

**HEARING TO RECEIVE TESTIMONY ON THE  
ACQUISITION OF MAJOR WEAPONS SYS-  
TEMS BY THE DEPARTMENT OF DEFENSE  
AND ON S. 454, THE WEAPON SYSTEMS AC-  
QUISITION REFORM ACT OF 2009**

**TUESDAY, MARCH 3, 2009**

U.S. SENATE,  
COMMITTEE ON ARMED SERVICES,  
*Washington, DC.*

The committee met, pursuant to notice, at 9:36 a.m. in room SH-216, Hart Senate Office Building, Senator Carl Levin (chairman) presiding.

Committee members present: Senators Levin, Lieberman, Akaka, Bill Nelson, Webb, McCaskill, Udall, Hagan, Begich, Burris, McCain, Chambliss, Thune, Martinez, Burr, and Collins.

Committee staff members present: Richard D. DeBobes, Staff Director, and Leah C. Brewer, Nominations and Hearings Clerk.

Majority staff members present: Creighton Greene, professional staff member; Peter K. Levine, general counsel; John H. Quirk V, professional staff member; Arun A. Seraphin, professional staff member; and William K. Sutey, professional staff member.

Minority staff members present: Joseph W. Bowab, Republican staff director; Daniel A. Lerner, professional staff member; David M. Morriss, minority counsel; Lucian L. Niemeyer, professional staff member; and Christopher J. Paul, professional staff member.

Staff assistants present: Jessica L. Kingston, Brian F. Sebold, and Breon N. Wells.

Committee members' assistants present: Jay Maroney, assistant to Senator Kennedy; Bonni Berge, assistant to Senator Akaka; Christopher Caple, assistant to Senator Bill Nelson; Jon Davey, assistant to Senator Bayh; Gordon I. Peterson, assistant to Senator Webb; Stephen C. Hedger, assistant to Senator McCaskill; Jennifer Barrett, assistant to Senator Udall; Michael Harney, assistant to Senator Hagan; David Ramseur, assistant to Senator Begich; Brady King, assistant to Senator Burris; Sandra Luff, assistant to Senator Sessions; Clyde A. Taylor IV, assistant to Senator Chambliss; Jason Van Beek, assistant to Senator Thune; Erskine W. Wells III, assistant to Senator Wicker; and Kevin Kane, assistant to Senator Burr.

**OPENING STATEMENT OF SENATOR CARL LEVIN, CHAIRMAN**

Chairman LEVIN. Good morning, everybody. The committee meets today to consider the performance of the Department of De-

fense's acquisition programs at a time when cost growth on these programs has reached levels that we cannot afford, including consideration of our bill, S. 454, the Weapon Systems Acquisition Reform Act of 2009, which Senator McCain and I recently introduced.

Since the beginning of 2006, nearly half of the Department's largest acquisition programs have exceeded the so-called Nunn-McCurdy cost-growth standards established by Congress to identify seriously troubled programs.

As Secretary Gates pointed out in his testimony before our committee last month, the list of big-ticket items—big-ticket weapon systems that have experienced contract or program performance problems spans the services—the Air Force tanker, the CSAR-X, the VH-71, the Osprey, the Future Combat Systems, the Armed Reconnaissance Helicopter, the Littoral Combat Ship, Joint Strike Fighter, and so on.

Overall, the Department's 95 defense acquisition programs, known as MDAPs, have exceeded their research and develop budgets by an average of 40 percent, senior acquisition costs grow by an average of 26 percent, and experienced an average schedule delay of almost 2 years. Last summer, the GAO reported that cost overruns on the Department's MDAPs now total 295 billion over the original program estimates. And that's true even though we've cut unit quantities and reduced performance expectations on many programs, in an effort to hold costs down.

These cost overruns happen because of fundamental flaws that are endemic to our acquisition system. We have a pretty good idea of what those flaws are. DOD acquisition programs fail, because the Department, one, continues to rely on unreasonable cost and schedule estimates; two, establishes unrealistic performance expectations; three, insists on the use of immature technologies; and, four, adopts costly changes to program requirements, production quantities, and funding levels in the middle of ongoing programs.

Earlier this year, the Under Secretary of Defense for Acquisition, John Young, wrote a memo in which he sought to explain the cost growth on some of the Department's largest programs. And this is what his memorandum said, quote, "A number of programs had a poor foundation and milestone B, the starting point for major development and manufacturing design. Fundamentally, these programs moved past milestone B, with inadequate foundations built on artificially low cost estimates, optimistic schedules and assumptions, immature design or technology, fluid requirements. and other issues."

Mr. Young then went on to list the : Joint Strike Fighter, too little understanding of the design; Future Combat System, fluid program strategy; V-22, immature technology, Congress reversed the Department to termination; C-17, department issues, underfunding; family and medium tactical vehicles, design flaws; CH-47F, low estimates, invalid remanufacture assumptions; advanced EHF satellite, optimistic schedule; LPD-17, flawed lead-ship design process and knowledge base; F-22A, immature exquisite technology.

Now, the first two of those programs, JSF and FCS, account for almost 80 billion in cost overruns, with average unit costs that have already increased by roughly 40 percent each over original

program estimates, and are likely to rise further. According to GAO, both programs were initiated with insufficiently mature technologies and overly optimistic assumptions about system performance.

With regard to the JSF, the GAO reports that initial estimates assume that commonality between the three variants of the aircraft could cut development costs by about 40 percent; however, this level of commonality has proven impossible to achieve. Twelve years after the program started, three of the JSF's eight critical technologies are still not mature, its production processes are not mature, and its designs are still not fully proven and tested.

With regard to FCS, GAO reports that the estimated lines of code needed to support FCS's software and development are almost three times the original assumptions, leading to an increase in software development costs that now approach \$8 billion. Eight years after the program started, only three of the FCS's 44 critical technologies are fully mature. GAO tells us that the Army has not advanced the maturity of 11 critical technologies since 2003, and that two other technologies which are central to the Army's plans are now rated less mature than when the program began.

This is the price that we have paid for our failure to complete needed system engineering tasks, perform appropriate developmental testing, and build prototypes, particularly at this time, when the Federal budget is under immense strain. As a result of the economic crisis, we cannot continue that kind of waste and inefficiency.

That is why Senator McCain and I have introduced the Weapon Systems Acquisition Reform Act of 2009. This bill is designed to help put major defense acquisition programs on a sound footing from the outset by addressing program shortcomings in the early phases of the acquisition process.

In particular, our bill would address unreasonable performance requirements by requiring the Department to rebuild its systems engineering capability, re-establishing the position of director of developmental testing, and using the Joint Requirements Oversight Council, the JROC, to make early tradeoffs between cost schedule and performance requirements.

Our bill will address unreasonable cost and schedule estimates by establishing a new director of independent cost assessment to ensure that cost estimates for four major—for major defense acquisition programs are fair, reliable, and unbiased.

Our bill will reduce the use of immature technologies by requiring the Department of Defense to make greater use of prototypes, including competitive prototypes, and requiring the Department—excuse me—requiring the director of defense research and engineering to periodically review and provide independent assessments of the maturity of critical technologies on major weapon systems.

And our bill, finally, addresses costly changes in the middle of programs by ensuring, through preliminary design review, that requirements are well understood before a program receives milestone-B approval, by providing an incentive for contractors to improve performance on ongoing programs, by developing mechanisms to maintain competitive pressure through the program cycle,

and by tightening the so-called Nunn-McCurdy requirements for underperforming programs by providing for the termination of any program that cannot be justified after a complete re-examination and revalidation.

Today we will hear from two distinguished former Under Secretaries of Defense for Acquisition, Paul Kaminski and Jacques Gansler. We will also hear from Pete Adolph, a former DOD director of developmental testing, and Mike Sullivan, the Government Accountability Office director of acquisition and sourcing management. Each of our witnesses has great experience in the area of weapon systems acquisition; and, in the course of the last year, each has completed a major report recommending significant improvements and reforms. We all look forward to their testimony on these issues.

And I now call on Senator McCain.

#### **STATEMENT OF SENATOR JOHN MCCAIN**

Senator MCCAIN. Well, thank you, Mr. Chairman, for today's hearing, and, more importantly, your leadership on the bill that is the subject of today's hearing, the Weapons Acquisition Reform Act of 2009. And I join you in welcoming our expert witnesses today.

Let me set the overall context of today's discussion, and I'll do so very simply. A train wreck is coming. Look at the President's 10-year budget and you'll see a decrease—overall decrease in defense spending. Unless difficult decisions are made and serious reform measures are undertaken, our ability to provide for our National security will be, over time, fundamentally compromised.

Clearly, the endless cycle of runaway costs, prolonged delivery schedules, and poor performance in the acquisition of major weapons has—in my view, has us mired in a form of unilateral disarmament. And since scrutinizing the tanker lease scandal, years ago, I'm sure that things are—I'm not sure that things are any better. For example, how could the Department of Defense award a multibillion-dollar contract based on a proposal it later found was fundamentally un-executable? That's exactly what happened on the Navy's VH-71 program, the program to replace the President's own helicopters.

Just over the last few years, the program has doubled, an additional cost of \$6 billion for 28 aircraft, that will likely cost taxpayers, are well over \$400 million each. How could the Department of Defense laden a multibillion-dollar shipbuilding program with so many requirements that the program more than doubled in cost, with the DOD basically asleep at the switch? That happened on the Navy's Littoral Combat Ships Program. At times, the program saw change orders averaging 75 per week.

How could a multibillion-dollar program for next-generation fighter jets produce planes that are operating below satisfactory readiness rates and could end up being too expensive to operate? That happened on the Air Force's F-22 Raptor program.

How could the DOD spend billions for the Army's biggest transformational program, valued at almost \$200 billion, only for it to be, in many respects, closer to the beginning of development than it is to the end? That's the Future Combat System program. At this

point, it's not been clear when, or even if, the information network at the heart of the FCS concept can be built.

On our military satellite program, how could a design flaw recently emerge that will take at least 1 year, and up to \$1 billion to fix? That's the Air Force's space-based infrared system, high satellite program. More cost and schedule increases are likely there.

But, to understand the depth and breadth of our acquisition problems, one needs to go no further than to look at the status of particular programs. Across all the services, the top 75 programs have unfunded cost overruns of at least \$295 billion. For the year 2000, the number of major defense acquisition programs from the year 2000, the number has increased from 75 to 95, and the cost of those programs has doubled, from \$790 billion to \$1.6 trillion, leaving unfunded acquisition commitments equal to more than 10 years' worth of major weapons procurement funding.

In other words, in the current fiscal environment we find ourselves, the DOD acquisition plan is unaffordable. In my view, meaningful reform is only going to happen if the DOD itself decides to change, develop an overarching management philosophy, set up clear lines of authority and accountability, bring discipline and control over the requirement process, shut the revolving door, and restore the corps of qualified and experienced acquisition and contracting professionals. That's what this legislation helps to do.

In this bill, the Chairman and I built on previous reform initiatives by focusing on costs and risk. The bill reflects that a key to managing defense procurement programs effectively is starting them right by requiring key program review up front to catch costly design flaws and technology risk before we actually buy them.

Probably the most aggressive feature of the bill gives the DOD a big stick, bigger than anything available under current law, to wield against the very worst-performing programs. It does so by giving the DOD additional tools to enforce fair, reliable, and unbiased, independent cost estimates with the creation of a new director, and, unlike merely promulgated DOD instructions which apply only to new programs, that provision will capture chronically-poor performance—performers that are in the development pipeline now.

This program, I—Mr. Chairman, I don't want to go all over the features of the bill; I want to hear from our witnesses. But, for truly meaningful reform to endure, the commitment to reform must begin with the fiduciaries of the taxpayers dollars within the Department itself.

I thank you, Mr. Chairman. I welcome the witnesses.

[The prepared statement of Senator McCain follows:]

[COMMITTEE INSERT]

Chairman LEVIN. Senator McCain, we thank you.

And now we'll call on our witnesses. First, we'll call on the General—the Government Accountability Office, GAO, Michael Sullivan.

Would you please proceed?

**STATEMENT OF MICHAEL J. SULLIVAN, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GOVERNMENT ACCOUNTABILITY OFFICE**

Mr. Sullivan: Chairman Levin, Senator McCain, members of the committee, I'm pleased to be here today to discuss the Department's acquisition outcomes and the legislation proposed by this committee to improve them. I'll make a brief oral statement and ask that my written testimony be placed in the record.

Chairman LEVIN. It will be.

Mr. Sullivan: We've been reporting for years on poor cost and schedule outcomes on the Department's major weapon system acquisitions. As the Chairman noted, most recently we reported that 95 programs in the Department's current portfolio have grown in cost by \$295 billion and are, on average, delivered about 21 months late. We believe there are problems at the strategic and at the program levels that cause these outcomes.

At the strategic level, the Department's three systemic processes for building its investment strategy are fragmented and broken. The requirement-setting process, known as JSIDS, is stove-piped, it does not consider resources, and it approves nearly every proposal that it reviews. The funding process accepts programs with unrealistic cost estimates, and does not fully fund their development costs. These two processes are poorly integrated, and this poor communication leads to unhealthy competition, where too many programs are chasing too few dollars.

Finally, at the program level, the acquisition process initiates programs with unreliable cost estimates and without knowledge from proper systems engineering analysis to understand each weapon system's requirements and the resources that will be needed to achieve them. These programs move forward with too much technology, design, and manufacturing risk as a result.

The Department understands this and has recently revised its policies to address some of these problems. Its new acquisition policy, for instance, encourages more systems engineering activity earlier in programs, competitive prototyping to gain knowledge more quickly and to maintain competition, earlier milestone reviews, and steering boards to protect programs against the desire to add more requirements once they've started.

Recent decisions by the Department on some programs have been encouraging, and some of the newer programs appear to have undergone more disciplined reviews.

For many years, there's been a broad consensus that weapon system acquisition problems are serious and their resolution is overdue. With the Federal budget under increasing strain from the economic crisis facing our Nation, the time to change is now.

In testimony before this committee last month, the Secretary of Defense identified many of the systemic problems associated with acquisitions, and indicated that efforts are underway to address them.

We believe that the legislation this committee has proposed will help address the toughest problems, and we enthusiastically support it. We believe it precisely targets key problem areas, provides much-needed oversight, and provides increased authority and independence to the critical functions of cost estimating and develop-

ment testing by requiring them to report to the Secretary and to the Congress.

Among other things, its provision to require a full inventory of the Department's current systems engineering skills is an excellent beginning to rebuilding that sorely-needed capability. Its addition of a termination criterion for Nunn-McCurdy breaches sends a strong signal to programs to have realistic cost estimates when they start.

It is important to state that there is also a need for changes to the overall acquisition culture and the incentives it provides. The culture should begin to change by resisting the urge to achieve the revolutionary, but unachievable, capability in one step by allowing technologies to mature in the tech base rather than forcing them on the acquisition programs too early, by ensuring that urgent requirements are well defined and quickly achievable, and by instituting shorter, more predictable development cycles.

These changes will not be easy to make. Tough decisions must be made about the Department's overall portfolio of weapon programs and about specific programs; and stakeholders from the Department, the military services industry, and the Congress will have to play a constructive role in this decision-making. We see the proposed legislation discussed here today as a very healthy step in that direction.

Mr. Chairman, this concludes my statement. I'll wait to answer questions.

[The prepared statement of Mr. Sullivan follows:]

Chairman LEVIN. Thank you so much, Mr. Sullivan.

Dr. Gansler?

**STATEMENT OF HON. JACQUES S. GANSLER, CHAIRMAN, DEFENSE SCIENCE BOARD TASK FORCE ON INDUSTRIAL STRUCTURE FOR TRANSFORMATION**

Dr. Gansler: Mr. Chairman, members of the committee, thank you very much for this honor of appearing before you at what I think is a critical period and on such an important topic.

I don't have to tell this committee of the incredible national security challenges that the U.S. is facing in the 21st century, brought on by the rather dramatic world changes that I believe require a new, holistic view of security—DOD, State, DHS, DNI, and so forth—and utilizing both hard and soft power, and addressing a very broad spectrum of the security missions with great unpredictability and covering the full spectrum, from terrorism all the way through nuclear deterrence.

I would also emphasize that we need to take full advantage of globalization of the technology of industry, not restricting or gaming the benefits from globalization through restrictive legislation.

In recognizing the long-term national security implications of the global financial crisis, the need for energy security, the worldwide pandemics, the impact of climate change, the growing anti-globalization backlash, and the challenging U.S. demographics. And we have to do all of this, as Senator McCain emphasized, in a likely fiscally-constrained budget environment.

Now, to address these challenges, I believe four highly inter-related acquisition issues must be addressed, and they have to be

addressed by both the DOD and the Congress. First, what goods and services to buy; that's the requirements process. Second, how to buy them; that's the acquisition reform. Third, who does the acquiring; we have major issues in the acquisition workforce. And fourth, from whom it is acquired; namely, the industrial base.

Now, I wish I could tell you that there is some silver bullet to address all of these needed changes, but it truly requires a very broad set of initiatives in each of the four areas if the Nation is to achieve the required 21st-century national security posture.

In my prepared testimony, which, Mr. Chairman, I would appreciate being put into the record—

Chairman LEVIN. It will be.

Dr. Gansler:—I listed the required actions in each of these four areas, and I'd be pleased to discuss any of these with you at any time. However, for now let me summarize.

I believe this is a very critical period, perhaps somewhat similar to the period following the launch of Sputnik or the fall of the Berlin Wall. Today, the security world is changing dramatically, especially since 9/11—geopolitically, technologically, threats, missions, warfighting, commercially, et cetera—and this holistic perspective that I mentioned is required. Moreover, a decade of solid budget growth, which I believe will almost certainly change, has deferred the difficult choices—for example, between more 20th-century equipment versus 21st-century equipment—and the controlling acquisition policies, practices, laws, and so forth, as well as the services' budgets and requirements priorities have not been transformed sufficiently to match the needs of this new world. In fact, there's still an emphasis on resetting, versus modernization.

Now, leadership is required to achieve the needed changes. You look at the literature on culture change, which I think this clearly is, two things are required to successfully bring about the needed changes. First is the recognition of the need, a crisis. In this case, I believe it is a combination of the economic—the budget, if you will, crisis—and the changing security needs, along with the shortage of the senior acquisition experienced personnel to address these needs. And second, leadership, with a vision, a strategy, and an action plan. And I honestly believe that President Obama, the Congress, and Secretary Gates support the needed changes; however, it's pretty clear that the changes can be expected to be severely resisted. Significant change always is.

I would start, as my highest priority, with the important role of the service chiefs and secretaries in recognizing and promoting senior acquisition personnel, military and civilian. Over the last decade, the DOD acquisition workforce has been greatly undervalued. The DOD leadership now must demonstrate their personal recognition of the critical nature of senior experienced acquisition personnel and of the smart acquisition practices that they would bring to America's military posture in the 21st century.

As my second priority, I would emphasize the importance of weapons costs as a true military requirement, to achieve adequate numbers of weapons in a resource-constrained environment. This will require enhanced systems engineering, including cost-performance tradeoffs, throughout both the government and industry, and incentives to industry for achieving lower cost.

By the way, this has been done before; for example, with the JDAM missile, where the Air Force Chief of Staff said it should hit the target and cost under \$40,000 each. It now sells for under 20,000 and precisely hits the targets.

Finally, as my third priority, I would emphasize the value of rapid acquisition, from both its military and its economic benefits, which will require the full use of spiral development, with each block based on proven, tested technology and continuous user and logistician feedback for the subsequent block improvements, and with the option of continuous effective competition, as the prime or at the sub level. If they're not continuously achieving improved performance at lower costs, then they should be competed.

Achieving these required changes will take political courage and sustained, strong leadership by both the executive and legislative branches, working together. I hope, and firmly believe, that it can be achieved. The American public, and particularly our fighting men and women, deserve it, and the Nation's future security depends upon it.

Thank you.

[The prepared statement of Dr. Gansler follows:]

Chairman LEVIN. Dr. Gansler, thank you so much.

Dr. Kaminski?

**STATEMENT OF HON. PAUL G. KAMINSKI, CHAIR, COMMITTEE  
ON PRE-MILESTONE A SYSTEMS ENGINEERING, AIR FORCE  
STUDIES BOARD, NATIONAL RESEARCH COUNCIL**

Dr. Kaminski: Mr. Chairman, Senator Levin, and members of the committee, first of all I want to thank you for your leadership on these critical acquisition issues and for the invitation to testify.

Since you've asked me to testify, first, in my role as chairman of the National Research Council's study on pre-milestone-A system engineering, with your permission I would ask that my statement, which includes a full summary, be put in the record, and then I will proceed to provide a short verbal summary of the summary.

Chairman LEVIN. All the statements will be made part of the record. Thank you.

Dr. Kaminski: Thank you, sir.

Recent years have seen a serious erosion in our ability to field new weapon systems quickly in response to changing threats, as well as a large increase in the cost of these weapon systems. Our programs today for developing weapon systems take two to three times longer than they did 30 years. And time is money in this process, and time also leaves room for disruptions, uncertainty, and changes in commercial technology. In a 15- or 20-year period, we're seeing, today, three, four, or five times rollover in the commercial technology. And when a weapon system takes 15 to 20 years to develop, what you start with isn't going to be supported or fielded when it's done. So, we have to vigorously attack this time issue.

Our committee also noted the importance of system engineering in reducing this acquisition time, when combined with development planning, and further underscored the importance of early system engineering effort, in that, prior to the key milestone-A and -B decisions, we find that those decisions impact somewhere between 75

percent and 85 percent of the total life-cycle cost. So, the time to address those issues is up front, before those decisions are made.

Our committee also noted that many of the conclusions that we reached have been reached in several previous studies. So, the issue isn't disagreement on what the recommendations are, the issue is implementing those recommendations. So, once again, we thank you for your leadership in creating a forum for that kind of implementation.

Let me address, now, the issues that you asked me to address.

First of all, just one overall comment on system engineering. I agree with Secretary Gates, who, when asked about acquisition, said, "There is no one silver bullet that is going to correct all the problems." But, I do believe that good system engineering, coupled with effective development planning early on, are two of the most important contributors to improving successful acquisition.

Our report provided some formal definitions of "system engineering," but they tend to be arcane, so I thought I might start, maybe, with a couple of examples of, Where do we see good system engineering in the work we've done, and where have we seen poor system engineering?

One of the really good examples is the Apollo program. That program, from the start, from a dead start, put man on the moon in 8 years. And when that program was started, we didn't have mature technology. What we did was good up-front system engineering and development planning so we could proceed in a sequential way, step by step, building on the previous step, building the experience of our acquisition workforce and industry, so we could, step by step, increase our capabilities, eventually going to the moon.

Another really good example is the Air Force ICBM programs that were done in the 1970s and 1980s. What we saw there is that we would never start a full-scale development contract for a new ICBM until we had done the development planning, which pushed a guidance system for that ICBM, critical propulsion components, and a reentry vehicle design on the shelf. That not only reduced the risk of the hardware development in the future, but it gave domain experience to our key people in government and industry, so that when we threw the switch and started full-scale development, we could typically expect a first flight in 3 to 4 years, using that experience base. That's what we need to restore.

You asked about, What were systemic contributors to acquisition problems? I listed five.

The first of these is the lack of this early and continuing system engineering, coupled to a development planning program early on, right up front.

The second key impediment is what I believe is the lack of alignment of responsibility, authority, and accountability of the program manager to be able to exercise his or her judgment in this environment. Much of that has been taken away by one-size-fits-all approaches to acquisition and by the oversight process, which has some onerous elements that are nonvalue-added.

A third major impediment is the lack of stability in program funding. Many contribute to that.

A fourth is the lack of early attention to test and evaluation, with insufficient planning and investment in the tools, such as

modeling and simulation, test equipment, facilities, and personnel, to provide us with the timely and meaningful results needed by program management and system engineering to refine, in a continuous way, our performance objectives and development plans.

And finally, the root fundamental issue here is this excessive time, I was talking about, to fielding. Time is money. As this time increases from a few years, in the past, to 15 years, today, it undermines our entire process, causing the key participants to lose what I call the "recipe" for how we move forward. And also to lose a sense of accountability, when we see new capabilities that are developed and fielded in 5 years, the engineers, the managers, the testers, the cost analysts are all able to benefit and apply their experience from previous programs, and they can also be held accountable, since they're managing the programs during these times. That all changes when we move to 15-year acquisitions and we have five rollovers of management, engineers, and cost analysts, and five rollovers of the technology in the process.

So, attacking this process is fundamental. And, I would say, a testament to our failure today is the fact that we have to discard our current acquisition approaches to deal with the urgent needs and field systems, such as MRAP and JMRs to counter-IEDs by forming and using rapid-reaction organizations, because our existing ones don't work. They can't respond to the cycle time that we need.

So, what do we do about this? Again, I've listed, in my statement, five steps.

The first is to ensure that we not only restore, but enhance, this early and continuing system engineering work, coupled with development planning. This means restoring funding up front in the programs, and to ensure we have enough funding up front. It also means attracting best and brightest to this critical system engineering work, and providing a path to career advancement, career tracking, and leadership for the key people that we need to rebuild in the cadre.

Second issue, alignment of the responsibility and authority with the accountability of the program manager. And I've listed several steps, in my statement, about what's needed to be done to do that.

Third issue is improving funding stability. We pay a great deal for the stability we exercise in making funding adjustments to program. My typical experience shows that every time we make a cut in a program, for financial or other reasons unrelated to performance, we end up putting in three times what we cut to restore the program later and get it back to a base.

Fourth item is giving early and serious attention to the test and evaluations issues that I talked—so they can be part of a rapid process. When we wait for test and evaluation results because we haven't done a good job planning, what we have is hundreds of people sitting on their hands, waiting for results, and we're paying all those people while they wait for results.

And finally, the last item is fundamentally attacking this problem of long development times by the combination of the previous four items.

I believe action on these five issues will have a significant and demonstrable impact on our serious acquisition problems. And I be-

lieve that we need to move now with the same urgency and priority that we expect in combat operations to permit the timely and effective development of fielding of new capabilities and services with what I expect will be more limited future defense dollars.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Kaminski follows:]

Chairman LEVIN. Thank you so much, Dr. Kaminski.

And Mr. Adolph?

**STATEMENT OF CHARLES E. (PETE) ADOLPH, CHAIRMAN, DEFENSE SCIENCE BOARD TASK FORCE ON DEVELOPMENTAL TEST AND EVALUATION**

Mr. Adolph: Chairman Levin, Senator McCain, members of the committee, I'd like to thank you for inviting me today.

I chaired a recent Defense Science Board study of developmental test and evaluation, and during my opening remarks, I'll summarize the key points from the study. I ask that my written testimony, which addresses the major findings and recommendations in more detail, be put into the record.

Chairman LEVIN. It will be.

Mr. Adolph: The task force was originally convened in 2007 to investigate the causal factors for the high percentage of programs completing initial operational test and evaluation in recent years, which have been evaluated as not operationally effective and/or suitable.

The task force was asked to assess roles and responsibilities for test-and-evaluation oversight in the Office of the Secretary of Defense. We were also tasked to recommend changes to facilitate the discovery of suitability problems earlier, and thus, improve the likelihood of operational suitability during initial operational test and evaluation.

Very early in the study, it became obvious that the high suitability failure rates were the result of systemic changes that had been made to the acquisition process, and that changes in test and evaluation alone could not remedy poor program formulation and execution.

A number of major changes in the last 15 years have had a significant impact on the acquisition process. First, congressional direction from '96 through '99 reduced the acquisition workforce, which, of course, includes developmental test and evaluation. In many instances, services acquisition organizations went well beyond the mandated cuts, some making up to 60-percent reductions in organizations providing acquisition support.

Concurrent with acquisition reform, the general practice of reliability growth during development was de-emphasized and, in most cases, eliminated. This departure from the widely recognized best practice may not have been a direct result of acquisition reform, but may instead be related to the loss of key personnel and experience, as well as shortsighted attempts to save acquisition funds at the expense of increased sustainment and life-cycle costs. Numerous studies have conclusively demonstrated that investing in system reliability during development will yield a substantial reduction in support costs.

Our study reached the conclusion that the single most important step necessary to correct high suitability failure rates is to ensure that programs are formulated to execute a viable systems engineering strategy, including a robust reliability, availability, and maintainability program, as an integral part of design and development.

Moving on to government test organizations, in the last 15 years, with some exceptions, there's been a significant decrease in government involvement in test planning, conduct, and execution. And one of our task force members observed that, in many instances, the government has gone from oversight to insight to out-of-sight. Our task force recommends that government test organizations reconstitute and retain a cadre of experienced test and evaluation personnel to perform the test oversight function.

Regarding the Office of the Secretary of Defense roles and responsibilities for test oversight, the study team found that the developmental test office, which had existed for decades, was disestablished in the late 1990s. And currently there is no OSD organization with comprehensive developmental test oversight, responsibility, authority, or staff. And we recommend that the office be re-established as a direct report to the Deputy Under Secretary for Acquisition and Technology, as outlined in the proposed legislation.

And I'd like to make a few additional observations about the systemic issues that have contributed to the current problems.

First, during a time of increased programmatic and technical complexity, there has been a loss of a large number of the most experienced management and technical personnel, without an adequate replacement pipeline. Solutions to acquisition problems must begin with reconstituting a trained and experienced government acquisition workforce, which includes program managers, subject-matter experts, as well as systems engineers, contracts personnel, testers, and evaluators.

Second, more attention must be paid to technology readiness, to include prototyping and testing crucial technologies.

Finally, I believe that the major recommendations in the recent study chaired by Dr. Kaminski on pre-milestone A systems engineer would, if implemented and combined with a revitalized acquisition workforce, go a long way towards correcting many of the current acquisition problems.

Thank you.

[The prepared statement of Mr. Adolph follows:]

Chairman LEVIN. Thank you so much.

I think we'll try a 7-minute round. I'm not sure there will be time for a second round; I think we have a vote scheduled around 11:30, if I'm not mistaken.

Let me start with this question. Mr. Sullivan, you commented on the bill, which I've introduced with Senator McCain, the reform bill. It is a comprehensive bill, S. 454. And I don't know—I think Mr. Adolph commented on part of the bill, and each of you, in a way, have commented on it, but I'd like to ask you, specifically—I've outlined the provisions, this morning. I don't know if we sent you copies or not; I hope we did. Senator McCain commented on some of the provisions also this morning. If you're able to do so—let me start with you, Dr. Gansler—would you comment on the bill,

any parts you like, any parts you don't like, any additions you might be able to recommend at this time.

Dr. Gansler: Overall, Mr. Chairman, I thought it was in the right direction and important. I think that we have to recognize that simply writing a memo, passing a law, doesn't change the system. And each of them—each of the areas that you highlighted, I think are in the right direction. What we have to be careful of is not going too far in one direction. For example, in the conflict of interest, clearly we have to avoid conflict of interest, but we don't have to go so far that we have only people who have no experience in those positions. And that's the danger of going too far, in terms of the legislation of it.

And in each of the areas, I think that there's some clarity that could be added, but, in general, I think you've gone in the right direction. For example, you emphasize systems engineering. I think you need to define that as including costs, you know, so that there's no ambiguity as to whether that's a pure engineering problem or a cost issue, from a design perspective.

I think the importance of test and evaluation that you highlight is clearly something that's very important. It could be emphasized without really changing the title of the office. But, nonetheless, when I was Under Secretary, I felt it was a very critical piece. But, it's important, when you talk about test and evaluation, that it be viewed as a part of a develop process. We learn from that testing. We do it early, as Mr. Adolph indicated, but we also don't view it as a pass-fail final exam, because we're doing spiral development, and we're continuing to learn from the testing as it goes along, and some people have tended to think of the test process as a final exam.

In the area of independent cost analysis, absolutely essential. On the other hand, we have the CAIG office, which I used all the time, and felt it was critically important. The problem is, people don't want to use their numbers. You know, if they say it's, realistically, going to cost more, and they want to put in the bid in order to get a program into the overall budget, that's a management question, it's not a matter of what organization you set up. But, it's a very important function, as you highlighted.

In terms of getting the combatant commanders involved in the requirements process, that was exactly what we intended with the Packard Commission, Goldwater-Nichols intended with the establishment of the Vice Chairman of the Joint Chiefs. That was the purpose of that statement. Somehow that hasn't gotten the strength, it has been much more the suppliers than the users, if you will, the warfighters. I think it is important to get the combatant commanders much more into the loop on the requirements process, and I think you've gotten that properly emphasized.

I think, in the acquisition area I would emphasize that projected unit costs are a military requirement, because that's one of the things we've lost in some of the programs. Global Hawk started out that way, got off track. You mentioned the Joint Strike Fighter. That started off as a cost being one of the requirements for globalization of that program. It got out of—off track, because it lost sight of that unit cost as being one of its principal considerations in design.

As I mentioned, in terms of competition, I think it's really important that we view competition as an option throughout the programs, at the prime and at the lower tiers, but not as a law. You don't compete, for its own sake; you compete when the current contractors, prime or sub, aren't getting better performance at lower cost. That's their incentive for doing it. If you tell them we're going to compete it anyhow, they have no incentive. If you tell them they can get higher performance and lower cost, then, in fact, they will try to achieve that so that they don't have to compete in the next round, and it's doing exactly what the government wants them to do.

And in the same way, if they achieve the objectives, we ought to use, in effect, the same way that the commercial world does, the price elasticity. If you get a lower cost, we'll buy more of them. We don't take the money away and put it in the general treasury, you know, so the—there will be need to be incentives for industry, as well as government, for doing a better job of higher performance at lower cost, continuously.

And, in terms of conflict of interest, I think we need to focus on some structural ways to address conflict of interest. We do this, in terms of foreign ownership, through limited liability corporations, in effect, the special boards are set up and things. Maybe there's some ways we can do that in order to address conflict of interest without the sort of blanket requirement that someone in an engineering job shouldn't know anything about that job. That's wrong.

You know, so those are kind of the suggestions that I would have. But, overall I think you are definitely going in the right direction with the bill.

Chairman LEVIN. Thank you. We would welcome any specific language changes you would recommend.

Now, Mr. Sullivan, you already commented. Do you have any additional comments?

Mr. Sullivan: Yeah, just briefly. I would say that we—the package that we've looked at, we support everything in it. We thought it was very well targeted to, really, the key problems on acquisition programs, that the idea to give more authority to the combatant commanders, in terms of getting urgent needs met, was a good provision.

I think the most important thing on an acquisition program is, at the outset—we've all discussed it here—to have more knowledge about the requirements that you're going to build to, before you begin, than they have now.

So, the two provisions that we think are most important—first is the cost-estimating provision. We wrote that we don't see any reason why the CAIG actually couldn't fulfill that position. The important thing there is to probably provide the CAIG with more resources so they can do their jobs on a more regular basis and rather than just periodically, at every milestone. And the other critical thing there is that if the director of kind of up, out of the bureaucracy a little bit more, the estimates that the CAIG make might be looked at less personality-driven, if you will, depending upon who's in office.

Under Secretary of Defense, Dr. Gansler, used the CAIG, others may not use it as much. If they're reporting to a higher level, and

they owe the Congress a report, I think that'll really improve their authority and their visibility and their independence. But, the key—it's always going to go back to the requirement-setting process, and jelling that with the—with cost estimates. If you begin with not enough information about what it is you're going to—you want to build, you are not going to get a good cost estimate. So, it's—it really has to be based on knowledge.

So, the cost-estimating provision, I think, is very good. The systems-engineering provisions that you have in there go a long way to providing the knowledge that the cost estimators would need up front.

Chairman LEVIN. Thank you.

Dr. Kaminski, do you have any comment?

Dr. Kaminski: Yes, sir, I do. I have some specific comments in the statement, but let me make a couple of big-picture comments, if I may.

If there's—one direction I would try to move language in the proposed legislation is to focus, not only on process, on oversight mechanisms—those are key, those are useful, and then attention a system engineering give them are very useful—I think there needs to be a larger focus on people, people that make this system work. And I don't care how good a process you put in place, you don't have people who know what they're doing, who have some experience in this domain, I think you're going to end up with problems.

And when I say "people," I can give resonance in response from the Department, from the leadership, to agree that the system engineering skills to make tradeoffs are very key for our acquisition workforce. But, think about this for a minute. These skills are also key for those who are sitting and doing development of requirements. They've got to participate in this tradeoff process to consider cost of what we're asking for and how those tradeoff with the physical capabilities we need.

Testing is a critical piece of this process. If you think about it—I know my experience is, there isn't any program I've ever worked on I didn't know a heck of a lot more about the program 6 months or a year into it than I did when I started. And so, this is a continuing learning process as we find out things about testing—what's hard to do, what's easier to do. And we need to have a continuing dialogue in this requirements loop.

So, requirements developers and people have to have some training and experience in these system engineering tools and techniques. We would never let a fighter pilot get into an aircraft without a very extensive training program to prepare him or her for that operation. It's one of the reasons we do so well with our forces. When I compare what the requirements are for training and education of people going into acquisition, they pale in comparison. We have to be able to develop the training, education, and the domain experience that go with this, to make it work. So, it's one sort of major area of emphasis. There are things we can do to track careers and the like.

I also believe it is worth it for us to look very hard at, How can we systematically attack this long development time? That's just killing us. There are places where we can do time-certain acquisition. Time is money, here. And by doing good development plan-

ning to be able to reduce the risk, following the example of Apollo, following the example of our ICBM programs, I believe we can compress that time. But, we need some targets, need some incentives to do that.

We need the use of prototypes, in a sensible way. Competitive prototypes for some programs, perhaps single-thread programs for others. We also need to realize that no size—one size does not fit all, here. For example, in dealing with improvised explosive devices, we find that we need to have an acquisition system whose cycle time is measured in weeks. That's a different acquisition system than you need for a strategic bomber. And the acquisition system has to fit the cycle of the threat that we're dealing with, so we have to tailor, in that way.

And the last comment I would make is that, with respect to implementation, what better place could we find to start to implement some of these processes, procedures, and people development than in these urgent programs that are doing rapid acquisition. Why start there? One, it's urgent. Two, we'll be able to see the impact of changes that we make more quickly in somebody who's operating the cycle times of weeks or months, and see what's benefiting us and what is not. And I'd like to see that commitment to implementation, because it'll happen much more quickly than if we simply write new processes or new 5000 series in the DOD.

Chairman LEVIN. Thank you.

My time's way up, but, Mr. Adolph, do you have a brief comment on the bill? Any changes?

Mr. Adolph: Very brief comment. In general, I believe that the proposed legislation will go a long way toward alleviating the major acquisition problems which have occurred in recent years.

A quick comment regarding the legislation pertaining to the director of the developmental test function. I would add one responsibility, and that's that the director participate in the acquisition program reviews conducted by the Under Secretary for Acquisition, and submit a status of the developmental testing for the programs under review. That was the norm in the past, for many years, and I think that's important.

Chairman LEVIN. Thank you so much.

Senator McCain?

Senator McCAIN. Thank you, Mr. Chairman. Again, thanks, to the witnesses.

I think there's general agreement on the part of the witnesses that there's been a dramatic erosion in acquisition workforce and test and evaluation personnel. Maybe I could ask you, Dr. Kaminski—What happened?

Dr. Kaminski: I think a number of things happened. Just as there's no one silver bullet, there's no one blame. But, let me list some of the things that happened. I think, as we looked at major programs of acquisition reform, we tried to do more with less. We also had some pretty strong direction from some portions of the Congress on this. I can recall the chairman of a key committee who publicly made statements that said we had too many shoppers in the Department and we really needed to reduce this acquisition workforce. So, over a period of 3 or 4 years, nearly 50 percent of

the acquisition workforce was taken out. Now, the Department was a partner in that, agreeing to those reductions—

Senator MCCAIN. And we removed incentives for people to remain in the acquisition workforce, in the form of lack of promotion or career enhancement.

Dr. Kaminski: Exactly. I mean, find the right system engineering—if that right system engineer doesn't see some path for advancement in the Department, he or she is going to go find a place where they can make a difference and have an advancement, which—

Senator MCCAIN. Which means a revolving door evolves.

Dr. Kaminski: Yes, sir. But, that revolving door actually may be the commercial industry. You know, again, this comment I was making about the importance of cycle time in the acquisition system, if you have someone who's really worth their salt and able to make contributions, and they get into a DOD acquisition system which is going to produce something in 15 or 20 years, it won't take them long to realize that their knowledge base is going to erode so that they will no longer be valuable to commercial industry, who's producing things in 2- or 3-year timeframes.

So, to be able to have some revolving door from commercial industry back to Defense will benefit from getting these cycle times down.

Senator MCCAIN. Dr. Gansler?

Dr. Gansler: Yes, Senator McCain. In—on my prepared testimony, I actually showed a graph that came out of the commission that I ran. I was shocked at how much it has been allowed to deteriorate, in terms of the acquisition workforce. In fact, as we came out of the cold war, the procurement budgets dropped, the number of acquisition people came out of it. Then, as Dr. Kaminski said, there was a legislative mandate in '96 to take another 25 percent out. And so, we've ended up, now, as—dramatically—where we had about 500,000 people in 1990, we now have about 200,000 people. But, the dollars have gone up dramatically, so you have this huge gap between the dollars and the people.

But, much more important is the point that you just made about the officers and the senior people. In 1990, the Army had five general officers; in 1970—I mean, 2007, when we did the study, there were zero general officers with contracting background. In the contract management organization, the Defense Contract Management Agency, they had 25,000 people in 1990, they have 10,000 today. There's basically an undervaluing. And they used to have four general officers; they have zero. So, as you suggest, if you're a young major, you're not getting into that career field, and, as a result, it's been just totally undervalued. And without those experienced senior people, both civilian and military, they don't know what questions to ask, and they are not going to be able to make the right judgments.

Senator MCCAIN. Mr. Sullivan—so, obviously, we need to have some personnel policy changes, as well—Mr. Sullivan, the issue of Nunn-McCurdy—when it was first passed, we thought it was really important and effective. And for a while, it was. I think a breach of Nunn-McCurdy was a big deal. Now it seems to be a routine kind of event that it—the notification comes over, we see it, and,

you know, ho-hum. Are we in danger of experiencing the same thing with this measure?

Mr. Sullivan: We have noticed that they're taking a lot longer to—you know, they—they're now—the Nunn- McCurdy breaches we see take a lot longer to resolve and come out with a new program, and the funding is continuing on that program as they do that.

As I read the proposal that the committee has now, the—I guess the clause that I would look at most—I think it's really good to have a termination criteria like that. And I think GAO thinks that's a good thing. In other words, a program will terminate, not just have to do a review, probably look at what happens, what the triggers are for that. I think right now it states that the program cannot change the scope of work, cannot start new contracts, and there might be one other thing that the program can do. I don't know if legislation can basically say that that program can no longer obligate money. But, that would—to me, would be a much more direct way to get the point across. If a program is automatically terminated when it passes a threshold, and cannot obligate money, that might get people's attention.

Senator MCCAIN. And I can imagine the blowback when some—

Mr. Sullivan: Well—

Senator MCCAIN.—vital program is shut down because of our failure to act, but—there's got to be—I think we're in—agree. There's got to be a more robust oversight and ability to exercise that oversight as we see these costs spiral completely out of control.

Mr. Sullivan: Yes, sir.

Senator MCCAIN. Mr. Adolph, on the issue of Nunn- McCurdy, do you think it's sufficient measure to make—to impose more discipline on the cost overruns?

Mr. Adolph: [Inaudible.]

Chairman LEVIN. Put your mike on, if you would.

Mr. Adolph: I believe it's sufficient. But, the thing that concerns me—and I think, again, the remedy—the remedy has been discussed here, the remedies—and that's to get the technology readiness right, at the outset, and second, to get a realistic cost estimate. There's too much concurrency, there are things that are done in the program to kick the can down the road on Nunn- McCurdy, which, in the long run, in my opinion, adversely impact the program. F-35 example, getting rid of two of the test articles.

So, again, the key—I think it's fundamentally good. It's—the problems in recent years are a combination of issues which I think the proposed legislation, if it's really implemented in the services—and, again, back to Dr. Kaminski and Dr. Gansler's point—in order to implement it, we've got to reconstitute the acquisition workforce. And that's the key.

Senator MCCAIN. Well, also I think would be important for us to have the combatant commanders more involved in the requirements process, as well. I think sometimes we have neglected that aspect of the equation.

I thank you, Mr. Chairman. I thank the witnesses.

Chairman LEVIN. Thank you, Senator McCain.

Senator Akaka?

Senator AKAKA. Thank you very much, Mr. Chairman.

I want to add my welcome to the witnesses before us today, and to point out that I'm glad that, Mr. Chairman, you are holding this hearing on acquisition. And for me over the years, it has—for me, I'm beginning to feel that we need to change, or try to change, the heart and soul of DOD, and, really, the culture of DOD, and to get to acquisition.

Gentlemen, as you well know, the reform of DOD acquisition process is an extraordinarily complex undertaking involving many, many moving parts. However, I believe the first step to tackling any problem is to prioritize. So, let me ask this question to each of you. In order to most effectively reform the DOD acquisition process, what do we need to focus on first?

First, Dr. Gansler.

Dr. Gansler: I believe it's the people. I think if we've undervalued the importance of this area, in terms of promotion, in terms of experience, in terms of numbers, all across the board, both civilians and military, that we're not going to get there, even if we pass all the laws in the world. We need the people who are going to be driving this process. And that is my number-one priority. And we have neglected it in—and, of course, in the last 8 years we've been living in a rich man's world, so money doesn't matter, and if people over-run or they don't perform, you know, "Let's spend more money." Now, that's not going to be the case, and we need people who are smart, experienced, and competent to run their programs—with flexibility, though. They have to eliminate tradeoffs of cost and performance, systems engineering kinds of work, test and evaluation, so forth. That requires management judgment, and you can't just legislate that, and therefore, you need people with experience to be able to make those management judgments. That's my number-one priority.

Senator AKAKA. Dr. Gansler, would you also say that another part of that would be inadequate staffing?

Dr. Gansler: Yes.

Senator AKAKA. From what I gathered, there were positions that were not filled.

Dr. Gansler: Absolutely. I was shocked to find that, in Iraq and Afghanistan, only 35 percent of the people that were in their jobs were qualified for those jobs, even with the minimal qualifications that Dr. Kaminski mentioned. And, besides that, most of the positions weren't even filled, and they were almost all volunteer civilians, you know, that—in the war zone. We need to be able to get some senior military there, as well. So, there's a great lack of people, numbers; but you don't want just numbers, you also want qualified people. Numbers won't do it. It has to be qualified, experienced people. Some of those by the way, can come from industry. You can rotate people from industry, without conflict of interest, very easily. I mean, that's what many of the people with experience that—in the past, we've had. We do that in DARPA, we bring them in and out. And we've done it in other parts of the government. I think that—people are there with experience; we just have to make sure that we make it attractive to get them there.

Senator AKAKA. Mr. Gansler—or, Mr. Sullivan. I'm sorry.

Mr. Sullivan: I think, at a strategic level, one of the biggest problems the Department faces is that it is unable to prioritize what

weapon system capabilities should be put into programs. They have 95 weapon system acquisition programs, major acquisitions, that are underway right now. That's up from about 75 or so in 2000.

There is a tendency to have too many programs vying for the acquisition dollars that are available to the Department on an annual basis. And when that happens, you get a very—kind of an unhealthy competition, where you want it—it drives the requirements-setting process, which is stove-piped in many ways, by service.

So, the services are all vying for a solution, they want requirements that are very, very tough to make, so that their weapon system can do the most. They—as a result of that, they tend to put in optimistic cost estimates. The funders, of course, are looking at those very optimistic cost estimates, that are very heavy on assumption and very light on facts and data and actual costs. And the acquisition process begins with the lack of the systems engineering, that we've talked about here today.

So, you have too many programs chasing too few dollars, with business cases that are unexecutable. And the whole system—everyone more or less understands this, but the system is segregated in such a way—I think you have process owners and stakeholders in this system that, in a way, it works for everyone. And that's the culture. It's a performance-driven culture, and we all understand that and accept that, but it—there's also a lot of players involved in the culture that create this kind of unhealthy competition at the outset. That's—I think that's the culture change that has to take place in this Department, and that is almost intractable, when you think about it, the difficulty of changing that. I think legislation can go a long way to requiring people to do certain things, but, in the end—I agree with Dr. Gansler—it falls on the people to have the right principles, if you will, to kind of change what this system is really supposed to create.

Senator AKAKA. Dr. Kaminski, with your research-and- study—  
Dr. Kaminski: Yes.

Senator AKAKA.—background—

Dr. Kaminski: Let me not repeat, because I agree with everything that's been said. Let me put another dimension on the people. I, too, would answer: most important is people. But, what you have to do is recognize the dynamics that involve people. If we're going to attract our very best and brightest people to an activity, I've found that the principal incentive usually isn't money. With the salaries we pay military officers and civilians in DOD, we are still able to attract to key jobs very capable people.

And what attracts them? What usually attracts them is the ability to make a difference, to say—see that they can have a personal impact on a major program, on the security of this nation.

So, I want to come back again to my issue about time. When programs are taking 15 or 20 years, many of those best and brightest people say, "What's the difference? If I'm not going to see happening—something happen in 15 or 20 years, why don't I go someplace where I can make that happen? If I don't have any freedom to make decisions and influence things because of excessive oversight processes and pieces of the system," they'll go find another place to work.

I want to share with you a perspective that I got from a different position. Rather than a perspective of a previous Under Secretary of Defense, I want to share the perspective that I gained when I served on active duty in the Air Force. And I'd say I spent two-thirds of my career working on special access programs, part of that career, in the early days of the National Reconnaissance Office, where I was a program manager for one of our National Reconnaissance spacecraft that's up and flying today, and for several years in the stealth program. And I—let me just pick one example there, the F-117 program—was heavily involved in that program. When we initiated that program, our plan was, from beginning, a full-scale development to field the aircraft in 3 years. We missed that, sir. We missed it by a year. We fielded the aircraft in 4 years. Everybody who worked on that program could see that they were making a difference. They could see that capability coming along to field. There was good dialogue in that process, between the testers and the program managers and the users who were going to use that aircraft. We made continual adjustments. So, that timing and people go together, if you'd permit that excursion. To attract the right kind of people, we have to work on this time issue.

Senator AKAKA. Mr. Adolph, on your test and evaluation background?

Mr. Adolph: As I mentioned in my earlier remarks, people are certainly the highest priority, and that's been reiterated here by the previous comments.

Another area is certainly overly ambitious requirements. And we need to continue to push technology, without a doubt. But, at the same time, we need to ensure that the technology is sufficiently matured to incorporate in a weapon system. And that means prototyping and testing, and testing the prototype item in an environment in which it's going to be placed in a combat environment. So, again, number one, people. And second, getting the requirements right and making sure that they're not overly ambitious. And again, Dr. Kaminski's study really addresses those issues quite well.

Senator AKAKA. Thank you very much, Mr. Chairman.

Chairman LEVIN. Thank you, Senator Akaka.

Senator Collins?

Senator COLLINS. Thank you. Thank you, Mr. Chairman.

Mr. Chairman, I first want to salute you and Senator McCain for your initiative. I think you've brought forth a bill that would really make a difference. I also want to point out that I'm very pleased to hear the witnesses today all stress the importance of the acquisition workforce. This is an area that Senator Lieberman, Senator Akaka, and many of us, have said is the number-one problem, over and over again. When I brought this up at the White House Conference last week, however, some of my colleagues felt that it was a lesser problem. So, I was very pleased to see the panel of experts before us list this as perhaps the greatest problem that we're facing.

Dr. Gansler, you and I also worked together, many, many years ago, on how to increase competition in Federal contracting, and it's very good to see you here again, as well.

I want to ask the panel about some of the specific provisions in the Levin-McCain bill. In particular, this bill would require that costs be considered right up front, when the requirements are set. That is a pretty dramatic change from how military requirements are set now, when they're done in an environment that does not consider costs, but, rather, an idealized world, where costs would not be a factor.

Dr. Gansler, you endorsed including cost as a design military requirement right up front, so I'm going to skip over you for this question and go to the rest of the panel and ask all of you, Should costs be considered up front when military requirements are first established?

Mr. Sullivan?

Mr. Sullivan: I think that is a good idea. Dr. Gansler said that should be one of the key performance parameters on any major weapon systems, in their business case, and I think we would agree with that.

I think that it would probably—when you're trying to set requirements, and you're doing the requirements analysis that's needed, I think you begin, at first, in an unconstrained manner, and try to get from the user what the user would like, in an unconstrained environment. But then it's critical, at some point, to start bonding that with the realities of your—of the time it's going to take to get that to the user, and the amount of money, and the technologies you have available to do it. So, I don't think—I think you could do that without precluding the ability to think, unconstrained. But, the end—the exit criteria, I guess, if you would, would be something that is constrained, at least in a cost range. And then, once it exits the requirements process, there is a some before it would become a set business case and begin as an acquisition program, where that cost range could be further reduced to more of a point estimate by continuing to make trades.

Senator COLLINS. Dr. Kaminski?

Dr. Kaminski: Senator Collins, I, also, agree that cost should be an up-front factor. I'd add another factor to go with it, though.

Senator COLLINS. Yes.

Dr. Kaminski: Back to my comment about time. Time and money go together. And when we're doing requirements tradeoffs, if we're going to have an acquisition cycle time that operates within the threat cycle time, those developing requirements have to look at the time they want something fielded, as well. So, that needs to be an important consideration in this process, and we need to manage the time.

The one other comment I wanted to make with respect to cost estimates—we talked earlier about breaches in Nunn-McCurdy. And the surveillance system that finds the breaches, I think, is fine. But, one of the things we want to do is look at root causes. What's causing us to get into Nunn-McCurdy? One of the constructive uses for the independent cost estimate that was in the bill might be to add another consideration. We've talked about the importance of the up-front work in system engineering and development planning. One of the things that would be useful for us all to ensure is that there is adequate funding at the beginning of a program, between milestone A and B, for us to get a good handle

on what those cost estimates are, and do a thorough job involving stakeholders, the requirements part of the equation, and the program manager in that process, along with the CAIG.

I, like Dr. Gansler, used the CAIG very heavily. In fact, I advocated that we fund programs to the CAIG estimate, but we hold the program manager and the contractor to the estimates they developed, so we have some Reserve in the two pieces.

Senator COLLINS. Thank you.

Mr. Adolph?

Mr. Adolph: Senator Collins, certainly we need to consider the cost issue up front. And a very important driver early on is technology readiness. And program after program after program, we're into full-scale development and discover that some of the critical technologies simply aren't mature enough. And so, the program is delayed, and that drives this schedule, and these slippages occur.

So, the key—a key to getting the costs right is to ensure that the technology is really sufficiently mature.

Senator COLLINS. Thank you.

Dr. Gansler, an issue that we—that hasn't been discussed today is the impact on cost growth of a lack of stability and predictability in a program. That obviously can drive up the unit cost. When the military starts out with one plan for acquiring a weapon system, and then switches direction or reduces the number of units, doesn't that also drive up the cost?

The reason I bring this up is, we talk a lot about the errors made by contractors, we talk about weapon systems that get gold-plated because additional requirements are added, but there's also an important issue, as far as the predictability stability of funding and the lack of predictability driving up the unit cost. Could you address that issue?

Dr. Gansler: Yes. But, let me just briefly comment on your first question, though, because frequently the military don't think that cost is a military requirement. What they neglect is the fact that numbers are a military requirement. And if you're resource-constrained, the total dollars that you have divided by the unit cost gives you the numbers. And numbers really matter in military operations, whether it's by Lancaster's law of N-squared or by numbers. Either way, numbers really matter, and therefore, cost really matters. And that's why it's so important to have the unit cost as part of the requirements.

Now you get to your changes, and unless we estimate the cost of those changes and their impact on the ultimate cost of the equipment, we let things get out of hand. So, we need to—if cost is a requirement, then every time a change comes in—and, as Senator McCain said earlier, 75 a week on the Littoral Combat Ship—you know, you have to price those each out to make sure they're not having a big cost impact on the program.

Then, when programs, in general, become relatively stable, you don't get this ripple effect through the budget, which is the point that you're really making, Senator, is that if I want to pay for program A, I take it out of program B, not recognizing that program B now is in really bad shape because they don't have the stability of the funding. That stability of funding is a critical issue.

Senator COLLINS. Thank you.

Chairman LEVIN. Thank you, Senator Collins.  
 Senator Burris?

Senator BURRIS. Thank you, Mr. Chairman.

This is an interesting experience for me, to hear the distinguished testimony, Mr. Chairman. I would rather listen than to talk. I yield my time.

Chairman LEVIN. Thank you.

Senator Burr is next on this side; he's not there.

Senator Chambliss?

Senator CHAMBLISS. Thank you, Mr. Chairman.

And, gentlemen, it's good to see all of you. And thanks for your service over the years, and thanks for you being here on what I think is, if not the most important issue at the Pentagon today, certainly it ranks up pretty high. With these budget times that we're in, trying to figure out a way to buy the weapon systems that we need within the timeframe we need is virtually impossible. And that's why your testimony is so critical.

I want to go back to what Senator Collins was talking about there, and what all of you have alluded to in some part, and that's this issue of stability in—rather than stability, instability, whether it's requirements, whether it's personnel, whether it's funding, or whether, as you say, Mr. Adolph, the technology aspect of it—we're—we, too many times, tend to come up with a great idea, and by the time we get in a—into the production phase, we've wasted, not only time, but—certainly, we've wasted money, but oftentimes, there's a new idea that has been developed in the meantime.

I'm amazed, Dr. Kaminski, that you say, on the 117, that we were in production in 4 years. Gosh, if we had done that with the F-22, we wouldn't be having the arguments we're having today, and we'd have a great airplane, and we'd be worrying about other issues.

But, it doesn't make any difference whether you're talking about an aircraft carrier, whether you're talking about FCS or a tactical fighter, we come up with this idea, and we get into the R&D phase, and there is, all of a sudden, a great idea, but instability in all four of those areas that runs that cost up tremendously. And then, you throw in what Senator Collins alluded to, about the number of these units that we're going to buy, and all of a sudden it explodes again and it becomes such a negative at the Pentagon, rather than the positive that it started out to be.

My question for a comment from each of you is, How do we get back to this? How do we get back to the point to where we come up with this idea? If it's a tactical fighter, it's supposed to be air-to-air, or supposed to be air-to-ground, whatever it may be, how do we develop that and get it into production right away, without technology intervening and all of a sudden having to add this and add that? How do we get our arms around that issue?

Jacques, let's start with you and—give your comments.

Dr. Gansler: I think one of the main opportunities we have is to accept the concept of spiral development, that for the block-1 system, we have a fixed set of requirements, we have a fixed price that we're trying to get, a fixed schedule, as Dr. Kaminski said, and we go ahead with block 1 under the assumption that if we can then demonstrate technology, if we find that the user needs some-

thing different, if we find that even the logistician has a problem with maintenance of that equipment or the reliability for—as we deploy it, that becomes block 2, block 3, block 4. But, block 1 has to use proven technology and get out there quickly, and with a set of constraints. So, it's a stability program, as you point out.

The most successful acquisition that—in fact, Congressman Aspin used to always highlight—was the Navy's Polaris, Poseidon, Trident. When I was in industry, I always knew how much money I was going to get next year for that program. I could hire, I could plan my workforce, and so forth. That stability is very important for efficiency. And I think we—if we go to a spiral development model, whereby the block 1 is stable, and block is being developed while block 1 is being deployed, you have the concept of stability built in, and evolutionary systems are still stable. That's the way the real world, the commercial world, works. You constantly are upgrading the software, the hardware of computers, but you're constantly getting higher performance at lower cost. That's got to be the objective of each of the blocks as we're going along in spiral development.

Senator CHAMBLISS. Mike?

Mr. Sullivan: The legislation—Goldwater-Nichols legislation, from years ago, tried to bring jointness into the Department. And I think it succeeded on the operations side. We now have the combatant command's matrix, the military forces that fight wars jointly very well. The same thing did not occur on the acquisition side. I think, you know, if you look at what's going on now, there's a kind of a stovepipe system for how you get programs started, and that creates this kind of competition for big requirements and cost estimates that are heavy on assumption.

I would agree with everything that Dr. Gansler just said. If you can work on that and get a more joint requirement setting and funding system, and try to get the proper balance of weapon systems started, try to get rid of the stovepipes, you'd have an environment that could do what Dr. Gansler, I think, is describing, a little more easily.

If you look at that—another program I would throw out is, the F-16 program, back in the '70s, was a block program. It was, you know, the capabilities that the Air Force wanted for the F-16. They knew that they needed an aircraft faster than they could develop the technologies to get those capabilities, so they had blocks. And if you look at the F-16's, and, for that matter, the F-15's, performance over the last 30 years, it's pretty impressive. And they basically upgraded those aircraft pretty efficiently as they went, because they started without that big revolutionary leap, that one-step, big-bang kind of a thing.

So, we've done this before, and I think it's possible to get back to it, but this is where the culture comes in. I think you—there's some culture change that needs to take place.

Dr. Gansler has other things that I read in his report that would help this significantly. Open systems, for example, on these weapon systems, when, you know, the—really, if you can make interfaces on the weapon systems uniform, it really—you can keep proprietary data that subcontractors have that supply subsystems to

them, and all they have to do is have the proper interface. And you can open up competition—you know, things like that can occur.

And then, just one more point I would make is, the difference between technology development and product development probably needs to be better understood. Technology is the kind of thing you should think of when you think of scientists and lab coats and, you know, trial and error, and it's done in an environment where you can kind of—a smaller-dollar environment, where you can test, and use trial and error, and make mistakes. You have to keep that off of these acquisition programs, because—I think someone up here, I don't know if it was Dr. Kaminski or Mr. Adolph, said that when you have a technology that's not mature and it's on an acquisition program that's driving towards production, you have an entire workforce—an entire supply chain, for that matter—that's waiting for that technology to mature. And the burn rate is pretty big on that workforce that you have.

Dr. Kaminski: I'd emphasize that point. While everybody's waiting, we're paying. And so, what you want to do is decouple those two.

And in terms of approaches to do this, I agree completely with the spiral development approach. One problem I see is in the application of spiral. The few spirals I've seen where we actually implemented the work, we had everything but the kitchen sink in the first spiral, rather than stretching this out over a period of time, like we did in Apollo. So, this development planning—you have to have a plan for stability to do this. And the program manager has to have the discipline and the experience to reject things that aren't in the plan or that aren't mature enough to be harvested.

One of the features I found—one of the characteristics of a good program manager—he or she had a big right-hand lower drawer in their desk, and what went into that drawer were all the ideas for improvement until such time as we fielded the first system; then we opened the door and started to look to see what development plans did we need for upgrades for that system.

This time-certain development is important, because as time goes by, the technology gets old, new ideas are introduced that ends up being disruptive in the process. So, time is a key factor here.

And this stability issue is really key. If I look back through my whole career, there is only one program I ever worked on where we actually produced the system at the rate we planned. That was the F-117. We built one a month. Every other program I can think of, by the time we were all done, we couldn't afford the build rate that we planned.

Senator CHAMBLISS. Anything to add, Mr. Adolph?

Mr. Adolph: Well, just one thing, since I'm—I certainly agree with the other panel members that—since I'm—my background is tests, I'll add that issue. In the case of the F-15 and F-16, which was mentioned earlier, I worked on both programs, and I was out in the field, test business, working for the Air Force.

Chairman LEVIN. Please talk a little bit louder, if you would.

Mr. Adolph: Yes. In the case of the F-15 and -16, I was working for the Air Force in the field at the time, and the test program was structured—we had 19 test articles, in the case of the F-15, and sufficient articles in the case of the F-16. And in the latter case,

the propulsion system had been matured. So, you need—in order to move a program along, you need an adequate number of test articles, and you need to be able to do what testing you can—and avionics is a good example—in some kind of a platform, rather than the developmental platform.

So, that's, I think, one key component of keeping a program moving. And when a program stagnates, when you only have one or two test articles, and you have this standing army, that's been mentioned, waiting, and the fixed cost of those people is almost as great as the durable cost of doing additional testing, particularly when you recover the article. That's not the case in a missile program, where you lose the article on—with each test.

Chairman LEVIN. Thank you, Senator Chambliss.

Senator McCaskill?

Senator MCCASKILL. Thank you, Mr. Chairman.

Let me start with Mr. Sullivan, and it—there's been several references that sometimes we have excessive oversight with no value added. And, you know, that's a frustrating comment to me, in that I have watched DCAA basically get taken to task by their peers for failure to even follow basic auditing standards. And I've watched—I've read, I can't tell how many of your reports that have, in fact, identified weapons acquisition as high risk, since 1990. And it is not as though the oversight's not occurring, it's just that it's being ignored. It's not adding value, because nobody's paying any attention to it.

And let me ask you, in that regard, about JCIDS, PPBE, and fiscal yearDP. Now, first of all, I think we ought to pass a law that they quit talking in initials, because you all know what those things are I just said, but I guarantee you, nobody that I work for in Missouri has any idea what JCIDS is, PPBE is, or fiscal yearDP. And what they are is—one, is all the services getting together and basically giving each other what they want; two is a 2-year calendar-driven process, where they're supposed to be figuring how they're going to spend the money; and three, it is the Secretary of Defense trying to low-ball what it's going to cost, long term, in order to make sure that the other two go along with it. Is that an accurate summary of what those three are?

Mr. Sullivan: The—that—

[Laughter.]

Mr. Sullivan: I would say that the—number one, that the JSIDS is a requirement-setting process; it's where all of the services tend to get together and figure out what it is that they require.

Senator MCCASKILL. But, in your testimony, Mr. Sullivan, you pointed out, they never say no.

Mr. Sullivan: That's true.

Senator MCCASKILL. Have they ever said no—

Mr. Sullivan: They—

Senator MCCASKILL.—that you're aware—

Mr. Sullivan: Well, I—

Senator MCCASKILL.—of since you've been looking at this?

Mr. Sullivan: We did a—we did a—issued a report for this committee, I think, about a year ago, where we looked at that, and it was—I think the JSIDS process then, if I'm not mistaken—this

may not be exact, but I can get it for you—about 90 percent of the proposals that went in were granted.

Senator MCCASKILL. And explain to me, so I understand, what are the makeup of the three groups of people that make these three—I mean, these three are really the stovepipes that cause a lot of the problem, because you've got, "Here's what we want, here's how we pay for it, and here's how we figure out how much it's going to cost in the long run."

Mr. Sullivan: Yes, ma'am.

Senator MCCASKILL. And, you know, what I don't understand is, What is keeping them from making that one thing, so they all have to do all of that at once?

Mr. Sullivan: The requirement-setting process, the JSIDS, is run by the JROC, the Joint Requirements Council, and that's made up of the military services chiefs, more or less. It's run by the vice chief of staff. So, it, in a sense, is a matrix organization, but it receives most of the proposals for needs to be validated as weapon systems from the three services, as stovepipes.

Now, the JSIDS was established to have something called "functional capability boards," which were supposed to be a matrixed organization based on looking things like battlespace awareness or force protection or force projection, looking at it functionally instead of across the services. What we found when we did that study was that they—that the Department has not staffed those functional capability boards properly, it hasn't resourced them properly, so they don't really do a lot of joint decisionmaking to send proposals forward to the JROC. So, mostly what they are receiving is proposals for capabilities that are coming from the Air Force, the Navy, and the Army, and they compete with each other.

Senator MCCASKILL. And the sense is, at JSIDS, that if you say no on their—what they want, then they're going to say no to what you want. Isn't that part of the problem, in terms of the way this is actually—I mean, I would, maybe, say that this is a—supposed to be oversight with no value added.

Mr. Sullivan: There's—I would say that there's—the oversight is far from perfect. There's not a lot of value to it.

Senator MCCASKILL. And does the Joint Chief—does the—I mean, the idea of the Joint Chief is that they're supposed to be picking winners and losers. What is your sense of how effective the organization of the Joint Chiefs office has been, in terms of weapon acquisition and—

Mr. Sullivan: In terms of—

Senator MCCASKILL.—picking winners and losers?

Mr. Sullivan: In terms of that organization, the JROC, that does that picking the winners and losers, it makes—there are a lot of redundancies right now in the weapon system portfolio because they can't make proper decisions, it seems to us.

I'll give you an example. On—right now, there are some unmanned aerial systems that are in development that we believe, and I think the Department actually believes, should have been joint programs, but the services had unique-enough requirements and missions—and I'm talking about—right now, there is a—the Predator, which has been very valuable in Iraq and Afghanistan, is an Air Force program. Air Force is currently making a bigger,

more powerful Predator, called the Reaper. And another one of the services—I believe it's the Army—is—has started what they call the Sky Warrior, both done by the same contractor and both with very similar requirements, but the services have determined that they're different enough that they each have to have their own acquisition program. That's the sort of thing that the JROC is contending with on a—it's a very parochial kind of a—an attitude.

Senator MCCASKILL. And so, is this not fixable?

Mr. Sullivan: This is—you know, this is the cultural aspects of this, I think, that we've all been kind of addressing, where you can write legislation, you can have—

Senator MCCASKILL. It doesn't—

Mr. Sullivan:—policies—

Senator MCCASKILL.—do any good.

Mr. Sullivan:—but, unless you change the culture—and I guess that is the number-one question, is, How do you change that culture, that has been in existence for so long, to try to turn it a little bit, to do things a little more efficiently? It—you know, it's a—very much a culture issue.

Senator MCCASKILL. Well, and I also think is—I know my time is up, but I also think, Mr. Chairman, one of the things we have to do, in some instances, is take out a mirror, because I think there are times that, when the military has tried, either by the way they've done the budget or by actually being so bold as to say we need to wind down a program, that Congress decides, because of our parochial interests, that it's important that we go to bat to augment the budget to take care of the weapon system that we think is important in our part of the world. And so, we contribute to this problem, and I think we shouldn't complete this hearing without at least acknowledging that sometimes Congress has their hand in this stew.

Mr. Sullivan: Yes, ma'am. I would say, I—what I—I think I referred earlier to, sometimes we should think of this as a system that is in equilibrium, because there are very many stakeholders in this system that are getting specific things—even the GAO—you know, it's a pretty good employment program for us—we report on cost schedule and performance problems, and have been doing it—30 years this has been in place. So, culturally speaking—I mean, sometimes I think, if you examine it as a system that, maybe, is in equilibrium, you know, in a sense—it's not necessarily broken for the people that are involved in it.

Senator MCCASKILL. Thank you.

Thank you, Mr. Chairman.

Chairman LEVIN. Thank you very much.

Just one quick comment on that. We do, in this bill, attempt to make the JROC system cover some of the issues which Senator McCaskill talked about by requiring it to make these early trade-offs, by looking at cost and looking at schedule, by the way, as well as the requirements and the performance requirements.

Mr. Sullivan: Yes, sir. And—

Chairman LEVIN. There is an effort, in this bill, Senator McCaskill—I just want to give you assurance that at least this bill attempts to do what we can, legislatively, to put those elements into the JROC process, which would, hopefully, cut down the paro-

chialism by forcing consideration of cost and schedule, not just requirements. So, I'd just—

Mr. Sullivan: Yes, sir.

Chairman LEVIN.—get that on the record, get their response to it.

Thank you, Senator McCaskill.

Senator Martinez is next.

Senator MARTINEZ. Chairman, thank you very much.

Dr. Gansler, I wondered if I could ask of you to define for me a little more broadly what you mention as a "holistic approach" to defense needs.

Dr. Gansler: Yes. In fact, when I even looked at the situation in Iraq and Afghanistan, I was surprised to find that the State Department, AID, and DOD were all there, but not integrated, in terms of the buying and the contracting and planning purposes. But, at—much more at a higher level than that, it seems to me that the world of the 21st century is going to require us to combine hard and soft power in the kinds of operations that we get involved with—I mean, certainly the kind of thing we have in expeditionary operations or insurgent operations, and going around the world. So, we're going to need a very much closer tie between, in that case, State and Defense. But, I would go further and say, Homeland Security and Defense. I mean, it shocked me, in fact, that Saddam didn't try and pull some terrorist actions at the same time as we attacked him. I would expect that's going to happen in the future. So, it is an integrated, holistic perspective on what is the meaning of "national security" in the 21st century, that will involve Homeland Security, that will involve State, will involve the intelligence community, will involve the DOD?

And I think that's basically what Jim Jones is now trying to do, some of the restructuring that's taking place at the National security level within the President's office. And I think this combination of soft and hard power is going to be required, very clearly. That's what I was thinking of, in terms of the "holistic perspective." But, also the types of threats. I mean, it's—think about it—the energy case, the pathogen spreading worldwide, the economic crisis that we're in—these are all national security issues for the 21st century that we've got to start to incorporate into our thinking of national security. That's what I had in mind.

Senator MARTINEZ. Thank you. I think it is an intriguing future that we all are stepping into. And I think, by the way, Saddam would have if he could have.

But, the LCS program is one that I'm very much fond of, and one that I think is essential to the National security interests of our country. And I wonder if I could, across the board, whether you believe the Navy—how we got so far off track on that particular program. Was it too many requirements being put on the platform by the Navy? Was it the length it's taken to develop it? We now have two hulls being developed. So, to the extent that any of you could speak to the LCS program and what you see, going forward, it would be helpful to me.

Dr. Gansler: I just actually published, I think last week, a Defense Science Board report which looks specifically at the LCS and the presidential helicopter, a couple of programs of that sort, where

the initial concept was, get something relatively fast; so, take something, quote, "off-the-shelf" that could be use, and addresses Dr. Kaminski's point about rapid acquisition, and then maybe block 2 and 3 and 4 would add some of the additional things.

What happened on the LCS is, the first thing they said was, "Has to go through sea state 8." Well, that's like going through a hurricane, you know, and it wasn't designed, initially, for that. Then the next thing they said is, "Well, it has to have a new Navy sprinkler system." The sprinkler that was in the system in those two ships that you talked about, you know, it wasn't going to be adequate, for some reason or other. And so, each of these special requirements ended up basically changing the original block-1 system and introduced the instability and cost growth and schedule impact that we've talked about in all these other programs.

Yes, we badly needed the Littoral Combat Ship, but is it going to have to be a battleship? You know, does it have to do everything that a battleship does? And how it's going to be used by the Navy is—was kind of resisted, in terms of the nontraditional solutions. And so, this is the culture change that we've been talking about, as well. If you kept the cost and the schedule, and got a block-1 system out there much faster—I like the idea that he did it competitively. I think that was a very important step. So, I would encourage that to be done in these earlier demonstration systems.

Senator MARTINEZ. Dr. Kaminski?

Dr. Kaminski: Yes, sir. I think the concept initially was a good concept. What was missing was the up-front system engineering and development planning that I spoke about. I can remember back, the time I was serving in the acquisition executive's jobs in the Pentagon; I was a big proponent of commercial practice in buying commercial systems. But, somebody came to me and said we were going to buy a commercial ship for this mission. My first question to him, "What are we going to change in the mission to be able to move the mission around this commercial ship?" If the answer is "nothing," then I have to ask a second question, "Wait a minute, this commercial ship doesn't have the kind of military requirements you would have for fire-safe cables or a sprinkler system, or a whole variety of things. What are you going to do about those?" I don't think we started asking those questions about the LCS program until we were well into the program, so we missed this up-front set of tradeoffs. Those are tradeoffs that you have to make. They can be make—made sensibly if you approach them, understand them, look at the costs and the performance and the schedule to make those tradeoffs. I don't believe we make those tradeoffs up front. That, for me, does not necessarily damn the LCS program. There may still be value derived from looking at this tradeoffs and now making sensible decisions to go forward. And I agree with Dr. Gansler about the advantage of having a competitive environment you have to be able to do that in.

Senator MARTINEZ. Mr. Adolph?

Mr. Adolph: I'm not really familiar with the—

Senator MARTINEZ. Okay.

Mr. Adolph:—LSC. I've had no involvement with the program.

Senator MARTINEZ. And you, Mr. Sullivan? I don't know whether you've had any—

Mr. Sullivan: I don't have any specific experience with that, but we do have a team that looks at all of our Navy ships, and I'm sure we've had a report on that recently, which I could probably e-mail to you or something.

Senator MARTINEZ. That would be great.

Mr. Sullivan: Yeah.

Senator MARTINEZ. I'd appreciate that.

Mr. Sullivan: Okay.

Senator MARTINEZ. And I'm sure going to try to look up your article, as well, Dr. Gansler.

And you haven't written on DGD-1000 and the DGD-51 to date, have you?

Dr. Gansler: Not lately.

Senator MARTINEZ. Okay. Do any of you share an opinion on the needs of the Navy as it relates to these two programs? And relative—

Mr. Sullivan: I would just say that we also have a—we're going to come out with our annual assessment of programs, and I think both of those would be—the 1000 and LCS are going to be programs that are covered in that, so you will get our take on them, probably in the next couple of weeks. And I'll follow up, as well.

Senator MARTINEZ. Very good. Thank you.

My time's up, thank you very much.

Chairman LEVIN. Thank you, Senator Martinez.

Senator Begich?

Senator BEGICH. Thank you. Thank you very much, Mr. Chairman.

It has been very interesting, listening to all the testimony. I will try to ask my questions very quickly, and I may not ask every single one of you to answer, because I want to get some specifics here.

Before I talk about the personnel issue, I—I'm a former mayor; I've just become a Senator. So, I believe I'm a mayor who just happens to be a Senator, so I like some of the comments you've made on personnel issues that I'll talk about in a second.

The item that I was—I'm not familiar with is the Cost Analysis Improvement Group. Is that the CAIG? And how—you know, I looked through the bill as quickly as I could, but I didn't see in the bill—I see an annual report to Congress, kind of where we're at. Do you think it would be helpful for us—because I believe it's a combination of oversight; it's not just internal oversight, but this body needs to do more. And I think this attempts to do that. But, do you think there should be a report—and maybe there is and I'm just not familiar with it—that comes to this committee on a regular basis, maybe quarterly and/or semi—twice a year, that shows what the CAIG said it would cost before a system is started? Because I think—I thought I heard—Mr. Gansler, you made the comment that—I may get these words wrong, but it's almost like they ignore it. It comes out, it says, maybe, what it might really cost, but then they kind of push it down. I'm familiar with this, as a mayor. We call them HMS studies, which the contractor wants to build it, as well the person inside the system who wants to build it, always seems to have a different price. And when it's all done, it's pretty close to the one that the ANS group did. Is that something we should have in this legislation, so we can see what—be-

fore these systems start kicking off, here is what the real—or, another group said it could cost, so we at least have some understanding? I don't know who can answer that. I'll—

Dr. Gansler: Well, the idea of the independent cost analysis, right up front, when we're doing the early systems engineering, is to be able to see the impact of the various requirements, and to be able to trade requirements, schedule, and cost as part of that early design requirements setting. I mean, cost is actually an engineering challenge, just as—

Senator BEGICH. Right.

Dr. Gansler:—schedule and technical performance are. And so, if you, up front, try to say, "What's the cost impact of this?" and the independent cost analysis group will say, "Well, historically here's what it's been," and then people will come back and say, "But, this time it's going to be different."

Senator BEGICH. Everything's different—

Dr. Gansler: Yeah.

Senator BEGICH.—the next time.

Dr. Gansler: Right? And so, it's important to keep that in perspective, that the new technology comes along, and so forth. But, it's absolutely essential to get that independent estimate. Now, do you want to have the Congress legislate what the price should be? I don't think so.

Senator BEGICH. No, I'm not asking that. But, if we—I mean, here we are, complaining about all these cost overruns. And I agree with all your comments. You can write all the legislation you want, but you do not change the culture and remove people who are not doing the job they should be doing, and putting people in there who should be doing the job, you don't change anything, we'll be back here in a couple of years. So, I'm not saying, legislate the price, but we become more aware, so we are putting the pressure where it should be, that—let's be honest about the pricing, so when we do the budgeting authorization and appropriation, we don't go from 75 to 95, with two-thirds probably in the planning and design stage, and we always get the answer, "Well, we're this far, we've got to do a little bit more, a little bit more, a little bit more." So, I mean, that's not—that's what I'm asking, is, Should we have a more regular reporting period? Because once you're into—a year into a project, even though some are longer, they're already obligating more money. By the time this system here moves, you could be 2 years into having any commentary on it.

And so, I—that's my question. Should it be more regular reporting with those varied—

Dr. Gansler: I think the thing you're missing is the fact that, in the development of a program, weekly the program changes. There's always technical programs that come up, there's always schedule problems, there's personnel problems, and so forth. And you don't want the Congress to be micromanaging the programs. You do want to make sure that the process is a good process. And that's where I think the independent cost analysis is a very important thing and that your emphasis on it is the right thing to do. But, I don't think you want to get down to the point where you've got a weekly report from the Department—

Senator BEGICH. I didn't ask that.

Dr. Gansler:—of Defense on the—

Senator BEGICH. That's what—I'm trying to get to the point. Is annual enough?

Dr. Gansler: I think that, in terms of—if you've convinced the Defense Department that you care about this, and that you are going to be monitoring it—and that's what you're trying to do with the threshold numbers and the controls on that. I think that you're giving the message that the Department of Defense needs to care about cost.

Senator BEGICH. Okay. Let me make one comment—I forget who said it—about, you know, "stop the obligation of money at a certain point." I know, as a mayor, that's what you do. You turn the dollars off, and suddenly you get response and you get people paying more attention. So, I might be a little different than earlier comments that were made. I'm a little more direct on that. But, the personnel issue—to me, this is the challenge. If you don't change the culture, nothing changes. We'll be back here, and the numbers will grow, as they have over the years. And it's not about adding more people. And I think Congress made a huge error by reducing down the amount of people. That was a huge mistake. We basically took the people who manage our programs out of the equation.

So, besides putting more people into the system to make sure we have more folks out there, do you think—and I'm not sure I want to ask this question, because I'm not sure you'll want to answer it—but, do you think, within the system that currently exists today, we have to change the deck? And when I say "change the deck," change personnel, people. And not just add more people and move people around so we satisfy their issues, but I mean—this is a very hard, direct question. I've had to do this, as mayor. And you might have half a dozen or a dozen or 100 people; I don't really—they're in the wrong place. Anyone dare to want to answer that question?

Mr. Sullivan: I would just say, just real quickly, that a lot of this is organizational. I—you know, I think the people that work in the Department now are great people, and really, really capable people, and good public servants and everything else.

Senator BEGICH. Right.

Mr. Sullivan: But, when we talk about culture, I guess, it's more the way things are organized. You know, for example, I think, in our written statement, we have the Under Secretary of Defense for Acquisition, Technology, and Logistics—probably should have more ability to make the final decisions on things, acquisition, than they have now. One of the things that probably gets in the way of that is the fact that that position—you know, we did a little checking, and we found that there's—that the average life of an—

Voice: Turnover.

Mr. Sullivan:—turnover is 20 months, since it started, in 1986. I think that's kind of part of the problem, is, there's an accountability issue, people change over too much, there's not a lot of direct communication. You know, the three processes, I think, that this legislation does address, that you're trying to get the three big processes that we've talked about to communicate with each other more and to share in decisionmaking; right now, that's not there.

So, I don't know if—the people are good people. The structures and the way they're organized and the way they come and go is the—  
Senator BEGICH. Is the problem.

Mr. Sullivan:—big issue.

Dr. Gansler: If I might comment that you—if we implemented what Goldwater-Nichols says to do relative to promotion potential for the acquisition community, that you'd get a big step forward there. I mean, instead of putting someone into a four-star position who has no acquisition background, but happens to be called an acquisition job, that's where we lose out. And each of the promotion-potential reviews and so forth need to really show that we value the acquisition workforce, civilians and military, and that's a critical point, I think, in order to keep people coming in that—Dr. Kaminski said they're not doing it for the money, they're doing it so they can have an impact, and they need to have promotion potential.

Senator BEGICH. I know my time's out, but you're about to jump out of your seat, so I don't want to—I'm looking to the Chairman, so—

Chairman LEVIN. Yeah, take—can you do it real quickly?

Mr. Adolph: Very quickly. There are three issues: numbers, training, and people. And particularly in the Air Force, they need to plus that, because they drew down their acquisition workforce to a greater extent.

I think the training that Defense Acquisition University provides is on the mark, for the most part. They were a part of our study. They ground in what we found into their training. Experience, I think people need to be moved around a bit more, particularly in the civilian workforce, so that they get a variety of backgrounds and don't get 1 or 2 years' experience ten times.

Senator BEGICH. Thank you very much, Mr. Chairman.

Chairman LEVIN. Thank you, Senator Begich.

Senator Lieberman?

Senator LIEBERMAN. Thanks, Mr. Chairman. Thanks, to the panel. It's been a very—it's probably not been an exciting hearing in content, but it's actually, you know, very important, an educational hearing, and there's a lot on the line in it, so I thank the four of you for the accumulated experience and wisdom you've brought to the table. And I thank Senator Levin and Senator McCain for their legislation, S. 454, which certainly would take us forward in significant ways. So, I hope it passes.

Senator Collins, earlier, referred to the fiscal responsibility summit that President Obama convened last week at the White House. And then, a group of us on this committee happened to be in a breakout session on procurement reform. As Senator Collins indicated, most—though not all, but most of us focused on the acquisition workforce, and the size of it. I want to talk to you about that in the time I have, hopefully, and at least one other subject we talked about.

Dr. Gansler, you had a chart here in your testimony which relates—has two lines; one is procurement by DOD, in dollars, from 1990 to 2006, about as close as we can to today, and then the other is the acquisition workforce. Obviously, the procurement dollars go up dramatically as the acquisition workforce goes down. But, be-

neath that, there are some numbers that are quite stunning, I think, and—and I know, when I was here, Mr. Sullivan referred to them. The acquisition workforce, in 1990, was actually 500,000 people, and today it's dropped, but it's still 200,000 people, which is an enormous number of people in acquisition. Is that—then, I note, in your testimony, that you focus in on the Defense Contract Management Agency and say that it had 25,000 people in 1990, down to 10,000 today. And then the other, four general officers, and down to zero today. Is—give me some sense of the 200,000. Because at first—my first reaction to it is, "Wow, 200,000 people, isn't it enough to handle acquisitions by the Pentagon, even though acquisitions are so large?"

Dr. Gansler: A large share of those are in the military depots that you have insisted do 50 percent of the maintenance work. And a depot that has 20,000 people, that adds up pretty fast. To get to 200,000, you only need ten of those.

Senator LIEBERMAN. So, that wouldn't be what most of those—

Dr. Gansler: That's part of the acquisition—

Senator LIEBERMAN. Yeah.

Dr. Gansler:—workforce, because logistics is part of the acquisition.

Senator LIEBERMAN. Got it. So—but, in the conventional meaning, I think that's important, so I wanted to bring out—

Dr. Gansler: Very few people that are actually doing contract work or program management work or things like that. As Mr. Adolph pointed out, the T&E community is down significantly—

Senator LIEBERMAN. Right.

Dr. Gansler:—but, they're part of that community. So, it's the total encompassing, from the research labs that the government runs, all the way through the maintenance and logistics support.

Senator LIEBERMAN. Is there any way, now or maybe afterward, to submit for the record, you could give us a sense of who—what we would normally, in conversation, consider to be the acquisition workforce, how many people in the Pentagon are actually involved in acquisition, contracting, et cetera?

Dr. Gansler: It's a small percentage of the people—

Senator LIEBERMAN. Yeah.

Dr. Gansler:—in the Pentagon—

Senator LIEBERMAN. Yeah.

Dr. Gansler:—that are actually involved in that.

Senator LIEBERMAN. Well, I mean—

Dr. Gansler: In other words, you have the comptroller people, you have—

Senator LIEBERMAN. Yeah.

Dr. Gansler:—you know, the personnel people, you have the policy people—

Senator LIEBERMAN. Right.

Dr. Gansler:—and you have the acquisition workforce.

Senator LIEBERMAN. So, maybe—I'd ask you, now or later, I'm curious as to really what the size of the—what the real acquisition workforce is, leaving out the depots and the rest.

Mr. Sullivan: I don't have that answer right now. I know we're doing work on that—

Senator LIEBERMAN. Good. Get it—

Mr. Sullivan:—right that.

Senator LIEBERMAN. Get it for the record, please.

Mr. Sullivan: Yes, sir.

[The information referred to follows:]

[COMMITTEE INSERT]

Senator LIEBERMAN. The other—there were two other things that we—there seemed to be an interesting consensus on, and they're quite different, about, you might say, principles for acquisition; a little different than anything we've talked about today. And they're not unfamiliar. One was that they're—our disposition, our original position on acquisition should be to favor fixed-price contracts over cost-plus, and to favor competitive bidding, as opposed to negotiated contracts. And I want to ask, to the extent that we have time—well, let's just focus on the fixed-price. Normal—our sense, as we discussed at our breakout session, probably about 25 people, was, generally speaking, private sector favors competition. So, why are we favoring cost-plus? Does the taxpayer really benefit from that?

Maybe—Mr. Adolph, you always get asked last, because we're going left to right, so let's start from the right and ask you about that.

Mr. Adolph: Well, I think the other three panel members have more expertise in this issue. But, when you're—in the basic research area, I mean, it's very difficult to do on a fixed-price basis. And that needs to be done, to a point, on cost-plus.

Once you—and the system—once you get beyond that, then the next challenge in the development is, even with mature technologies, is system integration. And that's not an insignificant task, with the very complex systems we're developing today. But, once you get beyond that point—

Senator LIEBERMAN. Right.

Mr. Adolph:—then I think you reach a point where you can really consider going to fixed-price for downstream procurement.

Senator LIEBERMAN. Right. That's interesting.

Dr. Kaminski, I think it—just to clarify, I think—if I could really make it too simple—what if we had a law that said, "Defense contracts ought to be done on a fixed-price basis unless the Secretary certifies that there's a good reason not to"?

Dr. Kaminski: I think that would end up requiring a lot of certification, Senator Lieberman, for the following reason.

Senator LIEBERMAN. Right.

Dr. Kaminski: I believe fixed-price contracts are completely appropriate when we know what it is we're going to buy, when we know precisely what it is we're going to buy. If there's uncertainty in what we're going to buy, and we know we're going to change, and we don't know yet quite how we're going to change, I think we end up on the wrong end of the bargain negotiating a fixed-price contract and then having to go back and renegotiate that effort for every change that occurs, especially when contractor prices in some contingency in the fixed price.

So, there's a time, for example, in the program, where perhaps we were working through this in development, and then we settle in on what we want to buy, and we're ready to enter a well-defined

production program. That would be a fine time to do a fixed-price contract.

So, I think you have to pass that criteria, knowing what it is you want to buy, and have it be predictable.

Senator LIEBERMAN. Okay. My time is running out, but, Mr. Sullivan, Dr. Gansler, if you'd give me a quick answer to a big question—

Mr. Sullivan: I think it—

Senator LIEBERMAN.—and follow up with writing.

Mr. Sullivan: For major developments, I think it would be very difficult to go to a fixed-price contract for that, because of the unknowns that are involved. But, I would say that if you work on requirements and try to do some of the things that we've been talking about here today, in terms of staying in what is doable, and having shorter—you know, shorter cycle times to get these things done, you could have cost-plus development contracts that don't get so out of control. It really goes back to how much knowledge you have when you set out.

Senator LIEBERMAN. Okay.

Dr. Gansler?

Dr. Gansler: I think that it's a question of, What's the meaning of a "fixed-price contract"? And, as Senator McCain said, you get 75 changes every week. You know, the contract continues to change hourly, in effect. I think it's very clear, when you have a stabilized and lower-risk program, that a fixed-price makes a lot of sense, it does give an incentive for the contractors. On the other hand, the cost-plus, I would say, we haven't been using the incentives that available with the cost-plus-type contracts as well as we should, and I think they're—clearly, for research-and-development-type activities, cost-plus is an appropriate way to do it, but the "plus" part is an incentive rather than a fixed fee, I think. And I would use the incentive more—

Senator LIEBERMAN. Those are very helpful answers. You encourage me to think that we ought to take a look, not at fixed prices on across-the-board answer, but to apply it by some selective means, and that, in doing so, we might benefit the taxpayers.

Thanks very much.

Chairman LEVIN. Thank you, Senator Lieberman.

Senator Webb?

Senator WEBB. Thank you, Mr. Chairman. And I'd like to add my appreciation for you taking on this issue. It's—we're—as has been so clear today, and we're burning up a lot of money, and we're not getting a lot of product right now, and—particularly in the ship-building programs and aircraft programs.

And, Dr. Gansler, when you're talking about people and—which everyone seems to agree is the major issue, I was thinking about all the different years and different positions I've had on, you know, different sides of the table, here, working on this issue. And it's so clear that what we need is disciplined management, not only on the people side, but in the system itself. "People" include people in government, on this side of government, it includes people in business. We've got challenges, because there are not a lot of people in the military who use the business concepts, quite frankly, and they're asked to manage these programs. And there are not a lot

of businesspeople who are used to how product comes through a governmental system.

And you mentioned the—oh, I believe it was Mr. Sullivan who mentioned the creation of the Defense—Under Secretary of Defense for Acquisition in 1986. I was actually on Cap Weinberger's staff when that position was created. We had a very talented individual who came into the position. He was bewildered with all the different steps that were required to get a system through the process. It's something you just don't see in the normal business world. There are lots of checks and balances. Some of them are appropriate, and some of them are less than appropriate.

I found—Dr. Gansler, I found your analogy with the LCS brought back a lot of different memories. You know, they say that a camel is a horse created by a committee. I can go all the way back to the M-16, when they first developed the M-16, and they developed it, you know, directly toward a jungle environment, and then the different requirements were put on it to be able to be used in the desert and other different places. They put a different round in it that carboned up the chamber so people were dying in Vietnam because the weapon system requirements had changed as it evolved.

The Bradley fighting vehicle—I was in the Pentagon when we were trying to do the Bradley fighting vehicle, and there were different requirements put on it here in the Congress, so that it was very similar to what you were talking about, the LCS. They were saying it should perform different functions from the original design, and then there were all these press reports about the Bradley fighting vehicle falling over, when it was going through a water obstacle, because it got top heavy.

Or the FG-7s, the USS Stark-class ships, which were designed to build to cost. So, we have fixed cost that we were going to build a ship toward, and then you go inside one of these FG-7s, you could plink the bulkheads on a FG-7, they were so thin. And so, when an Exocet missile hit the USS Stark in the Persian Gulf when I was Secretary of the Navy, it went all the way through the ship, because they had had to make adjustments based on the cost rather than on some other areas.

So, it's a very complicated question. It really—I think the key, when I look back, is, if you can find the right leadership at the top on a program, negotiate and agree on general requirements—there's always going to be fixes—we'll get a program through. And I—probably the best example of that is when they put Al Gray, who later became Commandant of the Marine Corps, and he had the Development Center, they put him on the LOD, and he got that program through in about a year. He just pushed it through, made all the negotiations, was very firm with people over here in the Congress, as to what the requirements were for the Marine Corps, and it was a very successful program.

I have one question I would like to put in front of you, because I'm very concerned about it, and that is the state of all these programs in the United States Navy right now. You talk about the Polaris as having been probably the best analytical prototype of how to build a weapon system. And one of the things about our submarine programs, as you know, is that we built the frame, and then we added the technology onto the frame, similar to, say, the

C-130, for instance—rather than continually building a new frame and all the costs and the time that goes into that. And I've just been really struck, over the last couple of years, at how difficult the Navy procurements appear to be, and I'm trying to get my arms around why. And either—any of you who would like to begin answering that question, I would be happy to hear from you.

Dr. Kaminski: I'll make one comment. I think a key thing that impacts the programs are stability. So, if you see a program that we've had in production for some period of time, they have very good learning curves on those ships when we have a stable production program. Our issues sometimes are with first-ship cost. But, if you look at the cost of subsequent ships, what's happening there is very commercial—very competitive with commercial kind of production experience. Where we're producing ships regularly—I mean, one of the ship families in which we're doing that is the DDG-51. We have two yards. We have some competitive arrangements. Not quite head-to-head competitions, but there are some incentives in those programs. But, it is a well-planned, stable program that we've been producing. And I think that approach would benefit us. It's the areas where we've had instability where we've more problems.

Dr. Gansler: Yeah, I guess I would approach it by thinking about, "What is it the Navy really needs for the 21st century?" and what types of ships they're going to want. And there is a resistance to change that's—I mean, in—the Arsenal ship, for example, which was primarily to support the Marines and the Army onshore, was resisted significantly, in terms of it being a low-cost ship, few people—I mean, the highest costs in the Navy are for people and fuel in the—if you look at the life-cycle costs of a ship. And so, trying to drive down the number of people on the ship and improve the fuel utilization are things we need to stress. Those are not the traditional things that are emphasized in the Navy construction ships. And so, I think it's a different look that we need to think about. Littoral Combat Ships, same thing. Is that, you know, something the Navy really wanted or really resisted? And so, it's more the institutional inertia that has to be changed, I think, in terms of what the future Navy for the 21st century is going to need.

Senator WEBB. Do any of you see this as leadership failures in the Navy?

[No response.]

Senator WEBB. In terms of defining these objectives and—

Dr. Gansler: There have been some real successes. The F-18E/F on the Navy program was extremely well managed, but that was because they had some really top people doing it, they had a clear objective, it was an incremental version of an—a prior demonstrated program, and it was well done.

Dr. Gansler: So, they're not all—

Senator WEBB.—the shipbuilding programs would—

Dr. Gansler: Another big success is—

Senator WEBB.—that criterion or—

Dr. Gansler:—the patrol frigate was a success at a—it kept competition throughout its life, and it had the steepest learning curves of any ship in the Navy. So, there are some success stories, but I think lessons learned haven't been widely applied.

Senator WEBB. Thank you, Mr. Chairman. My time's up.

Chairman LEVIN. Thank you, Senator Webb.

Any other questions of this panel before we excuse them?

[No response.]

Chairman LEVIN. Thank you all for your time. Some of you came some distance to get here, at some inconvenience. At least one of you had to give up a family commitment, and we won't identify who that was, because the family were better off not knowing, maybe.

[Laughter.]

Chairman LEVIN. But, we're very grateful to all of you for your testimony. It's very, very helpful.

And we'll stand adjourned.

[Whereupon, at 11:52 a.m., the hearing was adjourned.]