", rather than each program's individual, unique systems. Additionally, we have to be able to handle the rapid changes taking place in this technology. Therefore, we need to be able to, literally, "plug-and-play" with frequent updates of new systems. These are big management challenges to the acquisition community, it seems to me, brought on by the way we're going to be structuring our systems, in order to be fighting our wars of the future.

The fourth area I would raise *is the changing nature of the acquisition process itself.* We are moving to, and should have moved to a lot earlier, the use of spiral development - writing requirements that are capability-based, writing test and evaluation plans that are capability based. These all result in dramatic changes in each of the processes associated with the acquisition process.

Just think of the budget process. Historically we've had a budget process that's R&D, then procurement, and then logistics. Now, with spiral development, we have a

block one, a block two, a block three, and a block four, all with R&D. R&D never stops in a spiral development process. Test and evaluation never stops in a spiral development process. The requirements have to be written such that the system is capability-based and continues to evolve as the technology evolves - - as a new capability is proven out. This changes the whole acquisition process, and we haven't really implemented that. Additionally, these all have to be requirements that are cost-based, because otherwise we're not going to be able to afford enough of each system. We're going to have to get off that historic curve where we constantly get improved performance at higher cost. We now have to figure out how the next-generation systems will have improved performance at lower-costs. So cost is a military requirement, not an accounting problem.

Because the technology is changing so fast, we also have to be scheduled driven. And we haven't traditionally done that. In this Navy audience maybe I can pick on the F-22. Some cynics say it's named that because it's taken 22 years to develop it. Now think about the technology in that. When I was there a few years ago, we spent $350 million upgrading the electronics systems, because they were obsolete, and it hadn't even been put into production yet. There's something wrong about that cycle time when the critical information technology is evolving every 18 months and our system developments are taking 18 years. They're just incompatible. So, we have got to be schedule driven. The ACTDs and similar things are part of the acquisition change that can help us in this area. Also, using commercial systems, commercial practices, and commercial suppliers can have a big impact here. But all of these changes impact the way in which we have traditionally done our acquisition business. So, these are areas for very significant acquisition research.

The last area I would point out (in the changing nature of the acquisition process) is how do we keep continuous competition - - or at least the potential for it? If you genuinely believe, as I do and as all the empirical data certainly shows that the way to keep motivating innovation and lower-cost is through continuous competition, then it must be part of the process. By continuous I mean, for example, you can make the Joint Strike Fighter keep the two engines annually competing, (for a share of the buys)

as we did in the "great engine war" for the F-16's & F-15's - - so there is an incentive for better and better performance/reliability at lower and lower costs. Even in the case of the Joint Strike Fighter avionics, having a second avionics **potential** supplier so that every five years, as avionics technology continues to evolve, you can get two or three, or even four for five, generations of new avionics procured in a competitive environment.

So if the current supplier doesn't continue to improve their performance and/or lower their costs then you have an alternative. The fact is, if you have an alternative they will continue to improve performance and lower-costs - - as contrasted to our history, which is, once they've won and become a sole-source supplier, costs continue to grow and performance isn't motivated to get significantly better. It's the presence of a credible alternative, in a competitive environment, that can make such a dramatic difference.

Now, as you know, we've had trouble trying to convince Congress and many in the military about why it's worth keeping a second source around. I think the empirical data are very clear, but people say 'you mean you can't manage it (in a sole source environment) so that you drive up performance and lower-costs? Why do you have to pay a second source in order to do that? The answer is, we've tried for the last 40 years, and it hasn't worked. Why not try the one that does work; which is as in the commercial world, using continuous forms of competition, or at least the credible threat of competition.

By the way, I don't think it should be a law to always run the competition because if somebody continues to improve their performance and lower their costs they shouldn't be forced to compete it. That's the reward for doing what you should have done in the first place. **So that's the fourth area: The changes in the acquisition process.**

The fifth one, and one of the more challenging ones from an acquisition perspective, *is that I can't imagine that we are ever going to go into any military operation in the future without some form of a coalition of our allies.* Of course, the impact of this is far broader than just a particular military operation; it's the whole

area globalization and its impact on the acquisition process. Here, you do get into concerns about technology transfer; and you get into issues associated with how you achieve interoperability. When we go to war and our allies can't securely talk to us (which was the case in Kosovo - - with two allied airplanes flying along next to each other, but who couldn't talk in a secure mode) then we are vulnerable, and that's obviously not good. It's clearly a case of the acquisition process having failed to achieve its objectives.

And so if we're going to go to war as a coalition, and I believe we are, then we have to have ways of achieving allied systems' full interoperability. That gets into issues of sharing technologies with our allies, and having assurances that they are controlling it.   It actually gets into a lot of the internationalization of the defense industry, and the increasing globalization of the commercial technology that is leading-edge, and that our adversaries have access to. Surely, our allies should be able to get it directly from us.   Concerns of this sort are very serious acquisition research issues that I think that we have to address. My impression is that there's very little serious research being done in the area of issues such as technology transfer.

The sixth and the last area that I will highlight is the changing nature of the defense industry. Because of the fact that the DoD is a monopsony buyer it is our responsibility to ensure that we have an efficient, responsive, innovative defense industry out there when we need it. In this regard, I would not define the defense industry as just defense firms. I would define it as the people who supply goods and services - - directly or indirectly - - to the Department of Defense. The more of those we can have commercially, probably the better.

I would certainly think that, given flexible manufacturing and other technologies that are available, we could have many integrated (civil and military) production lines. The Japanese are heading in the direction of efficient production in quantities of one; for automotive. What you have is multiple different cars coming down the line, and the robots and computers are smart enough, and have been programmed, so that it's just insertion of different parts into the process. You can have some military stuff and some

commercial stuff, as long as the production process is the same. The end-item equipment doesn't have to be the same.

Why can't we have integrated lines? The reason we can't is because of all of our historic practices, and all of our unique rules. Not because the technology doesn't allow it. The commercial firms don't want to use our cost accounting standards, for example. That's fine; we have permission to waive it. Then why don't we take advantage of it? Because we've never done it before. And that's why we don't do it.

As to the industry structure itself, it is essential that we make sure we have at least two qualified firms in each critical sector. Because we had seven or eight aircraft companies and knew we couldn't afford all of them, we encouraged integration and consolidation of these firms - - always with the statement that what we were doing was allowing consolidation as long as we maintained competition, and as long as the government gained the benefit of cost savings. Those were the two considerations that we had.

We've had to stop some. You recall the proposed Northrop/Lockheed merger we stopped because that would not have maintained two people in some of the critical sub-sectors. I would emphasize that two in every critical sector is not necessarily just the platforms (ships, planes, and tanks). It's the critical subsystems, where technological innovation is so essential as we move along.

It's the government's job, as the monopsony buyer from an oligopoly set of suppliers, to worry about the structure of the industry, because the structure of that industry will determine the conduct and performance of that industry. If we don't worry about it, two or three wins in a row by one supplier and the other one's gone. That may mean we have to stimulate, even subsidize, some R&D in order to keep a second supplier in a critical area doing the next-generation systems. Then, when the competition comes along, there's still somebody there.

That leads me into thinking about what's happening today. In some of these consolidations, vertical integration is taking place. A major acquisition issue for the

future is how do you assure that the prime contractor, who is basically becoming a systems integration house (not first and foremost a platform supplier), is holding an objective, independent assessment of his own supplier (at both the platform level and the lower tier) versus someone else's? How do you guarantee that objectivity, from the government's perspective, and yet not have the government assume full responsibility for that decision; because you want your integration contractor to have that accountability? That's a really big challenge from an acquisition research perspective. I think there are ways to do it, but I don't see much research being done; and yet I see the industry continuing its consolidation through vertical integration. We're going to suffer from it unless we start to really figure out how to address that from a public-policy perspective. This should be an area of considerable research.

The problem is that we've taken the position that 'the market will take care of it', yet the natural forces of the market tend to yield a monopoly, if allowed to continue uncontrolled. That is why we have antitrust laws and things like that. Now we're down to the situation where if you're the only buyer of weapons systems and you have one or two suppliers, three at best, in any critical area, the Government has a responsibility to make sure that this industry becomes competitive - - and also that it makes money doing so, in order for it to reinvest in innovation.

Those are the six sets of changes: 1) The changing nature of what the government does; 2) the impact of e-government; 3) the changing nature of warfare and its associated technology; 4) new acquisition practices; 5) globalization's impact (including inter-national coalition operations); and, finally, 6) the changing nature of the defense industry.   And we must address these all together, because they're all happening at once. These are not independent. They are all interrelated.

It's a very complex analytic issue, and one in which serious research needs to be done - on best practices, on results achieved, on new ideas, and so forth. And that's where I think we don't now have that research being done. It needs to be done - - given its importance, and the potential associated with these changes to our military capability. I think it's a surprise that there is so little research being done, and so little

education being done. Particularly, I would argue, in universities around the country where you must develop the people who will do this in the future. You want to graduate students capable of addressing these issues. You want people who will come into the government with some training and background on these issues, and/or people who are in the government being trained instead of doing it the way we have always done it - - because 'that's the way they've always done it for 20 years, so let's keep doing it that way'. The old way is not applicable in this environment of these dramatic changes. Right now, if you look at the level of funding in this area - - of the $200 billion a year we spend here - - it's really a sin. I'd argue that a lack of funding and a lack of leadership priority is why we're not giving it proper attention.

We can set the requirement easily. It's a state-of-the-art, flexible, low cost, responsive Defense acquisition system. One that uses new models and new practices, and worries about both the theory and implementation. I think that can be done, on a relative scale, with very little money. The result will be not only enhanced acquisition results, but attracting new people and retaining top people in the acquisition community - - practitioners and researchers.

To summarize, I think this conference is a very important first step in the right direction. Obviously, much more is required in this area to be able to capitalize on what the military clearly need in the coming decades. I think this is very important; very much worth the effort that people are putting in here today. But even more important is what we can do in terms of the future; and I hope all of you will join me in trying to achieve our objective over the coming years.

Thank you very much.

Panel I: Issues in Acquisition Policies

Chair: RDML (sel.) Martin Brown, Deputy for Acquisition Management, Office of the Assistant Secretary of the Navy for Research, Development and Acquisition

Discussant: Lawrence R. Jones, Wagner Professor of Public Management, Graduate School of Business & Public Policy, Naval Postgraduate School

Centralized Control of Defense Acquisition Programs: A comparative Review of the Framework from 1987-2003
Presenter: **John T. Dillard**, Senior Lecturer, Naval Postgraduate School

Using the Systems Engineering Process to Balance the Interdependence of Mission Capability, Operations and Support Costs, and System Utility Rates – What's T&E's Role?
Presenter: **LTC Thom Crouch**, Lecturer, Naval Postgraduate School

Presentations are available within the attached CD or online at

http://www.nps.navy.mil/gsbpp/ACQN/forums/symposium

Centralized Control of Defense Acquisition Programs:
A comparative Review of the Framework from 1987-2003

John T. Dillard — Senior Lecturer in the Graduate School of Business and Public Policy at the Naval Postgraduate School, Monterey, California. He has been a project manager for several large Department of Defense missile and communications systems.

Abstract: In the last three years, there has been a great deal of turbulence in US defense acquisition policy. This has led to confusion within the acquisition workforce in terminology, major policy thrusts, and unobvious implications of the changes. The new framework has added complexity, with more phases and delineations of activity, and both the number and level of decision reviews have been increased. Decision reviews are used as top management level control gates, and are also a feature of centralized control within a bureaucracy. Although the current stated policy is to foster an environment supporting flexibility and innovation, Program Managers will now have fewer resources to manage their programs as they spend much of their time, and budgets, managing the bureaucracy. The result could become an endless cycle of decision reviews. Moreover, the implicit aspects of the still new model have not been fully realized, and may result in policy that actually lengthens program and delivers yesterday's technology tomorrow -- counter to goals of rapid transformation. The framework, and its associated requirements for senior level reviews, are opposed to the rapid and evolutionary policy espoused, and are counter to appropriate management strategies for a transformational era.

Introduction

The issuance of Department of Defense Directive 5000.1[1] and Instruction 5000.2[2] on May 12, 2003, is the third significant revision of acquisition policy in as many years. Looking further back, these three revisions of regulatory guidance had evolved from two previous versions in 1991[3] and 1996[4]. Each had its major thrusts and tenets, and perhaps of most importance to Program Managers, modifications to the "Defense Systems Acquisition Management Process"[5] or "Defense Acquisition Framework"[6] which is the broad paradigm of phases and milestone reviews in the life of an acquisition program. The purpose of the author's research was to examine the evolution of this framework and draw attention to the explicit and implicit aspects of recent changes to the various models to better understand its current form. Provided here is a synopsis of the most important findings. The full report of this research, examining both private industry and defense acquisition decision models is available at:

http://www.nps.navy.mil/gsbpp/ACQN/publications/FY03/AM-03-003.pdf

The very latest DoD 5000 policy changes have come during a time of DoD Transformation, which, while larger in scope than solely equipment and technology, is chiefly focused on changes to force structure and weapons employment capabilities. This latest version of the 5000 series was actually drafted in the documents rescinding its predecessor. According to his memorandum signed on October 30, 2002, Deputy Secretary of Defense Paul Wolfowitz said the series required revision "to create an acquisition policy environment that fosters efficiency, flexibility, creativity and

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[1] USD(AT&L) Department of Defense Directive 5000.1, *The Defense Acquisition System,* May 12, 2003.

[2] USD(AT&L) Department of Defense Instruction 5000.2, *Operation of the Defense Acquisition System,* May 12, 2003.

[3] USD(A) Department of Defense Directive 5000.1, *The Defense Acquisition System,* February 23, 1991.

[4] USD(A&T) Department of Defense Directive 5000.1, *Defense Acquisition,* March 15, 1996.

[5] Defense Systems Acquisition Management Process, Defense Systems Management College, January 1997.

[6] Defense Acquisition Framework, Defense Systems Management College, 2001.

innovation."[7] Interim guidance was issued, along with the rescission, as a temporary
replacement, outlining principles and policies to govern the operation of the new
Defense acquisition system. Among them:

> 3.1 Responsibility for acquisition of systems *shall be decentralized to the
> maximum extent practicable* . 3.18 The PM shall be *the single point of
> accountability*. for accomplishment of program objectives for total life cycle
> systems management, including sustainment. 3.27 It shall be DoD policy
> to *minimize reporting requirements*.[8]

Though the 5000 series provides guidance for all levels, or Acquisition
Categories (ACAT), of programs, its language is particularly applicable to the largest,
ACAT I, Major Defense Acquisition Programs (MDAP). In such cases, the MDA is the
Defense Acquisition Executive, who also chairs the Defense Acquisition Board (DAB) as
a decision making body for program milestone reviews. There are in fact both a
Component Acquisition Executive and Program Executive Officer in the hierarchy
between them, and direct communication between MDA and PM is infrequent. Other
top management stakeholders are OSD staff principals who sit in membership on the
Defense Acquisition Board, where milestone decision reviews are conducted.
Communication between PM and OSD staff principals is more frequent, especially via
the Overarching Integrated Product Team process.[9]

The Challenges of Defense Program Management

Defense systems in particular, known for their size and technological pursuits,
are seen as among the most challenging of projects. Gadeken, building upon previous
studies at the Defense Systems Management College, et al., concluded that the Project

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[7] Wolfowitz, Paul, Memorandum for Director, Washington Headquarters Services, *Cancellation of DoD 5000 Defense Acquisition Policy Documents,* October 30, 2002.

[8] Secretary of Defense Memorandum, *Defense Acquisition*, Attachment 1, *The Defense Acquisition System*, October 30, 2002, (Interim Guidance 5000.1, p. 6).

[9] Office of the Under Secretary of Defense (Acquisition and Technology) Washington, DC 20301-3000 DoD Integrated Product and Process Development Handbook, August 1998.

Manager competencies of systematic and innovative thinking were among the most needed and critical in order to accommodate growing complexities.[10]

Inherent difficulty in the management of any program is exacerbated for the DoD by several additional factors, which have become even more apparent in the last twenty years. Large defense systems are very complex systems, consisting of hardware and software, multiple suppliers, etc. and requiring design approaches that can alleviate complexity via decomposition into simpler subsets, etc. Rapid technology changes, yielding obsolescence, have become particularly problematic for very large systems with acquisition life cycles spanning a long period of time. Thus, it may not even be feasible to fully define the operational capabilities and functional characteristics of the entire system before commencing advanced development.[11]

The DoD 5000 series acknowledges these many complexities and difficulties facing MDAs and PMs in their management and oversight of large weapon system developments. An approach to mitigate these technological challenges, especially in the post-2000 series, is evolutionary acquisition, referred to by some outside of DoD as progressive acquisition. Also advocated by the General Accounting Office, it has evolved worldwide as a concept over the past two decades. It is an incremental development approach, using iterative development cycles versus a single grand design. Described succinctly by the Western European Armaments Group, the progressive acquisition approach is:

> a strategy to acquire a large and complex system, which is expected to change over its lifecycle. The final system is obtained by upgrades of system capability through a series of operational increments. (It) aims to minimize many of the risks associated with the length and size of the

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[10] Gadeken, Owen C., "Project Managers as Leaders – Competencies of Top Performers," *RD&A,* January – February 1997.

[11] Pitette, Giles, "Progressive Acquisition and the RUP: Comparing and Combining Iterative Process for Acquisition and Software Development," *The Rational Edge*, November 2001.

development, as well as requirements volatility and evolution of technology.[12]

Very similar in description, DoD's adaptation of this approach as "evolutionary acquisition" is a major policy thrust in the series, and is the stated "preferred approach" toward all new system developments. This particular policy thrust is important to this study as it pertains to the framework of phases and decision reviews of a program moving toward completion. It is meant to change the way programs are structured and products delivered. – actually separating projects into smaller, less complex increments. It is, additionally, one of several aspects of the new policy that affect the framework and its use as a management control mechanism.

Organizational Control Theory and Defense Acquisition

Wideman also advocated progressive (evolutionary) acquisition, and recognized senior management responsibility for financial accountability in private and public projects and their preference for central control. He noted problems with senior management control over complex developments such as software enterprises like Defense Information Systems, even when projects were not very large or lengthy.[13] His observations in large, complex programs align with classic contingency theory, which holds that organizational structures must change in response to contingencies of size, technology, and as external environments become more complex and dynamic. Indeed, it has long been accepted that when faced with uncertainty (a situation with less information than is needed) the management response must either be to redesign the organization for the task at hand, or improve communication flows and processing.[14]

Gareth Morgan traced organizational theory through the past century and depicts organizations as a variety of images, or metaphors in his treatise, *Images of*

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[12] Western European Armaments Group WEAG TA-13 Acquisition Programme, Guidance on the Use of Progressive Acquisition, Version 2, November 2000.

[13] Wideman, R. Max, Progressive Acquisition and the RUP Part I: Defining the Problem and Common Terminology, The Rational Edge, 2002.

[14] Galbraith, J. R., 1973, *Designing Complex Organization,* Reading, Massachusetts: Addison-Wesley.

Organization. He warns that large hierarchical, mechanistic organizational forms have difficulty adapting to change and are not designed for innovation.[15] Further research by Burrell and Morgan indicate that any incongruence among management processes and the organization's environment tend to reduce organizational effectiveness.[16]

In their book, *The Intelligent Organization*, Gifford & Elizabeth Pinchot make an even stronger case for decentralized management in large complex organizations faced with transformational change. They suggest that as organizations today face increasing complexity, rapidity of change, distributed information, and new forms of competition, organizations must grow more intelligent to confront and defeat the diverse and simultaneous challenges. They posit that for an organization to be fully intelligent, it must use the intelligence of its members all the way down the hierarchy. They note that with distributed information there is distributed intelligence, and failure to render authority to those closest to the problem will yield lethargy, mediocre performance, or worse – paralysis. Control will be maintained, and anarchy will not occur -- but neither will success.[17]

What the cumulative research appears to support is that, for large complex hierarchies such as the Department of Defense, decentralized control and empowerment should be an organizational strength, given today's environment of program complexity, evolving requirements, and rapidly changing technology.

An Examination of Project Management Life Cycle Models

Models have long been used to illustrate the integration of functional efforts across the timeline of a project or program. It is the successful integration of these diverse elements that is the very essence of project management. Models also help us to visualize the total scope of a project and "see" its division into phases and decision

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[15] Morgan, Gareth, 1997, *Images of Organization,* Sage Publications.

[16] Morgan, Gareth, 1997, *Images of Organization*, Sage Publications.

[17] Pinchot, Gifford and Elizabeth, *The End of Bureaucracy and the Rise of the Intelligent Organization.* Berrett-Koehler Publishers, San Francisco, 1993.

points. The interaction and overlapping of many and varied activities such as planning, engineering, test and evaluation, logistics, manufacturing, etc. must be adroitly managed for optimum attainment of project cost, schedule and technical performance outcomes. The Project Management Institute's Project Management Body of Knowledge (PMBOK®) provides generally accepted knowledge and practices in the broad field of project management.[18] Striving for commonality across diverse business areas and product commodities, it provides a generic framework as a structure for understanding the management of a project or program. In the figure below (Fig. 1.), a project life cycle is depicted as costs and staffing relative to time.
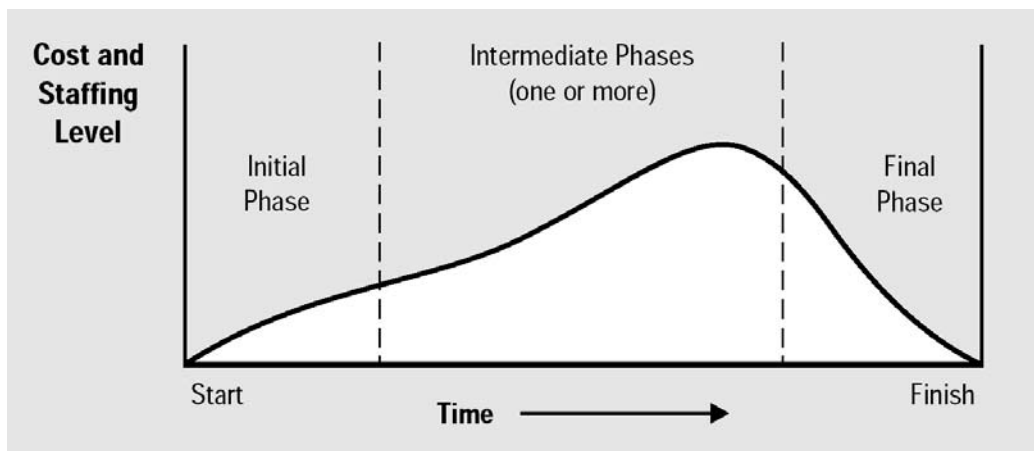

Fig. 1. Sample Generic Project Life Cycle, Adapted from PMBOK® 2000

Project Management difficulty climbs along the scale of system complexity and technological uncertainty, and is simplified by division of the effort into phases, with points between for management review and decision. The institute acknowledges a variety of approaches to modeling project life cycles, with some so detailed that they actually become management methodologies. Illustration of generic project management processes or activities across time are depicted thus (Fig. 2.):

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[18] Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, 2000 Edition, Pennsylvania, 2000.
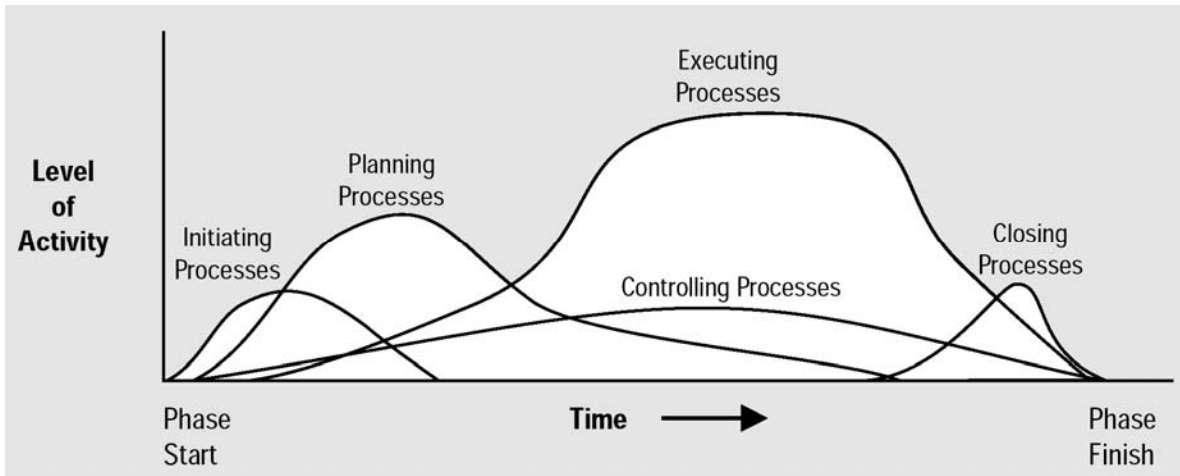
Fig. 2. Project Management Processes, Adapted from PMBOK® 2000[19]

The Evolving Defense Acquisition Framework

The 1996 Model

Models of program structure are important to the Department of Defense in conveying the overall acquisition strategy of a large acquisition project. The 1996 revision of the 5000 series was published after a rigorous effort to reform the defense acquisition system during the first half of the Clinton administration.
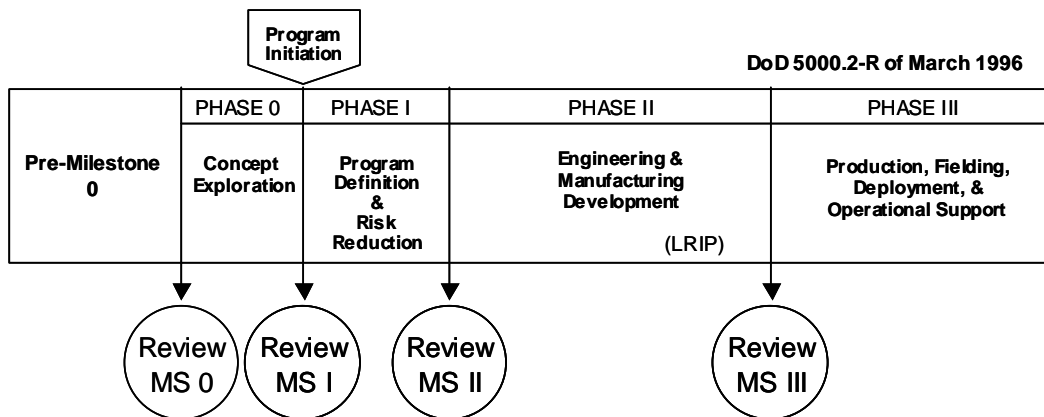

Fig. 3. Defense Systems Acquisition Management Process[20]

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[19] Ibid.

[20] Department of Defense 5000.2-R, Mandatory Procedures for Major Defense, *Acquisition Programs and Major Automated Information Systems*, 1996.

The model (Fig. 3.) is streamlined and simplified to depict only four phases and four decision reviews. Low Rate Initial Production (LRIP) could occur before Milestone III and frequently did occur in this phase as a service Secretary decision. Another key change was the very deliberate change in the declaration of Program Initiation moving from Milestone 0 to Milestone I. Program Initiation also served as a benchmark of OSD interest in annually reporting to Congress, per 10 USC § 2220(b), the average time period between program initiation and Initial Operational Capability (across all ACAT I programs of any commodity). In 1994, the average was 115 months.[21]
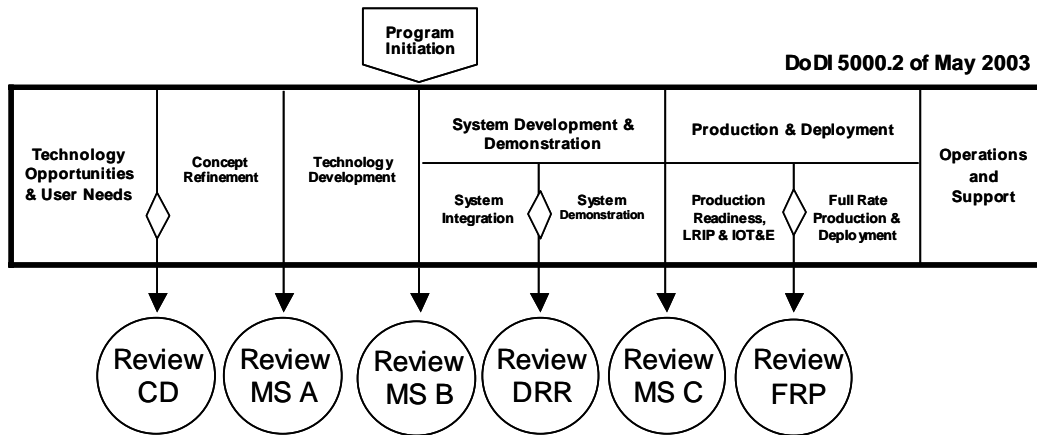
The Current 2003 Model

Fig. 4. Defense Acquisition Management Framework[22]

Toward Centralized Control of Acquisition Programs

The current 2003 model (Fig. 4.) has five phases and six potential decision reviews. Eight total distinct activity periods exist in the model, including pre-acquisition activity. The most apparent, and perhaps least significant, change between eras was from numerical to alphabetical designation of major milestone reviews. A more subtle and important change was the appearance of divided phases and within-phase decision and progress reviews. With the latest release of the regulatory series, these additional

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[21] Ibid.

[22] USD(AT&L) Department of Defense Instruction 5000.2, *Operation of the Defense Acquisition System,* May 12, 2003.

sub-phases or "work efforts," along with "pre-acquisition activities" have brought the total number of distinct activity intervals to eight, with as many as five phases and six decision reviews – more than at any time past. Each of these efforts has its own entrance and exit criteria, making them more in practice like a distinct phase of acquisition.

Reviews are described in the current policy to be decision points where decision makers can either stop, extend or grant permission to proceed into the next phase. Program reviews of any kind at the OSD level have a significant impact on program offices. Much documentation must be prepared and many preparatory meetings are conducted enroute to the ultimate review. And while non-milestone reviews are generally considered to be lesser in scope of effort to prepare for, a considerable amount of effort managing the decision process is still expended. A six-month timeline for these activities in preparation of an OSD-level review has been unchanged for many years. It outlines the requirements for meetings and preparatory briefings to staff members and committees. Some representatives from program management offices keep an accounting of travel and labor costs associated with a milestone reviews for an MDAP system. While only anecdotal data was available for this research, it is apparent that a substantial amount of program office funding is expended on support contractor assistance with supporting analyses and documentation, as well as frequent travel to the Pentagon, and other associated expenses in preparation for high-level reviews.[23] As of this writing, there are a total of 25 MDAP programs in the Department of Defense.

With Evolutionary Acquisition as the preferred strategy, notional systems are now shown as shorter developments (in SDD) with iterative Milestone B-to-C cycles. The new DoDI 5000.2 prescribes that, "In an evolutionary acquisition program, the development of each increment shall begin with a Milestone B, and production resulting

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[23] Author's unpublished interview with an anonymous representative from a major program office going through a milestone review, Naval Postgraduate School, Monterey, California, February 19, 2003.

from that increment shall begin with a Milestone C."[24] Thus, program managers can expect to undergo the reviews determined appropriate for the initial increment of development in their program, as well as reviews specified for the follow-on increments. The most recent published guidance shows one example of a system with no less than *fourteen reviews in its first eleven years from Concept Decision*.

In the past, technology development during the advanced development (EMD) phase was blamed for undue costs and lengthening of this phase. But a very real concern may now be that -- unless SDD is greatly shortened -- attaining technological maturity at Milestone B instead of C guarantees the fielding of "yesterday's technology tomorrow." In other words, there is a very real but somewhat understated distinction between what was Milestone III under the 1996 model and what is now Milestone C under the Post-2000 era models, beyond that of LRIP and Full Rate Production. Evolutionary acquisition under the new model prescribes the initiation of low-rate production of an 80% solution at Milestone C as the preferred approach. In order to achieve the 100% capability solution desired in the same time frame as would be planned under the single-step acquisition strategy, the model is perhaps more accurately depicted as below (Fig. 5). The diamond icons represent decision reviews.

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[24] USD(AT&L) Department of Defense Instruction 5000.2, *Operation of the Defense Acquisition System*. May 12, 2003.

Comparison of 1996 and 2003 Models
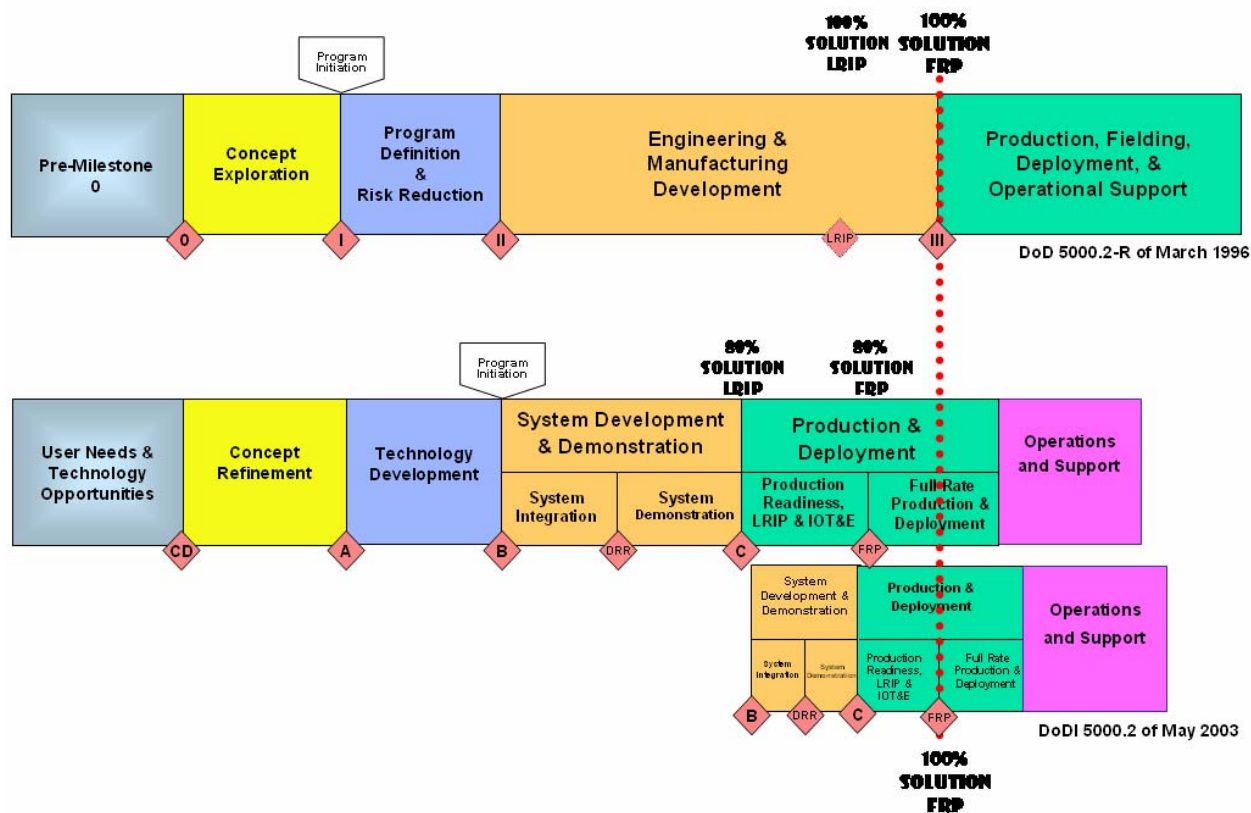### Under an Evolutionary Acquisition Strategy

Fig. 5. Actual Comparison of 1996 and 2003 Acquisition Framework Models

Again, what is most apparent here is the increased number of decision reviews, as well as the concurrent activities involved in managing the follow-on development increment and its requisite reviews as well. Assuming advanced development (SDD) is indeed shortened, and further assuming that concept and early prototyping phases are no longer than before, the time and effort on control activities appears almost certainly excessive within the same system delivery timeline.

Conclusions

On the whole, the 2003 acquisition model prescribes a very new paradigm, and only time can inform us whether Deputy Secretary Wolfowitz's goals of program management flexibility and innovation have been achieved. No program has yet gone through the entire model, and none will for many years to come.

Nevertheless, time spent "managing the bureaucracy" has remained an encumbrance to PMs. Back in 1988-89, military research fellows studying commercial practices at the Defense Systems Management College wrote about an imbalance of authority between PMs and the OSD staff.[25] Of eleven improvements they recommended to the acquisition process, number three on their list was, "Reduce the number and level of program decision milestones." Showing the 1987 model, they recommended that only one of the then five reviews be conducted at OSD level: the review for advanced development. They quoted the 1986 Packard Commission's conclusions, which said, "He (the PM) should be fully committed to abide by the program's specified baseline and, so long as he does so, the Defense and Service Acquisition Executives should support his program and permit him to manage it. This arrangement would provide much needed program stability."[26]

Mentioned earlier was that contingency theory encourages senior leaders to find the best fit for their organization's structure to its environment, understanding that some situations might call for rigid bureaucratic structure while others might require a more flexible, organic one. The concept of control is also a cornerstone of cybernetics: the study of organizations, communications and control in complex systems. It focuses on looped feedback mechanisms, where the controller communicates to the controlled what is the desired future state, and the controlled communicates to the controller information with which to form perceptions for use in comparing states. The controller then communicates (directs) purposeful behavior.[27]

The fundamental need for communications constrains the options for control, making the communications architecture a critically important feature of the control system. It is often heard that with communications in today's information age warfare, we seek to "act within the enemy's decision cycle." For acquisition decision makers, the

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[25] Defense Systems Management College, Using Commercial Practices in DoD Acquisition, December 1989.

[26] Packard Commission, A Quest for Excellence, Final Report to the President, 1986.

[27] Ashby, W. R., *An Introduction to Cybernetics,* London: Chapman & Hall, 1960.

information architecture is the command and control hierarchy within our bureaucracy. And the decision cycle in the course of a program still, after many years, reflects 180 days of typical preparation lead-time for a decision review.

Similarly, when Rand authors wrote about DoD decision making pertaining to training, equipping, manning, and operating the force, they suggested that decisions should be based upon senior leadership's desired outcomes. They acknowledge that with a decentralized management style comes dilution of responsibility and accountability, unless vigilance of execution is maintained. But they agree with other theorists that centralized decision making was consistent with the Cold War, and a style well-suited to the 1960s, but can be stifling and can restrict innovation.[28]

Pinchot's *Intelligent Organization* does not call for decentralization to undermine bureaucracy, but to improve it. They advocate decentralization with horizontal interconnection (a network organization) between business units, to lessen the reliance upon going up the chain of command and down again for communication flow and decision. Rather than total autonomy for PMs, he supports self-management, from trust, with responsibility and accountability.[29] This thinking seems particularly appropriate to a professionalized bureaucracy such as the DoD acquisition workforce, with disciplined standards of training, education, and experience steadily progressing since implementation of the Defense Acquisition Workforce Improvement Act (DAWIA) in the early 1990s.

It is evident that the debate about centralized control and number of OSD-level reviews has been taking place for a long time. The current model increases the number and levels of reviews, and their placement with regard to program events indicate that we are moving toward an even more centralized approach to control of acquisition programs. But what is perhaps even more significant than this observation is that

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[28] Johnson, Stuart, Libicki, Martin C. and Treverton, Gregory F., *New Challenges New Tools for Defense Decisionmaking,* Rand 2003.

[29] Pinchot, Gifford and Elizabeth, *The End of Bureaucracy and the Rise of the Intelligent Organization,* Berrett-Koehler Publishers, San Francisco, 1993.

moving toward greater centralization of control at the higher levels may be a cause for serious concern, given predominant management theory cited herein. The mainstream of thought indicates that more efficiency and effectiveness might be gained from a different approach to an external environment of instability and uncertainty, whether from unclear threats and uncertain scenarios, or from complexities of technology and systems acquisition.

Centralization of control is a management issue to be dealt with – the challenge to avoid anarchy, with no guidelines or parameters, as well as excessive control. Might programs actually be lengthened by more cumbersome reviews? Whether fourteen reviews in eleven years are too many is a matter of conjecture and more debate. However, it is obvious that there are today more reviews than ever before, and these do have a requisite cost associated with their execution. We will likely continue the struggle to find the appropriate balance between centralized functions at OSD and autonomy for the management of programs in both explicit or implicit management policies and frameworks. A study of how the DoD might exploit its current capacity via increased horizontal communication might provide insight toward attaining the decentralized empowerment it advocates.

Using the Systems Engineering Process to Balance the Interdependence of Mission Capability, Operations and Support Costs, and System Utility Rates – What's T&E's Role?

LTC Thom Crouch — Lecturer, Graduate School of Business & Public Policy, Naval Postgraduate School

ABSTRACT: This research project defines the interdependent relationship between a weapon system's mission capabilities, O&S costs, operational utility rate, and their impacts on overall mission effectiveness of an operational combat unit. By analyzing the sub-elements of both operational effectiveness and operational suitability it can be shown how operational effectiveness is a dependent element of operation suitability. Additionally, it will be demonstrated how support costs influence operational suitability parameters of a weapon system, which then impacts a combat unit's overall mission effectiveness. Since support costs have such a critical relationship with operational suitability factors, the project also defines the current relationships between Service Cost and T&E communities to question whether or not there is the requisite level of integration of effort between the two organizations to accurately assess weapon system costs and capability prior to production.

The Interdependence of Cost and Mission Effectiveness

LTC Thom Crouch
Lecturer, GSBPP

MISSION EFFECTIVENESS DRIVERS

Full Mission Effectiveness (ME) is a function of _BOTH:_

1. Collective crew proficiency to perform requisite mission tasks
2. Collective weapon system readiness and capability at the unit of action level
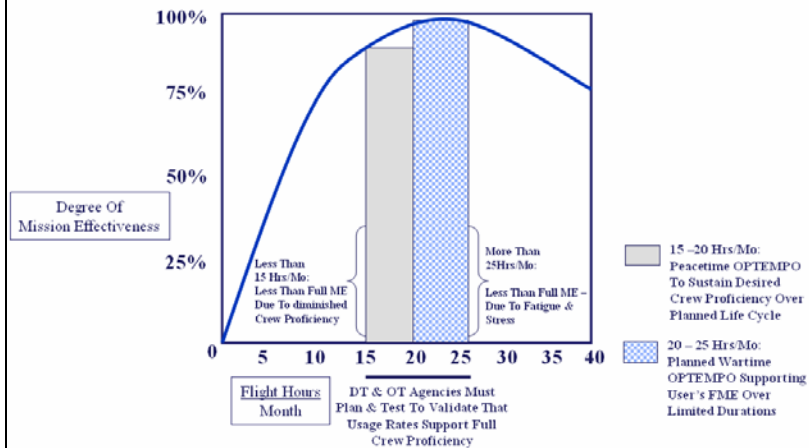
   In current terms – At the unit of action level, weapon systems must be both operationally effective and suitable (in both peace & wartime OPTEMPO) with particular attention to whether or not system readiness levels support crew proficiency.
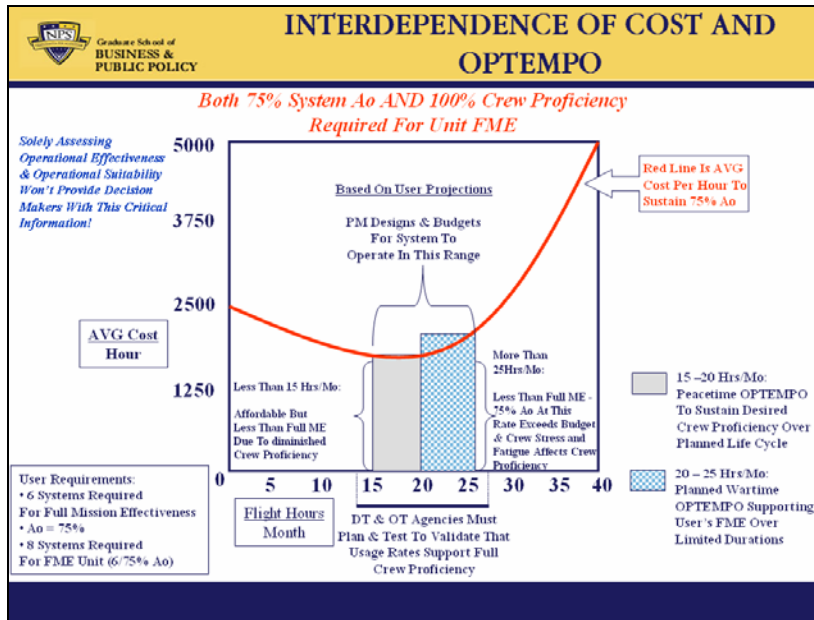
INTERDEPENDENCE OF COST AND OPTEMPO

Both 75% System Ao AND 100% Crew Proficiency Required For Unit FME

Solely Assessing Operational Effectiveness & Operational Suitability Won't Provide Decision Makers With This Critical Information!

Based On User Projections

PM Designs & Budgets For System To Operate In This Range

Red Line Is AVG Cost Per Hour To Sustain 75% Ao

AVG Cost Hour

5000
3750
2500
1250
0

Flight Hours Month: 5 10 15 20 25 30 35 40

Less Than 15 Hrs/Mo:
Affordable But Less Than Full ME Due To diminished Crew Proficiency

More Than 25Hrs/Mo:
Less Than Full ME - 75% Ao At This Rate Exceeds Budget & Crew Stress and Fatigue Affects Crew Proficiency

DT & OT Agencies Must Plan & Test To Validate That Usage Rates Support Full Crew Proficiency

15 –20 Hrs/Mo: Peacetime OPTEMPO To Sustain Desired Crew Proficiency Over Planned Life Cycle

20 – 25 Hrs/Mo: Planned Wartime OPTEMPO Supporting User's FME Over Limited Durations

User Requirements:
• 6 Systems Required For Full Mission Effectiveness
• Ao = 75%
• 8 Systems Required For FME Unit (6/75% Ao)

SUMMARY

- T&E communities can contribute significantly to defining and assessing requisite OPTEMPO rates for new systems
- Collecting data to define the shape of a system's operational cost curve can be most insightful in predicting O&S costs
- Close relationship between Cost and T&E communities a must to obtain total projected O&S impacts

Panel II: Total Ownership Costs: The Future

Chair: Robert W. Young – former Deputy Assistant Secretary of the Army for Cost and Economics

Discussant: David N. Burt – Director, Supply Chain Management Institute, University of San Diego

Total Ownership Cost: An Exercise in Discipline

Presenter: **Michael W. Boudreau**, Senior Lecturer, Naval Postgraduate School
Co-author: **Brad R. Naegle**, Lecturer, Naval Postgraduate School

The Impact of Software Support on System Total Ownership Cost
Presenter: **Brad R. Naegle**, Lecturer, Naval Postgraduate School

Presentations are available within the attached CD or online at

http://www.nps.navy.mil/gsbpp/ACQN/forums/symposium

Total Ownership Cost: An Exercise in Discipline

Michael W. Boudreau — Senior Lecturer, Graduate School of Business & Public Policy, Naval Postgraduate School

Brad R. Naegle — Lecturer, Graduate School of Business & Public Policy, Naval Postgraduate School

Presenter: Michael W. Boudreau

As a first step, we felt it was important to gather research and data relating to total ownership cost initiative, without bias and complicating the process. This, in itself, is quite a task, as there had been quite a bit of work done in the area over the last two years in all services and numerous DoD programs.

This presentation is designed to provide some insight and perspective into what we've drawn upon from the work done.

Presenter: Brad Naegle

Figure 1. Photo Courtesy of DAU

Here you have an F-16. When people think about an F-16 this is what they see. They say 'there's the bird, I can fly that' or that's an F-16 you can fly today.

If you want to fly one tomorrow, it looks more like this.

Figure 2. Photo Courtesy of DAU

Of course this is tests, measurement, diagnostic equipment, all the support equipment, all folks at earned Dalton embedded within that are the software processes and go along with it, all the training and education that as go out with the crew supporters of the system. And that is truly an F-16 you can fly for longer than a day. So when we think about things logistically total ownership cost wise. That's the system, and that's of course the cost driver to her trying to attack today.

O&S Life Cycle Cost Elements

These cost elements here make up the logistics footprint. This is by no means an exhaustive list. But there are a lot of elements around that that you can see that really impact and add to the cost of ownership for the system. That is logistics footprint.

Total Ownership Cost Element Influence
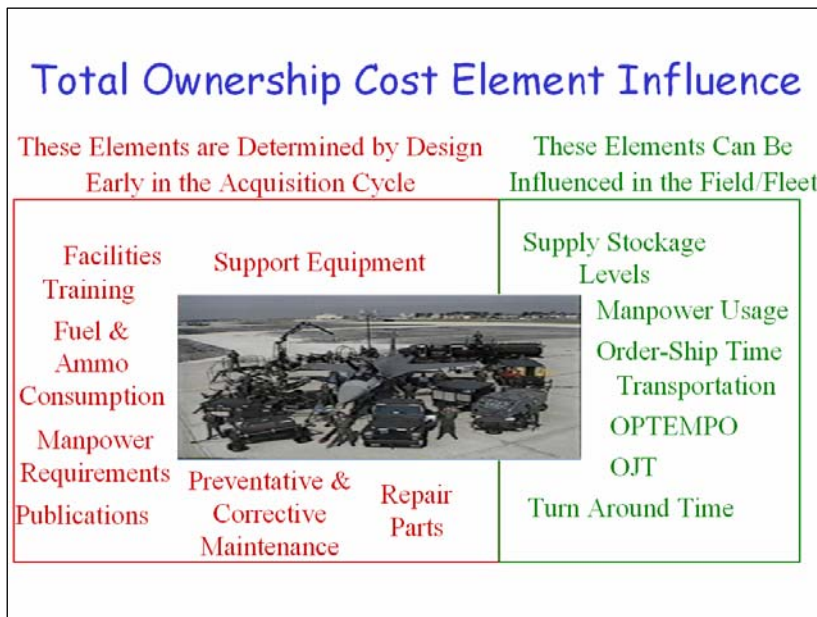
If you divide that out and that green line you see come down into the picture was put there on purpose, those items that show up on the right side in green are typically those that you can influence after deployment of the system in the field or the fleet. You

can choose to do some of those things or not do some of those things or just how you do those things.

That big chunk on the left that's in the dark red, are those things that are actually 1) determined during the acquisition process, 2) during the design and acquisition process of the system and 3) without a really significant reengineering, are hard to change. Of course, that's about the percentage of the cost that's involved in that and where that cost comes from.
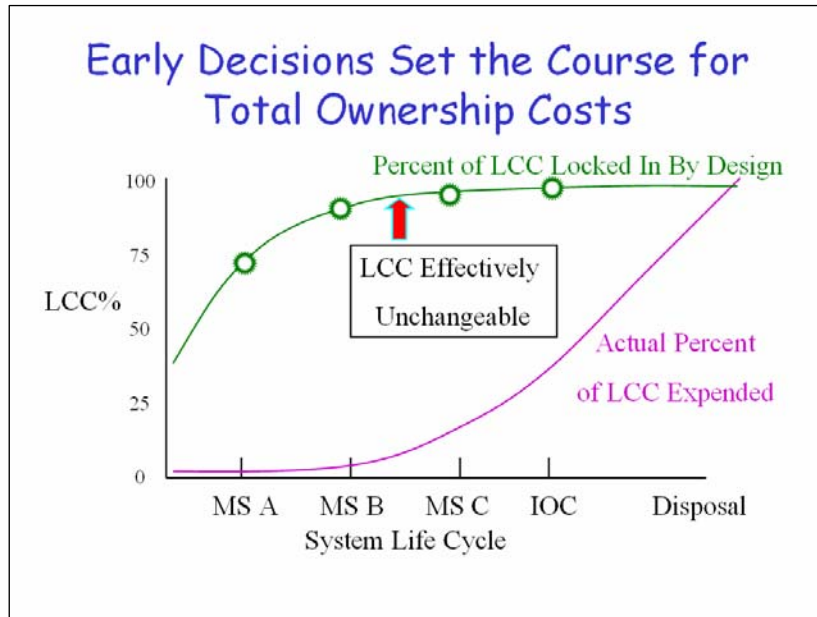
The green are the things that can be influenced in the field and the fleet and the rest of that. If we're asking people in the field or the fleet to reduce their costs by 10%, their taking 10% of that green block off of there and may not even be noticeable to the actual cost of the system. Where we need to attack this is clearly on the left hand side of that chart.

Early Decisions Set the Course for Total Ownership Costs

So, how do we spend money on the system? If you look at the purple line at the bottom, that is how we expend the dollars when we procure and support a system over it's lifecycle from Milestone A, or before Milestone A, through disposal. That's important. Everyone pays a lot of attention to that purple line and how we expend those dollars. The green line on top represents the percent of the lifecycle costs that are locked in at various stages. You can see, by the time you get past Milestone B you have effectively locked in the lifecycle and the cost of that system. It's going to be very difficult to change without significant engineering beyond that point. We haven't spent a great deal of the money for the total ownership of the cost of the system at that time but we have determined it.

Presenter: Michael W. Boudreau

DOD TOC Definition

DoD TOC is the sum of all financial resources necessary to organize, equip, train, sustain, and operate military forces sufficient to meet national goals in compliance with all laws, all policies applicable to DoD, all standards in effect for readiness, safety, and quality of life, and all other official measures of performance for DoD and its Components. DoD TOC is comprised of costs to research, develop, acquire, own, operate, and dispose of weapon and support systems, other equipment and real property, the costs to recruit, train, retain, separate and otherwise support military and civilian personnel, and all other costs of business operations of the DoD.

When we talk about total ownership costs we're talking about a lot of different aspects. We're talking about the personnel, the institutional costs, the system itself, the operating and support; that includes maintenance man hours, uniformed military members and civilian maintenance man hours, the repair parts, all the test equipment. It's easier to get an understanding of TOC in the charts just shown to you in the last few minutes. You could see in a pictorial way what was included. At least some of these items are well beyond the ability of program managers to deal with by themselves. The guidance that came out in 1998 in respect to system TOC suggested the program managers should go and get all the help they could muster within DoD because TOC reduction was a very big job and certainly had to be done by lots and lots of different people simultaneously.

System TOC Definition

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. The responsibility of program managers in support of reducing DoD TOC is the continuous reduction of LCC for their systems.

Those are the definitions that go with total ownership cost: One from an institution perspective, and the other from perspective of a war-fighting system itself. You can see those costs are pretty inclusive. If we were to put them on an acquisition timeline, it would cover all the RDT&E, the Research, Development, Test, and Evaluation activities and would stretch out all the way through disposal.
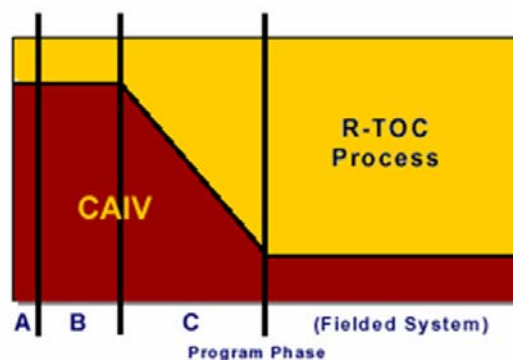

CAIV and R-TOC

Figure 3. CAIV / R-TOC Relationship[30]

The two buzz-words that I think have predominated in discussion related to TOC really show up nicely on this milestone and phase chart: The first being cost as an independent variable (CAIV). That is, in my humble description, figuring out how much money that you've got to devote to a war-fighting system and using that as one of the hard and fast "rocks" that constrain how you develop, and what you are able to develop. Finally, when the system is fielded, figuring out ways, throughout the life of the system to reduce ownership costs in areas that maybe you didn't understand completely as you would in ideal circumstances during the development itself. Even with beautifully developed systems, there are always opportunities for taking corrective action afterward -- this notion of continuous process improvement that reflects in RTOC, Reduction in Total Ownership Cost. Finding those ways by looking at cost drivers, particularly as the system is put into service, either in the field or in the fleet.
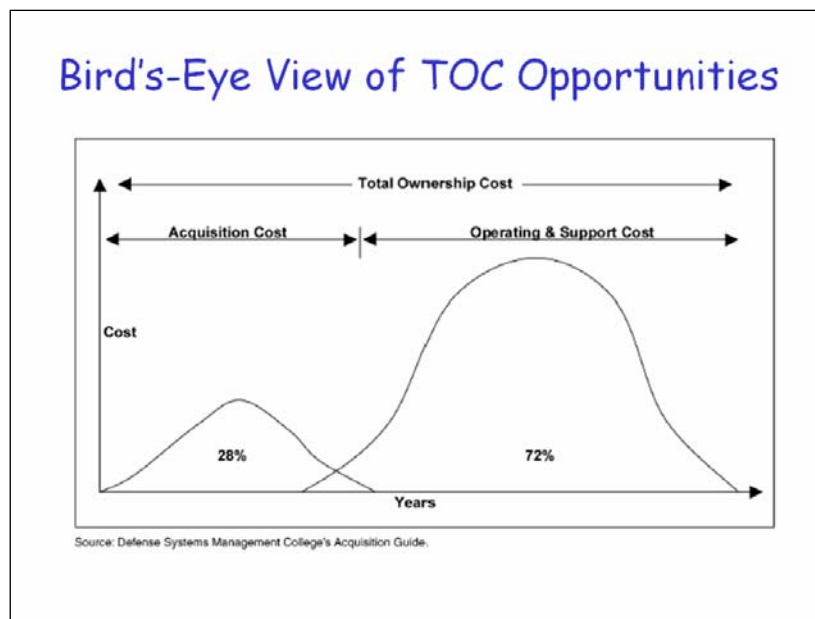

Figure 4. Nominal Life-Cycle Cost of Typical DoD Acquisition Program with a Thirty-Year Service Life [31]

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[30] Kaye, Michael A., Mark S. Sobota, David R. Graham, and Allen L. Gotwald. "Cost As An Independent Variable: Principles and Implementation." *Acquisition Review Quarterly*. Fall 2000.

[31] Ibid.

Another way of looking at TOC is on a percentage basis by when it happens. It is generally considered about a third, 28% if you want to be more precise looking across a number of programs, 28% of the TOC is in the acquisition phase, RDT&E and procurement. On the average, over numerous systems 72% is spent in operating and support costs. Which part is it that the PM is most attentive to? It is obvious, those things that the PM can touch closest-in. That routinely is RDT&E and procurement. When we say that the PM has to be a total life cycle cost system manager then we're really saying 'Mr. PM, we think that you need to focus a huge amount of your attention *also* on those operating and support costs and we are holding you responsible to do that.' That sounds, from my perspective, very logical, but in the doing is pretty tough. The reason being, that there's nothing that really connects in an easily definable, clear way, the amount of monies that are going to be spent on those systems that the program manager is responsible for. There is no way to connect him to those O&S costs. So you have to come up with artificial mechanisms: actually putting down operating and support costs in the PM's acquisition strategy and his acquisition baseline. But then how do you measure it? It's pretty hard to measure because, of course, those costs may not be incurred until 5 to 15 years in the future. How do you know whether a PM is doing a good job in that respect, or not? There may be ways of getting at TOC metrics, but it's not as clear as going out and measuring what's left in the bank account. It's much more complex.
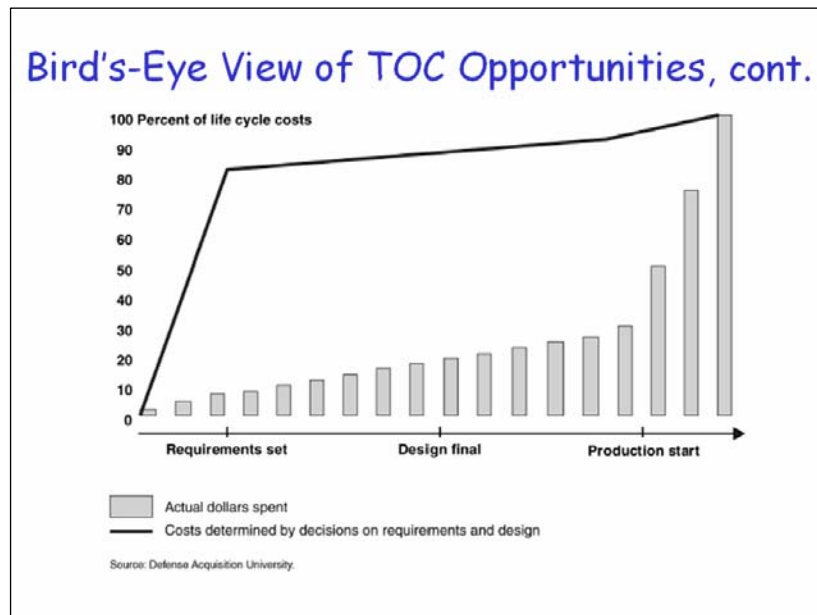
Figure 5. Design Decisions vs. Expenditure of Funds[32]

This chart is very similar to the one Brad just showed you. The thing that I'd like to note from the chart is that this is ascribed to the Defense Acquisition University. The interesting thing about this chart is that I pulled it out of a GAO report. What should you get from all that? To me, we should get that we've understood for a long time this mantra about 'up front and early': Needing to pay close attention to those things that are most important and dear to us at the very beginning of a developmental process. If we wait too long we will be unable to affect, to the extent we'd like to, those attributes; be they cost or performance attributes, either one. Just to reiterate, because our milestones and phases don't show up on this chart. We think that we get perilously close to the 90% locked-in position by the time we get to Milestone B. For those of you who don't work in acquisition every day, what does that mean? Milestone B is where the program manager gets assigned. Up until that time it's probably been a study group made up of many stakeholders under the direction of the user. At Milestone B when

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[32] U.S. General Accounting Office. "Best Practices: Setting Requirements Differently Could Reduce Weapon Systems' Total Ownership Costs." Report to the Subcommittee on Readiness and Management Support, Committee on Armed Services, U.S. Senate. GAO-03-57. February 2003.

there's a formal decision to go ahead with this program, then a program manager is assigned probably just before that but not long before that. So when we talk about upfront and early from the perspective of influencing TOC we're talking while the concept is still in the hands of the user and is not actually being developed by the acquisition community.

Presenter: Brad Naegle
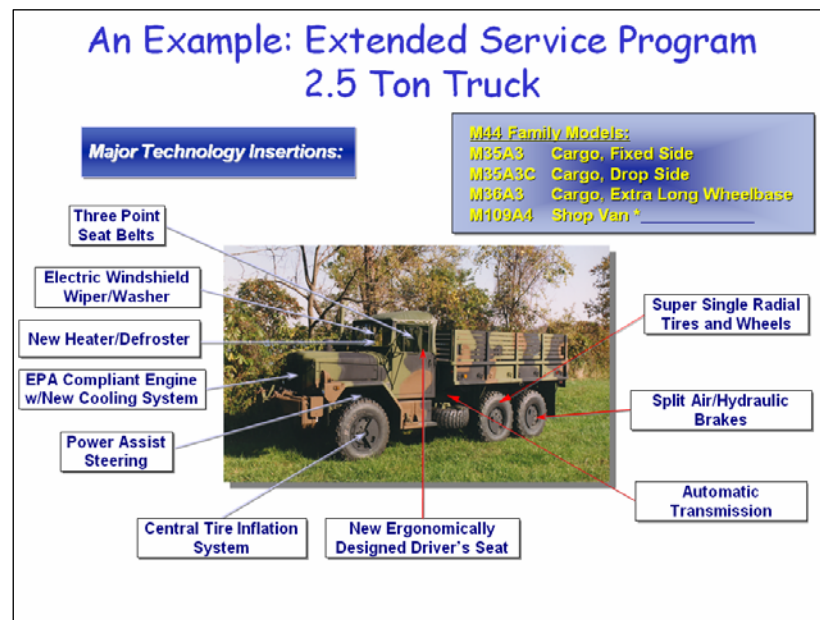
Figure 6. Photo courtesy of DAU

We tried to find some examples of this. This happens to be the program that I managed: The Extended Service Program. It was a service life extension program of the 2.5-ton fleet of trucks. This shows the truck and some of the neat things we did to it when we remanufactured it. The remanufacturing process tore the truck down to components and built it up like a new system. The idea was to start with an old 2.5-ton truck and end with a 2.5-ton truck. What we were trying to attack was the total ownership cost, the operations and support costs of this truck. But we did add some enhancements as we went through the thing. Some of my students who see this chart are kind of amazed. We said we put in a new heating and defrosting system that did two really unique things for that truck series: Heated and defrosted. That doesn't sound

like a great thing until you drove the old truck, then you realized it was a really great thing. We did enhance it as we went through this.

The whole idea was to reduce the total ownership cost. This is kind of what it looked like over a short period of time.
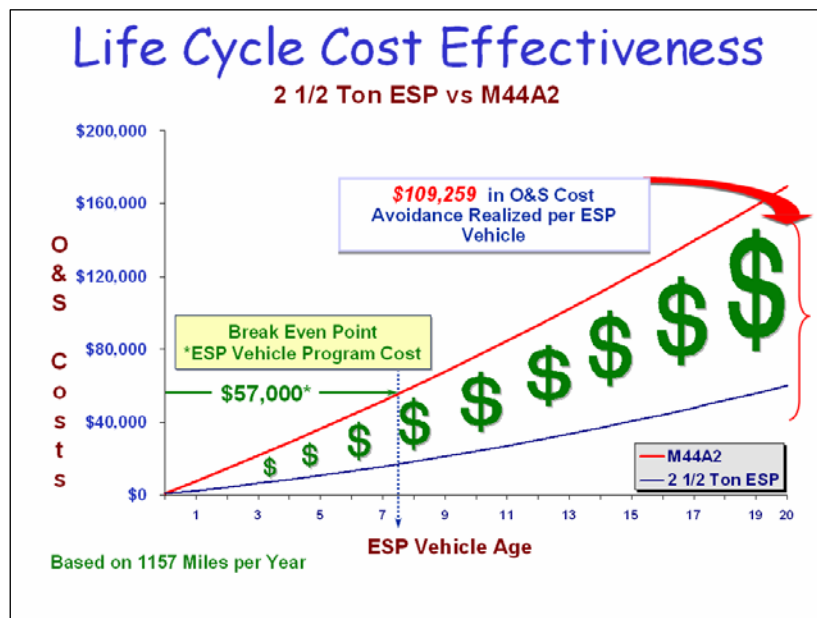
First of all, the entire weapons system cost of the truck was about $57,000. That included everything up until that point. The contract price was much less, around $44,000 a truck, but the fully burdened cost was $57,000 per truck. The blue line on the bottom is the total ownership cost of the new 2.5-ton extended service program. This data was extracted from 100,000 miles of testing. It was not projected but a projection of something we had empirical data for. The red line at the top was the cost of supporting an existing 2.5 ton truck in the system and reflects that they were very old and very costly. They went about 1,000 miles between hardware mission failures. They were very costly to support.

We were bringing on a new series of truck, that Mike Boudreau was in charge of at the time, the family of medium tactical vehicles, but we couldn't bring them on fast

enough because of the costs that are involved. So, we needed to do something to the fleet to keep the total ownership costs down.

As I was trying to sell this program as the program manager, I looked at the difference between the red line and the blue line equaled the total cost of getting a new ESP truck. That happened at just between seven and eight years. The truck was basically paid for in less than eight years of service as far as the differential in cost between the old and the new truck. The truck was re-baselined to 0 miles and it had a twenty year life span beyond that. So, if you go all the way out to the 20-year mark, the savings, per truck, ended up being $109,258. Which was a magic number because it was about the cost of a brand new FMTV replacement 2.5-ton truck. Not only did I pay for my own efforts within eight years but if you kept one it's entire life, you saved enough money to buy it's replacement. Great story but it didn't go over particularly well. People didn't like the idea of remanufactured trucks. Nonetheless, that was the concept behind it. It was quite effective and turned out to be about what you see on that chart.

TOC Resources

Websites:
AKSS & Legacy DAD,
http://deskbook.dau.mil/jsp/default.jsp
DAU
http://pmcop.dau.mil/simplify/ev.php?URL_ID=12 05&URL_DO=DO_TOPIC&URL_SECTION=201&rel oad=1034872330
IDA R-TOC
http://rtoc.ida.org/rtoc/rtoc.html

Presenter: Mike Boudreau

One thing worth mentioning; there is a wonderful database out in our acquisition community related to TOC. What we've done here is put down some of the sites where you can get some good information that shows you how robust the effort has been over the last few years. If you're not familiar with some of these acronyms; AKSS is the Acquisition Knowledge Sharing System which is a DoD/OSD website that replaces what was on CD ROM. It was formerly called the Defense Acquisition Desk Book. In fact you can get the web version of that on websites today even though it has become obsolete. DAU is the Defense Acquisition University. They have quite a body of material that has put together on TOC. IDA, the Institute for Defense Analysis, has an R-TOC website that includes 30 systems that cover all the services.

TOC Pilot Programs

R-TOC Pilots and Acquisition Phases

	Army	Navy	Air Force
Development Systems	[Comanche]	AAAV	
Production Systems	ITAS UAV Systems	LPD-17 MTVR SLAM-ER	C-17 JSTARS
Mixture of Developmental and Fielded Systems	Precis. Fires Sys. of Sys. [FSC2]	Aviation Spt Equip. H-60	CCIC2S SBIRS
Fielded Systems	Apache Abrams CH-47 Guardrail HEMTT	Aegis Cruisers Common Ship CVN-68 Carriers EA-6B	AWACS B-1 C-5 C/KC-135 F-16 F-117

There it is. By way of apology one of the things that's happened in the intervening time since we did this research was that Comanche has fallen off this list. Not because they did anything really wrong in the way that they wanted to proceed with TOC but maybe the program was simply too costly when combined with other warfighter needs. Also there's a Fire Support Command and Control Army System that shows up

under the fielded system that is a follow-on to AFATIDS for those of you who are followers of army command and control systems. That's also fallen off the list recently.

At any rate, as you can see here is that in each of the services there were 10 TOC pilot systems, pilot programs that were used to put together and test R-TOC ideas. There are a lot of them here that I'm sure you are familiar with besides the ones that I've mentioned.

AAAV is the Marine Corps Advanced Amphibious Assault Vehicle. It's now called EFV the Expeditionary Fighting Vehicle. The name has changed but the system is the same. MTVR has been discussed earlier today that is the Marine Corp medium tactical vehicle replacement. H60 is a helicopter program. EA-6B is the Prowler an electronic aircraft. CVN68 is the aircraft carrier that has been used as a test bed for some of these R-TOC ideas. AWACS you're familiar with and JSTARS. I suspect many of you are familiar with. F-117 is the stealth fighter. F-16 is ubiquitous, everybody knows about it. So, you can see there are quite a selection of different programs that have provided test beds, some of which have already begun to show dividends in terms of R-TOC. In some of these systems, it will be years before we see the dividends of the R-TOC work that's been done.

TOC Initiatives

KPPs	COSSI
Leadership Support	ABC
Government and Contractor Incentives	Risk Management
	CPIPTs & other IPTs
RCM	APBs
Balanced Programs	Cost Drivers
EVM	Lean Manufacturing
PBL	Value Engineering
Database/Analysis tools	

There are lots of different TOC initiatives. KPPs are Key Performance Parameters. Those are parameters that are identified by users as elements that are most important to a system that's being considered for acquisition. KPPs doctrinally now show up in what used to be called the ORD, Operational Requirement Document but is now called the CDD, the Capability Development Document and its follow on user document that supports production. At any rate KPPs are those areas that are so important to the user that if they cannot be achieved that throws into question whether or not we should go on with this development and acquisition of the system.

TOC in Concept Refinement & Technology Development

KPPs
"The Slice of the Pie"
Identification of affordable technology
Balancing the Program
PBL

You would think if cost is really important to the DoD that at least on some programs you would see a TOC metric as one of those KPPs. I submit to you that you have to look a long way to find that because that is not what is most attractive to military users. Being in the military once upon a time, I can relate. We are more interested in the "pointy end of the stick." But, what good is it to have the world's greatest warfighting system if we can't afford to acquire it, or later on, to maintain it or sustain it? We think the KPPs are an area where we ought to start defining the number of dollars we are going to spend on a program and make cost so important that if we can't stay within TOC constraints, maybe we don't need the warfighting system in that form.

TOC in SDD

Laying out the Architectures (based on performance, reliability, procurement cost, support costs)

CPIPTs in the tradeoff process

Reliability Centered Maintenance is important. RCM has been around for a very long time. That's another thing that the GAO has played back to us of things that we've known for years and years, decades for heavens sake. Lots of those TOC pilot programs are working on going back to review the basics of reliability centered maintenance, which is a very worthwhile endeavor.

You will hear a lot more about PBL, Performance Based Logistics throughout the day. That is very closely related to the control of TOC. PBL has to be a constituent consideration for what that sustainment, in fact, is going to cost.

TOC in Sustainment

More Data Collection
Searching for Cost Drivers
VE

Cost drivers, looking at those things that are most expensive in fielded systems, is one of the very fruitful ways of getting at R-TOC for legacy systems. Through modification of systems, maybe we can reduce the cost of ownership.

Value engineering is another program that has been around forever. Value engineering kicks in after production starts. Often we spend many more dollars than is necessary in early production because of things that we didn't understand completely, but that we begin to understand more fully as time goes on. The way that we can get at needed changes and address the associated production and sustainment costs is through value engineering change proposals.

Those are just a few of the TOC initiatives. Frankly, we haven't, in our study come up with any of those ideas. They've all been out there being used by one program or another within the community, but maybe not used to the extent that they should.

TOC Conclusions

R-TOC efforts are more effective and less costly to implement early in the developmental process

TOC considerations not directly linked to a KPP are in the 'Trade Space' for CAIV / trade-off analyses leading to sub-optimized TOC in favor of Procurement cost or performance enhancement

Several TOC Pathologies:
- O&S savings not returned for modernization
- Combat Developer/User focused on "What it will do" rather than "What it will cost to do it"
- PM's & Materiel Development community follow Combat Developer/User lead
- "Sticker Shock" makes PM's obscure TOC numbers
- R-TOC efforts focused on post-deployment phase
- No DoD TOC Databases are available/reliable

By way of conclusion, we think that the earlier you begin considerations of Total Ownership Cost in a program acquisition, the more effective you are likely to be. We also think as I've mentioned before, that focusing on ownership cost as a Key Performance Parameter (KPP) makes it so important that it cannot be traded away. We also think there are a lot of things counterbalancing TOC. Some of them are pretty simple. We tell people to do one thing but we incentivize them to do another. What happens to operating and support savings? Can the community that makes the savings, use the savings to plow back in and get other beneficial results? Oftentimes not! Those savings are taken away and used elsewhere, probably for very useful things, but it's a disincentive for program managers and users. We think that combat developers, the user community, is not as focused on how much war-fighting system costs, as maybe they should be. They are interested in warfighting capability, not how that capability is going to be sustained. We think that program managers and material developers typically will follow the lead of the user community. If the user community identifies the importance of ownership cost and makes sure that TOC translates into the acquisition program baseline, the program managers and their communities will follow that lead and manage it to the best of their ability. We also think R-TOC should be a continued focus in legacy systems and in the post-deployment phase because there are

always ways of taking cost out of systems even though it may take a little bit of up-front money in order to get yourself to that point.

One of the things that we think is an important pathology that in fact the TOC databases have not really matured yet.

In all the services there are problems with databases. When you think about that, if you don't have a good cost and performance database that describes your legacy systems, then do you have all the tools that you need in order to progress with the follow-on systems? We think the answer is that we've not come up with databases that are as complete and flexible as we need. It's been a problem in all the services and all the services have devoted R-TOC focus in trying to develop better databases. Oftentimes, those databases exist but they exist in a lot of different places in ways that are somewhere between difficult and impossible to patch together so as to get meaningful collective data from them.

TOC Recommendations

Designate TOC target as a System KPP
- Causes PM to focus and continually report on TOC
- Places TOC on equal footing with performance, etc.
- Facilitates trade-off analyses in favor of TOC
- Focuses Contractors on TOC-efficient design

Establish TOC databases for tracking TOC cost drivers and measuring R-TOC effectiveness

Establish Contractor incentives for improving system TOC characteristics

Garner User/Upper Leadership support for TOC goals

By way of recommendations from the research we've done:

- It's clear that we think the TOC ought to be described in Key Performance Parameters (KPP). That will cause program managers and their staffs to continue to pay attention to the total life cycle cost of the system.

- More work needs to be done to continue to enhance our databases such that they will be good tools for us to do more focused work in reducing TOC.

- We think that we have contractual mechanisms, but we need to refocus those toward keeping the contractor involved in R-TOC. Once again, there have been some initiatives that have been done in the pilot programs that look to have great promise in that respect.

- Leadership support is necessary in order to make TOC a focus within each of the services. Certainly without that leadership support, will those key questions be asked at our different meetings, such as milestone decision meetings? Without the hard TOC questions being asked at the leadership level, the workforce won't focus on the issues of TOC, because they see that it is not what the boss considers to be important.
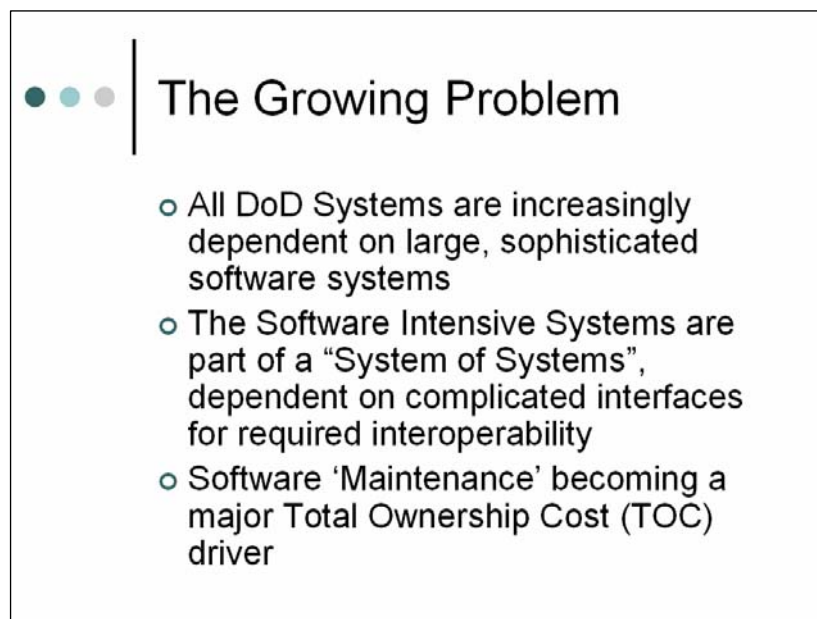
The Impact of Software Support on System Total Ownership Cost

Brad R. Naegle — Lecturer, Graduate School of Business & Public Policy, Naval Postgraduate School

As a spin-off of the Total Ownership Cost (TOC) research that Mike Boudreau and I conducted, there was some interest in examining the TOC implications of software intensive systems and what the software component is adding to the TOC burden. I thought it would be interesting to get into this, it felt a lot like opening 'Pandora's Box.'

The Growing Problem

We are obviously significantly dependent on these software systems. Virtually everything we have is moving into a software intensive system. We've gone from the M-16 rifle to our new objective individual combat weapon, which has lines and lines of software code. We want to put these together in the system of systems that Dr. Gansler talked about in the keynote presentation at the Symposium.

These systems of systems are going to be an important concept as we talk about TOC and the software drivers linked into the difficult interfaces that are associated with making a system of systems work effectively. Software maintenance is becoming an ever-increasing part of the TOC of our systems.

Magnitude of the Problem

How big is the problem? With the lack of databases that we discovered in the first research effort, we do not have a really good accounting of how much money is being spent on the software component of software intensive systems.

Some estimates indicate we spend about $30 Billion a year on embedded weapons system software. This is not the management information systems piece; this is literally the tactical systems portion. Of that, about $21.6 Billion is attributed to software maintenance and it's continuing to grow. Given what Dr. Gansler said, we spend about $80 Billion a year overall, a quarter of it being software maintenance at this time and growing.

The cost data is hard to come by, with few data sources. I asked a number of program managers what it costs to support software. They are less than forthcoming

with numbers, which might be attributed back to the program, as it is typically a large number.

One of the pathologies I encounter is that we don't want to talk about the TOC of systems. The rational is that decision makers, Congressmen and others who can kill a program, are not seeing numbers presented in a way to illuminate TOC. No one wants to be the first to say that an M-1 tank doesn't cost $2 Million a copy; it actually costs $12 Million a copy if you look at it from the TOC perspective. Someone unfamiliar with the concept of evaluation would look at those numbers and eventually cancel the program.

I was able to locate information on the B1-B Bomber program; this is the old Reagan era Bomber. I happened to work with the software maintenance manager of that system who said her budget was $980 million a year to support the software only on the B1-B Bomber. That gives some perspective on the number of dollars being put into software maintainability.

Software Supportability's Nature

What is software maintenance? We often talk about it as if it's a supportability thing like hardware maintenance. Software maintenance is really software reengineering. Those responsible for software maintenance are software engineers or

software professionals. To hire that group of people, the cost is much higher than for a typical hardware maintainer. Automatically, the cost-basis for hiring people to support our software are higher. It is also important to note, software systems are changed at a much higher rate than hardware systems.
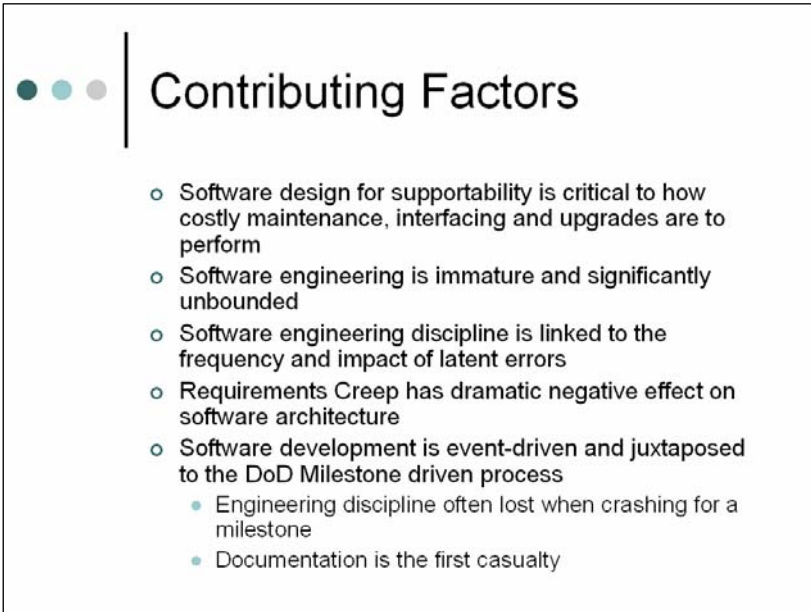
As a point of reference, software is actually deployed with the knowledge that there are thousands of latent errors throughout and those errors will be identified in use. For example, when Microsoft released Windows XP, the very day of the release, 2.8 GB of patches needed to go on it. You have to expect the errors in these things. In fact, if Microsoft met their own goal for errors per 1000 lines of code; XP would have 8 million errors. That's what is expected in a software build, due to the complexity of it. Software is a different animal than what we have grown accustomed to in hardware deployment.

Interfaces between software systems and hardware within these systems of systems are critical to make the systems of systems run efficiently. When one change is made to one system within the system of systems, it requires interface changes to ripple across the rest of the systems that are involved. Sometimes the interfaces are seamless and go well and no interoperability problem occurs. More often than not, a single change in software function requires changes throughout the system of systems. This is a driving factor that continues to increase the maintainability rates for the software.

Along the same line, software must be upgraded continuously to maintain required levels of performance within the system. For example, the M-1 Abrams office tells me their goal is to reduce software drops or additions to the system to twice a year. Hardware systems do not change that frequently, it becomes much more difficult to maintain the integrity of our software systems.

Contributing Factors

There are some contributing factors to how the software is physically architected which have a huge impact on costs related to resolving issues, scalability, maintaining or other required alterations. Among these are:

Software engineering. With over 50 years of history, Software Engineering is still immature. We do not have a standardized language to build software. We still lack the skills and the skill sets that are required to build upon a standard body of knowledge like more mature engineering disciplines have overtime. Unfortunately, when a new software system is built specifically for the DOD, it can rarely be reused. The system is built from scratch. It's like implementing and maintaining a new technology every time we build a new software system.

Software is significantly unbounded. Software doesn't have the physical world as a concern. It is literally the logic processes that are involved with the coders and the people who are involved with the design of the software.

Engineering discipline is often linked to the frequency and impact of latent errors – the importance will be made clear later in this presentation.

Requirements Creep has dramatic negative effect on software architecture. The negative effect is more dramatic than it is in hardware due to the complexities and the interoperability pieces that go with the software. As we saw in John Dillard's presentation, we set up acquisition processes against the milestones. Those milestones are fixed in concrete because of the funding system that goes along with them.

It is well documented that software development is an event-driven process. Trying to put an event-driven process function within a milestone model creates significant issues, especially when imposed milestones are driven by oversight rather than clear software evaluation points. The first thing that typically happens is the engineering discipline is lost. The focus becomes milestone driven, rather than quality, losing engineering discipline and the ability to maintain the system.

The first casualty is documentation, which is critical for the supportability of the software. Processes are shortened, then "undisciplined coding to get functionality and move on," becomes the continual loop.

RFP & Source Selection

RFP & Source Selection
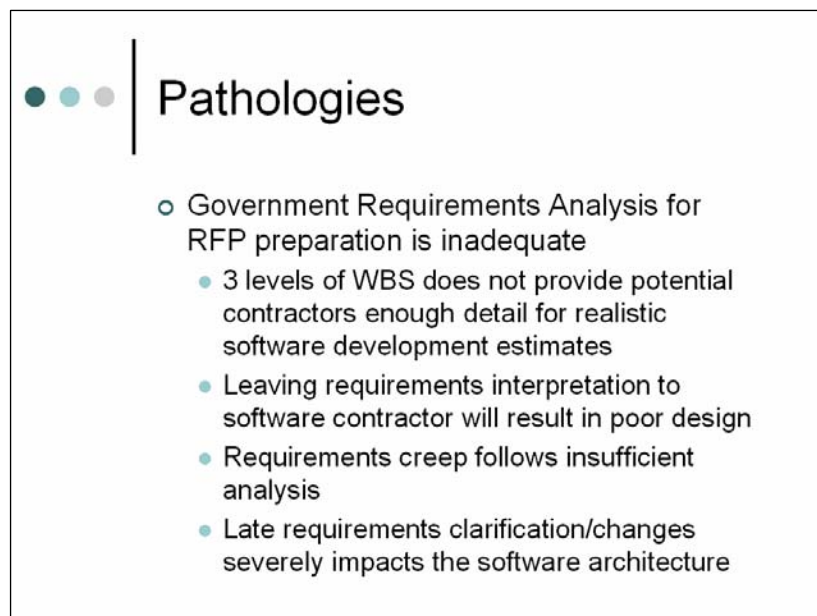
- o Inadequate Requirements analysis leads to vague RFP performance specification
- o Resulting proposals significantly underestimate the cost and time required to engineer the software components
- o Competitive pressures cause potential contractors to propose short schedules and low costs
- o Source selection criteria typically weighted toward lower cost, shorter schedule proposals
- o Source Selection Evaluation Boards have only RFP specifications and little other capability to evaluate software development proposal realism

How do we go about doing the request for proposal and the source selection on our software intensive systems? The process is not significantly different than for hardware centric systems. With recent reforms toward performance-based specification, a lot of detail is left out. This is purposeful to garner innovation. Requirements analysis is weakened as the contractor is required to make sense of open-ended requirements and maintain cohesion within the system of systems.

Without clear requirement expectations, realistic estimates of time, effort, dollars and delivery schedule are nearly impossible. It also becomes much more difficult to compare contractors based on quantifiable selection factors like price and schedule. While the intent is quality innovation at a good price, the results are foggy requirements with unrealistic deliverables and schedule. Quality software innovation takes back seat to the selection process where evaluation boards only have the RFP type data to evaluate the software development realism. The net effect; we still do not have an objective way of determining whether or not what is proposed and ultimately awarded will actually be anywhere near the reality of developing that software component of the system.

Pathologies

Here are some of the pathologies that go along with the software development piece. First, requirements are not broken into the level of detail required. Currently in the RFP process, level three is required of the work breakdown structure. This is one level below the major end item in the software architecture. This is not enough detail for the contractor to build as they would in a mature engineering environment such as with hardware.

Software requires a much more detailed approach to system requirements. If one leaves software system architecture to the interpretation of the software developer without clear requirements, poor design becomes standard. As noted previously, this introduces critical functional errors to the software system of systems as new software is built with top-line functionality only.

It is more costly to fix errors the later they are discovered in the software production cycle. Strong requirements, refined over time, develop stronger processes. Requirements creep is part of managing the software lifecycle; without a clear structure in place, late requirements clarification/changes will severely impact the software architecture and lengthen the time and costs associated with error corrections.

Emerging Recommendations

Emerging Recommendations

o Capture software supportability costs
o Improve Requirements Analysis
  • Develop the WBS well beyond 3 levels and address, as a minimum:
    · Current, planned & projected capability upgrades
    · Current, planned & projected interoperability interface requirements

Somehow, we have to get our hands around how the support costs of weapons systems are contributing to TOC, especially the software component. It is important that we capture where the money is being spent and attack issues as they relate to sustainability.

It is important that we improve the requirements analysis. Expecting to hand off a level-three work breakdown structure to a software intensive system and hoping to get a quality product is not realistic. At the very minimum, we need to tell contractors what is the current, planned and projected capability upgrades. Even though software is ever changing, it is important that we make a cut at requirements and upgrade expectations to enable contractors to build efficiently in the front end and construct the software architecture for flexibility to accommodate those changes and upgrades. This should also be applied for software interfaces.

We require higher safety and security requirements on intensive software systems, beyond what is readily available in most of the commercial markets.

Exception or fault handling: There are current software systems in the tactical world that lock up when a fault occurs. In a combat situation, this is deadly. A system needs to have a 'reject faults' capability, to move on and continue to function.

Recovery technique: For example, I spoke to a Navy commander who was involved with the STENNIS. A software glitch in the system caused the ship not to know where it was in the world. They didn't want to get too close to land masses or any other ships so they steamed around for about six hours rebooting the software.

Reliability: Our requirements for reliability in our weapon systems are thousands of times higher than what we expect from the software sitting on our desks and in our offices.

Redundant Capability: What do we need to make sure it does not go down under any circumstances?

Conclusion

The software component of our increasingly high-technology weapons systems provides the capabilities and lethality desired for our forces, but is potentially devastating to our ability to cost-effectively maintain their advantages.

The complexity of individual software-intensive systems is significantly compounded when they are combined in a "system of systems" architecture. The initial software architecture, driven by how requirements are translated into performance specifications, is critical in determining how much maintenance will be required and how much effort will be required in the necessary maintenance actions.

To gain more effective software design, significantly more effort is required in requirements analyses. Performance specifications must be much more developed than is typical in the current development model. Handing off performance specifications developed through just three levels of the Work Breakdown Structure (WBS) for software intensive systems is insufficient in a complex, system of systems environment dependent on seamless interfaces in an ever-changing architecture.

Significant development, incorporating all critical performance features, interface requirements, and known, planned and projected upgrades, changes and enhancements must be effectively transmitted to the developer for consideration in the software design and architecture.

Without these efforts, software supportability costs will continue to skyrocket as existing software will require expensive and time consuming re-engineering to accommodate interface and capability changes that were known or could have been derived from more thorough requirements analyses.

Panel III: Performance Based Logistics: Contractor Performance Measurements

Chair: Lorna Estep – Deputy Director, Directorate of Logistics Readiness, Headquarters, Department of the Air Force.

Discussant: Steven J. Kelman – former Administrator of the Office of Federal Procurement Policy at the U.S. Office of Management and Budget; presently the Albert J. Weatherhead III and Richard W. Weatherhead Professor of Public Management, John F. Kennedy School of Government.

Characteristics of Good Metrics for Performance Based Logistics (PBL)

Presenter: **Kenneth Doerr,** Associate Professor, Naval Postgraduate School
Co-authors: **RADM Donald Eaton, USN (ret.),** Senior Lecturer, Arthur Chair and
Ira A. Lewis, Associate Professor, Naval Postgraduate School

Using Metrics to Measure Contractor Performance
Presenter: **R. Marshall Engelbeck,** Lecturer, Naval Postgraduate School

Presentations are available within the attached CD or online at

http://www.nps.navy.mil/gsbpp/ACQN/forums/symposium

Characteristics of Good Metrics for Performance Based Logistics (PBL)

Kenneth Doerr — Associate Professor, Operations Management, Graduate School of Business & Public Policy, Naval Postgraduate School

Donald R. Eaton, RADM, USN (ret.) — Senior Lecturer, Arthur Chair, Graduate School of Business & Public Policy, Naval Postgraduate School

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Performance Based Service Acquisition is a Department of Defense (DoD) acquisition reform that has had noted success in reducing cost and streamlining the management of non-core government service capabilities (Office of the Deputy Under Secretary of Defense – Defense Acquisition Reform [OSD-DAR], 2000). The guiding principle in Performance Based Service Acquisition is that when an outside vendor exists who can perform a service more effectively than a government user could organically, that user should specify measurable outcomes to a service vendor, and allow the vendor to best determine the appropriate processes (how) of delivering the service. Performance Based Logistics (PBL) is an extension of Performance Based Service Acquisition aimed at the logistic services for major weapon systems. PBL is intended to reduce lifecycle cost, increase readiness, improve reliability and reduce the logistical footprint of weapon systems. A number of case studies of successful PBL initiatives are available (e.g., Candreva, et al., 2001).

This paper takes for granted the success of PBL initiatives, and takes as its starting point the question of how best to measure the degree of that success. In support of our prescriptions for measurement, we will draw not only on successful best practice, but also on the underlying logic and justification of outsourcing, as laid out in the economics and management literature. While PBL prescriptions from OSD are always careful to explain that a PBL initiative may result in the selection of an 'organic contractor' (i.e., another DoD command), actual instances of 'organic contractors' are fairly rare, and in any event, some of the same measurement issues arise regardless of the blend of private sector and organic resources.

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While measuring the performance of ongoing PBL initiatives is our starting point, we also intend this paper to inform valuation questions. From the initial question of whether to bring forward a weapon system or a major component of a weapon system as a candidate for PBL, to later design questions of 'what form' of PBL is best applied to that candidate, measurement issues are endemic. After all, the logistic services to be outsourced will be priced contractually, and for some services, there is no clear market to determine that price. When discussing CONUS transportation, prices are perhaps not difficult to determine by reference to a market. However, when discussing something like intermediate-level maintenance of a deployed weapon system on which the DoD has a monopsony and the number of qualified bidders is quite limited (and may indeed be only one or two), the market paradigm clearly breaks down, and is perhaps best understood in the context of game theory (Shubik & Levitan, 1980). Unlike the simple solutions of monopolistic games, however, the monopsonistic game of buying weapon systems logistics is hampered by the difficulty of measuring the value of the services to be obtained.

In discussing whether a case could be made for the privatization of a particular governmental service, Bendick (1984) said it was important to compare private to 'nonmarket' (i.e., organic) alternatives, and that the private sector should only be employed if it could reasonably be expected to be more efficient. He listed

"four aspects of market efficiency [that] are important to examine:

- In producing the services … do the private sector's production processes and input costs allow it to generate output at a lower total cost than could the public sector?

- Are the administrative costs incurred by government to mobilize and control the private sector les than the cost savings from more efficient production?

- Is the supply side of the market sufficiently responsive that private firms enter markets rapidly and smoothly?

- Are purchasers sufficiently rational and careful, and the quality of the service sufficiently definable and measurable, that effective, informed consumer sovereignty can be exercised? (Bendick, 1984, pp. 153-154)."

Each of these considerations is potentially problematic when examining PBL initiatives. When considering the first of his factors, the existence of PBL contracts in which the private sector vendor has hired back organic resources as subcontractors to do the touch labor puts in question exactly what services are being outsourced – logistics or management? When considering the third of his factors, the consolidation of the defense industry and the decline of the number of independent companies that might act as potential bidders raise concern. However, this paper will primarily concern itself with the second, and especially the fourth of his factors. We will discuss how an excess of measurement can make administration of comprehensive PBL contracts more costly, while the difficulty with defining and measuring some logistic services make consumer sovereignty difficult to establish.

The rest of the paper will be organized as follows. First, we will lay out a structural framework upon which measurement issues will be developed. Upon that framework, we will then develop questions about how measurement informs which sorts of candidates are best suited for PBL. Finally, we will discuss how measurement issues should be considered when deciding on the form of PBL to be adopted for a particular candidate, and the management of ongoing PBL contracts. We are not attempting to clearly delineate between good and bad measures, or good or bad candidates for PBL. Rather, we are attempting to surface imbedded measurement-related issues that may make the difference between a problematic implementation and an easy one. Thus, this paper is not intended as a guidebook for implementation, but rather as a guidebook for further investigation.

A Hierarchical Bridge Framework of Measurement for PBL

When describing logistics service acquisition for a weapon system as an economic game, it is important at the outset to note the dissimilarity between the two players. The vendor has a clear objective of maximizing the wealth of their owners, and a clear profit incentive (again, we assume throughout the paper that we are dealing with a private-sector vendor). The objective of the user acquiring the service is not so easy to state, and far more difficult to assess. Maximizing national security would be one way to state the objective, and the incentive (at least at the organizational level) might be understood in the same terms – to gain more security for the nation. At the outset then, the game has a measurement and a translation problem – measuring the services in terms of their contribution to the objectives and incentives of the DoD, and translating that measure into the dollar measurement used by the private sector.

Of course, it might be claimed that business does not really have such clear objectives and incentives either. There is a venerable literature pointing out the maximization of shareholder wealth should not be (and is not in practice) the sole aim of a public corporation. Stakeholder analysis has its roots in this observation (Donaldson & Preston, 1995). But even stakeholder analysis (in narrow form at least) does not deny the centrality of profit as a corporate incentive, rather the discussion centers on rights of resource holders, and equitable distribution of profits.

The management fashion of Balanced Scorecards has demonstrated the willingness of corporate executives to look beyond profit in analyzing performance (Kaplan & Norton, 1992). But it would be a mistake to take the current proliferation of Balanced Scorecards as evidence that corporations suffer under the same sorts of fundamental measurement problems with their objectives and incentives as the DoD. The Balanced Scorecard is clearly meant to be a *diagnostic tool* to inform management decisions beyond retrospective financial figures about the long term viability of the firm (i.e., it is meant in part to help predict and control *future* financial performance). Kaplan

and Norton (1992) discuss the shortcomings of financial performance measures in terms of their ability to guide (1) the innovation necessary to obtain future profitability, (2) the diagnosis of internal process problems that limit current and future profitability and (3) the relationship with the customer necessary to sustain future profitability. Their main criticisms of current financial measures (which are a part of the Balanced Scorecard) are that they are historical and external to operations. They tell a firm how well it has performed, not why, or what to do next to maintain or improve future performance.

But measurement-related differences between the DoD and the corporate world exist not only in the incentives and objectives of each, but also in the process capabilities that are important in developing logistics tactics to meet those objectives. In reviewing essential dimensions to be considered in logistic performance analysis in the commercial sector, Mentzer & Konrad (1991) developed a matrix in which five core logistics functions (transportation, warehousing, inventory, order processing and administration) could be measured along six dimensions (cost, labor, facilities, equipment, time & energy). Distinguish between those dimensions and the four "overarching goals of PBL … to compress the supply chain, eliminate non-value added steps, reduce Total Ownership Cost and improve readiness for weapons systems…(Department of Defense – Defense Contract Management Agency [DoD-DCMA], undated)" to which one should add "increased reliability and reduced logistics footprint (Office of the Secretary of Defense [OSD], 2003)". Aside from cost, these sets of six factors seem to have little in common. But all of the commercial sector factors can be translated into cost, and can be understood as the essential dimensions that must be managed efficiently and effectively, in order to facilitate logistics support of the firm's profitability objective. The DoD factors, on the other hand, do not all translate so readily into cost, and fall into three categories of dimensions that logistics improves warfighting capability: improved readiness (facilitated both directly by a focus on readiness and indirectly by a focus on reliability), increased agility (reducing logistical footprint, eliminating non-value-added steps, supply chain compression, and improved reliability) and reducing cost (by freeing capital for other warfighting priorities).

This is a significant difference in how logistics is viewed. The concept of readiness shows up as 'equipment' to commercial firms, who view the maintenance and functioning (and depreciation) of their operating capital primarily as a financial question – when will it become so expensive to maintain that I will have to replace it? Since DoD weapon systems are often quite old, very expensive and difficult to re-capitalize (lacking a depreciation mechanism, recapitalization is often driven by technological obsolescence), readiness is a much more central issue. Improvements in readiness, of course, improve warfighting capability; but marginal improvements are quite difficult to value in dollar terms. The idea of 'agility' is increasingly important to commercial firms, but agility in a commercial operation means, for example, the flexibility to quickly change production volumes, or quickly changing production technology. It shows up in the list above as 'time', which is also translatable to dollars. DoD operations on the other hand are mobile, and mobility directly impacts their effectiveness. Agility is not a newly discovered competitive dimension – it has always been an operational necessity. Once again, however, the operational effectiveness derived from a marginal improvement in logistics agility is very difficult to translate into dollars.

These differences in organizational objectives and the consequent logistics objectives further devolve into differences in process measurement. Caplice & Sheffi (1994), in a classification and review of corporate logistic process metrics develop three categories: utilization, productivity, and effectiveness (see Table 1). Utilization measures simply address the question of how much of a resource is used, compared to what has been made available. While these sorts of measures may be useful in assessing the efficiency of a narrow segment of a process (e.g., space utilization may be useful in assessing the efficiency of a facilities layout manager), they have virtually no contribution to the understanding of logistics contribution to organizational objectives, primarily because they do not measure outputs at all. It might be claimed that they measure waste, but even this is not true – all they measure is activity, not whether that activity is directed toward some valued outcome. What Caplice and Sheffi (1994) have called effectiveness measures, on the other hand, 'beg the question' in an essential way – those measures are only as good as the norms one establishes for outputs. They

may be useful for historical comparison of a single process, but their value in comparing across processes or in guiding resource allocation decisions is quite limited. Productivity measures, on the other hand, incorporate both outputs and inputs. For the corporation, assessing the contribution of an activity to its objectives is a matter of relating those inputs outputs to profits. While of course this is not necessarily easy (e.g., single factor productivity measures do not capture a comprehensive cost picture), at least the examples given by Caplice & Sheffi (1994) can be measured or translated to dollars (e.g., dollars paid for orders processed, or shipments made), and this is broadly true of metrics proposed in other reviews of corporate logistic performance measurement systems as well (e.g., Chow, Heaver & Henriksson, 1994; Lambert & Burduroglu, 2000; Mentzer & Konrad, 1991), with the important exception of customer satisfaction metrics. The importance of the 'customer view' has already been mentioned in relation to Balanced Scorecards, is often mentioned my authors on logistic performance measurement. However, it is worth noting that Lambert & Burduroglu (2000) list "reliance on management outside of logistics to identify the impact [of customer satisfaction] on revenues, which typically does not happen" as a primary disadvantage of customer satisfaction measurement. Hence, beyond simple utilization measures, corporate logistic performance measures can, or are desired to be, understood in terms of their impact on profitability.

Table 1. Corporate Logistics Metrics (from Caplice and Sheffi, 1994)

Dimension	Form of Metric	Logistics Examples
Utilization	Actual Input / Normed Input	Labor hour used / labor hours budgeted
		Area of warehouse occupied / total area
		Hours machine used / machine capacity
Productivity	Actual Output / Actual Input	Ton-miles delivered / costs incurred
		Orders processed / hours of labor
		Pallets unloaded / hour of dock time
Effectiveness	Actual Output / Norm Output	Items filled / items requested
		Shipments on time / shipments sent
		Transactions w/o error / total transactions

Compare those corporate logistic measures to what might be proposed as a productivity ratio for weapons systems logistics –

Operational Availability (Ao) of deployed systems / Total deployed hours.

At first glance, this looks like a utilization measure, not a productivity measure – but Ao is often used as a surrogate for readiness, which is typically given as a primary *outcome* objective of military logistics (it would be a utilization measure if, e.g., flight hours were in the numerator). The denominator translates to dollars in a budget (whether or not they could be translated to an actual cost is another issue). But the numerator is not and should not be translatable to dollars, because profit is not the objective. While measurable, it is difficult to value in terms of the dollars that might be spent to increase it, or relinquished in order to pursue other priorities. Another problem is that Ao is only a surrogate for readiness because it is a 'single factor' measure. It is also not fine grained enough for many resource allocation decision we wish to make (hence the distinction between 'mission capable' and 'fully mission capable' systems). And finally readiness itself, after all, is only a surrogate for the organizational objectives of the DoD (i.e., ready for what?). Note that if Ao were really the objective, it could be maximized by parking equipment. Hence, logistic performance of weapon systems are

more difficult to measure than commercial logistics (at least in terms of productivity), and perhaps more attenuated from DoD objectives than are commercial logistic measurement systems.

Figure 1. A hierarchical framework of measurement issues
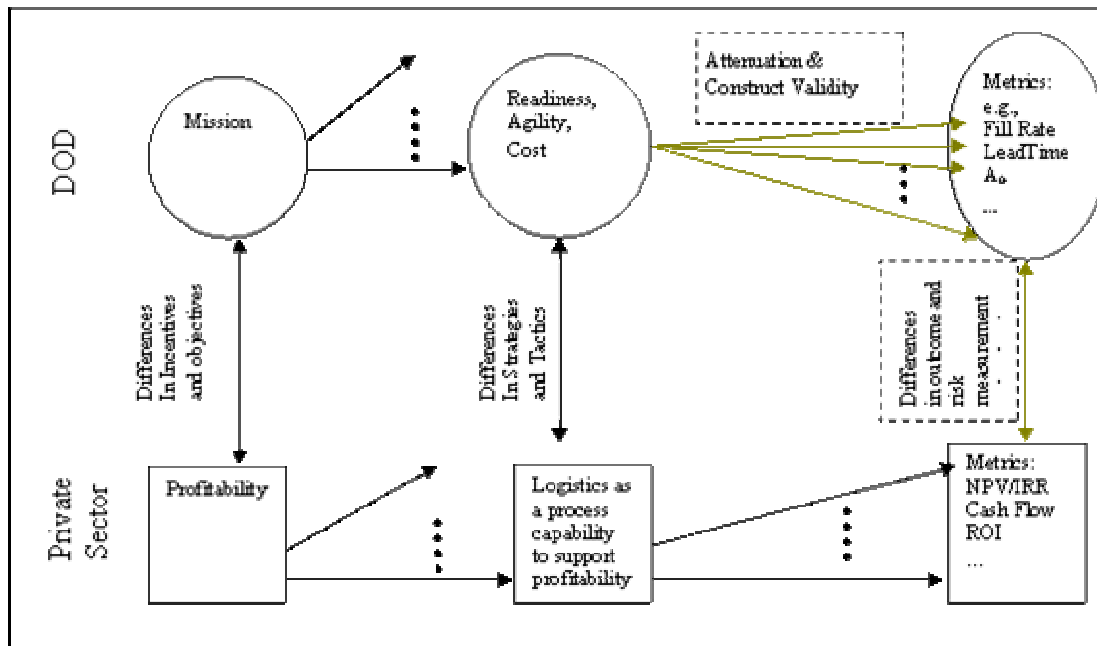
How do these measurement issues inform the decision to bring forward a weapon system or component as a PBL Candidate? First, again considering only outsourced PBL solutions, we must consider the economic logic behind outsourcing. One basic economic justification of outsourcing is the tradeoff of economies of scale with reduction in transaction costs. If the outsourced service can be performed by an organization that offers similar services to a number of other customers, that organization gains economies of scale, and should be able to offer the service more cheaply than if it were done by the outsourcing organization in house. The price that is usually paid for such outsourced services is usually in terms of increased transaction costs to negotiate price and services, and monitor performance (Aubert, Rivard & Patry, 1996). When economies of scale are difficult to obtain, as with a unique weapon system requirement, some of the underlying justification for outsourcing disappears. On the other hand, high internal transaction costs, due to e.g., high reporting requirements, or

inefficient internal controls make outsourcing relatively more attractive. If high internal transaction costs are part of the justification for outsourcing a PBL contract, then it is important that the system or component being outsourced avoid some of those transaction costs. When measurement of logistic outcomes (readiness, agility and cost) is more difficult, it will mean higher transaction costs, because performance monitoring systems will have to be more elaborate, and fair prices will be more difficult to determine and negotiate.

One way to make pricing and performance monitoring easier is by reference to a market for similar services. Hence, in prescribing a methodology for the analysis of performance based contracts for contract managers, market research is indicated as a required step (OSD-DAR, 2000). For comprehensive weapon system logistical support, or for weapon system-unique components, there will likely be no ready market for maintenance, or many other logistical support functions. In those cases, the implementation of an outsourced PBL solution will require more cost and effort to develop appropriate metrics, and negotiate appropriate prices.

In summary, measurement issues are endemic to the relationship between commercial sector vendors and the DoD. From the point of view of measurement, the best PBL candidates are those with external markets for services, and clear outcomes that are easy to relate to mission objectives. This is not to place a definite boundary on the systems where PBL ought to be applied, but only to point out that measurement issues may make some PBL implementations far more difficult and expensive, and may affect the form of the PBL solution.

Measurement, the PBL support spectrum and the management of ongoing contracts

One of the characteristics of PBL is that general characterizations are hard to make. The top level guidance for the initiative always has caveats such as

"there is no one-size-fits-all approach to PBL. Several programs have started the move to PBL under initiatives designed to meet the programs' specific requirements. Each program has tailored the PBL application to its unique circumstances taking into account cost, schedule, or product integrity to meet warfighter capability. (DoD, 2001, p. 2-2)"

In reviewing implementations, a wide variety of approaches can be found, in terms of measurement and incentives, and in terms of the level at which the PBL contract is written: from a complete weapon system as with the DDG-51, to component level stock support, as with the AEGIS. The spectrum of choices is usually described in terms of the degree of commercial support involved, and a frequently encountered graphic (which we have been unable to track to its original source) is shown in Figure 2.

Figure 2. The PBL Support Spectrum.
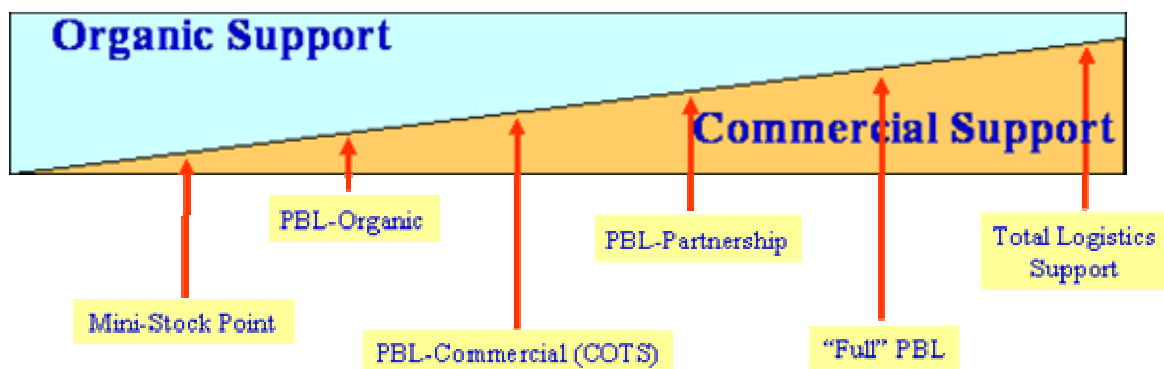
While examples of systems are often given in association with this chart, and definitions of the various anchor points (e.g., Mini-Stock Point) are offered, very little guidance can be found for the program manager as to what characteristics of a weapon

system should inform the choice of the degree of commercial involvement, and whether the contract should be offered at the system, or component level. It is our position that measurement issues should inform this choice.

A primary aspect of measurement informing the choice of commercial involvement, which we have not discussed yet, is risk. As should be clear by reference to Figure 1, vendors will be primarily interested in reductions of financial risk, while the DoD is entirely concerned with operational risk. The tradeoff of these two kinds of risk is central to the logic of PBL outsourcing. Contracts are almost always offered across multiple years (lowering financial risk for the vendor), with the expectation that the vendor will assume some degree of operational risk. Figure 3 shows the expected tradeoff of operational risk.

Figure 3. Intended risk transfer under PBL. From DoD-DCMA (undated).
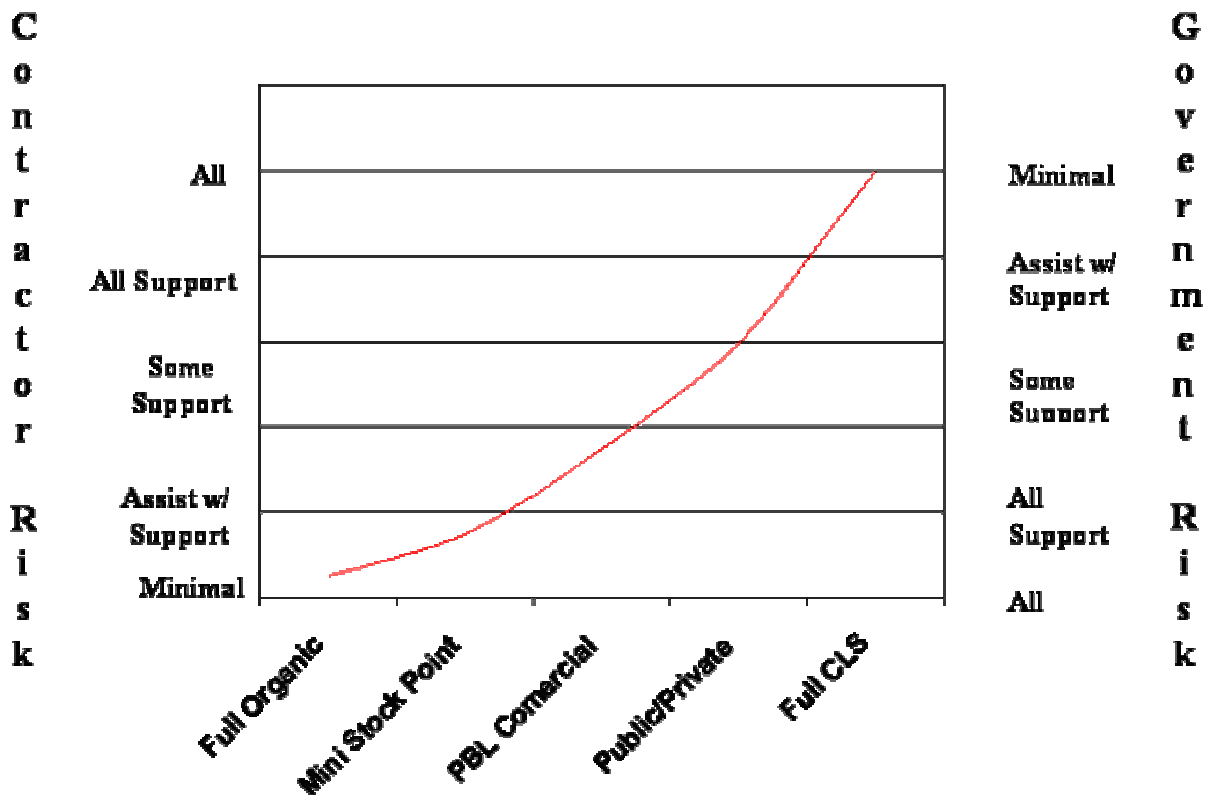
Although risk is clearly indicated as a factor to consider when developing a PBL strategy (ASN-RDA, 2003; Office of the Assistant Deputy Under Secretary of Defense – Logistics & Material Readiness [OSD-LMR], Undated), this factor is rarely mentioned as a candidate for measures of ongoing performance in PBL contracts. Indeed, it has been said that

> "minimal contract management involvement is anticipated as long as the contractor meets contractually specified performance metrics. However our involvement may increase if the contractor systems and processes are not functioning correctly and end users are not appropriately supported (DoD-DCMA, undated, pp 28-29.)"

This is a curious form of risk transfer. Operational risk, as we understand it, involves the variance associated with outcomes. The assumption of operational risk by a contractor then would entail accountability for control of that variance, and assurance (with appropriate remedy in the case of failure) of the mitigation of its impact. Here, rather, it seems that vendors are being asked to assume some aspects of risk (not clearly defined), but that the DoD will 'increase involvement if the contractor' fails to meet requirements. We do not claim that this is risk transfer in name only, but that the form of risk being assumed by vendors is not what is commonly understood as operational risk, and the degree of risk they are assuming is apparently quite limited.

It is our view that the degree of operational risk a contractor can assume is limited in many cases by the nature of our operations. It is unrealistic, for example, to assume that contractors will be able to perform operational level maintenance on a ground combat weapon system; difficult issues relating to the physical risk, insurance, and liability of non-DoD personnel in or near combat need to be addressed. These sorts of operational risk are difficult to measure, and even more difficult to value. We think it likely therefore, that commercial sector vendors will be reluctant to undertake it. Depot level maintenance, and operation of CONUS inventory control points involve less operational risk, and risk in a form that is easier to measure, and less costly for a vendor to assume, and hence we think it likely that the more operational risk involved in the

logistical support of a particular system, the more organic resources will need to be involved.

Proposition 1. When operational risk is high or difficult to measure, PBL strategies should seek less commercial sector involvement.

Within the context of a price negotiation, it is also key to understand the benefit we provide by eliminating financial risk, as this is part of what we are paying to potential vendors. Especially if interest rates and rise and the difference between the cost of capital and risk-free rates increase, what the DoD offers in terms of financial risk mitigation is highly valuable. This valuable benefit is not free for the government to offer, and should be incorporated into pricing and contract negotiations. If less operational risk is assumed by the vendor (or if that risk is difficult to assess), less financial risk should be mitigated – meaning contract terms should be reduced.

Proposition 2. When commercial sector vendors assume less (measurable) operational risk under a PBL contract, the term of that contract should be less.

On the other hand, the outcomes of PBL strategies involving only certain components, or only depot-level support, are more difficult to tie to weapon system outcomes. Consider Figure 4, which shows a highly stylized and simplified version of a weapon system and its major components, along with the failure rates (mean time to failure) of each of the components. Assuming failure of any of the components cause the weapon system to become non-mission capable, the failure rate of the overall weapon system is then an order statistic, formed of the *distributions* of the time to failure of *all* of the components. Now consider the problem faced by a program manager who has decided that his best PBL strategy involves outsourcing only component A (the one with the highest failure rate). To properly value the impact of, for example a proposed incentive to improve the reliability of component A by 10%, the program manager would need not only distributional information about the time to fail of all the other components, but also a working model which imbeds that system in mission requirements. After all, the final value of an improvement in reliability of a component (to readiness – of course there are other benefits in terms of reduced life-cycle cost of

spares, and improved agility through reduced footprint) rests in the increased likelihood of mission success in the deployed weapon system. The sort of integrated simulation model needed to properly assess the impact of improved component reliability would be expensive, and more importantly, time consuming to build. Given the time pressures put upon Program Managers, it is easy to see that the situation is problematic.

Proposition 3. PBL strategies involving less than comprehensive logistical support of a weapon system (e.g., for a component) should nonetheless have integrated weapons system models in support of their business case analysis.

In summary, measurement issues exist across the PBL spectrum, but present different sorts of challenges at either end. Ultimately there are at least two core measurement issues that should be referred to when deciding on an appropriate level of support within the PBL spectrum. The first is the valuation of outcome-related performance, and the second is valuation of operational and financial risk. While outcomes are easier to measure at the right end of the spectrum, one is less likely to find a relevant market to support price and value decisions. On the left hand of the spectrum, markets may well exist that essentially duplicate, for example, the services of a mini-stock point. However, the valuation of those isolated services in terms of weapon systems performance is even more difficult.

Figure 4. Need for integrated system model to judge impact of component outcomes.
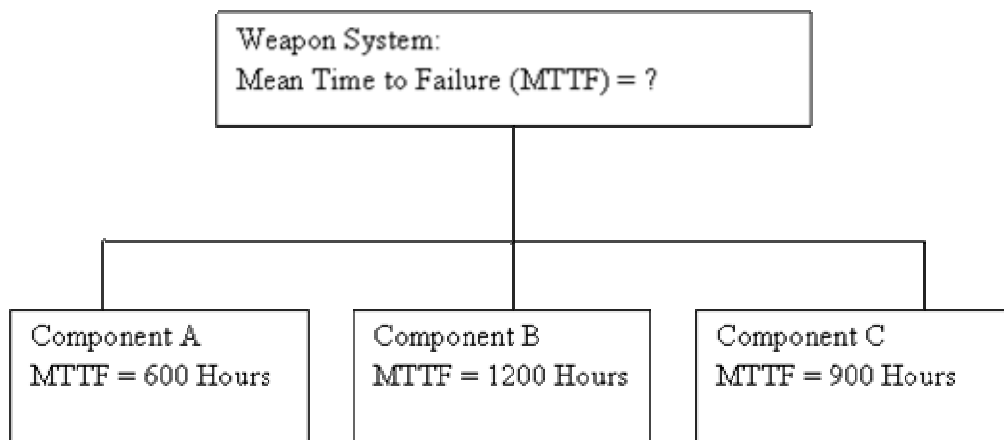
Aside from risk, the main distinction we will develop when discussing management of ongoing PBL contracts is the difference between process and outcome measures. It is our position that, while PBL is clearly intended to buy outcomes, and relieve management of the necessity of monitoring the details of 'how' performance is obtained, a great deal of effort is still being devoted to process measurement. It has recently been said that 'too many metrics' is a major problem with PBL implementation (Office of the Secretary of Defense, Undersecretary for Acquisition, Technology & Logistics [OSD-ATL], 2004). If the DoD is buying outcomes, not process, then it may be that much of the process measurement is unnecessary.

An example of 'too many metrics' is shown in Figure 5. This is a slide shown in a brief to a base commander to provide an overview of the PBL contracts at his base. This is a small base, with only a handful of PBL contracts. Clearly, the commander understands that there are too many metrics, and is tracking them quarterly in order to push for their reduction. Here, the number of metrics itself has become a metric, with visibility to the top operating officer at a command.

Figure 5. A measure of PBL measures used at one DoD command.
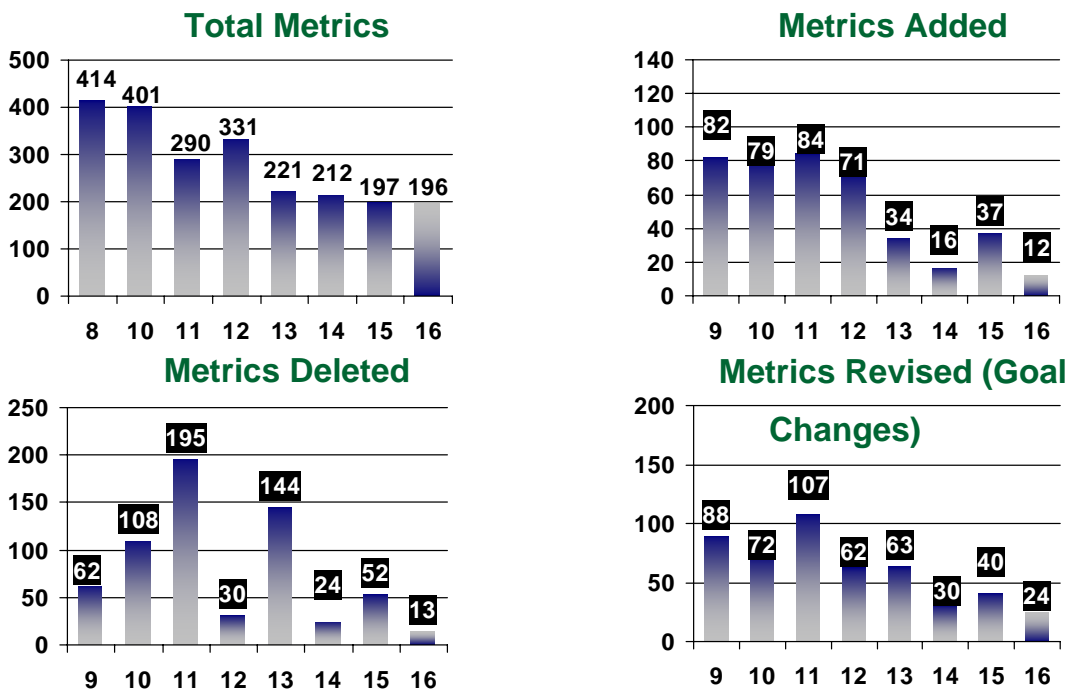
Exactly how the superabundance of metrics arises is an open question. PBL is a process meant to streamline managements concern with the details of a logistical process. In part, it may arise from a broader context within DoD, of understanding the systemic relationships of which logistics is only a part. Under various titles, including Integrated Logistics Support, the last several years has seen an increasing awareness of the embedded nature of logistical support, and the inter-relationships involved between e.g., manpower, maintenance, and supply. Figure 6 is taken from a presentation to a PBL 'tiger team' concerned with establishing metrics. Figure 6a lists the 'balanced scorecard' of top level factors for weapon system support.

Figure 6a. DoD Balanced Scorecard for Weapon System Support. From PRTM (2004).
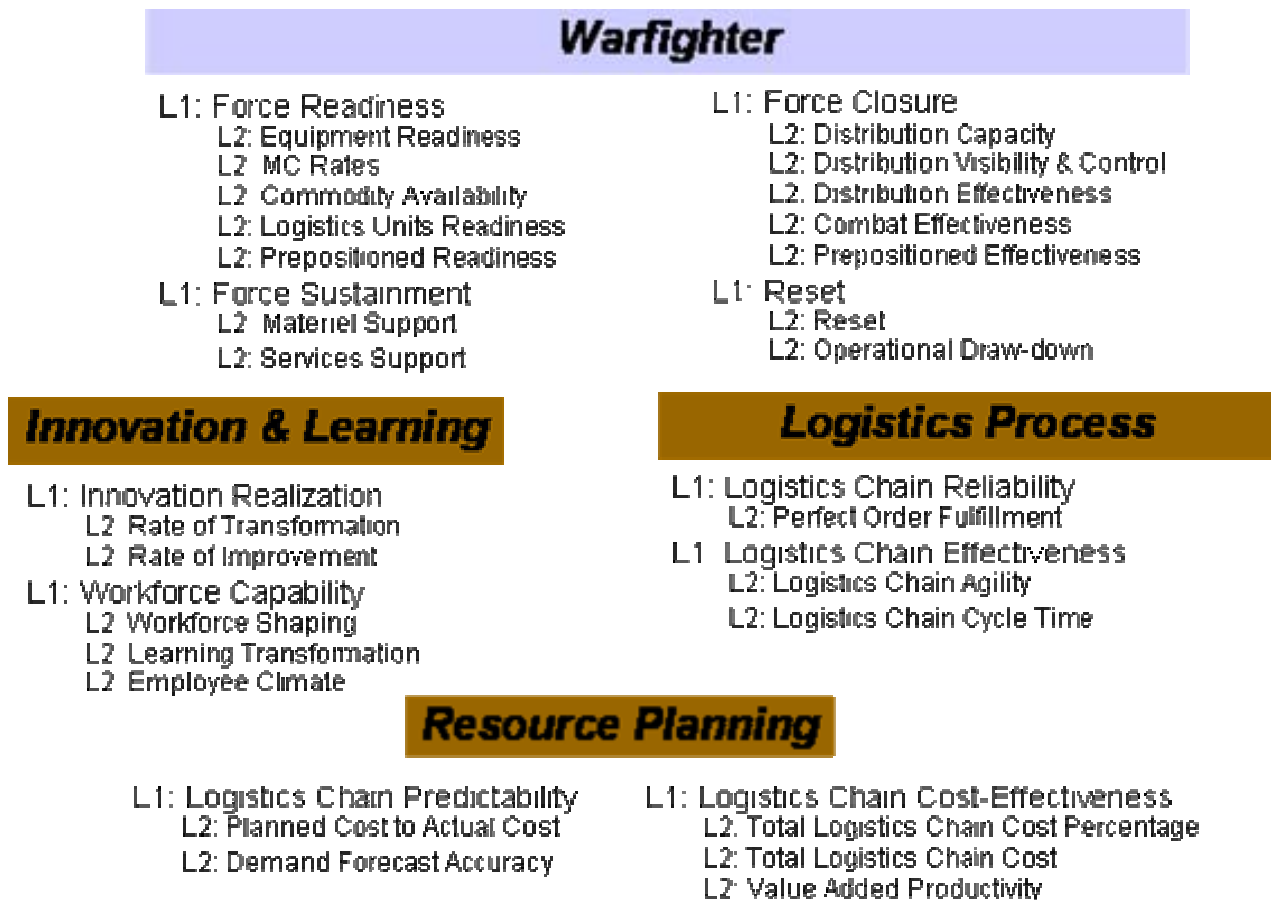
Figure 6b, translates the scorecard into logistics measures, by mapping between the high level scorecard factors, and the primary factors (process elements) of another management fashion called Integrated Logistical Support (ILS). The details of ILS process elements are not germane here, only to note that they are indeed *detailed* and *process* oriented. If one starts with a multidimensional balanced scorecard, and works through these process elements, it is easy to see how the number of metrics that must be tracked could be numbered in the hundreds – in fact, it would be hard to avoid. One must ask why however, if we are engaged in an initiative to buy performance, we are starting with a detailed map of the internals of the process. Wouldn't it make more sense to measure only key outcomes, and measure them well?

When we first presented this idea at a conference, we were met with the objection that an abundance of measures do not necessarily distract a decision maker from key tasks. The analogy was drawn to a pilot in a jet, where the cockpit has a superabundance of meters and instruments, almost all of which can be ignored, except in the case of an emergency. The analogy is a telling one, in that most of the people making decisions about metrics for PBL have themselves been pilots, or ship captains, or in charge of some complex process in the past. However, PBL is not supposed to present the DoD with a complex process to manage – it is supposed to take one off the hands of the DoD. We aren't supposed to be flying the plane – we are supposed to be passengers. When you are paying someone else to get you to your destination, you care about the price of the ticket, and arriving on time.

Of course this is a simplification. When discussing a PBL contract with one deployed squadron, we were met with a complaint about the difficulty of obtaining requisition status for parts that were backordered. The maintenance officer for that squadron was not impressed that the average lead time to get the parts had been reduced, because his primary decision when confronted with a backorder was whether or not to devote the manpower to strip a spare part from another downed aircraft. It was a decision that was difficult to make, without knowing how long it would be before the spare part arrived. Clearly, in this case, some visibility into the process was needed, *but only because a key operational decision rested on the measurement of that*

process. Given that at least part of the justification for PBL is meant to be a reduction in transaction costs, we think this should probably be a general rule.

Proposition 4. In the management of ongoing PBL contracts, metrics should primarily concern themselves with valued outcomes, and should be related to weapon system cost, readiness, and agility. Process measures should only be applied when key operating decisions depend on the status of the process itself.

Figure 6b. Metric Areas informed by Balanced Scorecard, and ILS Process Elements. From PRTM (2004).
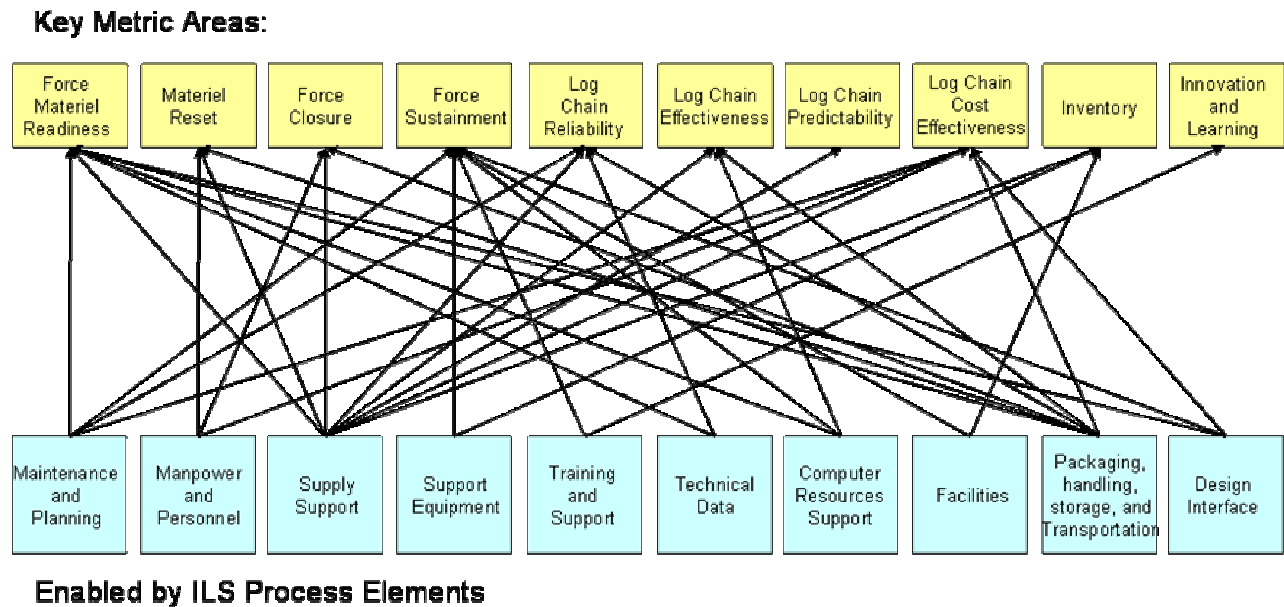
Finally, we turn to the measurement of risk in ongoing PBL contracts. Operational risk is always difficult to assess. In the context of support for a weapon system, it can be understood as variance in the logistics-related readiness of that system. A common measure of readiness is Ao. To see how variability, or risk, affects Ao, consider Table 2. The table shows the availability of two squadrons of 10 aircraft over a 20 day period. Over that period, both squadrons would report operational availability of 95%. But consider that a mission requiring 10 aircraft would be degraded (more likely to fail) only 5% of the time in the first case, but 50% of the time in the second case. The difference

is the variance in Ao. To our knowledge, in spite of the exhortations of the centrality of risk assumption and readiness to PBL, there are no programs currently tracking this measure.

Table 2. Distributional differences in a 95% Ao.

Day	FMC aircraft In Squadron A (10 aircraft total)	FMC aircraft In Squadron B (10 aircraft total)
1	10	10
2	10	09
3	10	10
4	10	09
5	10	10
6	10	09
7	10	10
8	10	09
9	10	10
10	10	09
11	10	10
12	10	09
13	10	10
14	10	09
15	10	10
16	10	09
17	10	10
18	10	09
19	10	10
20	0	09

In a very thoughtful document, the office of the Assistant Secretary of the Navy for Research, Development and Acquisition (ASN-RDA, 2003) listed factors to consider when deciding whether to use a PBL strategy: life-cycle stage, acquisition program strategy (including programmatic risks), organic impact (e.g., maintaining engineering expertise), commercial base (including additional risk required of industry partners), design considerations (including risk associated with incentives and performance thresholds), and technology considerations (including supportability risks). Although risk is mentioned in four of the six factors, there is no mention of the sort of operational risk discussed above, and shown in Figure 3. Indeed, there is little mention of risk for

ongoing contracts in this, or any other guidance documents for PBL. We find this curious. If part of what we are buying is operational risk mitigation (in key performance dimensions), it seems to us that it ought to be measured.

Propositions 5. Operational risk (variability) in key performance measures should be tracked for ongoing PBL contracts. Where essential to mission support, a reduction in variability should be supported with appropriate incentives.

In summary, this paper has presented a framework, and propositions about the impact of measurement on PBL. None of the propositions have the status of fully supported hypotheses, or fully developed theorems. All need further investigation. Some of the propositions are empirical, and need to be investigated in the field. Others are prescriptive, and need to be supported by modeling and analysis. Our hope is that we have furthered the discussion of metrics for PBL, and added to the momentum for improved implementations of PBL.

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Using Metrics to Measure Contractor Performance

R. Marshall Engelbeck — Lecturer, Graduate School of Business & Public Policy, Naval Postgraduate School

Introduction

This Project examines the use of metrics as a means to measure contractor performance. It is also designed to supplement the research being done on the "Characteristics of Good Metrics for Performance Based Logistics (PBL)" by Professors Ken Doerr and Ira Lewis along with Admiral Eaton.

I can remember as a second lieutenant in the Air Force, the only metric I needed to know was how many aircraft are in commission and how many you could launch. This was a lesson I learned very earlier in my career when the Wing Commander, a very ambitious officer, kept reporting to higher headquarters all the aircraft were in commission. After about two or three weeks we had a team visit the base. We went to the stand-up in the morning the team leader asked the Wing Commander, "how many aircraft were in commission?" When he answered 100% the team leader told him to launch them. Only about 70% got off the ground. Now that I have more experience and realize the world is much more complex, it is clear that measuring performance, especially when it comes to multiple variables is important. This is critically important as it relates to contractor performance.

Research Questions

Since my research question concerns the use of metrics to measure contractor performance in an organization as large as the Department of Defense the first research question addresses what is the regulatory foundation for the use of metrics to measure performance?

The second question: Is there a difference between metrics applicable to contracts for supplies and contracts for equipment. This question was selected because I perceive we continue to view the procurement practices as if we were buying only supplies and equipment. Today, the statistics tell us that 60% of our dollars are going to purchase services.

This brings us to the third question: Are there differences between the metrics used to measure contractor performance when we are buying supplies and equipment from the ones from whom services are purchased?

These three questions are addressed in phase one of my research project and represent a majority of the information that will be provided this afternoon.

Although it is part of phase II, I will touch on a fourth question in order to illustrate that various functions have their own interests. They have different concerns, which are often portrayed in the metrics they view as most valuable. This is very significant because it sends mixed signals as to what we value as being important.

Regulatory and Philosophical Underpinnings of Performance Measurement

First we have the Government Performance and Results Act of 1993. Much of the literature on this subject concentrates on the requirement that each of the departments in the Executive Branch report to Congress on program results every two years. Frankly I didn't realize the extent the management philosophy behind this piece of legislation has affected the way managers view their management responsibilities at the grass roots level. As many of you know the Act says: no longer is having a program the primary objective, nor is it the compliance with process that is most important. What is paramount is the results achieved and the fact you also need to measure the outcome in order to evaluate effectiveness. I'm hearing this philosophy expressed more frequently in day-to-day discussions with the students we have in class

here in Monterey as well as from students from the buying offices throughout the country that participate in our distance learning programs.

The next major event that has affected the application of metrics to the acquisition process has been the National Performance Review, which as you remember, also occurred in 1993. The Core Vision of that review was that government works for the people and should be free from red tape and useless rules no doubt facilitated acquisition streamlining.

The Federal Acquisition Streamlining Act of 1994 has been heralded as changing the way we buy goods and services. It prompted major changes to the Federal Acquisition Regulations (FAR), which hit the field in 1995. As a practitioner I was most appreciative of the "guiding principles" and "performance standards" stated in the preamble to the FAR.[33] They were very significant because for the first time in my memory, and I go back to the Armed Services Procurement Regulations (ASPR), a procurement regulation made it clear the primary goal was to support the ultimate user. This revision to FAR also included four results oriented performance standards by which the process can be measured. We all owe a debt of gratitude to Professor Steve Kelman, a member of this panel, who was head of OFPP at the time, for putting acquisition in the right perspective.

Next on the philosophical side, we have the "balanced scorecard" concept. Because the federal government does not operate in a "profit" environment some advocate use a modified "balanced scorecard" approach when applied to government operations.[34] "Balanced scorecard" is a concept introduced by Robert S. Kaplan and David P Norton of Harvard in 1996. It evolved from their study of how four corporations measured their performance and set corporate strategy.[35] This concept represents a

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[33] FAR Part 1.102

[34] James B. Whittaker, *President's Management Agenda: A Balanced Scorecard Approach*, Management Concepts, Vienna, VA. 2003.

[35] Robert S. Kaplan and David P. Norton, "Putting the balanced Scorecard to Work*," Harvard Business Review*, September-October 1993.

good guide for establishing a strategic measurement system. However, we need to be cautious. We shouldn't just adopt what business is doing. It is important that we take good ideas from industry and adapt them to our needs.

You Get What You Measure!

As Dr. Marshall Meyer points out "You get what you measure." [36] This means when measuring performance it is vital to consider what to measure and the unintended consequences on what is not measured. This can lead to mixed signals as to what is important.

We must state our objectives in terms of measurable results. All agree with the comment made earlier that experience tells us, when we say to contractors this is what we want and what we will measure, we do not always say it in a way they can understand it. Some of the results we desire are not quantifiable. Case in point: How

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[36] Marshall Meyer, Rethinking Performance Measurement, Cambridge University Press, UK, 2004.

clean is clean? How do you measure clean? We want a facility maintained in the cleanest manner. How do you define that?

Consider the quote 'people are better motivated with measurable objectives than without them', made back in 1961. The lesson from this for our students sitting in the back, don't throw away your old textbooks. This quote came from the textbook titled "Management by Results" that was popular in 1961.[37] I kept mine all these years. I knew it would come in handy sometime.

Last, but not least, is a statement that moves metrics from a measurement to a management tool. This is a statement made by Luke Campbell. It was made at a software metrics conference in the mid-1990's where he said, "If you're not measuring, you're not managing. You're just along for the ride!" [38] That management philosophy says a lot.

Performance Measurement

Performance Measurement

- Process of Assessing Progress Toward Achieving Predetermined Goals
- Includes Information on,
  - Efficiency Resources are Transformed into Quality Outputs
  - Extent to Which Customers are Satisfied
  - Effectiveness of Government Operations in Terms of Specific Contributions to Program Objectives

James B. Whittaker, Presidents Management Agendas: Balanced Scorecard Approach, Management Concepts, Vienna, VA, 2003,p 259

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[37] Edward C. Schleh, *Management by Results*, McGraw-Hill, New York, 1961.

[38] Luke Campbell and Brian Koster, "Software Metrics: Adding Engineering Rigor to a Currently Ephemeral Process," 1995.

So what are we talking about? Here's performance measurement, I'll let you read the definitions as they came out of the President's management agenda and the scorecard approach published just last year. [39]

Acquisition Program Baseline

Acquisition Program Baseline
(DoD 5000 Series Regulations)

• User Performance Requirements
• Schedule Requirements
• Interoperability
• Supportability
  – Cost of Ownership
• Applicable Environmental Requirements
• Estimate of Total Program Cost

5000.2-R dated April 5, 2002, Paragraph C 1.4.

Next, what overarching metrics do we have? What are our objectives as stated by from OSD? They are cited in the DoD 5000 series regulations. These are the performance factors the program manager must report on when reviewing program milestones. They are mandatory for high-value or high-priority programs. They include performance requirements, schedule requirements, interoperability, supportability, cost-of-ownership, applicable environmental requirements, and estimate of total program cost.[40]

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[39] James B. Whittaker, *President's Management Agenda: A Balanced Scorecard Approach*, Management Concepts, Vienna, VA. 2003.

[40] Paragraph C 1.4 of DoD 5000.2-R dated April 5, 2002.

ACQUISITION STANDARDS

"TO DELIVER ON A TIMELY BASIS THE BEST VALUE PRODUCT OR SERVICE TO THE CUSTOMER WHILE MAINTAINING PUBLIC TRUST AND FULFILLING POLICY OBJECTIVES."

SATISFY CUSTOMER IN COST, QUALITY, AND TIMELINESS

FULFILL PUBLIC POLICY OBJECTIVES

MINIMIZE ADMINISTRATIVE OPERATING COSTS

CONDUCT BUSINESS WITH INTEGRITY, FAIRNESS AND OPENNESS
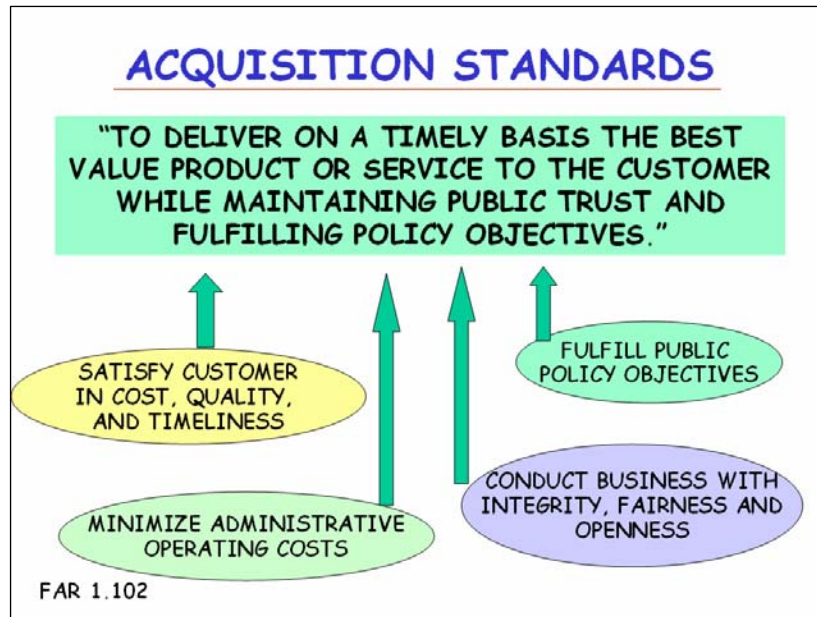
FAR 1.102

Moving into the contracting side, this came out of the Acquisition Streamlining Act FAR 1.102. Doctor Kelman, thank you for putting this in there, because we in the contracting community were working so hard to follow the regulations, which we sometime forget about keeping our eye on the ball.

Comment by Dr. Kelman: Will you also please thank Dave Drabkin who played a very important role as a civil servant and worked with Colleen Preston in OSD.

Note, that performance standards flow upward, illustrating that in order to achieve results, the acquisition process must successfully meet the standards established in four areas of performance. I would venture to say each of these areas are where performance metrics would be useful.

Categories of Deliverables

Categories of Deliverables

- Initial Delivery of Supplies and Equipment
- Installation Support
  - Food Service
  - Installation Maintenance
- Support Weapon Systems and Other Mission Capabilities
  - Component Repair
  - Sustaining Engineering Services
  - Advisory Services
  - Research and Development
  - Logistics/Sustainment Services
    - Depot Level Maintenance
    - Depot Level Support of Computer Systems

60%

As you recall two of the first three research questions dealt with the three different categories of deliverables. First is the delivery of supplies and equipment. This category includes the High-Value and High-Priority systems that are covered by the DoD 5000 series regulations we discussed earlier. This is the area that in the past has received most of our attention when it came to regulations and our policies. However, dollar wise we're not buying as much in this area as we did prior to the end of the cold war. Currently approximately 60% of procurement dollars go to purchase services. This includes installation support, food service and installation maintenance. Then we have weapons system support and other mission capabilities, component repair, sustaining engineering, advisory services, research and development, logistics/sustainment services including depot level maintenance and computer software support.

Categories of Contractor Deliverables Spectrum of Tangibility

Categories of Contractor Deliverables Spectrum of Tangibility

- Supplies
- Equipment
- Research and Development
- Services
  - Facility Maintenance
  - IT Services
  - Logistics Support and Services
  - Personnel Services

TANGABLE

INTANGIBLE

Larry R. Smeltzer and Jeffery A. Ogden, "Purchasing Professionals' Perceive Differences Between Purchasing Materials and Purchasing Services," *Journal of Supply Chain Management*, Feb. 02

The next research question was: Is there is a difference between contracting for Supplies/equipment and buying services? A study from the *Journal of Supply Chain Management* reported a survey of about 1400 contracting personnel in the commercial world and concluded: (1) supplies and equipment are more tangible than services. (This slide illustrates a range of tangibility as it applies to the categories of deliverables purchased by DoD.); (2) there is a difference in the degree of difficulty between writing requirements for tangible vs. intangible items; and (3) it's much harder to write requirements documents for the intangible items. [41] There have been other studies that reached the same conclusion. Just yesterday I was talking to Laura Baldwin of the RAND Corporation and she commented that she continues to be surprised at the problems the acquisition community is having in stating performance-based requirements. We've gone to defining "what" we want rather than describing "how" we wanted it done. She also said there are more contracting issues that span the

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[41] Larry R. Smeltzer and Jeffery A. Ogden, "Purchasing Professional's Perceive Differences Between Purchasing Materials and Purchasing Services." *Journal of Supply Chain Management*, Feb., 02.

differences between the two methods than she had ever imagined. I agree with what Ken Doerr said previously, we still want to measure the how.

Top Ten Categories

Top Ten Categories

CATEGORIES/(PERCENTAGE)	RELATIVE IMPORTANCE	
– Quality and Process Control (24.9)	1	
– Continuous Improvement (9.2)	2	
– Facility Environment (8.2)	2	
– Customer Relationship (8.2)	2	
– Delivery (8.1)	2	No Statistical Difference
– Inventory and Warehousing (7.0)	2	
– Ordering (5.8)	2	
– Financial Condition (5.5)	2	
– Certifications- ISO (3.6)	3	
– Price (3.6)	3	

Penny M. Simpson and Judy A Siguaw, "Measuring the Performance of Suppliers: An Analysis of Evaluation Processes," *Journal of Supply Chain Management: A Global Review of Purchasing and Supply*, Institute of Supply Management, February 2002, Tables III and IV, pages 13 - 14

To get an idea what industry measures, this slide shows the top ten supplier performance categories evaluated by over 2,000 randomly selected members of the Institute for Supply Management (ISM) and reported in the *Journal of Supply Management*.[42] Note that way and above the rest is quality and the importance placed on continuous improvement. Also note at the bottom is price, which was evaluated by less than 4% of the respondents. In the middle section are facility environment (9.2%), customer relationship (8.2%), delivery (8.1%), inventory and warehousing (7%), ordering (5.8%), and financial condition (5.5%). Notice there are no statistical differences between these categories. This tells us what industry thinks are the most

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[42] Penny M. Simposn, Judy A. Siguaw and Susan C. White, "Measuring the Performance of Suppliers: An Analysis of Evaluation Processes, *Journal of Supply Chain Management*, February 2002.

important supplier performance indicators. It also says buyers, as a supplier or as a producer of a product, want to have a good supply base to deliver quality product.

How Commercial Firms Measure Services

How Commercial Firms Measure Services

- Customer-Provider Relationship
  - Call Center Metrics
- Customer Satisfaction Metrics
  - Overall Customer Satisfaction
- Operations
  - Total Cost of Ownership
  - Occupancy Cost
- Special Interest
  - Number of Contracts With Small Businesses

Laura H. Baldwin, Frank Camm, and Nancy Moore, *Strategic Sourcing: Measuring and Managing Performance*, RAND DB-287-AF, Santa Monica, CA.. 2000, Appendix B

Let's look at services. In a study published by RAND, Laura Baldwin studied 14 corporations that purchase services to determine what they measure. Customer-provider relationship, like a call center response, is an important metric. The question asked was, "were you satisfied with the response you got on the call?" This question could be applied to a maintenance technician after being dispatched to repair an aircraft on the line or it can also apply to a repair of a water heater in a facility at a Navy installation.

Customer satisfaction metrics, overall customer satisfaction: That's hard to quantify. The only way is through some type of a survey. We all get them all the time; when we stay in hotels, things like that.

Next is Operations: This I found very interesting. Many companies measure the cost of ownership of a facility. They track the cost of repairs by building or they evaluate its ownership cost by the number of occupants.

Last, but not least, are special interests: The number of contracts with small business or socioeconomic programs. The message here is the metrics are different for services than for hardware.

Conclusions

In conclusion; The Government Performance results Act (GPRA) of 1993 establishes the need for government managers to define desired program results and to establish performance metrics so that results achieved can be measured. Customer satisfaction should be the number one standard metric.

There is a difference between metrics used to evaluate contractor performance for supplies/equipment and services.

There should be relatively few key performance metrics. However, achieving this with the number of competing interests will be difficult. Currently a company working out of New York is walking the halls of the Pentagon saying that it has an IT program that will measure contractor performance. It contains between 100 and 1,000 factors that can be measured and report contractor performance. They advertise that their program can be tailored to individual contracts. Their theme is, if we're not measuring and managing all the contract requirements then the taxpayer is getting short changed. I would ask, if we had to measure 1,000 factors that could be measured in a contract and managers feel there are only 10 or so of these they feel are important, then are we paying for something we really don't need that much.

Conclusions

5. Metrics Selected Should be able to Project Subsequent Outcomes (Results)
6. Metrics Selected Should Facilitate Continuous Improvement
7. Metrics Selected Should Cross-Functional Boundaries
8. Should Provide Capability to Compare Contractors
9. Metrics Selected Should be Used to Award/Penalize Contractors

Metrics selected should be able to project subsequent outcomes. They should give you the ability, by looking at trend analysis, where you will be in the future. Answer the question; will this contractor be able to support the organization's mission?

- Metrics selected should facilitate continuous Improvement.

- Metrics selected should also cross-functional boundaries. Our processes cross-organizational boundaries horizontally. They are no longer confined to functional stovepipes as we learned with the introduction of the computer.

- The performance measurement system should provide the capability to compare contractors and should be use to award/penalize contractors.

Final Thoughts

Research results concludes, performance measurement can be used to manage contractor performance after award. Private industry uses performance measurement primarily to evaluate the effectiveness and efficiency of its purchasing department and to guide contractor selection, However, the Government Performance and Results Act (GPRA) of 1996 makes measurement of contractor performance a very appropriate way to manage contracts in the public sector.

GPRA requires managers in the executive branch to develop strategic plans as use performance indicators to record output and evaluate the outcome of each program. The study recommends that the Kaplan and Norton's Balanced Scorecard method can be adapting to the contract in a manner that would enable performance indicators to flow down to major contractors. The goal would be to add joint accountability for results to the buyer-seller relationship.

Past performance is also is an integral part of the contract management process. It is primarily seen as a way to mitigate the risk of selecting a contractor with a poor performance track record by reporting on contractor performance annually. Examples of information that must be reported to a centralized data base by the contracting officer includes, (a) A contractor's record of conforming to contract requirements and standards of good workmanship, (b) A contractor's record of forecasting and controlling cost, (c) A contractor's adherence to contract schedules, including the administrative aspects of performance contractor's history of reasonable and cooperative behavior and commitment to customer satisfaction and, (d) A contractor's business-like concern for the interests of the customer. The study concludes that both parties would jointly benefit managing these indicators concurrent throughout the life of the contract rather than reporting after the fact.

Panel IV: Government in the Market Place

Chair: David Drabkin – Associate Administrator, Office of Acquisition Policy, General Services Administration.

Discussant: G. Fredrick Thompson – Grace & Elmer Goudy Professor of Public Management & Policy Analysis, Atkinson Graduate School of Management, Willamette University

Downsizing the Navy: Privatization of the Naval Air Warfare Center, Aircraft Division, Indianapolis - A Case Study

Presenter: Jeffery Cuskey, Lecturer, Naval Postgraduate School
Co-authors: Luci Stephens and **William Lucyshyn,** University of Maryland

The Army Seeks a World Class Logistics Modernization Program (LMP) – an Outsourcing Case Study

Presenter: Robert Maly, University of Maryland
Co-authors: William Lucyshyn, University of Maryland and **Keith F. Snider**, Naval Postgraduate School

Presentations are available within the attached CD or online at

http://www.nps.navy.mil/gsbpp/ACQN/forums/symposium

Downsizing the Navy:
Privatization of the Naval Air Warfare Center
Aircraft Division, Indianapolis
A CASE STUDY

William Lucyshyn — Visiting Senior Research Scholar, Center for Public Policy and Private Enterprise, University of Maryland

Jeffrey R. Cuskey — Lecturer, Graduate School of Business & Public Policy

Jonathan Roberts — Graduate Research Assistant, Center for Public Policy and Private Enterprise, University of Maryland[43]

Case Objectives

- *Strategic*: When faced with a BRAC decision (1) identify and analyze the stakeholders; (2) develop top level guidance with an overarching process framework; and, (3) develop and evaluate alternative courses of action, completing "customer satisfaction," business case, and risk analyses.

- *Tactical*: Once an alternative is selected, develop a detailed implementation plan to address (1) transition issues; (2) economic development and agreement terms and conditions from City and business perspectives; and, (3) contract terms and conditions from the business and Navy perspectives.

- *Lesson Learned/Reflections*: Identify potential risks and mitigations, barriers to implementation, success factors, and best practices; and make recommendations for future privatizations.

Introduction

It was just another day in the office for Steve Carberry, the Executive Director for Contracts at the Naval Air Systems Command (known as NAVAIR), when Carberry's boss, NAVAIR's Commander, Vice Admiral John Lockard, asked to see him. Lockard was known for tackling tough issues, and this time he wanted to enlist Carberry's support for his latest challenge. Lockard asked Carberry to head a NAVAIR team tasked with exploring the feasibility of privatizing the Naval Air Warfare Center, Aircraft Division, Indianapolis (NAWC-ADI). As Carberry researched his new assignment, he began to appreciate that NAWC-ADI had a complicated but fascinating history.

The NAWC-ADI Facility

The 163-acre World War II-era facility had a rich history. Originally opened as a bomb-making facility in America's heartland far enough in-land to be insulated from the German threat, NAWC-ADI had developed as a center of excellence, designing, producing, and sustaining advanced electronics for defense applications, including such systems as the guidance technology for Patriot missiles. The 62-building, 984,000 square foot facility employed almost 2,500 people – over 1,900 were highly-skilled engineers, logisticians, and manufacturing personnel. NAWC-ADI – whose basic products included aviation and aerospace electronic systems; weapons guidance, control, and launch systems; ground-based electronic systems; and shipboard electronic systems – was the only Department of Defense (DoD) resource that had the capacity to take projects from concept through design and to production, all under one roof.

In the early 1990s, NAWC-ADI underwent an internal reorganization geared around acquisitions reform that was so successful that it became the model for other such reorganizations – including NAVAIR, its parent organization. The workload grew to include a broad array of technical support across the full spectrum of Naval Electronics Systems – and its mission was to:

". . . conduct research, development, engineering, material acquisition, pilot and limited manufacturing, technical evaluation, depot maintenance and integrated logistics support on assigned airborne electronics (avionics), missile, spaceborne, undersea, and surface weapon systems, and related equipment."

The customer base – much of it outside the Navy – was very satisfied with NAWC-ADI. Most important in the eyes of DoD, NAWC-ADI "saved the military more than $200 million in the 1990s" by, for example, reducing indirect costs by nearly 30 percent between 1991 and 1995.[44]

But despite these accomplishments, NAWC-ADI was in trouble.

Problems at NAVAIR

A number of insiders believed that NAVAIR as a whole was in peril. According to insiders, NAVAIR's customers were deeply disappointed with the fleet. Products did not meet their requirements, and they were always overpriced. On top of that, it took "years and years to get stuff out to the fleet."[45] NAVAIR was perceived as eating up the infrastructures of the Navy's Systems Command without adding any value to the operations, and there was a large duplication of industrial and engineering capabilities.

Paranoia had set in. In 1993, NAVAIR Headquarters was slated to be moved from Crystal City, Virginia to Patuxent River, Maryland to increase that facility's business base and to keep it away from Wright-Patterson Air Force Base in Ohio, which had plenty of room available. NAVAIR decided to launch a preemptive strike to save itself. Through a variety of efforts, it aimed to reduce its staffing by nearly 50 percent, from 59,000 to 31,000 employees.

Put simply, "NAWC-Indy didn't have anything that couldn't be moved."[46]

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[44] Jim Wheeler and Susan Walcott. "Anatomy of a Successful Privatization." Indianapolis: Hudson, 1999. p. 10.

[45] Steve Carberry interview with William Lucyshyn, Jeffrey Cuskey and Luci Stevens. 17 November 2003.

[46] Ibid.

The Base Reuse and Closure (BRAC) Process

With the end of the Cold War, the Department of Defense (DoD) significantly reduced the size of the military forces. Budgetary pressures were driving DoD to look for ways to shed infrastructure while freeing funding for force modernization initiatives. But when it came to closing facilities, political realities always caused resistance. In an effort to depoliticize this process, Congress passed the Defense Base Closure and Realignment Act of 1990.[47] The Act established three rounds of review – one in each of 1991, 1993, and 1995.

The BRAC process requires the Secretary of Defense to make recommendations to an open and independent blue-ribbon Base Closure and Realignment Commission (BCRC) comprised of eight members nominated by the President and confirmed by the Senate. The BCRC then reviews these recommendations and compiles its own recommendations, which are forwarded to the President. The President reviews the Commission's recommendations and either sends them back to the BCRC for additional work or forwards them in whole to Congress. Absent a joint resolution of Congress expressing disapproval, the Commission's recommendations are implemented.

For the BRAC-1995 round, DoD emphasized cross-service use of common support assets, including depot maintenance, laboratories, test and evaluation facilities, undergraduate pilot training, and medical treatment facilities.[48] The Secretary's recommendations are based on a 6-year force structure plan, and the eight criteria for selecting bases to close or realign are spread across four categories for review (see Table 1).

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[47] See P.L. 101-510.

[48] David R. Warren. "Military Bases: Analysis of DOD's 1995 Process and Recommendations for Closure and Realignment." GAO/NSIAD-95-133, April 1995.

Table 1. Criteria for Selecting Bases to Close or Realign

Category	Criteria
Military Value	1. Current and future mission requirements and the impact on operational readiness of DoD's entire force.
	2. The availability and condition of land, facilities, and associated airspace at both the existing and potential receiving locations.
	3. The ability to accommodate contingency, mobilization, and future total force requirements at both the existing and potential receiving locations.
	4. Cost and manpower implications.
Return on Investment	5. The extent and timing of potential costs and savings, including the number of years, beginning with the date of completion of the closure or realignment, for the savings to exceed the costs.
Impact	6. The economic impact on communities.
	7. The ability of both the existing and potential receiving communities' infrastructures to support forces, missions, and personnel.
	8. The environmental impact.

The 1995 Base Reuse and Closure Round

The BRAC process had been used to select bases for closure in two previous years – 1991 and 1993 – prior to the 1995 round. Because the easy cuts were made in the early rounds, 1995 proved to be "both technically and politically the most difficult BRAC round."[49] The Navy was faced with some difficult decisions. Although NAWC-ADI was an excellent facility, in the end, it could not compete with the other NAVAIR facilities that could do engineering work *and* also support flight operations. Moreover, NAWC-ADI's geographical location did not correspond with the Navy's plans to shift major operations to the East and West Coasts. Therefore, the Navy forwarded NAWC-ADI to DoD as a candidate for closure. In 1995, DoD issued the following recommendation to the BRAC:

"Close the Naval Air Warfare Center (NAWC), Aircraft Division, Indianapolis, Indiana. Relocate necessary functions along with associated personnel, equipment and support to other naval technical activities. . . ."[50]

NAWC-ADI was placed on the dreaded base realignment and closure list, slated to meet the same fate some 402 military facilities met in the two previous rounds.[51]

Enter Mayor Stephen Goldsmith

Typically, base closures resulted in the relocation of personnel and equipment to other bases – in this case, NAWC-ADI assets would be moved to the China Lake, California and Patuxent River, Maryland facilities. NAVAIR was performing triage –

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[49] Wheeler and Walcott, op. cit., p. 11.

[50] Federal Register. 1 March 1995. Volume 60, Number 40. p. 11485.

[51] 250 military bases were listed for closure, and 152 more facilities were scheduled for realignment.

sacrificing Indianapolis would shore-up the China Lake and Patuxent River operations, then considered the jewels of NAVAIR.[52] But was there a smarter way to proceed?

The entrepreneurial mayor of Indianapolis, Stephen Goldsmith, proposed transferring the NAWC-ADI personnel and equipment to the private sector. Goldsmith had been inaugurated as the Mayor of Indianapolis in January 1992, and he immediately began transforming the city into a "marketplace for municipal services."[53] He changed more than 60 city functions "from government monopolies into services that compete[d] in an open market."[54] These changes usually resulted in improved performance at reduced costs. For example, privatizing wastewater treatment in the City of Indianapolis reduced operating costs by 44 percent, increased employee wages, and reduced employee grievances by 99 percent.[55] A contract with Corrections Corporation of America (CCA) reduced jail overcrowding, while also saving $20 million in new construction costs and $1.4 million in annual operating expenses.[56] But competition did not always result in privatization. When Goldsmith competed the City's trash collection business – a large part of which already was being serviced by private, though non-competitive, companies – City crews actually won back some of the contracts, saving $15 million, or 25 percent.[57]

By the time NAWC-ADI was placed on the BRAC list, Goldsmith was well known for his innovative leadership – he even was known locally as "Mr. Privatization."[58] A more appropriate moniker, however, might have been "Mr. Competition."

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[52] Stephen Goldsmith and Larry Gigerich interview by William Lucyshyn and Luci Stevens. 18 December 2003.

[53] William D. Eggers and John O'Leary. "Revolution at the Roots." New York: The Free Press, 1995. p. 106.

[54] Ibid, pp. 105-15.

[55] Stephen Goldsmith. "Making Government Cheaper and Better – Indianapolis mayor Stephen Goldsmith's economic policy." USA Today (Magazine), January 2000. Vol. 128, Issue 2656, p. 11-12.

[56] Ibid.

[57] Eggers and O'Leary, op. cit., pp. 107-108.

[58] "From boots to electronics: shutting military bases." *The Economist.* 21 June 1997.

Forewarned . . . and Forearmed

In late 1992, before the BRAC-93 process officially even began, Goldsmith began learning more about NAWC-ADI's business by meeting with the leadership, touring the facility, and speaking with employees. In early 1993, with a good understanding of the business, Goldsmith and Larry Gigerich – a senior advisor to the Mayor, a member of the Indianapolis Economic Development Commission (IEDC), and one of Indiana's top powerbrokers, began lobbying key Navy officials involved in the BRAC closures in Washington, D.C. Lew Lundberg, then-Technical Director of NAWC Headquarters, and Vice Admiral William Bowes, then-Commander of NAVAIR, told Goldsmith and Gigerich that if not 1993, then 1995 was the year to expect a possible base closure. Echoing these sentiments were Robin Pirie, head of the Base Structure Evaluation Committee (BSEC) and Assistant Secretary of the Navy for Installations and Environment (ASNI&E), and Charles Nemfakos, Executive Director of the Base Structure Analysis Team (BSAT) and former Assistant Comptroller of the Navy. Thus, even though NAWC-ADI was spared from earlier BRAC rounds, the facility's vulnerability was made known by the Navy, especially because it did not fly or float, or have ports or runways. It became clear that the City would have to fight to make NAWC-ADI more competitive and keep it open.

Even though Navy officials were undecided whether it would be better to wait for a closure decision to float an alternative, to have counterproposal options at the ready in case of a closure decision, or to fight closure altogether, the City and NAWC-ADI, led by Mayor Goldsmith, pursued a strategy of keeping the facility open by presenting alternative plans that both raised the value while reducing the overall costs of the Indianapolis operation to the Navy. Throughout 1994, Goldsmith continued to meet with federal and state political representatives to coordinate strategies and discuss alternatives with the Navy. With the help of the Hudson Institute, the City of Indianapolis continued to refine its alternatives, while also identifying which alternatives might be politically feasible.

Initial Alternatives, and Privatization as a Potential Backstop

In the face of these dire predictions, Goldsmith began preparing for the worst outcome by forming alternatives to closure before the BRAC-1995 process even began. The City started with four broad options that focused on increasing the military value of NAWC-ADI while reducing costs to the Navy, in order to make it more competitive with other bases. Each option came with its own set of advantages and disadvantages. First, the Navy could build on NAWC-ADI's "Smart Buyer" function. Second, the Navy could use the Indianapolis transportation hub to its advantage to turn NAWC-ADI into an "Emergency Supply Center." Third, the City could work with the Navy to find a private buyer – though this option repeatedly was dismissed as premature because no closure decision had been reached. Fourth, the City could promote a functional consolidation with the Crane Division, Naval Surface Warfare Center and/or its Louisville operation.

Privatization was considered as the City's fallback position rather than as a first line of defense. Goldsmith and the Indianapolis already were benefiting from successful privatization and public-private partnership activities. Goldsmith gave his aides two pieces of guidance in formulating the fall-back plan. First, in order to be attractive to commercial companies, NAWC-ADI had to retain its employee assets and be marketed as an ongoing operation. Second, the market had to produce the best proposal, which necessitated a competitive bidding process. Analysts from two Indianapolis companies heavily involved in DoD-related work – Allison Engine and Allison Transmission – embraced privatization as both worthwhile and plausible.

Modest Proposals: Refining and Narrowing the Options and Alternatives

Goldsmith and the City continued to refine their initial options based on new information and analysis, and their discussions with both the NAWC-ADI leadership and rank-and-file employees. They developed four broad options based on the initial set. The first option was to build on Indianapolis' role as a national air freight and distribution hub. This option would mimic the radical logistics restructuring taking place in private industry. However, there was no internal champion, and it did not have a discernable effect on key Navy decision-makers.

A second option sought to privatize certain on-site business units. Because the funds for NAWC-ADI's "competency aligned" and highly efficient operations came from customers' orders, it was close to a market-sensitive business already. Moreover, NAWC-ADI was becoming increasingly involved with government, academia, and private industry in an electronics technology transfer consortium. This allowed it to keep pace with the complex and fast-changing electronics environment without losing responsiveness, which, in turn, allowed the Navy to function as a "smart buyer." Despite these big positives, this option did not mesh well with DoD's downsizing criteria, and it, too, was discouraged. A third option either would transform NAWC-ADI into a government-owned, contractor-operated (GOCO) facility or keep NAWC-ADI around as a Federally Funded Research and Development Center (FFRDC). The former was discouraged because of the Navy's concern with cutting assets. The latter was discouraged because of potential political perceptions – the Navy worried that it would be perceived as funding a non-profit entity that ultimately would compete with the private sector instead of actually cutting costs.

A number of realignment scenarios were considered, mostly teaming NAWC-ADI with Crane. NAVAIR had a greater desire to reduce infrastructure than NAVSEA, who controlled Crane. It was generally accepted, though, that if significant savings could be realized, NAWC-ADI could be changed from NAVAIR to NAVSEA, and the Indianapolis operation might be able to remain open. A study by the Hudson Institute estimated a possible annual savings of $50 million – without closing any of the Louisville, Crane, or Indianapolis facilities. However, the Navy brass pointed to the formidable claimancy issue – that is, who had the right to claim or assert primary command and control over which entity. Transferring NAWC-ADI from NAVAIR to NAVSEA would blur the boundaries of who had control of – and took responsibility and claimed credit for – the facility, also posing recordkeeping challenges related to shifting employees and workloads. Ultimately the claimancy issue doomed this proposal.

In sum, even these refined options were largely ignored – they either were torpedoed by a major decision-maker, or the Navy felt that it could not review options that did not fall within the narrow BRAC structure.

In the meantime, however, NAWC-ADI received the designation of "Reinvention Laboratory" in support of its restructuring initiatives, which gave it greater flexibility and allowed it to seek waivers from certain constraining regulations.[59] Goldsmith continued to meet with top Navy and DoD officials and a Congressional delegation of supporters, led by Senator Richard Lugar (R-Indiana). Goldsmith's already aggressive schedule intensified as the Base Closure and Realignment Commission (BCRC) decision approached. As it became obvious that the merger with Crane would not work, Goldsmith and the City of Indianapolis began to push the privatization option to the fore, emphasizing the successes the City had already had with public-private ventures.

A Decent Proposal: Lobbying for Logic

In Spring 1995, after the initial BCRC decision to close NAWC-ADI and as Carberry was constructing the protocols for proceeding with the closure, Goldsmith began lobbying to ensure that the closure was done "in a logical way."[60] Goldsmith was scheduled to appear before the BCRC, whose mission was to guarantee that "a fair process [would] result in the timely closure and realignment of military installations. . . ."[61] Unlike other mayors of cities containing targeted bases, Goldsmith did not try to appeal the closure decision. Instead, he tried to convince the BCRC that privatizing the facility was advantageous to the Navy, meeting the twin goals of downsizing and retaining NAWC-ADI's core military capabilities. Goldsmith argued that what NAWC-ADI was doing was:

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[59] A Reinvention Laboratory, created as part of the National Performance Review, was defined as "a place that cuts through 'red tape,' exceeds customer expectations, and unleashes innovations for improvements from its employees" at the first Reinvention Lab Conference at Hunt Valley, Maryland in October 1993. The National Partnership for Reinventing Government Task Force redefined Reinvention Laboratories as "innovative organizations or activities that are established to test or prototype new 'reinventing government' initiatives. The reinvention laboratories are empowered to begin experimenting with radical new ways of doing business, and share their ideas, successes and lessons across government."

[60] Wheeler and Walcott, op. cit., p. 17.

[61] Quoted. in Gregory A Hogan. "Evaluation of Military Base Closure Alternatives." Virginia: February 1997. p. 1.

"Not inherently government work. We said, 'We can help you fulfill your mission better.' Our thesis was that the Navy would become a procurer. We based our argument on the business case – that [NAWC-ADI] had the lowest costs and lowest rates in the Navy, and [the products] are high-quality. *We're the best value.*"[62]

According to Goldsmith, the BCRC staff called the proposal the most creative base closure response in the country, and they requested a white paper detailing the proposal.[63] But what he really was doing was "looking for a congruence of goals" between the City and DoD.[64]

Specifically, the Mayor proposed that the City or the State would assume ownership of the resources and would take on the operating and maintenance costs. The plan also focused on the savings that the government could realize by leaving the NAWC-ADI employees in Indianapolis as opposed to spending millions of dollars transferring them. Furthermore, a privatized facility could take on other commercial or governmental work in addition to the Navy work. Such arrangements would help provide a smooth transition for DoD clients.[65] Goldsmith framed the issues as economic and human resources considerations, and, in doing so, he escaped much of the messy politics that stymied the efforts of other mayors and governors who fought similar base closures while capturing the imagination of the BCRC members.

The BCRC's Revised Recommendation

On July 14, 1995, the BCRC recommended that the President either "transfer workload, equipment and facilities to the private sector . . . *or* relocate necessary functions along with necessary personnel, equipment and support to other naval

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[62] Goldsmith and Gigerich interview, supra. Interviewee's emphasis.

[63] Wheeler and Walcott, op. cit., p. 16.

[64] Goldsmith and Gigerich interview, supra.

[65] Wheeler and Walcott, op. cit., p. 17.

technical activities. . . ."[66] Ultimately, the Commission left the decision to relocate or privatize up to the Navy.   Subsequently, the Navy drafted a long list of issues (see Appendix A) that would need to be addressed before privatization could be pursued. The ownership structure, environmental contamination, and human resources issues were just some of the Navy's concerns.[67]

In addition, Vice Admiral Lockard was particularly concerned about the legal issues associated with such a large scale privatization effort – most significantly, which contractual approaches would support privatization if it were to proceed. In addition, Navy officials were concerned with political perceptions, and they wanted to ensure that privatization was not perceived as a way of skirting outright closure. Internal Navy politics also were problematic, as other Navy sites were vying for NAWC-ADI's personnel and workload.

But from many angles, the fate of the employees was the biggest issue. Everyone recognized that "without the employees, there was nothing to privatize" – and, about 200 people from NAWC-ADI left to seek other employment locally while the privatization option was being investigated, including some people from the NAWC-ADI privatization team.[68] Vice Admiral Lockard proposed that 80 percent of the issues would need to be resolved before the Navy could consider moving forward with the privatization of NAWC-ADI.

At the same time, the BCRC recommended the closure of two Air Force Air Logistics Centers – Kelly Air Force Base in San Antonio, Texas, and McClellan Air Force Base in Sacramento, California. In light of rising unemployment and the large number of electoral votes at stake just before the 1996 election in the already economically hard-hit areas of Texas and California, President Clinton encouraged the

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[66] Emphasis added. Defense Base Closure and Realignment Commission. *1995 Report to the President.* pp. 1-59.

[67] Wheeler and Walcott, op. cit., pp. 44-45.

[68] Carberry interview, supra.

Navy to consider privatization as an alternative to closing the bases, breaking his promise not to politicize the BRAC process. Nevertheless, "The McClellan Effect" played out well among the public, and the Navy began to consider privatization as a viable option for Indianapolis.

Both George Stephanopoulos – then the Senior Advisor to the President for Policy and Strategy – and President Clinton were familiar with the details of the privatization efforts. The White House exerted significant pressure on the BRAC decisions. Staffers took a keen interest in seeing the NAWC-ADI privatization proceed, and when it came time to close the Texas and California bases, the BCRC was instructed to "Do it like NAWC-Indy."[69]

Vice Admiral Lockard Commissions Steve Carberry's Help

Eventually, Goldsmith's innovative ideas caught the attention of the Commander of NAVAIR, Vice Admiral Lockard. Although Lockard supported the BCRC decision, he knew that the potential impact on the civilian employees would be significant. These were all excellent, highly-skilled employees who had served the country well, and he believed the Navy should do what it could to help with their transition to the other bases. Vice Admiral Lockard also was attracted to the NAWC-ADI facility because it had developed an entrepreneurial attitude. And, as Table 2 shows, even with the declining DoD budget, their revenues were expanding, with much of the work coming from agencies outside of NAVAIR.

Vice Admiral Lockard therefore decided to investigate Goldsmith's ideas as a means to "minimize disruption to employees' lives," acknowledging that privatization could be a way to ensure that the displaced NAWC-ADI workers stayed at the Navy's beck-and-call, while also seizing "an opportunity to show more connection between industry and government – [the relationship] is not either or."[70] He knew that the

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[69] Ibid.

[70] Lockard personal interview with William Lucyshyn and Luci Stevens. 14 Nov. 2003.

operational capability of Navy would not be jeopardized with any of the options considered. Therefore, his "personal concern was not so much to preserve the capabilities of the Navy, as it was [to] preserve the lives of the people who had worked there."[71] Although at this late phase in the BRAC process the successful privatization was a long-shot, Lockard "knew that [the Navy] always had the closure option if privatization didn't work."[72]

Table 2. NAWC-ADI Revenues Sources

Year	Revenues (in millions)	Source of Revenues NAVAIR	Other
1991	$274	42%	58%
1992	$295	66%	34%
1993	$327	50%	50%
1994	$303	67%	33%
1995	$332	40%	60%

Despite Lockard's support for privatization, NAVAIR was, according to Admiral Steve Loftus, head of logistics for the Chief of Naval Operations, committed to employing a "coastal hub concentration strategy" to meet the demands of BRAC downsizing.[73] This strategy called for relocating smaller Midwest facilities to large coastal facilities that also supported flight operations. As such, NAVAIR planned to move the NAWC-ADI and Midwest-region assets to its China Lake, California and Patuxent River, Maryland facilities.

Vice Admiral Lockard had a taste for making changes in the bureaucracy – although it was challenging, he "was always out on the edge, probing" for something new.[74] So, notwithstanding the coastal concentration strategy, Lockard wanted to examine the privatization option in greater depth, and he was enlisting Carberry's help.

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[71] Ibid.

[72] Ibid.

[73] Wheeler and Walcott, op. cit., p. 15.

[74] Ibid.

Carberry knew that he now would be called on to make decisions that would have a significant impact on the operational capability of the Navy as well as alter the lives of thousands of its faithful employees. Furthermore, Carberry realized that in order to succeed in his role, he would have to pressure all of the stakeholders to work through obstacles quickly. "Time is the enemy," became his mantra.[75]

"Time is the enemy" was not just an observation or a way of life – rather, Carberry used it as a teambuilding tool. As a common enemy, it shifted the focus away from the natural conflicts between the stakeholders and emphasized the need to work together. Beyond that, portraying time as the enemy also functioned as a morale booster. Recognizing that problems were lurking around every corner, it was important to continually reassure the stakeholders that they were not "dead in the water." Instead, they had to postpone minor problems and disputes and take on serious issues as they arose.[76]

In this pressure-filled climate, Steve Carberry was tasked with finding the best way to close or realign NAWC-ADI while still maintaining its military capabilities and looking out for the employees. Developing an overarching strategy and framework would require thinking about processes and timelines that would make the change as painless as possible. Carberry recalls the uncertainty at the time of his appointment: "Where do you begin? It would be fair to say 'begin at the beginning,' but we struggled [during] probably the first four or five meetings to figure out where the beginning was – *outside* of figuring out where we were going."[77]

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[75] Carberry interview, supra.

[76] Ibid.

[77] Ibid. Interviewee's emphasis.

The Case for Privatization

"The push from the very beginning was privatization. In fact, we didn't refer to it as the close-and-move or the close-and-privatization – this was privatization."

— Steve Carberry

Mayor Stephen Goldsmith and the City of Indianapolis had won a major battle in getting the BCRC to consider privatization as an alternative to outright closure. But how did they win the battle, given that there was no precedent for such a large privatization effort? And, even though Goldsmith and the City carried the day, could they win the war against close-and-move?

In order to win the battle, they had to assert that privatization made more economic and military sense than shutting down the facility; in order to win the war, they had to *demonstrate* it. The City hired Arthur Andersen to analyze NAWC-ADI and to generate a business plan. They also hired the Hudson Institute to critique the Navy's analysis of the military value of the NAWC-ADI facility and the projected return on investment resulting from the facility's closure. The Arthur Andersen business plan consisted of three basic elements:

1. **Economic and financial considerations:** 1,600 of the 2,800 employees were scheduled to be moved, but many of the soon-to-be-separated employees had workload contracts that would pay for 700-800 work years, in addition to the already contracted-out 500 work years to be finished *after* closure.

2. **Government savings:** It would cost tens of millions to transfer 1,600 employees.

3. **Workload diversification:** The new company would take on commercial and other government work to supplement the ongoing Navy and DoD work.

It was now up to Carberry to determine whether the arguments made sense and to assess the feasibility of the proposed privatization venture. His evaluation of the situation would directly affect the lives of the 2,800 people who worked at the NAWC-ADI facility, as well as the local economy of the already ailing Indianapolis – not to

mention the other Navy facilities that were counting on picking up the NAWC-ADI employees and workload.

Wins for the City

Stephen Goldsmith, the enterprising mayor of Indianapolis, knew that the closure would seriously affect the city's economy – NAWC-ADI's contribution to the economy of central Indiana was estimated at $1 billion. At stake were some 2,500 well-paid high technology jobs – already down from the high mark of 3,200 in 1992. The scientists and engineers, whose average salaries exceeded $45,000, also provided a well-trained talent pool that benefited local facilities – including Eli Lilly and Company and Allison Gas Turbine (now Rolls Royce), among scores of smaller medical device and auto manufacturing firms. In fact, NAWC-ADI employees had the highest per capita income of any comparably-sized entity in Indiana.[78] The mayor realized that he would have to do something to minimize the impact of the DoD's decision.

The city had been through a similar ordeal in 1991 when Fort Benjamin Harrison – a pre-WWI-era, 2,501-acre Army Soldier Support Center and Defense Finance and Accounting Service facility located in Lawrence, Indiana – was placed on the BRAC closure list and its units subsequently directed to move to Fort Jackson, South Carolina and Fort Benning, Georgia.[79] The estimated cost to close Fort Harrison was $206 million, and the savings, between 1992 and 1997, were estimated at a total of $123.8 million.[80] After Mayor Goldsmith was elected in 1992, he vowed that NAWC-ADI would not suffer the same fate. Although the facility was not placed on the 1993 closure list, the mayor was advised by key Navy personnel that NAWC-ADI would not escape closure in 1995.

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[78] Carberry interview, supra.

[79] Stephen E. Bower. "The American Army In The Heartland: A History of Fort Benjamin Harrison, 1903-1995." Indianapolis: Indiana Creative Arts, 1995. The unit directed to Fort Jackson ultimately was redirected to Fort Meade, Maryland.

[80] Defense Base Closure and Realignment Commission. 1991 Report to the President. p. 5-4.

Mayor Goldsmith decided to launch a preemptive strike. He tried to sell the Navy on a myriad of creative privatization and realignment proposals. Despite his best efforts, NAWC-ADI still appeared on the 1995 BRAC closure list. The employees were "devastated . . . discouraged and broken-hearted."[81] At a meeting of the Base Closure and Realignment Commission (BCRC), instead of protesting the BRAC decision, Mayor Goldsmith said, "go ahead and close us, just do it in a logical way."[82] He then set forth the case for the privatization of NAWC-ADI.

Much to the mayor's disappointment, the BCRC left the final decision as to what to do with NAWC-ADI up to the Navy. Mayor Goldsmith feared that the Navy would close the base without seriously considering his privatization plan. However, much to his surprise, the Navy brass decided to contemplate privatization despite their many concerns, in part, because privatization was being pushed by President Clinton and seriously considered by Vice Admiral Lockard.

Under the privatization plan now being seriously considered by Carberry, who was acting as the principal agent of the Navy, the City or the City and State would assume ownership of the site, facilities, and equipment, and would become responsible for operating and maintenance costs. Apart from the employees being relocated, as many of the released employees as possible would be absorbed into one or more private companies to be established on site, performing work under contract to DoD. Complementary companies would be invited to locate on-site, thereby creating further employment opportunities for displaced workers, providing support for the new company or companies taking over the NAWC-ADI facilities, and sharing the facility's operation and maintenance costs. Thus, an estimated 800 to 1,000 new private sector jobs would be supported locally through these various linkages.

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[81] Quoted in Wheeler and Walcott, op. cit., p. 16.

[82] Ibid, p. 17.

Downsizing the Navy:
Privatization of the Naval Air Warfare Center
Aircraft Division, Indianapolis

Part II

Wins for the Navy

For both the Navy and the private company that was going to take over the NAWC-ADI operation, the business case for privatization had to make sense. Privatization options would be assessed in terms of such factors as size, lines of business, markets, ownership, capitalization, and organizational structure. The privatization plan was consistent with Navy goals insofar as NAWC-ADI would be closed as a DoD site, and the Navy and DoD would see a reduction in employment equivalent to its closure proposal. A side benefit was rather than moving 1,600 DoD employees, they would remain in Indianapolis, thus avoiding both relocation costs and extended disruption to vital Navy programs.

Initially, the new firm or firms taking over NAWC-ADI would provide products and services under the auspices of a sole-source umbrella contract, providing a seamless transition for DoD customers. In five years, the firm(s) would have to compete for DoD contracts. DoD still would retain over half of the workers, while the other half would work for the new company or companies to supply electronic products at lower costs. This public-private partnership would produce an estimated onetime savings for the Navy of $180 million and recurring annual savings estimated at $12 million. As a hedge, before NAWC-ADI closed, the firm or firms taking over would begin marketing to the private sector, so as to reduce dependence on DoD business. Table 3 below compares the costs of each alternative for the 5-year period before the contract would be reopened for competition. A detailed year-by-year breakdown can be found in Appendix B.

Table 3. Alternative Cost Comparison (TY $M)[83]

	Status Quo	Relocation	Privatization
Total Program Cost	1,428.0	1,585.3	1,384.2
Recurring Costs (5 years)	1,428.0	1,342.6	1,254.1
Non-recurring Cost	-	242.7	130.1
Labor	1,022.4	849.0	881.0
Material	381.5	457.9	357.7
Facilities	-	57.8	0.4
Environment	-	52.8	52.0
Personnel	24.1	122.3	82.3
Other	-	35.5	10.6

In light of the revised BCRC decision to consider privatization as an alternative to closure, Vice Admiral Lockard asked Steve Carberry to evaluate the issues to be addressed before privatizing, as well as the cost estimates. Most importantly, Vice Admiral Lockard placed Carberry at the conn when he asked him to recommend a strategy for the Navy.

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[83] Gregory A. Hogan. "Evaluation of Military Base Closure Alternatives." Virginia Polytechnic Institute and State University Thesis: Blacksburg, VA, February 1997, p. 20.

Engineering a Successful Plan for Privatization-in-Place

The City and the Navy agreed that Indianapolis would solicit bids from private companies that were interested in taking over NAWC-ADI. The City would then select a winner, and the Navy would negotiate a contract. Although Goldsmith was on the verge of rescuing NAWC-ADI, he also was navigating uncharted waters. There was concern among the City of Indianapolis and the Navy about whether private companies would even be interested in participating in this unorthodox process. Further, there was no precedent for such a competition, so procedures had to be carefully crafted to ensure that the process was both legal and ethical.

The main legal sticking point was the employees – leaving Navy personnel on-site was a key to the public-private partnership, but the Navy still had reservations about leaving a detachment on a closed base. The legalities were resolved in 1995, however, when Congress, under the Defense Authorization Act of 1996, authorized DoD to leave employees in leased space on closed bases.[84] Still, managing employee and workload flight after privatization would be key challenges.

Ethics concerns included procurement integrity, conflicts of interest, and switching sides, as enumerated in the United States Code (USC). According to 18 USC 423, procurement officials cannot seek employment with a competing contractor, or disclosure proprietary or source selection material. For NAWC-ADI, "procurement procedures" did not commence until after the new company was selected, and merely participating in privatization discussions with the City did not automatically make any employee a "procurement official." To protect against Conflicts of Interest (18 USC 208), NAWC-ADI employees were not allowed to be involved in the selection process itself, although they could provide information to the City to assist in establishing a selection process. Although under 18 USC 207, former government officials and

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[84] P.L. 104-106.

employees can neither represent a person before the U.S. government concerning a project on which they once worked nor engage in work involving government contracts for two years, the provision does not prohibit conversations. Throughout the process, employees were informed of potential risks, and it was possible to obtain written waivers to enable employees to participate. All in all, ethics concerns did not appear to present insurmountable barriers to privatization.

Identifying the Issues

Vice Admiral Lockard and Lew Lundberg – who spent 20 years at NAWC-ADI and had become the NAVAIR privatization czar before Carberry's appointment – were serious about resolving 80 percent of the implementation issues. From mid-summer to mid-November 1995, teams from the City and the Navy worked together to identify and resolve the issues. The teams did not shy away from tough issues, and the cooperative approach allowed the parties to address misunderstandings and conflicts under a set of common ground-rules and goals. The City, along with NAVAIR and NAWC-ADI teams, came to comprise the Joint Privatization Steering Group (JPSG), which took the lead in defining and working through key issues, coordinating the efforts for cross-group teams, and resolving conflicts.

Revising the List of Issues

In early October, Steve Carberry, then the head of NAVAIR contracting, took over for Lundberg; and the pressure to reach agreements quickly intensified. By mid-October, the critical issues list was distilled to ten:

1. Continued support of government customers and workload;
2. Establishing a viable private entity by supplementing its Navy/DoD business with commercial workload;
3. Operating rules and concepts for the public-private partnership (concept of operations);
4. Determining the necessary number of on-site Navy employees;
5. Identifying the type of contract and terms and conditions required for success;

6. The type(s) of private entity appropriate to the partnership;

7. The ownership of buildings, facilities, and equipment;

8. Sharing, hiring, or purchasing of staff equipment between partners;

9. Employee benefits; and,

10. Partnership budget requirements.

According to Goldsmith, who continued to meet with top officials to rally support, "Admiral Lockard asked all the right questions" to keep the process moving forward. Their burgeoning trust and mutual respect became very important as the City and Navy continued to crystallize the case for privatization and as big challenges loomed on the horizon.[85]

A survey found that 75 percent of NAWC-ADI employees had little confidence in being employed through privatization. Yet despite the lack of confidence in the City's plan, only 26 percent of the employees were willing to accept a Navy relocation, implying that a move alternative would cause high program disruptions and losses in capacity related to losses of key competencies. Actual, real-world data showed that the Navy already had lost an enormous amount of capacity because of the move requirements in other base closures and realignments.

Components of the "80 Percent Solution"

The 80 Percent Solution focused on four key elements. Although at the macro level, the elements involved issues that largely were resolved through peaceful negotiations among the JPSG players, many of the detailed steps to implementation actually were outstanding at the time the "solution" was reached. Vice Admiral Lockard and Mayor Goldsmith agreed to a policy of *not* putting anything in writing until a solution was agreed upon. This approach encouraged cooperative teaming, and, perhaps more significantly, it decreased the probability that any particular decision would be challenged. Avoiding preemptive strikes became increasingly important as the deadline

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[85] Goldsmith and Gigerich interview, supra.

loomed. It also allowed more innovative solutions to emerge when they might not have done so if the arrangements were formalized. Often, the inventive solutions placed the decisions within the already existing legal interpretations, heading-off potential legal challenges. Establishing trust, avoiding unnecessary conflict, and innovating were crucial steps for succeeding within such a limited timeframe. Even so, many people taking part in the process found the lack of structure and precedent troubling at the time.

1. What stays, what moves?

This issue addressed the number and types of projects that would stay at NAWC-ADI. In principle, all projects would stay in order to boost the business case upon which the private company could build and prosper. But this decision prevented other Navy sites from acquiring some key projects and thus reducing their overhead rates.

2. What functions must be retained by the Indianapolis government?

In addition to considering different privatization scenarios and the associated employment implications, also of great importance were the size, function, and duration of the Navy contingent that would stay at NAWC-ADI. These decisions would alter customer perceptions and workload retention. Ultimately, an interim compromise was reached whereby a government continent of 100 to 150 would remain in FY1997.

3. Contractual approach.

The City wanted – and Navy ultimately agreed to – a single workload contract to reflect cross-functional, team-based operations, similar to those that came to characterize NAWC-ADI and differentiate it from other facilities. Not-for-profit ownership was considered and rejected because of potential negative political perceptions. Moreover, in the eyes of the JPSG, it would have bypassed competition, which would hurt the commercial viability of NAWC-ADI. An option for an employee-owned company enjoyed bipartisan political support. However, as a hedge against risk, NAWC-ADI

would have to bring in a larger, more experienced company to help provide management skills and to prepare NAWC for competition. Even with an outside company, there still were major employee incentives for success and a virtually seamless transition for customers.

The players had always envisioned a large, long-term umbrella contract. Ultimately, the JPSG decided on a one-year Indefinite Delivery, Indefinite Quantity (IDIQ) contract with four additional one-year options. The details and duration of the IDIQ contract went unresolved until much later in the process. Unlike the near consensus on the IDIQ contract, the alternatives for a competitive approach were hotly debated. All sides recognized that long-term success depended on NAWC-ADI's ability to respond to market forces. As such, any transitional process had to prepare NAWC-ADI to compete in full and open competition. At this stage, though, it was deemed sufficient to focus on assessing the benefits and costs of various alternatives rather than adopting any one particular option.

4. Supporting business analysis.

The responsibility for generating a supporting business analysis belonged to the City, though the Navy later had to do its own analysis to determine the impact on NAVAIR business. Goldsmith argued that it was impossible to do such an analysis without committing to a plan, and he was unwilling to invest in an analysis that took into account the myriad options available to the JPSG. At last, a compromise was reached whereby Arthur Andersen and the Hudson Institute would conduct another feasibility study that flowed from several basic, agreed-upon assumptions. Ultimately, the case study translated the NAWC-ADI books into a financial analysis that had meaning to the private sector, analyzed NAWC-ADI's potential as a private business, and presented a business model with enough detail that the Navy and outside analysts could manipulate the basic assumptions and determine NAWC-ADI's long-term business viability. The assumptions inherent in the business analysis were crucial. While major savings could be realized from keeping the facilities, equipment, and people in-place, slightly altering

the labor rates and/or retaining additional personnel could tilt the analysis away from the privatize-in-place option back to the default close-and-move option.

"Time is the Enemy"

Vice Admiral Lockard and Mayor Goldsmith met on November 17, 1995 after many issues had been resolved. However, other issues were outstanding because either the parties were deadlocked or decisions had been blocked in some way. Rather than tackling all of the remaining issues, the goal of the meeting was to lay the groundwork for proceeding with privatization. Lockard and Goldsmith agreed that privatization would be the primary option, but that BRAC closure had to be considered as a backup plan in case privatization could not be achieved.

Although it was taken as given that the City would run a competition to determine which private company or companies would take over NAWC-ADI and that the Navy would then negotiate a workload contract, the respective roles of the City and the Navy in the selection process was the focus of much concern and debate. Setting new precedent, Navy counsel determined that the City should steer the privatization because the privatization process was initiated as part of a base closure and BCRC legislation established the City's reuse planning as a major decision-maker, and this particular BCRC recommendation put particular emphasis on Mayor Goldsmith's initiative.

Also coming out of this meeting was Vice Admiral Lockard's desire to speed up the privatization process. Specifically, he wanted the privatization to begin in 1997, agreeing that if Goldsmith met his goals in a suitable timeframe, a workload contract could be finalized by October 1, 1996. Lockard also explained that it was necessary to determine the "character and workload" of the new company *before* determining the size of the Navy employee detachment to remain in Indianapolis. In December 1995, Lockard sent a message to NAWC-ADI customers supporting the privatization plan and directing them to continue their business with the facility. He also asked that NAWC-ADI's customers who considered taking their business elsewhere contact him first. John Douglass, who had just become Assistant Secretary of the Navy for Research,

Development, and Acquisitions, sent a similar letter to the Navy Program Executive Offices (PEOs).

Soliciting Proposals

At this point, there just was not enough time to meet all of the Federal Acquisition Regulation/Defense Federal Acquisition Regulation (FAR/DFAR) standards. Carberry realized an awful paradox.[86] Deviating from the FAR/DFAR acquisition process was sure to elicit protests from the losing bidders. But even if Carberry could get waivers, the award still was subject to protest to the General Accounting Office (GAO), with a federal court likely to place a temporary hold on the process.

City and Navy officials eventually agreed that they would have to disengage from direct consultations on selection to insulate against conflicts of interest and potential ethics violations. Source selection was going to be the sole and exclusive responsibility of the City, and all of the major players were about to sign a Memorandum of Understanding (MOU) to this effect. But, even so, given the way that the Navy usually did business, it was very unusual that it was not going to be involved in the solicitation, and the Navy's initial insistence that it be detached from the selection jolted everyone – particularly NAWC-ADI.[87] The City was worried because the Navy pledged to be their partner in a venture they knew almost nothing about. But their greatest fear was that the Navy would disregard the source selection decision – in particular, the Mayor's Office was worried that this was "subterfuge," setting the City up for failure and providing the Navy with a convenient way out.[88] This was a matter of trust – one which threatened the entire privatization plan.

Vice Admiral Lockard recalls his meetings with Goldsmith: "We had to go eyeball-to-eyeball" and read each others' body-language to establish – and continually

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[86] Carberry interview, supra.

[87] Ibid.

[88] Ibid.

reaffirm – trust.[89] In the end, he successfully assured Mayor Goldsmith that Carberry's idea simply was a way of avoiding conflict both with the Navy and with the bidders. Finally, the City of Indianapolis released the "Sources Sought Solicitation" on December 22, 1995, which contained the solicitation, a detailed overview of NAWC-ADI, the Arthur Andersen feasibility study, and sample draft language for a possible workload contract from NAVAIR.

The evaluation criteria were expressed in a set of thirty-four questions broken down into six categories. The overarching goal was to develop a plan to balance the desired outcomes of each of the stakeholders to have them all come out ahead. Specifically, employees wanted new job opportunities and employment growth; the Navy wanted cost, quality, and performance enhancements; the new business entity would need long-term profitable growth potential; and the City wanted economic development, technology growth, a new tax base, and a long-term commitment from the new business entity. Ultimately, according to both Goldsmith and Gigerich, the "fierce and open competition" really provided the City and the Navy with a number of creative ideas for making the privatization work better.[90]

Evaluating Responses

In mid-January, 110 representatives from 36 companies attended a "Responders Conference," where attendees received a tour of the facility, detailed briefings, and the chance to ask questions – a good response, considering the City was trying to sell a closed business. Employee morale picked up noticeably as the prospective bidders streamed through the NAWC-ADI facility. As of the February 28 deadline, the city had received full bids from the American Competitiveness Institute, Battelle, Hughes

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[89] Lockard interview, supra.

[90] Goldsmith and Gigerich interview, supra.

Technical Services, SEMCOR, Lockheed Martin, VITRO, and Science Applications International Corporation (SAIC).[91]

The City was now tasked with evaluating the offers to find the best value and making a source selection recommendation. An expert Review Group analyzed the proposals, and invited each of the seven companies back to Indianapolis to make clarifications and answer a common set of questions based on the review of all of the proposals. At the end of these meetings, the Review Group determined that Battelle, Lockheed Martin, Hughes, and SAIC were ready to proceed to the next round of the selection process.[92]

Resolving Open Issues

Because the entire privatization schedule was so compressed, the City and the Navy continued to tackle issues, even during the competition phase. To save even more time, rather than reaching agreement on one issue and seeking final approval before moving to the next issue, multiple negotiations proceeded in parallel. The issues that the City and the Navy had to work through addressed three areas – namely, policy, operations, and statutory compliance.

1. Policy Issues

The Competition in Contracting Act (CICA) made it difficult to award the contract to a single entity. However, in early January 1996, NAVAIR proposed using the "public interest" justification for a one-time exemption from CICA, and ASN Douglass was highly supportive. The exemption was subject to approval by the Secretary of the Navy, and Congress required a thirty-day notification. A draft Determination and Finding (D&F) for the public interest exemption was set to NAVAIR for review, and within the month, it was on its way to Secretary of the Navy Dalton for his signature. The exemption proved to be extremely important, as the team that eventually won the

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[91] Wheeler and Walcott, op. cit., p. 32. Four partial responses also were received.

[92] Lockheed Martin later withdrew from the competition during the final stage of the selection process.

competition was reluctant even to place a bid without a five-year guarantee. Although the final character of the agreement did not specifically guarantee a five-year windfall, the one-year IDIQ contract with four one-year options was enough enticement.[93]

There were concerns about protecting retirement benefits for workers choosing to join the new private entity. Some 600 employees who joined the federal government before 1984 and did not transfer from the old Civil Service Retirement System (CSRS) to the new Federal Employee Retirement System (FERS) lost their pension benefits if they separated from the federal system before they were eligible to do so. At risk were the most experienced workers who had the most to contribute. However, Senator Daniel Coats (R-Indiana) introduced legislation as part of the Defense Authorization Act of 1997 to help retain core technical staff, prevent disruption to key integrated project teams, and do it at fairly low cost to the government. The legislation, which applied only to CSRS employees who accepted work with the private contractor and were otherwise ineligible for federal retirement benefits, offered a voluntary option to index a deferred annuity, as a two-year pilot program. DoD would pay the annual salary increases into CSRS for the indexed annuity, though employees would have to forego their federal severance pay, receive a federal deferred annuity at the retirement age, and allow indexing of the average pay on which the annuity is computed. The employees' union, which became involved in some of the political proceedings, agreed to continue representing the employees even after the privatization was complete.[94]

Navy officials approved an Acquisition Strategy Plan for the Privatization of NAWC-ADI. The document formally laid out the process to which the City and the Navy had agreed.

2. Operations Issues

On January 24 and 25, 1996, the JPSG conducted a special meeting with Navy financial and contracts representatives, NAWC-ADI customers, as well as City, NAWC-

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[93] Carberry interview, supra.

[94] Goldsmith and Gigerich interview, supra.

ADI, and NAVAIR personnel. The JPSG assigned various breakout groups to address as many outstanding issues as possible, bringing them to closure, establishing a plan for their resolution, or finding viable alternatives. In addition to establishing processes and timelines for resolving critical issues, the Navy also initiated a cost-benefit analysis of two closure options, which became part of the final decision-making process on whether to close or to privatize.

3. Statutory Compliance

NAWC-ADI still had to meet normal base closure requirements. Before the government could transfer ownership of the facility to Indianapolis, they were required to cleanup contaminated areas. The BRAC Environmental Planning process started almost immediately after the closure decision was announced. Pollution almost certainly existed in one storage shed and a number of underground tanks. The BRAC Cleanup Team (BCT) also was concerned about the plating shop and the printed wiring board shop. The BCT, along with a group of local and community organizations comprising the Restoration Advisory Board (RAB), and the Reuse Planning Authority (RPA) took an integrated, cooperative approach to avoid conflict and minimize the chance for rejection by the Environmental Protection Agency (EPA). Potential environmental liability issues – issues that the private company taking over did not create that could cause them operational disruption costs – ultimately would have to be addressed in the interim lease agreement.

The City ultimately would lease the facilities and equipment from the Navy, and, in turn, would sub-lease them to the winner of the competition. After ten years – comprised of two five-year options – the title would belong to the City, who would pass it to the private company. The City initiated a process for negotiating an economic development conveyance with the Navy, and Arthur Andersen won the role of the City's support contractor. Their primary responsibility was to prepare a financial valuation and offset cost analysis for the City and the Navy.

And the Award Goes to . . . Hughes Technical Services Company

Although any of the three finalists' bids would have been preferable to the Navy's original closure decision, Steve Carberry, who officially had become the leader of the NAVAIR Privatization Team, was excited when Hughes Technical Services Company was awarded the NAWC-ADI contract on May 14, 1996. Hughes offered the best employment opportunities and prospects for job growth. They also promised to keep the technical teams together, reduce costs to perform existing and new work, and minimize disruption costs to the Navy. Hughes, who already had demonstrated success with other Indiana sites, offered Indianapolis a strong, positive, long-term growth outlook. Moreover, the acquisition of NAWC-ADI clearly fit within both the firm's and the City's respective strategic visions.

But Hughes only won the right to begin negotiations with the Navy – the close-and-move alternative was still looming in the background. As such, Carberry had to develop an implementation plan that accommodated the needs of Indianapolis, the Navy, and Hughes. In just over three months, the Navy expected to sign a workload agreement with Hughes; and in less than eight months, Hughes would take over NAWC-ADI. Even though the City and the Navy had done much to resolve many of the outstanding issues, a good number still had to be resolved within this compressed timeframe.

The Alpha Acquisition Process

A Tool for Compressed Negotiations

Carberry had to address the selection of a contract negotiation model. The normal acquisition process was extremely time-consuming, often requiring 12 or more months. Another option, "Alpha Acquisition," involved all of the members of the approval chain in the negotiations *simultaneously*. Thus, once an agreement was negotiated, rapid authorization could be obtained from all of the parties involved. The Alpha process removes a significant amount of duplication from the process, for example, eliminating countless iterations of internal documents.

The Alpha Acquisition requires that the contractor and the government:

- Get a commitment from all of the Integrated Product Team members;
- Dedicate resources;
- Take ownership of the process;
- Be willing to change existing processes and procedures; and,
- Share a common purpose, vision, and desired results with honest and trust.

Taken from Michael White. "Contracting Overview." Acquisition Reform Week.

Although Alpha Acquisition promised to speed up negotiations, it was a new model still under development at NAVAIR. Still, with so little time and so much to do, the City, the Navy, and Hughes had to risk trying the Alpha approach. Even Naval Facilities Command felt the time crunch and agreed to a compressed interim lease negotiating process, similar to the Alpha Acquisition approach.

Negotiating the Contract

Hughes had difficulty coming up with an accounting system, which was a prerequisite for determining the contract type – the accounting system in place at NAWC-ADI simply was not suitable for a private company.[95] Carberry suggested that the Defense Contract Audit Agency (DCAA) develop an accounting system for Hughes. This was an interesting approach, as the contractor usually develops a system and submits it for DCAA approval, but Carberry sold his novel approach and overcame this potential show-stopper.

Additionally, a refined copy of the business case data came in for review, and the results were surprising – the cost of privatization-in-place and close-and-move were incredibly close. Although privatization was the still the best value, a small increase in the labor rates could easily shift the balance in favor of the close-and-move option.[96]

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[95] Carberry interview, supra.

[96] Ibid.

Carberry had to do something to make the privatization plan more appealing, or his supporters easily could jump ship. To remove the ambiguity and turn the tide fully in favor of privatization, he decided that he would have to change the structure of the contract from cost-plus to a firm fixed-price – effectively fixing the labor rates and requiring Hughes to commit to the as-yet unverified rate structure for the next five years.[97] It seemed like Hughes was being set-up: a government agency was taking away a "cost-plus" contract and replacing it with a fixed-cost contract. How could they possibly agree to such a deal?

The answer: Carberry and his Hughes counterparts had built their relationship on trust. On Carberry's direction, Hughes officials peeked at some of the business case numbers, and they realized that he was right. Thus, after successfully navigating the cost-benefit issue that could have sunk the whole privatization effort, the type of contract negotiation was concluded within only three or four days.[98]

Carberry was close to ensuring for the City, NAWC-ADI, and the Navy a win/win/win outcome.

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[97] Ibid.

[98] Ibid.

Downsizing the Navy:
Privatization of the Naval Air Warfare Center
Aircraft Division, Indianapolis

Part III

Epilogue

The Win/Win/Win Outcome

Within one week of Hughes' selection, the Navy announced its intention to privatize the NAWC-ADI facility. The Navy and Hughes signed a one-year IDIQ contract with an additional four one-year options on September 25, 1996. At the same time, the Navy and the City signed an interim lease agreement, and the City and Hughes signed a sublease. The workload contract provided NAWC-ADI's customers with a seamless transition, enabled the new facility to gear-up for competition for Navy business in five years, and allowed the entire government – not just the Navy – to place orders with the new NAWC-ADI. Although difficult project-by-project negotiations were required to convert Navy Air Tasks into IDIQ task orders – as required by Federal Acquisition Regulation/Defense Federal Acquisition Regulation (FAR/DFAR) standards – Hughes took over operations on January 5, 1997, with most on-site Navy employees becoming Hughes employees. NAWC-ADI became Hughes Air Warfare Center (HAWC).[99]

The City essentially swapped former NAWC-ADI land, equipment, and employees for employment guarantees and a local investment in human capital. Indeed, Hughes pledged to bring in over 700 new technical jobs from elsewhere in the

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[99] James P. Valley. "A Comparison of the Contracts Involving the Privatization of Newark AFB and the Naval Air Warfare Center-Indianapolis (AFIT/GCM/LAL/97S-14)." Air Force Institute of Technology: Thesis, 1997, p. 29.

company and to provide training for existing NAWC-ADI employees.[100] Further, Hughes claimed it would increase the number of people employed at the former NAWC-ADI to 3,000 by 2002,[101] and pay the City $3 million a year in property taxes.[102] The actual Navy workload guarantee was set at one-half of the projected workload for the facility. In exchange, Hughes pledged to reduce man-year rates by 15 percent over the five-year contract period.[103]

Raytheon Takes Over for Hughes

In December 1997, Raytheon Corporation merged with Hughes Aircraft Company and took control of the Indianapolis operation. The federal government has not been able to measure the effects of the Indianapolis privatization-in-place under either Hughes or Raytheon because of a lack of baseline data from the original NAWC-ADI operation, and the changing and mixing of workloads. However, both Hughes and Raytheon did institute a number of business improvements that appear to be increasing efficiencies and reducing costs to the government; and, military customers have been satisfied with the quality and timeliness of the products.[104]

The Indianapolis operation really began to feel declining workloads by 1999. Raytheon attempted to counter by bringing in new Defense-related work from other sites and reengineering processes to mitigate the negative effects. Although Raytheon had difficulty attracting new customers and were uncertain about future workloads, the company remained optimistic about its efforts. Despite these efforts, though, the Indianapolis workload dropped by 30 percent only three years after the privatization.[105]

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[100] Carla E. Tighe, et. al. "A Privatization Primer: Issues and Evidence (CRM 96-123)." Alexandria, VA: Center for Naval Analysis, 1997, pp. 37-38.

[101] Ibid.

[102] "From boots to electronics: shutting military bases," op. cit.

[103] Tighe, op. cit., pp. 37-38.

[104] David R. Warren. "Military Base Closures: Lack of Data Inhibits Cost-Effectiveness Analysis of Privatization-in-Place Initiatives." GAO/NSIAD-00/23, December 1999, p. 7.

[105] Ibid, pp. 8-9.

And, although Hughes promised over 700 new jobs, in mid-1998, Raytheon cut the workforce by 17 percent for a loss of 330 employees. Carberry recalls in retrospect that "Hughes was the only one that understood that this was not a procurement, it was an acquisition and a merger . . ., and when Raytheon took over, they didn't understand that."[106]

It was not all bad news, though – at least not for Indianapolis. Raytheon transferred its entire Long Beach, California depot-level repairs and spares manufacturing to Indianapolis. The consolidation equated to moving 120,000 square feet from Long Beach to Indianapolis. Raytheon also brought additional work to Indianapolis through foreign government sales, such as armored tank modifications for Portugal, for a total of $31 million in sales.[107]

Even though the overall cost-effectiveness of the privatization-in-place operation for NAWC-ADI could not be determined, there are signs that indicate that the Navy realized some savings – at least in the short-term. A City-imposed covenant required that Raytheon charge the Navy at labor hour rates that were 15 percent lower than Navy rates at the time. However, these rates were subject to renegotiation in 2002, coinciding with the end of the five-year contract.

Even though the Navy promised only 50 percent of the total workload, the Navy business that existed before the privatization accounts for about 65 percent of the total business done in Indianapolis.

Does the BRAC Process Save the Government Money?

As noted above, the 1993 closure of Fort Harrison cost the government $206 million, and the estimated savings between 1992 and 1997 were only $123.8 million – a non-trivial shortfall of $82.2 million over five years. But a March 2004 DoD report claimed that through FY2001, DoD had achieved an aggregate net savings of $17

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[106] Carberry interview, supra.

[107] Warren, op. cit., p. 9.

billion, with recurring annual savings of $7 billion – implementation costs, especially environmental cleanup costs, are quite high.[108]

Apart from these "observable" savings, what was the impact on employment? DoD estimated that the 1993 closings would increase unemployment by an average of 5.6 percentage points in the 34 affected communities.[109] However, the DoD estimate did not take into account the reuse of valuable resources left behind by the base closures – DoD's Office of Economic Adjustment estimated that between 1961 and 1997, in some cases, for every one DoD job lost, almost two civilian jobs were created,[110] as former facilities have been used for transportation needs, education centers, commercial and industrial centers, new neighborhood complexes, community support services, and recreation and conservation sites.[111] Although there is a lag between government closure and private sector takeover, the time needed to complete the transfers has fallen from 57 months in 1988 to 21 months in 1995.[112]

On the whole, the BRAC process, as a tool for excising excess infrastructure while retaining savings for DoD, still has fat to trim. The current DoD estimated excess capacity is 24 percent above the 1989 baseline. Table 4 shows the excess capacity by service branch and for the Defense Logistics Agency (DLA).[113] Another BRAC round is scheduled for 2005. Difficulties arise, in part, because the BRAC process relies on a static picture, or, as Mayor Goldsmith put it, "a snapshot of what is going on today."[114] It likewise is difficult to forecast activities that are five years away, especially as the

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[108] Department of Defense. "Report Required by Section 2912 of the Defense Base Closure and Realignment Act of 1990, as amended through the National Defense Authorization Act for Fiscal Year 2003." March 2004, p. 55.

[109] "From boots to electronics: shutting military bases," op. cit.

[110] Ibid.

[111] March 2004 DoD report, op. cit., pp. 58-61.

[112] "From boots to electronics: shutting military bases," op. cit.

[113] March 2004 DoD report, op. cit., p. 54.

[114] Goldsmith and Gigerich interview, supra.

threats to the national security continue to evolve and as government continues its transformation.

Table 4. Estimated Percentage of Excess Capacity in DoD

Department	Estimated Excess Capacity (above 1989 baseline)
Army	29%
Navy	21%
Air Force	24%
DLA	17%
Total DoD	**24%**

Appendix A

List of Navy Issues to be Addressed Prior to Privatization, Summer 1995

NAWCADI Privatization/Critical Issues

- Contracting/Programmatic

- Budget and Finance

- Environmental

- Human Resources

- Private Side Construct

- Other

Ownership Structure

- Employee owned

- Publicly traded SEC company

- Joint venture between ESOP and large defense/other government contractor

- Employee owned and management contract with large defense/other government contractor

Contracting Approach

- Sole source through 3 to 5 years, then free and open competition

- Initial free and open competition

- Long-term sole source beyond 5 years

Smart-Buyer Considerations

- Navy need to retain smart buyers

- Retention of Navy employees critical to continuance of NAVAIR workload

- Customer support additionally affected by retention of Navy employees

- Need to consider who will remain key engineering Navy employees and balance Navy employees with private side engineering force

Contracting/Programmatic Issues

- Specific business plan for implementation of privatization concepts
- Identify cost and benefits of privatized divisions, personnel and facilities
- Identify costs and risks of privatization to customers
- Understand GFE/GFM process
- Private entity rights vs. Government rights to assets and facilities
- Reversion clauses for special government facilities and equipment
- Transition of workload
- Prepare timeline for transition of workload, equipment, facilities, how the transitions will occur and what functions will be transferred
- Determine vehicles for interim use and early turnover of the facilities
- Determine approach to privatization
- Full privatization vs. division of private and public company workload
- Identify those functions, processes, products that are Navy-inherent and cannot be transferred
- Develop models of privatization to determine organizational structure and how products get delivered
- Consider FAR/DFARs and how they affect privatization

Budgeting and Fiscal Issues

- Can commercial work begin prior to privatization?
- Need to consider interim-use agreement for commercial work
- Commercial work revenues may offset costs of transition to private company
- What is the fair market value of assets and facilities?
- Government should grant economic development conveyance to privatized company
- Budget for NAVCOMP
- How does it affect operations and transition to private company?
- What is the budget for a new contracting requirement for privatization?

Environmental

- Perform an environmental assessment or environmental impact study

- What is cost?

- What is timing?

- How does either affect privatization or ability to perform commercial work

- Determine if NAVFAC needs to be involved City of Indianapolis can indemnify Navy upon transfer of facilities or equipment

- What are Pryor amendments for environmental requirements and how do they apply to this privatization?

- Need to prepare official reuse plan

Human Resources

- NAVSEA issues

- Pension mobility

- Retention of skill base – smart buyers for Navy vs. core engineering force for private company

- Stable and strong workload continuance affects retention of skill-base

- Contracting vehicle critical to retention of skill base

- Identify legal precedent and authority to retain government personnel in closed facility (Navy presence, detachment, and other)

Other

- Navy guidance on major labs

- EP-3, V-22 labs to stay or move?

- Short-term success of privatization plan will rely on private company to retain these labs

- Can there be a privatization of these labs and workload continuance for 1 to 2 years on these projects?

- What is fall back position – give up V-22 and retain EP-3 or vice versa

- Speed of privatization critical to success. Delays or long time horizon implementation unacceptable

- What are the roles and responsibilities of the various individuals in the private company vs. Navy?

- Decision authorities

- Integrated project team structures

- Development of evaluation criteria for options/models

- Develop list of transition issue

- Is there initial funding for the private company and where does it come from?

- Determine effect of Reinvention Lab status (NAVAIR and NAWC-Indy) on privatization

- Reinvention Lab status offers selective waiver opportunities to achieve specific goals

- All privatization models cost less than close and move

- Goal of Privatization is to save Navy money and improve efficiency of contract process.

- Consider local, regional, and national political implications

Appendix B

Detailed Cost Estimate of Relocation and Privatization Options

Table 5. Relocation Plan Cost Estimate (TY $M)[115]

	TY97	TY98	TY99	TY00	TY01	Total
Total Cost	329.6	320.1	327.3	330.5	277.8	1,585.3
Labor	211.3	196.1	167.8	142.8	141.1	859.0
Material	84.9	86.3	81.6	99.0	106.1	457.9
Facilities	12.0	15.4	18.7	11.7	-	57.8
Environment	6.1	5.2	11.4	15.0	15.1	52.8
Personnel	13.6	14.8	36.9	42.9	14.0	122.3
Other	1.7	2.3	10.9	19.1	1.6	35.5

Table 6. Privatization Plan Cost Estimate (TY $M)[116]

	TY97	TY98	TY99	TY00	TY01	Total
Total Cost	339.3	282.7	241.6	254.1	266.6	1,384.2
Labor	191.2	180.7	161.9	170.7	176.4	881.0
Material	79.5	71.0	65.7	69.4	72.1	357.7
Facilities	0.4	-	-	-	-	0.4
Environment	9.5	5.3	11.1	11.1	15.1	52.0
Personnel	55.9	23.3	1.0	1.0	1.1	82.3
Other	2.8	2.3	1.8	1.9	1.9	10.6

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[115] Gregory A Hogan. "Evaluation of Military Base Closure Alternatives." Virginia: February 1997. p. 46.

[116] Ibid, p. 47.

The Army Seeks a World Class

Logistics Modernization Program

William Lucyshyn, Keith F. Snider, and Robert Maly

CENTER FOR PUBLIC POLICY
AND PRIVATE ENTERPRISE

SCHOOL OF PUBLIC AFFAIRS

23 June 2004

The Army Seeks a World Class Logistics Modernization Program

William Lucyshyn — Visiting Senior Research Scholar, Center for Public Policy and Private Enterprise, University of Maryland

Keith F. Snider — Associate Professor, Graduate School of Business & Public Policy

Robert Maly — Graduate Research Assistant, Center for Public Policy and Private Enterprise, University of Maryland[117]

On a hot summer day in early August 1999, Paul Capelli walked from the Longworth House of Representatives office building after briefing the staffers of Representative Richard Gephardt on the Army program for which he was responsible. He was on his way to brief another House member and his staffers in the Rayburn office building. This trip felt like his 100th, and he wondered if they would ever stop. Capelli had been tasked by the Army Materiel Command (AMC) to lead a project team to modernize the Army's logistics management and information systems in the Logistics Modernization Program (LMP).[118]

In the beginning, Paul Capelli was concerned mainly with assembling the right team and developing innovative alternatives for modernization. However, he had soon realized his major resistance would come due to the unprecedented nature of the modernization, and the political resistance that resulted.

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[117] This case was a joint effort of the University of Maryland's Center for Public Policy and Private Enterprise (at the School of Public Policy) and the Naval Post Graduate School's Graduate School of Business and Public Policy. William Lucyshyn is Visiting Senior Research Scholar at the Center for Public Policy and Private Enterprise, Keith F. Snider is an Associate Professor at the Graduate School of Business and Public Policy (Naval Post Graduate School), and Robert Maly is Graduate Research Assistant at the Center for Public Policy and Private Enterprise. This case was written under the supervision of Professor Jacques S. Gansler at the University of Maryland and was supported by RADM James B. Greene, USN (Ret) Acquisition Chair at the Graduate School of Business and Public Policy (Naval Post Graduate School)

[118] Originally, LMP, or LogMod, was termed "WLMP," which referred to Wholesale LMP. Later, LMP was expanded to include retail logistics and the "W" was dropped from LMP, although the wholesale and retail operations have yet to be integrated fully as of April 2004.

INTRODUCTION

Capelli's work with LMP started two years prior in August of 1997 at the Communications-Electronics Command (CECOM), Fort Monmouth, New Jersey. CECOM's Deputy to the Commanding General Mr. Victor Ferlise called Capelli to ask him if he'd be interested in leading an important new program that would help modernize the Army's outdated logistics management systems. Capelli had served at every level within CECOM's Logistics Readiness Center (LRC) prior to being named the Program Director of LMP. And, since a core aspect of LMP was the modernization of the logistics business processes, Capelli's experience made him a logical choice.

CECOM was responding to an Army Materiel Command's (AMC's) August 5, 1997 memorandum (see Appendix A), in which AMC's Deputy Commanding General Dennis Benchoff tasked the Commander, CECOM "to explore alternatives to modernize the wholesale logistics processes and associated information technology to support these processes."[119] Specifically, the letter asked CECOM to:[120]

1) Determine feasible alternatives for logistics modernization strategies,
2) consider the implications and devise methods to soften the impact on the existing workforce,
3) develop a performance-based statement of requirements, and
4) to recommend an acquisition approach.

As the first step toward this aim, General Benchoff had asked the CECOM Commander to designate a Special Project Team in order to gather information and conduct market research to develop alternatives for a modernization strategy. The team, to be led by Capelli, would ultimately consist of top hand-picked individuals from across AMC, all of AMC's Major Subordinate Commands (MSCs), one of which is CECOM; numerous affiliated MSC depots; and other activities and centers supporting

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[119] Dennis Benchoff, Memorandum to Commander of CECOM, US Army, August 5, 1997, p. 1.

[120] Ibid.

the Army's logistics enterprise. Specifically, Benchoff wanted the team to develop a plan to modernize the Army's wholesale logistics systems leveraging recent acquisition reform initiatives and best commercial business processes and products. He encouraged outside-the-box thinking and gave the team the authority to challenge all regulatory and process constraints. Benchoff envisioned a "partnering with industry" that "privatized development and sustainment of the wholesale logistics automation systems."[121]

PAUL CAPELLI

Before he became the Program Director for LMP, Capelli served in the federal government for over 20 years. He began his career in logistics at CECOM and steadily developed into one of CECOM's most talented leaders. Throughout his tenure there, Capelli had been a user of the logistics systems as well as a supervisor for divisions of other users. In fact, he had experience with virtually every aspect of CECOM's logistics processes during his career—as an intern, a materiel manager, a branch chief and a division chief.

Prior to his appointment with LMP, Capelli was the Deputy Director in CECOM's Directorate of Materiel Management, where he began seeing the changes in strategic direction the Army was making. Increasingly, the Army's strategy was integrating best practices from the commercial sector. In this capacity, Capelli began to believe that the Army's supply chain processes could benefit greatly from those in the private sector where firms were continually making their world class systems more effective and more efficient.

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[121] Ibid.

SETTING THE STAGE

The US Army is supported by a vast and complex logistics network, which contains about $9 billion of Army general issue inventory and about $4 billion in spare parts; the average annual inventory turnover is about $2.5 billion.[122] It is this system that is responsible for moving supplies from manufacturers and warehouses to the soldiers on the battleground.

The first Gulf War revealed flaws in the existing Army logistics system. These weaknesses were generally not characterized by a lack of supplies, but by a lack of supplies in a timely manner, and the inability to efficiently get supplies, replacement parts and equipment to the units that needed them.[123] In fact, the Gulf War logistics operation has often been described as a classic "push" system in which the Army would literally send everything it might need into the theater first, and then issue the specific equipment as needed. This method can be effective, but it is rarely efficient. Generals coming off helicopters after the war referred to the pallets of unused equipment in the desert as "iron mountains." Recognizing a need for improvement, Department of Defense (DoD) and Army leaders began to look to the advances made in how the private sector was transforming supply chain management and began to consider ways to incorporate those into their logistics reform efforts.

In fact, the 1990's saw a large push throughout the entire federal government for best business practices. In Congress, the Government Performance and Results Act of 1993 set off a series of mandates for government performance measurements, infrastructure reductions and increased government efficiency within the federal government known as the Revolution in Business Affairs. In parallel, DoD introduced its Revolution in Military Affairs based on the idea that the US military must revolutionize

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[122] Paul Taibl, "Army Logistics Modernization Program: A Case Study," Business Executives for National Security *Tail-to-Tooth*, April 9, 1999. [Accessed on February 2004] Viewed at http://www.bens.org.

[123] Larry Asch, LMP Chief, LMP Business Office, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. College Park, Maryland, January 29, 2004.

itself in order to adapt to future needs of speed and flexibility in combat. In 1994, President Clinton signed the Federal Acquisition Streamlining Act, and in 1996, he signed the Federal Acquisition Reform Act. These laws made it easier for the government to buy goods and services from the private sector through reduced government oversight, simplified contracting procedures, and generally eliminated barriers between the public and private sectors.[124]

In July 1996, the Joint Chiefs of Staff issued *Joint Vision 2010*, which proposed a vision for the US military to channel human resources and leverage technological advances to achieve higher levels of effectiveness and efficiency. It identified four main operational cornerstones—among them, *focused logistics* that were responsive, flexible and precise. The report stated: "Service and Defense agencies will work jointly and integrate with the civilian sector, where required, to take advantage of advanced business practices, commercial economies, and global networks."[125]

Two of the most influential legislative actions in the 1990s regarding acquisition reform, the Governmental Performance and Results Act (1993) and the Clinger Cohen Act (1996), stressed the importance of government performing duties that were inherently governmental. These Acts recommended that non-core competencies, those duties such as software maintenance that could be performed in the private sector, should be competitively sourced.

In May 1997, Defense Secretary William Cohen released the *Quadrennial Defense Review* which mandated the adoption of innovative business practices used in the private sector and put forward goals to reengineer DoD support structures. Secretary Cohen said, "Our purchasing system is still too cumbersome, slow and

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[124] Michael Lippitz, Sean O'Keefe and John White with John Brown, "Advancing the Revolution in Business Affairs," *Keeping the Edge: Managing Defense for the Future*, Cambridge, MA: Preventive Defense Project, September 2000, p. 170-171. [Accessed on April 2004] Viewed at http://bcsia.ksg.harvard.edu/BCSIA_content/documents/KTE_ch7.pdf..

[125] US Joint Chiefs of Staff, *Joint Vision 2010*, 1996, p. 24.

expensive. We still do too many things in-house that we can do better and cheaper through outsourcing."[126]

And yet, as of August of 1997, the Army still relied on its 30-year-old logistics and depot maintenance systems, the Commodity Command Standard System (CCSS) and the Standard Depot System (SDS), to support the Army's annual procurement of supplies and equipment worth billions of dollars. These wholesale systems, which were written in Common Business Oriented Language (COBOL) software dated from the early 1970's, were neither flexible nor adaptable to change, and were very expensive to sustain and upgrade.[127] In addition, when the Army questioned whether developing and maintaining these computer systems was a core competency, the answer came back a resounding no.

According to Paul Capelli, "While commercial logistics business processes have evolved towards replacing inventory mass with velocity management, the Army logistics system remains based upon an inventory mass concept…For the soldier, the current system is inflexible and generally unresponsive. For the Army, it is obsolete and costly to sustain. Modernization of our thirty-year-old system is an imperative."[128]

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[126] William Cohen, DoD News Release, May 5, 1997. [Accessed on April 2004] Viewed at http://www.defenselink.mil/news/May1997/b051997_bt250-97.html.

[127] Paul Capelli and John Keogh, "Wholesale Logistics Modernization Program," LMP, US Army, p. 2.

[128] Ibid.

SEIZING THE OPPORTUNITY TO MODERNIZE

In 1996, as a result of a Base Realignment and Closure (BRAC) recommendation, CECOM assumed responsibility for the two Army central design activity (CDA) logistics centers in St. Louis, Missouri, and Chambersburg, Pennsylvania. Previously under the authority of the Industrial Operations Command, the mission of these centers had been to "design, develop and maintain computer software systems and provide services that manage commodities, such as ammunition, avionics, communications and electronics, tanks, and missiles."[129]

One of CECOM's first actions at these centers was to assess the state of the logistics systems run at each location. At the time, many COBOL software experts were retiring—in fact, most would be eligible for retirement in less than two years.[130] As a result, CECOM managers were finding it difficult to train new employees in COBOL—both because there were fewer and fewer people to be the trainers and because the technology was so old, with little application in the private sector, so recruiting new employees was difficult. From their evaluation of the current systems, CCSS and SDS, both based on outmoded business processes and outdated technology, CECOM determined that addressing the outdated systems was a top priority. Larry Asch, Chief of the Business and Operations Office at LMP, said, "The systems were being held together with spaghetti links."[131]

According to CECOM, there were major weaknesses in the old AMC legacy systems:[132]

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[129] General Accounting Office, "DoD Competitive Sourcing: Plan Needed to Mitigate Risks in Army Logistics Modernization Program," October 1999, p. 5.

[130] LMP Special Project Team, "The Business Case: Wholesale Logistics Modernization Program," CECOM, US Army, February 12, 2004, p. 13.

[131] Larry Asch, LMP Chief, LMP Business Office, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. College Park, Maryland, January 29, 2004.

[132] LMP Special Project Team, "The Business Case: Wholesale Logistics Modernization Program," CECOM, US Army, February 12, 2004, p. 7.

- *Lack of flexibility*: Process changes, regulatory changes, and reorganizations within and between user commands require expensive and extensive data conversions and programming changes.

- *Slow, unfocused reports*: Reporting and summarization capabilities are geared to workers. Managers and executives, with their need for easily specified, flexible, tailored, and rapid generation of reports and summaries are usually frustrated with output capabilities.

- *Difficult to use*: The system is not user friendly. The system relies on extensive use of codes to provide compact storage (a holdover from the time when computer storage was inordinately expensive). Users are required to learn codes and have extensive system knowledge. The system lacks adequate data edits and validations, as well as support functions.

- *Expensive to maintain*: The system's size and complexities make it difficult to manage and change code. Large portions are based on relatively old third-generation programming languages and flat data structures that are inflexible to change and inefficient to operate.

- *Unresponsive*: The use of batch processing precludes timely updates to data architecture, flexible data retrieval capabilities, and informed decision-making.

- *Outmoded database*: The use of outmoded database systems and architecture result in rampant data inconsistencies, data duplication, and the lack of data standardization.

- *Expensive to operate*: The system requires extensive manual intervention because of outmoded data and system architectures.

- *Lack of cost-sharing*: The Army is the only "bill payer," precluding the ability to leverage existing industry investments in modern logistics processes and IT.

Said one Army logistics consultant: "The trust in the system is not there. Because supply lines are slow and unreliable, the smart supply clerk orders twice as much as he needs, or he orders it again 30 days later, just to be sure it comes in."[133] According to Larry Asch, the existing system was characterized by the mantra: "gotta'

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[133] Nancy Ferris, "Logistics Logjam," *Government Executive*, May 1, 1999. [Accessed on February 2004] Viewed at http://www.govexec.com.

hunch, buy a bunch."[134] Yet another observer said of the CCSS and SDS systems: "These old systems are literally running on patches and prayers and could collapse at any time."[135] The resultant excess inventory from these systems costs the Army millions of dollars.

Now that CECOM was able to examine the situation with a new and independent perspective, the necessity for modernization was painfully obvious. Yet, due to institutional resistance and inertia, the status quo had been sustained for years. The transition of the CDA centers from AMC's Industrial Operations Command to CECOM provided an opportunity for change and innovation. From the first days of this transition, CECOM proceeded with a proactive approach.

In the CECOM tasking letter, General Benchoff made clear that the modernization goal was an imperative, but the direction for modernization was left wide open because the solution was yet unknown. The tasking included four broad parameters. First, the letter emphasized that maximizing the logistics performance to supply the troops was AMC's core competency—software coding was not. Second, Benchoff determined that the team must seek a solution that operated within the current operating budget, that is, the existing system had to maintained as the new one was developed—all within the current operating budget, estimated at $426M for the next 10 years. He did not want to go to Congress and ask for more money to fund the modernization because he was not confident in the result, and he knew, at minimum, doing so would greatly slow down the process. Third, Benchoff believed it was important to use best commercial business processes and technology because the private sector was so far ahead of the public sector in supply chain management practices. Finally, Benchoff instructed Capelli to take care of the employees at the CDA centers who had given many years of committed work, had done their jobs well, and who would be ultimately most affected by the modernization changes.

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[134] Larry Asch, LMP Chief, LMP Business Office, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. College Park, Maryland, January 29, 2004.

With these broad parameters, AMC gave Capelli's team the modernization task and essentially said, "Now go figure out how to do this."

Within a week of assuming the responsibility to direct the new logistics modernization program, Paul knew that the staffing of the special project team was his first important responsibility as the team leader. Finding themselves in uncharted territory, Paul and one of his key attorneys, Thomas Carroll, decided they needed expertise in key areas of contracting, logistics and IT. Fortunately, Paul's supervisor, Victor Ferlise, was an avid supporter of the program. Ferlise essentially told Capelli: "Get the best and the brightest people—give me specific names you need, and we'll get them."[136] Paul and Thomas made a list of their nominees, emphasizing highly knowledgeable people who were innovators and risk-takers.

Said Paul Capelli: "My initial concerns were focused around getting the right people together. Fortunately, this consideration was a core element for my management as well. We got the best and the brightest that CECOM had to offer, and then when the contract was eventually awarded, we got the best and the brightest of what the AMC community had to offer."[137]

Thomas Carroll said: "Vic Ferlise went to the Commander and said, 'We want this guy and this guy.' And of course we were asking for the best of the best, so everyone objected. But our task was such a priority that our leaders mandated the personnel choices. That's how we got the team we needed."[138]

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[135] Paul Taibl, "Army Logistics Modernization Program: A Case Study," Business Executives for National Security *Tail-to-Tooth*, April 9, 1999. [Accessed on February 2004] Viewed at http://www.bens.org.

[136] Larry Asch, LMP Chief, LMP Business Office, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. College Park, Maryland, January 29, 2004.

[137] Paul Capelli, email response to questions, May 14, 2004

[138] Thomas Carroll, LMP Attorney, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. Moorestown, New Jersey, March 11, 2004.

By the Spring of 1998, Capelli had 7 new people on his team that represented some of the most experienced CECOM staff. Many team members had over 20 years experience with major contracts and complicated programs. In all, the team had over 100 years of acquisition experience.[139] With such a talented roster, AMC leadership empowered the team to freely seek modernization solutions without unnecessary oversight and restrictions. The team was required to directly coordinate with only one of their superiors, Victor Ferlise, the Deputy to the Commander of CECOM.

Once they took a closer look at the challenges facing them, for Capelli and his team, the path ahead was clear:

"It is time, once again, for the Army's wholesale logistics business systems to lay claim to the title of state of the art by adopting commercially available business processes and enabling technologies. A refinement of our systems is not enough. We can only achieve a revolution in military logistics if we first revolutionize our business affairs. The destination is known. It is a place where American industry resides; successfully forged out of competition in a global marketplace during the 80s and 90s."[140]

In order to accomplish their first task, developing feasible alternatives for logistics modernization, the team began work on a business case.

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[139] Ibid.

[140] Paul Capelli and John Keogh, "Wholesale Logistics Modernization Program," LMP, US Army, p. 1.

ALTERNATIVES: HOW TO MODERNIZE?

First, the team began to conduct market research to see where the best private sector firms were regarding supply chain processes. The team decided early in the process that free and open communication with the private sector was critical to their success. While they had their top-level goal of modernization, they did not have a template of how to achieve that goal. Said Carroll, "At every step, we were more open with industry about what we were doing, and why we were doing it than anyone has ever been in a government procurement, in my experience."[141] So, the team conducted meetings for 6-8 months with industry leaders to find out what lessons learned and best practices companies had discovered from their own modernization efforts. The team also developed a website that enabled companies and prospective service vendors to ask questions about the LMP project and enter into a dialogue with the project team.

As a result of their research and communication with industry, the team realized their modernization goal was essentially dual in nature: (1) to reengineer their business processes, and (2) to support those new processes with modern information technology.[142] With this goal and the original parameters in mind, the LMP team used the following as screening criteria for potential alternatives:[143]

- Wholesale logistics must change to meet the needs of the modern Army.

- The potential performing organization must have the expertise to perform Business Process Reengineering (BPR) and the experience to implement logistics Commercial-Off-The-Shelf (COTS) software.

- The alternatives must have an acceptable level of risk and risk mitigation strategy.

- Alternatives must have the potential to meet the schedule for developing and fielding the Army Global Combat Support System (GCSS-Army is a strategy to modernize

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[141] Thomas Carroll, LMP Attorney, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. Moorestown, New Jersey, March 11, 2004.

[142] Ibid.

[143] LMP Special Project Team, "The Business Case: Wholesale Logistics Modernization Program," CECOM, US Army, February 12, 2004, p. 11.

and implement an integrated logistics system that meets the requirements of the 21st century).

- Alternatives must have the potential to be executable within the existing operating budget.

Based on the screening criteria, the status quo was rejected as a viable option, which reconfirmed the commitment to bring about the needed changes. In the Business Case study, the LMP team identified three alternatives to the status quo.[144]

Alternative 1:

The CDAs perform legacy sustainment while minimizing changes to existing systems. The Government also performs wholesale logistics modernization. This in-house effort employs the current workforce to implement a modern enterprise project with COTS software. This alternative assumes that the CDAs will be reorganized, provided the skills and trained to perform industry-quality BPR. Additionally, they will acquire the skills to design and implement a system that will achieve the modernization and sustainment goals of the LMP and GCSS-Army.

Alternative 2:

The Government performs legacy sustainment; the contractor performs wholesale logistics modernization and sustainment of the modernized system. Alternative 2 relies on the private sector for modernization while the Army continues to maintain its legacy system.

Alternative 3:

The Contractor performs legacy sustainment services and wholesale logistics modernization services. The contractor will employ displaced Central Design Activities center workers.

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[144] Ibid, 11-12.

Under Alternative 1, federal IT employees would be responsible for the modernization, yet the majority of these employees had neither the expertise nor the basic skills necessary for such a transformation. A 1997 General Accounting Office (GAO) report said that when federal employees attempt to undertake a software modernization such as the LMP, the result often "is characterized by a software process that is ad hoc, and occasionally even chaotic."[145] In addition to lacking the basic software and programming skills, existing federal employees lacked critical BPR knowledge and experience that was needed for the logistics modernization. On top of the performance risk that these deficiencies posed, re-training the federal employees would pose time and financial risks. The Business Case estimated the cost of Alternative 1 at $581.7M for the next 10 years, which would exceed the current operating budget by at least 30 percent; and even if the federal employees were able to reengineer the logistic process and modernize the system, the LMP team estimated a delay of at least four years (see Figure 1 for Investment/Implementation Comparison of the three Alternatives).

Under Alternative 2, perhaps the biggest risk to the LMP was the conversion from the legacy system to the modernized system. Using this alternative, there would likely be an adversarial relationship between the government employees and the contractor because as the modernization was implemented, the contractor would be increasingly displacing government employees. In fact, there was an inverse incentive for government employees to work inefficiently toward the program goals so that their employment could be extended. Furthermore, the actual conversion of data from the legacy system to the new system would be at risk. The Business Case noted:

> *When the legacy system and a modernized system are separated, and their respective responsibilities for each system is separated between the government*

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[145] General Accounting Office, "Defense Computers: LSSC Needs to Confront Significant Year 2000 Issues," September 1997, p. 9-10.

and the contractor, the risk inherent in the data migration is magnified since each organization has little expertise in the other's systems and processes.[146]

Although the estimated cost of Alternative 2 was $425.2M for a ten year period, which was below the current operating budget, the risks were such that Army officials feared the estimate could quickly balloon.

Also, under Alternative 2, there would be no provision for a "soft-landing" for the then 478 government employees at the two Central Design Activities centers in St. Louis and Chambersburg.[147] Under alternative 3, the soft-landing was an arrangement in which the winning contractor would agree to employ the government employees affected by the transition for a pre-specified period of time, offering competitive pay and benefits. Consideration of the employees at the CDA centers had been one of the original mandates for the project team. Moreover, without a soft-landing provision, Army officials feared the federal employees, who had the most expertise in sustaining the legacy system until modernization was fully implemented, would leave before the transition took place. One solution to this specific concern would be to migrate the systems in a "turn key" fashion—turning on the modernized system all at once while turning off the legacy system. However, the Joint Logistics Systems Center had tried this approach in a similar effort in 1998 with little success. The LMP team determined a phased approach, with incremental transitions between the systems, was preferred.

The project team strongly recommended Alternative 3 with a ten year program cost of $420.9. The project team determined that the biggest risk posed by Alternative 3 was the interruption of logistics services during the transition from the government to the contractor. However, since the status quo had already been rejected, this alternative appeared the least risky of the three. Essentially, the team determined the greatest risk was doing nothing. Private industry, with companies such as Federal Express, Chrysler and Proctor and Gamble, had proven its ability to continuously

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[146] LMP Special Project Team, "The Business Case: Wholesale Logistics Modernization Program," CECOM, US Army, February 12, 2004, p. 24.

[147] General Accounting Office, "DoD Competitive Sourcing: Plan Needed to Mitigate Risks in Army Logistics Modernization Program," October 1999, p. 7.

integrate new technology and reengineer business processes to enhance efficiency and effectiveness. This alternative would allow the modernization to occur under current Army funding levels, as directed, because the winning contractor would be required to provide the initial investment costs.

Figure 1
Source: LMP Business Case, 1999

In the end, the project team determined Alternative 3 would best satisfy LMP goals and objectives. This alternative, utilizing commercial best practices and proven experience, had the lowest estimated cost for the government (see Table 1), the lowest level of risk, and the best prospect for a timely transition. In addition, it was the only strategy that allowed for a soft-landing requirement with the contractor in the request for proposals.

	Baseline	Alternative 1	Alternative 2	Alternative 3
Current Dollars	$426.0M	$581.7M	$425.2M	$420.9M

Table 1. *Cost summary of Alternatives (10 Year program)*
Source: LMP Business Case, 1999

Said Capelli: "If you look at any of the other alternatives, the people impacts are much more severe…I personally believe that many of [the employees] will be better off [under LMP]."[148]

Under this alternative, the Army would neither own nor operate the new system. According to Victor Ferlise, "We made a fundamental switch from the procurement of systems to the acquisition of services."[149] The contractor that the Army selects would be responsible for re-engineering and modernizing the service's logistics processes using commercial best practices on a continual basis—thereby satisfying the team's two-fold goal. "We didn't want to worry about obsolescence every couple years," said Asch.[150]

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[148] Nancy Ferris, "Logistics Logjam," *Government Executive*, May 1, 1999. [Accessed on February 2004] Viewed at http://www.govexec.com.

[149] Victor Ferlise, "Innovations in Logistics Modernization," *Program Manager*, May/June 2000, p. 64.

[150] Dan Caterinicchia, "Army Logistics Marches Ahead," *Federal Computer Weekly*, November 18, 2002. [Accessed on February 2004] Viewed at http://www.fcw.com/fcw/articles/2002/1118/pol-army-11-18-02.asp.

COMPARING APPLES TO ORANGES:

OUTSOURCING OR PRIVATIZATION

Once it settled on Alternative 3, the project team considered how their modernization effort would need to use the relevant government processes for acquiring private sector services. The team believed they would need to conduct either an outsourcing or privatization effort.

All outsourcing proposals were required to comply with the Office of Management and Budget (OMB) Circular A-76 requirements; that is, to use "competitive sourcing" (i.e. competition between the public and private sector to do the work). A-76 requires all federal agencies pursuing competitive sourcing options to allow the federal employees to form a "most efficient organization" (MEO) in order to compete on equal footing with the private companies for a contract. While outsourcing is the sourcing model in which organizational activities are contracted out to vendors or suppliers who specialize in these activities in a competitive fashion.[151] However, the LMP project team believed its objectives required privatization, not outsourcing. In contrast to outsourcing, privatization is the sourcing model in which current government equipment and personnel are moved into the private sector.[152] First, the team maintained that it did not make sense to conduct a cost comparison competition under A-76 because the current CDA employees were not comparable to the BPR and IT experts in the private sector with which they would be competing. "It was like comparing apples to oranges," said Carroll.[153] Secondly, in an A-76 competition, when the government MEO loses, the employees lose their jobs completely. From their market research and the business case, the team knew the CDA employees had no chance to compete through the A-76

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[151] Jacques Gansler, *Moving Toward Market-Based Government: The Changing Role of Government as the Provider*, Center for Public Policy and Private Enterprise and the IBM Endowment for the Business of Government, June 2003, p. 10.

[152] Ibid.

[153] Thomas Carroll, LMP Attorney, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. Moorestown, New Jersey, March 11, 2004.

process with the private sector because they simply did not possess the necessary expertise. Privatization was consistent with their desire for a soft-landing provision with the winning contractor. Consequently, privatization was deemed the way to go.

The team decided to work towards a strategic partnership with one contractor for a 10-year period. However, the team's research led them to decide that their first priority would be to find the best company, not necessarily the best software solution initially. They determined:

> …no 'silver bullet' solution [was] available that satisf[ied] all the Army's anticipated needs. Rather several commercial software products provide the functionality to accomplish the wholesale logistics requirements. This research indicates clearly that the effort to develop and gain approval of the reengineered business practices as a baseline for determining an IT and organizational solution must be a priority effort.[154]

By April 1998, the team's plans to modernize through privatization were approved through top-level management in CECOM, AMC, and the Army. However, when their proposal reached the Office of the Secretary of Defense (OSD) level and OMB, OMB told OSD and the project team that in fact LMP was an outsourcing initiative, not a privatization effort, and that they did need to conduct a competition with the government employees. OSD did not appear willing to take on that political battle, so the team was stuck with the A-76 process despite their reasoning to the contrary. According to Carroll, "At that point, we thought our efforts were finished because we knew an A-76 cost comparison was a waste of time in this circumstance."

Nonetheless, the team still had one remaining option. OMB representatives had mentioned that the Circular allowed for the application of a waiver in special circumstances. Vince Buonocore, the team's main attorney and Assistant to the Chief Council at CECOM, found that their case for a waiver fit OMB's requirements. He also

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[154] LMP Special Project Team, "The Business Case: Wholesale Logistics Modernization Program," CECOM, US Army, February 12, 2004, p. 34.

found that although waivers were permitted under A-76 guidelines, there was in fact no precedent for a waiver request.[155] Still the team pushed forward—they had nothing to lose by trying. The team officially assembled their case for a waiver, and AMC Commander General Johnnie Wilson sent an A-76 waiver package to the Assistant Secretary of the Army for Installations, Logistics and Environment in October of 1998. Wilson signed the waiver request saying, "An elongated A-76 process can take between 14 months and 24 months to complete…. If we cannot get the waiver approved, then it's really going to set us back."[156] The Assistant Secretary of the Army for Installations, Logistics and Environment—ultimately responsible for granting the initial waiver according to OMB regulations—approved LMP's waiver request. Although OMB had published the A-76 Circular, OMB did not have a direct role in the waiver process once the team submitted its request. Thus, it was essential for LMP to have the support from top-level management throughout the DoD chain of command.

In anticipation of future resistance, the original waiver package was revised in March of 1999 to include a revised business case, an economic analysis, an acquisition strategy, a logistics integration agency study, background on private sector supply chain achievements, and a risk analysis of the alternatives.[157] The memorandum in support of the request listed three main reasons for a waiver: (1) the conversion will result in significant service quality improvements, (2) the conversion will not serve to reduce significantly the level or quality of competition in the future award or performance of work, and (3) the functions to be converted are not inherently governmental.[158] However, a waiver request had in fact never been attempted because such a move was

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[155] As of March 2004, the members of the LMP project team believe that the LMP waiver request was the first and only request of its kind for any executive agency.

[156] Gregory Slabodkin, "Army Seeks A-76 Waiver for Logistics Project," *Government Computer News*, November 23, 1998. [Accessed on February 2004] Viewed at http://www.gcn.com/archives/gcn/1998/november23/3a.htm.

[157] General Accounting Office, "DoD Competitive Sourcing: Plan Needed to Mitigate Risks in Army Logistics Modernization Program," October 1999, p. 20.

[158] LMP Special Project Team, Memorandum in Support of the Request for Cost Comparison Waiver in Connection with the Wholesale Logistics Modernization Program, US Army, p. 1.

expected to bring stiff resistance from unions and Congress. Indeed, the expectations for resistance were realized.

THE BIGGEST HURDLE:

CONGRESS, UNIONS AND A SOFT-LANDING

On April 27, 1999, the Army notified Congress and the CDA employees that it had approved an A-76 waiver for the LMP project. In early May, the local union in St. Louis that represented many of the St. Louis CDA employees, the National Federation of Federal Employees (NFFE), officially filed an appeal with the Army (the Chambersburg center employees were not represented by a union). NFFE claimed the government employees should be able to compete for the contract through the traditional A-76 process. Immediately, Congressional representatives from the two areas became involved.

Representative Dick Gephardt, the House Minority Leader, was heavily connected with labor unions in Missouri and represented some of the employees at the St. Louis CDA. With Gephardt, Representatives Jim Talent and Jerry Costello, members whose districts also held the St. Louis CDA employees, demanded to know what was happening to their constituents' jobs.

Due to the number of government jobs involved, the program was highly charged politically, but it was also covering new ground. As a result, Capelli and Buonocore were required to make innumerable trips around Washington to brief and explain to many congressional committees, representatives, military departments and even other executive agencies what LMP was doing and why. According to Buonocore, whose primary role on the team was to serve as an advocate for the program, helping put together the request for the waiver and responding to interested parties in Washington:

> *The attitude in the Pentagon often was: 'Get as many fingerprints on it as possible so there is enough blame to be spread around when the political heat comes in.' A lot of the resistance was due to the unprecedented nature*

of our program. There really weren't many substantive program issues to deal with. This just wasn't the way competitive sourcing was done…and people were put off by it because it had never been tried at that time. We had to explain, explain, and explain again.[159]

Meanwhile, in March of 1999, the project team had continued to prepare its solicitation and evaluation strategy for potential contractors. Their strategy was not to ask competing companies for a business process and software solution, but to ask for an *approach* to find the solution. To facilitate this process, the team used a commercial business practice called "due diligence," a risk management tool often used prior to corporate acquisitions.[160] In their case, the LMP team defined "due diligence" as "a period of time wherein offerors shall be allowed to examine the organizations and operations associated with the WLMP. This period will allow offerors to asses the program's needs in order to mitigate proposal risks."[161] This included site visits and access to an Internet-based virtual library.

The team then focused on each company's risk assessment of the contractors' proposed approaches to finding a business process and software solution. With their responsibility to take care of CDA employees in mind, the team wanted to make the contract a win-win for both the government and the private vendor. Their Request for Proposal (RFP) required all offerors to put a minimum soft-landing requirement in the contract, stating that the contract must offer at least a one-year job guarantee to all CDA employees, at the current geographical location, with comparable pay and benefits. Additionally, one of their evaluation criteria was "What are you going to do to get a hold of the expertise you need to sustain our legacy systems—which we are going to transfer

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[159] Vince Buonocore, LMP Attorney, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. Moorestown, New Jersey, March 11, 2004.

[160] For more information about LMP's use of the Due Diligence process, see: Lea Duerinck, "Use of Due Diligence in the Wholesale Logistics Modernization Program," *Program Manager*, July/August 2000.

[161] Lea Duerinck, "Use of Due Diligence in the Wholesale Logistics Modernization Program," *Program Manager*, July/August 2000, p. 61.

to you at the time of award—until modernization is complete?"[162] The team asked how each company was going to mitigate the risk of losing legacy expertise until the transition was completed knowing well that the only logical solution for the contractors to mitigate the risk was to hire the current CDA employees.

Said Carroll: "The only place the offerors could get the expertise to run the legacy systems was from the CDA employees, so the employees became valuable assets to win the contract and to achieve future performance bonuses…We were able to take this to Congress, leaders in DoD and the employees and say, 'yes, taking care of our people is a top priority.'"

In addition to the due diligence process, the team employed other methods of commercial acquisition practice that were allowed by the recent revisions to the Federal Acquisition Reform Act.[163] Most notably, the team conducted communications with the offerors prior to establishing the competitive range. The team provided each offeror Initial, Interim and Final Evaluation Reports that listed their strengths, weaknesses and deficiencies.[164] These periodic reports let the offerors know exactly where they stood throughout the evaluation process. As a result, the contractors knew what specific points in their offer to improve, and the proposals continually got better. For instance, in the end, the winning contractor offered a three-year soft-landing—two years beyond the team's minimum requirement.

As the process went along, LMP received a lot of high level interest from within DoD due to the innovative methods that were being introduced. In fact, in terms of the soft-landing, it was the first ever in DoD history.[165] LMP enjoyed the support of many key leaders such as the Secretary of the Army, the Army Chief of Staff, and

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[162] Thomas Carroll, LMP Attorney, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. Moorestown, New Jersey, March 11, 2004.

[163] The most recent section of Federal Acquisition Reform Act to be rewritten is Section 15, "Contracting by Negotiation," which was used specifically by the LMP team.

[164] Paul Capelli and John Keogh, "Wholesale Logistics Modernization Program," LMP, US Army, p. 4.

[165] Nancy Ferris, "Logistics Logjam," *Government Executive*, May 1, 1999. [Accessed on February 2004] Viewed at http://www.govexec.com.

Undersecretary of Defense for Acquisition, Logistics and Technology Dr. Jacques Gansler.

> *"I really supported the Army's Logistics Modernization Program. In the end it demonstrated that with good planning you can arrive at a win-win situation…the Army acquired a state of the art, COTS based logistics management system, while the soft landing program protected the displaced employees."* Dr. Jacques S. Gansler

In addition to their trips to the Pentagon, Capelli and Buonocore estimate that they delivered about 20 briefings on the Hill. Of those trips, only two were to House member Bud Shuster who represented the Chambersburg employees. Once they explained the substantive reasoning for LMP, and explained the soft-landing provision they were requiring of the winning contractor, Rep. Shuster and his staff understood what the LMP program was trying to accomplish.

The experience was different with the St. Louis representatives because the union involvement was providing a source of greater resistance. Capelli and Buonocore made many trips to brief these representatives with the same presentation. Interestingly, after Capelli and Buonocore had explained the soft landing provision that they were requiring to the staffers of Rep. Gephardt, one of the most prominent union supporters in Congress, most of the staffers reacted positively to the plans, and repeatedly asked: "Gee, it all sounds good—so tell us again why the union doesn't like it?" Says Buonocore, "Was the local union stoking the fires in St. Louis? Yes, no question, because there weren't really many objections with the substance and reasoning for the program."[166]

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[166] Vince Buonocore, LMP Attorney, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. Moorestown, New Jersey, March 11, 2004.

LMP did have lobbyists in their corner as well—among them, the Information Technology Association of America and the Professional Services Council. Ultimately, Capelli said the scales in Congress tipped in their favor because "of the sanity of what we were tasked to do. We had to modernize. It made sense to outsource. The money was right and just as importantly we had devised a plan to take care of the Government employees that were being outsourced."[167]

Capelli and Buonocore tried other mollifying measures with NFFE when things continued to stagnate. They had visited the Naval Air Warfare Center in Indianapolis where, in the face of a nationwide wave of base closures, the Navy had conducted a privatization effort to place the operation of the center under private control.[168] In this case, the Navy and the winning contractor conciliated the union representing the public employees by allowing the employees to remain unionized even after the public-to-private transition took place. They had specifically asked the local NFFE president, John Morris, whether a similar approach could work in St. Louis, but Morris ultimately responded that such a move went against NFFE's national charter, and was therefore not a possibility.

When NFFE maintained that the Army wouldn't negotiate or communicate, Capelli and the LMP team "took great pains" to keep the union informed and extended opportunities to NFFE to share any input they may have had on implementation and impact proposals.[169] Buonocore says the team never received a response from the union in this regard because the union was caught in a catch-22 situation. On one hand, the union wanted to preserve their stance that the agency wasn't negotiating. On

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[167] Paul Capelli, email response to questions, May 14, 2004

[168] Jacques Gansler, *Moving Toward Market-Based Government: The Changing Role of Government as the Provider*, Center for Public Policy and Private Enterprise and the IBM Endowment for the Business of Government, June 2003, p. 29.

[169] Vince Buonocore, LMP Attorney, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. Moorestown, New Jersey, March 11, 2004.

the other hand, if the union gave any advice or proposals, they were facilitating the same process that they were trying to stop.

Army Secretary Louis Caldera, responsible for the final appeal decision, rejected the union appeal and sustained the initial decision in a September 30, 1999 memorandum, stating: "The OMB Circular A-76 process is intended to apply to recurring commercial activities. The Circular is not intended to constrain federal agencies in the adoption of better business management practices or the termination of obsolete services…Accordingly, I deny all of the appeals on the wholly independent ground that the A-76 process is not applicable."[170]

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[170] Brian Friel, "Army Outsourcing Plan Leads to Employee Exodus," *Government Executive*, October 18, 1999. [Accessed on March 2004]Viewed at http://www.govexec.com.

CONCLUSION

When all else had failed, in early December NFFE went to the U.S. District Court of the Eastern District of Missouri looking for a restraining order and an injunction. The correspondence from the team to the union, which clearly requested and welcomed the union's help served to repudiate the union's claim that the Army and the LMP Program were not negotiating. Also, the business case and the myriad of appeal analyses stating why the cost comparison did not make sense in LMP's case were enough to rebut the union's charge that the process for decision-making was arbitrary and unfair. The final legal appeal was unsuccessful, and on December 30, 1999, AMC awarded the Computer Sciences Corporation (CSC) with a 10-year contract—the ten year contract was required so that CSC could recoup the loss during the development phase while they were also maintaining the legacy system and operating at a loss.

Ultimately, AMC chose CSC because: (1) their performance bonus plan was more aggressive—they were willing to put a greater percentage of their revenues contingent on their performance, and the team believed this minimized the Army's risk; and (2) their soft landing plan was better for employees. CSC guaranteed every employee a three-year job guarantee in the same geographic location, comparable pay and benefits, and a $15,000 bonus with the first CSC paycheck.

Addressing the final soft-landing package extended to the CDA employees by CSC, Capelli said:

> Throughout the entire process leading up to award, never once was the 'soft-landing' taken off the table. Everyone, from each member of my team, to Commanding Generals at all levels, to Congressmen and Senators, took this aspect of the program very seriously. All were adamant that our

displaced employees get a fair shake for ensuring the readiness of our soldiers. We think the package extended by CSC is an excellent one.[171]

In the end, job offers were extended to all remaining 207 employees, with 205 accepting.[172] Originally, there were almost 500 total employees at both centers. Most CDA employees, however, were participants in the legacy Civil Service Retirement System, and 83% were eligible for regular or early retirement within five years of 1999. [173] Consequently, many employees chose to transfer to other federal positions or accept buyouts and early retirement packages offered by the Army.[174]

Capelli and his team were satisfied that they had successfully completed their difficult task with an innovative solution. For Capelli, the LMP would "provide a single wholesale logistics system[175] that will be capable of providing timely, flexible and cost-effective world wide distribution of assets that can sustain integrated, joint and multinational military and peacetime operations…From a logistics standpoint, the LMP is on the cutting edge of everything the Army wants to become…LMP will forward the march in the revolution in business affairs and resultant revolution in military logistics."[176]

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[171] Paul Capelli, email response to questions, May 14, 2004

[172] Computer Sciences Corporation, "Logistics Modernization Program Transition." [Accessed on April 2004] Viewed at http://www.csc.com/industries/government/casestudies/1346.shtml.

[173] General Accounting Office, "DoD Competitive Sourcing: Plan Needed to Mitigate Risks in Army Logistics Modernization Program," October 1999, p. 17.

[174] Larry Asch, LMP Chief, LMP Business Office, US Army. Interviewed by William Lucyshyn, Robert Maly and Keith Snider. College Park, Maryland, January 29, 2004.

[175] NOTE: the retail portion is under the Global Combat Support System-Army

[176] Paul Capelli and John Keogh, "Wholesale Logistics Modernization Program," LMP, US Army, p. 5.

APPENDIX A

August 5, 1997 Memorandum

AMCDCG
SUBJECT: Army Materiel Command's Wholesale Logistics Management System

(7) Offers users the opportunity to evaluate proposed solutions and provide feedback (via short feedback loop) during implementation

(8) Provides innovative solutions characterized by unconventional thinking and aggressive implementation of acquisition reform initiatives to remove potential barriers to success within compressed schedule goals

(9) Aims to accomplish the objective at or below the current funding level used to operate and maintain the legacy system (Cost as an Independent Variable)

(10) Leverages commercial logistics management processes and associated automation products to provide an initial solution that meets the essential functionality required and matures to accomplish all functionality

(11) Provides for contractor operation of legacy system until total implementation of modernized system is accomplished

(12) Exploits advances in information technology to allow continuous upgrade, technology refreshment, and provides for interoperability with associated DoD systems.

2. Organization and Membership. True partnership between CECOM, AMC and its other subordinate activities is critical to this effort. CECOM will provide overall leadership for the SPT and will coordinate appropriate representation from other agencies as the program progresses. The SPT will include membership from the AMC Business Process Managers, the AMC CIO, Lead AMC Integration Support Office (LAISO), Industrial Operations Command (IOC), US Army Security Assistance Command (USASAC), and Logistics Support Activity (LOGSA). CECOM should also consider the extent of involvement required by other DoD agencies, such as Defense Information Systems Agency (DISA), Defense Logistics Agency (DLA), Defense Finance and Accounting Service (DFAS), and Combined Arms Support Command (CASCOM).

The Wholesale Logistics Modernization Initiative is a partnership between the Army Materiel Command, its various major subordinate commands (MSCs) and activities, other DoD organizations, and industry. No funds are specifically provided to manage and develop this program. This type of acquisition requires new thinking and a creative approach to managing requirements and allocating resources. As such, each organization will provide support to develop, and administer this initiative from within current resources.

3. Authority. The SPT members are empowered to identify needs, identify and analyze modernization alternatives, develop an executable acquisition strategy, and, upon approval, execute the Wholesale Logistics Modernization Program in accordance with the mission statement. Issues which impact more than one functional area of the program will require a consensus of core SPT members. If the group cannot reach consensus or resolution by the Special Project Team Leader, the issue will be raised to the AMC Deputy Commanding General for resolution.
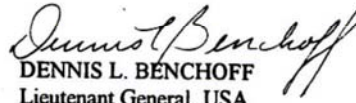
Since this acquisition will require a significant amount of innovation and "out of box" thinking, the team is given the authority, except for statutory requirements, to challenge all regulatory and process procedural constraints (local and departmental).

AMCDCG
SUBJECT: Army Materiel Command's Wholesale Logistics Management System

4. Not later than 30 September 1997, I want CECOM with the key players to brief me and AMC staff with greater detail addressing program scope, funding, strategy, timeline, and major concerns.

DENNIS L. BENCHOFF
Lieutenant General, USA
Deputy Commanding General

CF:
HEADQUARTERS AMC, ATTN: AMCDCG-L (Mr.Mills)
HEADQUARTERS AMC, ATTN: AMCDCG-T (Mr. Fisette)
HEADQUARTERS AMC, ATTN: AMCLG (Mr. Hunter)
US ARMY RESEARCH LABORATORY
US ARMY AVIATION AND TROOP COMMAND
US ARMY CHEMICAL AND BIOLOGICAL DEFENSE COMMAND
US ARMY INDUSTRIAL OPERATIONS COMMAND
US ARMY AVIATION AND MISSILE COMMAND
US ARMY SOLDIER SYSTEMS COMMAND
US ARMY SIMULATION, TRAINING AND INSTRUMENTATION COMMAND
US ARMY TANK-AUTOMOTIVE AND ARMAMENTS COMMAND
US ARMY TEST & EVALUATION COMMAND
US ARMY SECURITY ASSISTANCE COMMAND
US ARMY MATERIAL SYSTEMS ANALYSIS ACTIVITY
US ARMY INDUSTRIAL ENGINEERING ACTIVITY
US AMC INSTALLATIONS & SERVICES ACTIVITY
US AMC LOGISTIC SUPPORT ACTIVITY
US ARMY LOGISTICS SUPPORT ELEMENT
US ARMY LOGISTICS INTEGRATION ACTIVITY

REPLY TO
ATTENTION OF

S: 30 Sep 97

AMCDCG

5 August 1997

MEMORANDUM FOR Commander, US Army Communications-Electronics Command, Fort Monmouth, NJ 07703

SUBJECT: Army Materiel Command's Wholesale Logistics Management System

1. The need to upgrade our automation capabilities provides us with a unique opportunity to focus on the way we do business in the wholesale logistics arena. CECOM is tasked to lead a Special Project Team (SPT) to explore alternatives to modernize the wholesale logistics processes and associated information technology to support those processes. In exploring potential alternatives, I want the SPT focus on the following specific areas:

    a. Determine the feasibility of modernization alternatives and implementation strategies for AMC's wholesale logistics processes, practices, and information technologies

    b. Consider the implications and devise methods to soften the impact of the system's modernization on the current workforce

    c. Develop performance-based statement of requirements that articulates the needs without restricting innovative solutions

    d. Identify significant events in the timeline and conduct briefings as appropriate

    e. Recommend an acquisition approach that:

        (1) Identifies the best commercial business processes and associated commercially available products that support those processes to improve the logistics business processes and software tools concurrently.

        (2) Privatizes development and sustainment of the wholesale logistics automation systems

        (3) Facilitates reshape of the workforce to manage a privatized sustainment contract, and to achieve the optimum skill mix and a substantially lower government to contractor ratio

        (4) Takes care of the people: provide for a "soft landing" for the dedicated workforce within the affected logistics systems Central Design Activities (CDAs)

        (5) Implements partnering with industry to facilitate a strategic relationship with the contractor, with the potential to explore expanding the contract effort to integrate other business automation processes and databases based on successful performance

        (6) Involves industry early in the development of requirements, acquisition strategy, and solicitation

APPENDIX B

Terms and Abbreviations

AMC	Army Materiel Command
BPR	Business Process Reengineering
BRAC	Base Realignment and Closure
CCSS	Commodity Command Standard System
CECOM	Communications-Electronics Command
CDA	Central Design Activity
CIO	Chief Information Officer
COTS	Commercial off-the-shelf
CSC	Computer Sciences Corporation
COBOL	Common Business Oriented Language
DoD	Department of Defense
GAO	General Accounting Office
GCSS	Global Combat Support System
IT	Information Technology
LMP	Logistics Modernization Program (or WLMP, or LOGMOD)
LOGMOD	Logistics Modernization Program (or WLMP, or LMP)
MEO	Most Efficient Organization
NFFE	National Federation of Federal Employees
OMB	Office of Management and Budget
OSD	Office of the Secretary of Defense
SDS	Standard Depot System
WLMP	Wholesale Logistics Modernization Program (or LMP, or LOGMOD)

Web links to Presentations and Appendices

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Centralized Control of Defense Acquisition Programs

What's T&E's Role?

Panel II: Total Ownership Costs: The Future

Total Ownership Cost: An Exercise in Discipline

Impact of Software

Panel III: Performance Based Logistics: Contractor Performance Measurements

Characteristics of Good Metrics

Using Metrics

Panel VI: Government in the Market Place

Navy - Privatization Case Study

Army – Outsourcing Case Study

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