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ACQUISITION OVERSIGHT OF THE U.S. NAVY'S LITTORAL COMBAT SYSTEM

HEARING

BEFORE THE

SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

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ACQUISITION OVERSIGHT OF THE U.S. NAVY'S LITTORAL COMBAT SYSTEM

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE,
Washington, DC, Thursday, February 8, 2007.

The subcommittee met, pursuant to call, at 3:10 p.m., in room 2212, Rayburn House Office Building, Hon. Gene Taylor (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. GENE TAYLOR, A REPRESENTATIVE FROM MISSISSIPPI, CHAIRMAN, SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

Mr. TAYLOR. The committee will come to order. On January 12 of this year the Secretary of the Navy issued a stop work order for the construction of the third vessel of the Navy's Littoral Combat Ships (LCS). At that time the Secretary's explanation to the committee cited escalating costs in the LCS program. He indicated he needed to verify that the correct oversight systems were in place and that the reason behind the price escalation for the first ship was completely understood in order to control cost of future ships. The Secretary acknowledged that the stop work order would further escalate costs associated with the LCS program, specifically in planning; however, he was convinced that he needed to fully comprehend the faults within the program execution before continuing.

As many of you are aware, the Navy currently uses large combatants to accomplish missions much more suitable to a fleet of smaller and faster ships. It is a waste of resources to have a modern Aegis class destroyer conducting board and search operations. In order to remedy this misallocation of assets the Navy advocated for a smaller, faster and cheaper ship with reconfigurable warfighting capability, the ability to operate in a Littoral Combat environment. In a world of asymmetrical threats, this new ship would be capable of both protecting the main naval force anti-submarine and anti-mine capability, taking the fight to the enemy with a wide array of installed weapons systems.

This committee is supportive of that vision, which is now known as the Littoral Combat Ship. One of the key selling points of the development, design and construction of the LCS was affordability. The Navy has routinely advised this committee that costs were being closely watched and that the original estimates for affordability would be realized. In fiscal year 2006 National Defense Authorization Act, this subcommittee, led by my friend Representative Roscoe Bartlett, directed the Secretary of the Navy to meet the cost target of $220 million for the fifth ship of this class. The committee

was told that the cost target was achievable. Now it appears this is not the case. I have been informed that Lockheed's first ship, the Freedom, is 50 percent above the baseline at about $270 million. We are looking at a ship that is going to cost the American taxpayers almost $400 million.

I wish I could say that the cost overruns on defense programs were an exception. Unfortunately, in recent years cost overruns seem to be the rule. The American Congress has an inherent responsibility to the American taxpayer. We are expected and entrusted to account for how our tax dollars are spent. I have never taken this responsibility lightly, and I am going to make sure that this committee does due diligence on behalf of our citizens.

If this Nation is to maintain undisputed dominance of the oceans of the world, we need to come to terms with out-of-control cost growth of major shipbuilding programs. Congress will not continue to throw money away at programs that exceed their cost projections. On behalf of the American taxpayers, this committee will demand accountability and transparency, not only in the case of LCS, but across the range of acquisition programs. The bottom line is this, the Navy needs to start budgeting with cost margins to deliver ships at a price they promise the American people. Industry needs to understand that a government contract does not equal a blank check from the people of the United States. If industry can't execute a contract at an agreed upon cost, then there will be repercussions.

To that end this committee will endeavor to determine the root causes of the staggering cost increases of the LCS program. Let me acknowledge that this committee is fully aware that the first ship of every class has learning curves in construction. The cost differential for first ships and follow-on ships is well documented. In the specific case of the LCS, the committee is aware that the changes of design requirements to the vessel were implemented a week before the contract was awarded. However, Lockheed Martin began construction of the Freedom nine months after the award of that contract. The committee is also aware of construction delays caused by the late delivery of a key piece of the propulsion machinery. While Lockheed Martin fined its subcontractor for the late delivery, the cost of the delay is being paid out of the pockets of the American taxpayer.

Today's hearing will focus on the LCS contract award method, the accelerated procurement plan, and the rationale behind using a system integrator as a prime contractor. At an absolute minimum, the committee expects that the two panels of witnesses today will address the following issues: What were the actual effects of the design change and late arrival of the reduction gears? Were these effects accurately understood by the contractor and by the Navy program office? Why or why not? How did the schedule of the program affect the decision making process of both the Navy and the contractor? Was there an unneeded rush to complete this that is now costing the taxpayer significantly more money? Have lessons learned been captured? And is there a mitigation plan to assure that these problems will not occur in follow-on ships? Does the current Navy oversight structure need to be modified? Does the Navy have the correct personnel in place as program managers and su-

pervisors of shipbuilding with skills necessary to identify potential problems with construction?

The first panel we will hear from today is comprised of representatives of the Department of the Navy. Testifying for the Navy we have Dr. Delores Etter, Assistant Secretary of the Navy for Research, Development, and Acquisition. Dr. Etter is the senior acquisition official for the United States Navy. Vice Admiral Paul Sullivan, the Commander of the Navy Sea Systems Command, who issues technical authority on building naval ships and supervises their construction. Rear Admiral Charles Hamilton, the Program Executive Officer for Ship Construction, who is charged with oversight for all surface ship construction programs. Rear Admiral Barry McCullough, Director of Surface Warfare Requirements for the Chief of Naval Operations.

Second panel includes the following representatives of prime contractors and major subcontractors. Mr. Fred Moosally, President of Marine Systems at Lockheed Martin, prime contractor and the system integrator for the LCS program. Mr. Richard McCreary, Vice President and General Manager of Marinette Marine Shipyard, the construction yard for the first LCS. Mr. Mike Ellis, Vice President and Chief Operating Officer for Bollinger Shipyards, slated to build LCS 3. Mr. Kevin Moak, Chairman, Gibbs & Cox, Inc., the naval architecture firm that designed the LCS built by the Lockheed Martin team.

I would now like to recognize our panel's ranking member, Roscoe Bartlett.

STATEMENT OF HON. ROSCOE G. BARTLETT, A REPRESENTATIVE FROM MARYLAND, RANKING MEMBER, SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

Mr. BARTLETT. Thank you, Mr. Chairman. Mr. Chairman, I would like to thank the witnesses for being with us today. Dr. Etter, on January 11 you announced publicly that the Navy was aware of significant cost growth on LCS 1 and that the Navy will be taking prompt action to investigate the matter further to determine the exact amount of cost growth as well as root causes. The following day Secretary Winter delivered a stop work order to Lockheed Martin, the lead systems integrator for LCS 3, which had not yet begun construction.

While I applaud your efforts and the efforts of your staff to keep Members of Congress apprised of the steps being taken by the Navy over the last four weeks, I have also expressed my concern to you regarding our apparent inability to learn from past lessons. Today will be the first opportunity for this subcommittee to receive testimony on the Navy and Lockheed Martin's preliminary findings regarding root causes of cost growth, the LCS acquisitions strategy which was widely heralded as a paradigm ship for shipbuilding which may have inadvertently created challenges for the Navy and industry team. The Navy and Lockheed Martin program management structures for LCS, how well did these structures perform their duties and what lessons have we learned to mitigate further cost growth on follow-on ships and other shipbuilding programs? The reporting mechanisms and the incentives in place to minimize

cost schedule and requirements growth, particularly within a cost-plus contract and using a lead system integrator.

I cannot overemphasize the importance of your testimony in this regard. This subcommittee has been committed to ensuring that the Navy and Marine Corps receive the necessary resources to maintain sufficient force structure to meet current and future operational requirements. However, if LCS costs cannot be controlled, we will meet neither the operational requirements of our Navy nor the needs of our industrial base. I consider this a serious threat to our national security.

In the near term, the President submitted his budget request this week. The request includes funding for an additional three LCS sea frames which would provide authority for hull 7, 8, and 9. It is critical for this subcommittee to understand what measures the Navy proposes to take and the point at which LCS design stabilizes in order to adequately evaluate the budget request and to make appropriate decisions.

I would ask all of our witnesses to maintain an open dialogue with this subcommittee even after this hearing to ensure a sensible outcome for the fiscal year 2008. Last, I would like to remind members that while the Navy has awarded contracts to both Lockheed Martin and General Dynamics for Flight Zero of LCS, both contractors remain in a competitive environment. As a result, some of the information relevant to this hearing, such as exact cost and man-hour estimates or engineering data that may provide a competitive advantage is considered business sensitive. We should all respect the proprietary nature of such information and the laws which govern the witnesses' testimony. Both the Navy and Lockheed Martin have done an extraordinary job of sharing such information as may be necessary for this subcommittee to perform its oversight function. As a result, much of that data has been provided to committee staff and is available to members upon request.

Again, I want to thank all of you for your distinguished service to our country and for participating in today's hearing. Thank you, Mr. Chairman.

Mr. TAYLOR. Thank you, Mr. Bartlett. I would like to ask at this time unanimous consent that our colleague from New Jersey be allowed to participate in the hearing. Without objection. Do any other members wish to make an opening statement? We have unfortunately been called to a 15-minute vote followed by five 5-minute votes. We have about seven minutes. What I would recommend is that we go ahead and break, go ahead and make those votes and give our witnesses—because I really—number one, we are on a day of such a distinguished group here, and I want this panel, those that are here, to give you our undivided attention, to not be interrupted by votes. So if you do not mind, we will break. Hopefully we will be back, I regret to say, in a half-hour or so. Then we just plan to proceed until we finish. Okay? All right.

[Recess.]

Mr. TAYLOR. I very much apologize for the delay. The House has adjourned for the day so we will not anticipate—we had tried to see if tomorrow was available but several of the members have conflicts. So if you don't mind, we are going to go through. I guess the good news is you probably won't be getting as many questions as

you would have. But with that, I want to thank you again, our distinguished guests.

I guess we will begin with you, Madam Secretary.

STATEMENT OF HON. DR. DELORES M. ETTER, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT AND ACQUISITION; VICE ADM. PAUL E. SULLIVAN, COMMANDER, NAVAL SEA SYSTEMS COMMAND, U.S. NAVY; REAR ADM. CHARLES S. HAMILTON, II, PROGRAM EXECUTIVE OFFICER FOR SHIPS, U.S. NAVY; REAR ADM. BARRY J. MCCULLOUGH, DIRECTOR OF SURFACE WARFARE, U.S. NAVY

STATEMENT OF HON. DR. DELORES M. ETTER

Secretary ETTER. Thank you. Chairman Taylor, Mr. Bartlett, members of the subcommittee, thank you for the opportunity to appear before you to discuss the cost and schedule challenges associated with the Navy's Littoral Combat Ship program, or LCS. On behalf of myself and the others who join me I would like to submit our written testimony for the record. As Assistant Secretary of the Navy for Research, Development and Acquisition, I serve as the Navy's acquisition executive. The authority, responsibility and accountability for all Navy and Marine Corps acquisition functions and programs rest with me. I assure you that we moved quickly to determine the root causes of this cost growth and we are taking corrective actions.

The Chief of Naval Operations (CNO) has reaffirmed the LCS requirement to defeat asymmetric anti-access threats generated by diesel submarines, mines and swarming boats. LCS is also a key element of the Navy's requirement of 313 naval vessels. It comprises 55 of the 313 ships in the long-range shipbuilding plan. Because LCS is so critical to our national security, I want to share with you some of the program challenges and the corresponding actions that we are taking to ensure that the LCS program is successful.

New ship designs historically face cost and schedule pressures. LCS also incorporated many additional new approaches. LCS has a rapid 24-month build cycle instead of 5 or more years. Naval Vessel Rules (NVR) were used for LCS for the first time as a building code for warships, and this is the first construction of combatants at mid-tier shipyards. The result was an aggressive focus on schedule which increased concurrency between design and production. Unexpected vendor issues and design changes due to NVR were also more difficult to accommodate. In addition, the Navy did not properly adjust its management to accommodate for all of these first and thus lacked sufficient oversight. Finally, there was not as much transparency as was needed into management and cost matters.

Lockheed Martin also experienced some challenges. They did not fully understand the impact of NVR on the design, resulting in more design and production concurrency. They faced increased cost of materials such as steel. Manufacturing failures on the main reduction gears on the lead ship created a total schedule impact of 27 weeks, and there was also not as much transparency as was needed into management and cost issues.

You requested a timeline for the identification of the cost overrun. Deteriorating cost performance on LCS 1 was observed in late summer 2006. However, cost performance did not improve as expected following the September 23, 2006 launch. In early November I was briefed on the negative cost trends. Following that meeting the Program Executive Office (PEO) and the contractor commenced in-depth cost reviews. Lockheed Martin briefed me and the PEO team on their cost review on December 18, confirming significant LCS 1 overruns. I alerted Navy and Office of the Secretary of Defense (OSD) leadership and directed a Navy team to conduct a detailed analysis of the overrun. On January 12, 2007, the Navy issued a 90-day stop work order for LCS 3. Work on the other Lockheed Martin ship and on the two G.D. ships have not been affected. This stop work order was issued because the contractors' estimates of cost to complete exceeded our budgets on LCS 1 and LCS 3. I initiated a number of reviews to determine the root causes for the cost overrun on LCS 1 and to determine the appropriate courses of action. I briefed the initial results of the independent program managers assist team, PMAT, including our detailed actions during the 90-day stop work period to your professional staff yesterday.

Rear Admiral Chuck Goddard is conducting a review of all four ships currently under contract. The Navy Inspector General is performing a review and Lockheed Martin also performed a review of the root causes and actions to correct declining contractor performance. Our initial assessment revealed the following root causes: An overconstrained program. We specified cost, schedule, and performance that together gave little room for design trades. A design and build schedule concurrency that was made worse by the parallel ship bid and development of NVR. The competitive environment resulted in contractor disincentive to raise concerns. Insufficient metrics and tools to seek trends early and inadequate oversight of design and construction by both the contractor and the Navy.

Our initial recommendations for actions include improving the timing and staffing levels of onsite government oversight, examining the ability of the program office staff to keep pace with acquisition, matching the most experienced people to the programs with the highest risk, and ensuring that earned value metrics are correctly reported by shipyard. These enhancements will help us identify and resolve program issues earlier before they become larger problems. We are also aggressively applying the lessons from LCS 1 across all our ship programs.

In closing, LCS will bring a critical capability to our Nation. The Navy continues to remain committed to cost control. Cost overruns on Navy shipbuilding programs cannot be tolerated, and the Navy intends to remain transparent as LCS decisions are implemented.

Thank you for this opportunity to appear before this subcommittee to discuss the Navy's commitment to LCS and to correcting the issues that have arisen. We look forward to responding to your questions.

[The joint prepared statement of Secretary Etter, Admiral Sullivan, Admiral Hamilton and Admiral McCullough can be found in the Appendix on page 47.]

Mr. TAYLOR. Madam Secretary, again I do want to apologize for keeping you and your distinguished group late. Do any of the admirals wish to speak?

Admiral SULLIVAN. No, sir.

Mr. TAYLOR. The impression I get from your testimony and from what I have read is that in order to build this ship, and I believe the term that CNO used was "with the speed of light." In order to build this ship and deploy this ship at the speed of light, it certainly appears that a lot of costly mistakes were made that did not result in building the ship any faster, but certainly resulted in the citizens paying well over $100 million more for the ship than they should have. The other thing that troubles me is, quite frankly, I am disturbed by the whole thought of training young people at our academies, having them spend a life at sea, having them get the knowledge of that life at sea, and traditionally it would be those senior level captains and admirals who would draw the specs to a ship, put it out to industry, say give us a price on it. I am really troubled with the whole design/build concept, not just this program but with two Coast Guard programs that are equally screwed up.

I would like to hear your thoughts on whether or not your department is rethinking the entire design/build concept because in my book, it is zero for three right now.

Secretary ETTER. Congressman Taylor, we are looking closely at all of the things that went on in the design of this program so that we can learn lessons from the mistakes that we made here. We are finding a number of things, as I outlined in my initial statement, and I do think that we are learning lessons that will apply to other ships. I do believe we have the right processes. We understand how to do this. But we have challenges when we try to address taking risk and getting things done quickly. It is a balancing thing that we have to do, and that is the challenge of making things happen quickly so that we can get ships to the warfighter.

Mr. TAYLOR. In trying to work with—and believe me I want this ship to be built. I want us to get to even better than a 313-ship Navy and this is certainly slowing things down, but I have to tell you there will be some skepticism within the halls of Congress and in the other body when there are other pressing defense needs. Two screwed up Coast Guard programs. This thing, quite frankly—I have said it, I will say it again—the spokesperson for this program at the moment ought to be Michael Brown. That is how disappointed I am in the program. It has got to get better and we will never get better unless we identify these problems, and I have word from someone in the Department of the Navy this is not going to happen again.

Traditionally some of the people who visited me say, well, we always have first-ship problems. When we are only going to build seven of a kind of the DDG 1000, we can't afford to throw away one of seven. We can't afford these kind of problems, and what I would like to hear from you and from the admirals is what sort of structural changes are going to take place so that this doesn't become a habit?

I happen to have been in south Mississippi in the wake of Hurricane Katrina. I saw an enormous amount of waste on cost-plus contracts. I never want to see another cost-plus contract come out of

this Department as long as I live because I think someone at a business school somewhere is telling defense contractors if you get a cost-plus contract and if you don't take advantage of the government you are a fool. We are not going to have that anymore. And I want to hear from you and I want to hear from these admirals this is never going to happen on their watch.

I am saying this in the form of a question, Ms. Etter. There are other pressing defense needs. There are airplanes that need to be bought. There are other pressing defense needs. There are a whole lot of vehicles that this committee is going to try to get built to make this more mine resistant. There are a lot of ways that we can pay the taxpayers' defense dollar on programs that work.

Secretary ETTER. At this point in our analysis we are finding this ship meets all the capability requirements that we wanted in it. So the problem is not with the ship. The capabilities are there. The challenges are that we tried to do it too fast. There are a number of things that we are learning from that we are applying as we look at other ship programs. Certainly we are all concerned about DDG 1000 being very successful. So the things we are seeing here we are fixing not only for LCS, but the other ships in terms of, as I mentioned, oversight.

One of the things we have learned is that we need to have more people, the Superintendent of Ships people that are on the ground at the shipyards. So we are working to make sure as just one example that we do that in a way that takes into account the more priority programs.

Mr. TAYLOR. Secretary Etter, is that going to be a structural change within the Navy to where this doesn't occur again or is this a one-time fix and then we turn around and find ourselves in the same boat in a couple years on the DDG 1000? Within the Navy what is going to change so that Naval Sea Systems Command (NAVSEA) ships don't do this again, so within the Navy the right people and the right number of people are assigned to catch problems early on before they lead to other problems, just as the reduction gear led to an enormous cost of escalation on this program?

Secretary ETTER. I would like to ask Admiral Sullivan to talk to the Naval Vessel Rules because that is one of the significant reasons for the cost growth on this ship, and this was something that was very important to do for the ship and something that is important for us to do for these follow-on ships. Admiral Sullivan?

Admiral SULLIVAN. Yes, ma'am. Let me talk about Naval Vessel Rules first and why we had to do them and why it was so concurrent. We had a set of—I will call them builders' codes, like you would do for builders' codes for the warships of the Navy, called GENSPECS, general specifications. Those are out of date because they hadn't been funded for a long time and the folks that we had in house in the Navy technical authority to write and keep those rules up to date had been cut severely. So budget cuts to both the rules development and the people that did them put us in a situation in 1998 that we had to cancel those rules. With the DDG 1000 and the LCS coming down the road quickly at us, we had to do something. So we started our partnership with American Bureau of Shipping (ABS) in 2003 to write a new set of rules to take the best of the old and some of the good commercial practice from ABS

and blend them together in a set of Naval Vessel Rules for the ship. A problem is that we did that throughout—concurrently throughout the time when the bidders were bidding on the ship and the ship that we bid and the ship that we costed out is not the same ship that we are buying today because of the parallel development of those rules, which are good rules, they are going to keep our sailors safe. It would have been much better had we had those rules complete, well understood before the ship was designed, costed and tried to be built.

Mr. TAYLOR. Admiral, the whole concept, and again my memory is so far from perfect, but I do remember someone appearing before this committee and proposing that they go to ABS rules like somehow that that was absolutely the only course to take. And what troubles me in retrospect is I am not a professional sailor, you are. And what troubles me is that why no one in your profession was raising the question that ABS is fine for a commercial vessel. It is not intended to go in harm's way. It is not going to be sent out in the worst weather. People aren't going to intensely try to sink it. And why the whole delay in deciding well, we are not going to go to ABS. We are going to go back to a naval vessel somewhere in between. But even with that decision being made, there was still seven months before the Navy said this is what we are going to and the contractor beginning their work. I would think that is a heck of a lot of time for those people to have implemented those plans without using incredibly expensive cost delays.

Admiral SULLIVAN. Well, let me say first about using ABS rules. The Naval Vessel Rules are our rules and I mean they are the Navy's rules. The ABS rules that are used for commercial ships would not in any way, shape or fashion be used to build a United States warship. I am talking about a combatant ship. The Naval Vessel Rules are designed for combatant ships. They include the best of the Navy technical authority in every single section of the rules. Again, the concurrency of the design work and the build spec gave—we in the Navy had, and I will say an impression that the ship design and construction teams. Because they worked with us on the Naval Vessel Rules and because we had several rounds of discussion of those rules and several rounds of publication of those rules, we felt that their design reflected the rules. It was only in that seven-month period that you are talking about that we discovered we were—the ship that was bid did not include many of the provisions of the Naval Vessel Rules because it was based on a commercial design and in getting the ship design from the commercial design to meet the rules that we need to keep our sailors safe, that is what took those seven months, and again, because of the highly pressurized schedule, the ship construction started before the design was complete.

Mr. TAYLOR. Admiral, I would think common sense would beg that someone in the senior leadership with the Navy would have said, this doesn't make sense. Let's don't start cutting steel, let's not start putting the ship together until we know what the final product will look like, where we want the stranglers to be, where we want the pipe hangers to be, where the wiring and the plumbing have to be, and what is particularly troubling is not only is the

ship delayed but the taxpayers are out over a $100 million. That is a heck of a lot of money.

Admiral SULLIVAN. Yes, sir. The need to go stand up and say this isn't going to make sense was not particularly visible to Navy leadership, partly because of the cause that Dr. Etter mentioned, which was it was a lack of transparency in the program and also there were not enough Navy supervisors, shipbuilding people on site early in the process. We ramped those people up and we will be ramping them up to about double today very shortly, but the time to catch all this was early in the program, and we did not have eyeballs on site enough to do that.

Mr. TAYLOR. Admiral, another thing that troubles me, and I would welcome your thoughts or any member of the panel's thoughts, and I will correct a mistake that I made. I made the mistake of saying that the taxpayers are going to pay twice for that reduction gear when it turns out that the contractor, even though it was a cost-plus contract, all he billed was once and apparently they paid a penalty for that. But the delay in that reduction gear did throw the building of the ship out of sequence, and it did cause the citizens to pay a heck of a lot more for that ship because of throwing it clear out of sequence.

This is water under the bridge. What I don't want to see is this become the norm in shipbuilding in our country, where a mistake of that magnitude has occurred and the only person who pays a penalty is the taxpayer. How are we going to address that? What would be your recommendations to address that so it does not happen again?

Admiral SULLIVAN. For that specific——

Mr. TAYLOR. Or anything similar to that. The propulsor does not show up, the generator, anything that has got to be there first does not show up and causes sequential problems in the construction.

Admiral SULLIVAN. The best remedy for all of those sorts of problems are to not concurrently design and build the ship. The schedule should not be constructed so that you are building the ship when you don't have the design complete, and I would also suggest that some of these major components that are arriving late should be the source of an advanced procurement.

Now I am off my territory here because that works on the acquisition side. Maybe Admiral Hamilton can comment. Should there be an advanced procurement for these ships to buy water jets, diesel engines, reduction gears, et cetera?

Mr. TAYLOR. All right. Seeing as how the DDG 1000 is coming down the pike, is that advanced procurement money there? And has the appropriate amount of advanced procurement been requested so this does not happen on the DDX 1000?

Admiral SULLIVAN. I will have to pass that one down to Admiral Hamilton.

STATEMENT OF REAR ADM. CHARLES S. HAMILTON, II

Admiral HAMILTON. Chairman Taylor, good afternoon. It is great to be with you again.

Mr. TAYLOR. Thank you for being here this evening. You are quite a gentleman for sticking around this long.

Admiral HAMILTON. On DDG 1000 the analogies to the LCS program are pretty sparse in my opinion. In DDG 1000——

Mr. TAYLOR. Admiral Hamilton, if you could get a little bit closer to the mic.

Admiral HAMILTON. The analogies between LCS and DDG 1000 are fairly sparse. In DDG 1000 we spent a three-year period developing engineering development models to do risk mitigation of the technologies we were working on. In DDG 1000 we have two and a half years of detailed design with teams that have been in place with a design tool that has been in use for five years with both teams. We have metrics in place that track those design artifacts and products on DDG 1000 and those have been reported on a quarterly basis to our leadership and the Navy and OSD. We have those ships and DDG 1000 built in our new construction shipyards at Bath Ironworks and North Montgomery Ship Systems, Pascagoula, where there is a large footprint of supervisor over ships personnel to maintain both earned value management tracking as well as ship performance during the production process. The program office for DDG 1000 in headquarters is staffed at a level of about five times that of the LCS program. The design concurrency that was deliberately built into the LCS program because Admiral Vern Clark requested we get this at the speed of heat is not resident in the DDG 1000 program. We invested significantly in budgetary terms for both design and production, to include advanced procurement money for those materials that would allow us to get those materials and your need date satisfied to a sequence that construction over those ships in a way that would give us production efficiencies. Those conditions did not exist on LCS based on our stated Navy need to get this ship in the water as fast as possible, to respond to the global war on terror threat. And so in that process, we elected to invoke Naval Vessel Rules as part of both a preliminary design process, the final systems design process, and the detailed design and construction process. We teamed with our industry partners to help write those rules in realtime. They participated in that rule set in the technical committee, they were advised of their requirement to deal with that in source selection. They testified in both writing and in orals and source selection that they understood those rules and were executing to those rules. Following publication of those rules in May of 2004, the companies had the opportunity to come back to us through the engineering change proposal (ECP) process to deal with the NVR changes that were required. That did occur. We did negotiate those ECPs with the two companies and proceeded along our production dilemmas with the reduction gear and steel frankly followed the mitigation of the ECPs for Naval Vessel Rules and Naval Vessel Rules is clouding this conversation.

Mr. TAYLOR. Now I will yield to my ranking member, Mr. Bartlett.

Mr. BARTLETT. Thank you very much. I had the privilege of spending many hours with three of our witnesses on Congressional Delegations (CODELs) and on each of those our chairman was with us when we visited the shipyards in Europe and Asia and in this country. I was impressed that the taxpayers were getting a really good value for the salaries that we paid you. I never traveled with

people that I thought were harder working or more knowledgeable, and I am surprised that we are here today because you are really very bright people and we shouldn't be here today talking about this, and so I have been asking myself, how in the heck did we get here? If design/build could work anywhere, it ought to have worked for this ship. This is not rocket science. This is a sea frame with, I presume, relatively defined interfaces with the modules. If design/build, Mr. Chairman, would ever work, Mr. Chairman, it ought to have worked here because this is probably the least complicated package that we—you know, it has got—it is just the sea frame. It has got only interfaces for the modules that are going to go on it. So we really need to take another look at the design. I am not ready yet to admit that the design/build will not work. It clearly didn't work here. I am not sure that the reason that we are here today is because of design, of design/build.

Dr. Etter briefed me on this program when we were on one of the CODELs and there were several of what looked like modest overruns, but every one of them were explainable. One of them was I understand that somehow we got caught up with $220 million and never put in the program office cost. So we should have been talking about $220 million plus whatever the program office costs were. The second was that there was some inflation that had gone about, and that is a usual thing. And always there is inflation, unfortunately. Because we spend too darn much money in Washington, and the input I got then was that considering these things, we were okay, we were on schedule, and the hull minus inflation and minus the program office was still at $220 million. That is what I was told on that CODEL. I have really thought about this and why we are here with such confident, knowledgeable people running this program. Who imposed the schedule? Because I look back on it, every one of the cost overruns except for whatever cost increase there would have been, a result of the Naval Vessel Rules, all the other costs were because we were trying to build to a schedule that was totally unrealistic.

When the reduction gears didn't get there, we started building other modules on the ship, and that greatly increased the cost, I understand, the final integration of those modules, and we were doing that simply because there was a schedule that we were trying to adhere to. Instead of taking a meaningful pause to look at what the Naval Vessel Rules would cost us in terms of schedule and time, we had a relatively modest increase in schedule and a relatively modest increase in cost, both which turned out to be very unrealistic.

Who imposed the schedule on us? Because Mr. Chairman, as I look back at this program, I think that we can attribute almost all of the costs except those attributable to Naval Vessel Rules, almost all of the costs to trying to adhere to a schedule which was just very unrealistic. Who imposed this schedule on us? I think that was probably above your pay grade, wasn't it?

Secretary ETTER. I would like to ask Admiral McCullough to address this in representing the requirements part of the program.

STATEMENT OF REAR ADM. BARRY J. MCCULLOUGH

Admiral MCCULLOUGH. Yes, ma'am. Chairman Taylor, Ranking Member Bartlett, it is a pleasure to be here with you this evening. To answer the senior member's question, the global war games hosted by the Naval War College in both 2000 and 2001 identified a critical warfighting gap in the Littoral with respect to quiet diesel submarines, submerged mines and small swarming boats with anti-ship cruise missiles, specifically directing us to build a capability to punch through and support joint forcible entry operations. As such, the then CNO Admiral Vernon Clark in his posture hearing for the 2004 budget in February of 2003 said, we will capitalize on DOD initiatives, spiral development and new acquisition methods to streamline the acquisition process and begin construction of the first LCS in 2005. The CNO believed this was a critical warfighting gap and we needed this capability to the fleet soonest and we were going to take advantage of revisions to the DOD 5000 manual that occurred in May of 2003. Additionally, then Assistant Secretary of the Navy for Research, Development and Acquisition John Young directed that this be a fast track acquisition program similar to what the U.S. Air Force does with Pathfinder, and he said we would take this ship from conceptualization to initial operational capability (IOC) in five years and directed that the IOC date be 2007. That is what drove the schedule. We had a critical warfighting gap and the Navy leadership believed we needed to fill it.

Mr. BARTLETT. Yeah, this whole thing reminds me a little bit of General Shinseki and his berets. He wanted them by a certain date and somehow nobody in his chain of command had the courage to tell him the only way we are going to get those is to have the Chinese build them, make them. And I was at the hearing when he first learned that and I suggested that maybe he should put an anonymous suggestion box out in front of his office because certainly someone in that chain of command knew he would be embarrassed when he learned that the berets that he wanted were being made in China. And there had to be somebody in your organization and in Lockheed Martin that realized that this was an unrealistic schedule, that if we tried to adhere to the schedule we were simply going to increase cost, and it just seems to me that is very unfortunate because I think the design/build can work. It clearly didn't work here but I am not willing to blame design/build because if ever it could work it should work on a ship like this probably, being a sea frame one of the most simplest predictable things we have built in a long time, isn't it?

Secretary ETTER. Yes. Admiral Sullivan.

Mr. BARTLETT. That was supposed to be the genius of this, that it is a sea frame. And we define interfaces that interface with the modules.

Admiral Sullivan. Yes, sir. That was our impression at the very start of this project where we were adopting commercial high speed ferry designs, and that was the intent when we marched off on this project. However, when you take a design that is for limited service, close to shore, that doesn't have to fight wars, and translate that basic design into a ship that has to go forward, fight wars, get out of harm's way, get hit, have a combat system, have guns, have

missiles, have Navy computers on it, and also perform in high sea states where the parent craft, the ferry, would come in and just not—was just not—we don't have that choice. A myriad of changes in hull structure, auxiliary systems and electronics take place and we were all caught, I would say, by the increasing complexity.

Mr. BARTLETT. Would you agree though if we hadn't been constrained by a schedule that we probably could have ultimately built it a lot cheaper with fewer false starts? My understanding is that a lot of modules that were built before we had final design trying to adhere to the schedule, we had a lot of rework on those.

Admiral SULLIVAN. That is right.

Mr. BARTLETT. Because we wanted to reach—to meet a launch date, we didn't keep the modules in the yard upside down as long as we could, we didn't keep them in the yard as long as we could, we put them in the ship, hoping that we could catch up in the most inefficient mode for building, which is once it is in the water, as I understand, and so we kind of abbreviated what we could have done upside down. What we could have done when it was modules in the yard and because we wanted to meet a launch date, we rushed these things to weld them together for launching, we would fix it once it was in the water. Am I wrong that that is what happened?

Secretary ETTER. There were aspects of that that were true about this problem, but what we are trying to do at this point is understand what really occurred in the difference in price. We have roughly $100 million that is different in the price that we anticipated. So we are trying to understand, what part of that really was caused by doing the concurrent design and build? Because if it is attributable to that, then we won't see that expense as we go on to the next ships. So that was the reason for the stop work, so we could look at things precisely as you are describing and understand whether it was attributed to, for example, the Naval Vessel Rules being invoked in parallel with this or whether it was due to the reduction gear or whether it was due to materials or whatever. So that is the reason for the stop work, to understand that difference in price.

Mr. BARTLETT. But doesn't this all get back to schedule? I would think that you wouldn't build a module where you didn't have the specifications, and apparently we went ahead and built a lot that we had to redo, is that correct?

Secretary ETTER. That is correct. Admiral Hamilton——

Mr. BARTLETT. And that is because we were trying to adhere to a schedule? And nobody waved a red flag and said, hey, you know, you might adhere to that schedule but it is really going to cost a lot more money.

Admiral HAMILTON. Congressman Bartlett, we did several things on the time frame based on the urgency of the need. As we provided the drawings for ABS for certification, we triaged and prioritized the drawings to help follow the erection sequence of the modules for the ship, and so the modules that were first under construction were sequenced first and the majority of the drawing packages to support that were completed in a timely way to execute that construction sequence.

Mr. BARTLETT. How come there is so much rework then?

Admiral HAMILTON. A specific piece of the rework was vendor furnished information provided to the client by their subcontractors which inaccurately reflected foundation points, connections, fittings and some of that was impacted by design and some of that was impacted by bad material ordering and procurement.

Mr. BARTLETT. We were told there was $26 million increased cost because of the reduction gear, of course reduction gear cost us no more. We understand now that was a fixed price item from General Electric and they ate the extra expense of cutting the gear wrong the first time. Isn't it true that there would have been no increased cost from that except for trying to adhere to a schedule and build modules out of sequence?

Admiral HAMILTON. It is true we elected to build modules out of sequence, again to meet the schedule and the urgency of the need. At the disclosure of the reduction gear problem we were not presented with—here is a 27-week delay in one discrete bite which would have allowed decision making to perhaps proceed in a different way. We were given in fact six different disclosures over a seven-month period, the aggregation of those disclosures got us the 27-week schedule delay. When we started, we thought we had about a two and a half-month schedule and thought that we could resequence around that initially without fundamental disruption to the ship construction.

Mr. BARTLETT. If we could roll back the hands of ship and be as smart then as we are now, what would you do differently?

Admiral HAMILTON. From my perspective, I would have done several things. I would have said to my design community, both in the Navy and in Lockheed, the design products are not maturing on a timeline that we really need to do, let us slow down and get that right. Separately, I would have relooked at the decision making we executed on the reduction gear resequencing to see if we had enough of the requisite information in hand to make the correct decisions about that sequencing, but I will tell you in both cases that both the industry team and the government were motivated by the belief that this need was now and we needed to satisfy it it as quickly as we could, and we tried very hard within the constraints of the program to satisfy that need.

Mr. BARTLETT. So a lot of these overruns were schedule driven, that is what you are saying?

Admiral HAMILTON. Yes, sir.

Mr. BARTLETT. Which was my assessment when I looked at it. Organizations looking over your shoulder like Congressional Research Service (CRS), did they do some assessments of this during this process? And if so, what did they tell you or tell us? Because they report to us, not you.

Admiral HAMILTON. CRS has examined our cost estimating procedures and are designed in a macro sense as part of their analysis. To the best of my knowledge, CRS has not specifically looked at either the design/build NVR concurrency question or the reduction gear question to date.

Mr. BARTLETT. Admiral Sullivan says that there weren't enough Navy personnel on site. How many were there? We understand that there were 13, and now it is going up to 14. That doesn't look like much of a ramp-up.

Admiral SULLIVAN. At the start of construction there was nobody there, at the start of the contract there was nobody there because the ship was getting built in Marinette, which is a place we don't have a supervisor presence. So we had to develop a plan to ramp up those—that the people onsite from Supervisor of Shipbuilding (SUPSHIP) Gulf Coast. SUPSHIP Gulf Coast, as you know, is in an area that just had finished a hurricane and a third of the people who worked there lost everything. So that office had to get stood up in stages. We started with about three or four people. Then we ramped up to nine. We are ramping up to this month to about 14, 15. We will be up to over 20 in the next couple of months. So we are taking action right now, but we should have done this months ago.

I have to say that SUPSHIP Gulf Coast is about half the size it was about 15 years ago with a higher workload and that has been challenging. There are other high risk programs that are going on at SUPSHIP Gulf Coast with the small ship builders on the Gulf Coast, the LPD 17 program, recovering the DDG that was damaged by the storm and trying to get LHD 8 and LHA 6 on track whilst also trying to deal with work on the DDG 1000 program. We are still working on the design piece so they are stressed, they are half the size they used to be, and we did not allocate enough people up to Marinette quickly enough because of the overall picture down there.

Mr. BARTLETT. Just one last question. We have to move on. We have another whole panel. What confidence do you have that our whole estimated completion cost will be any better than our estimation before?

Secretary ETTER. We have had a number of people looking at our cost estimates over the past few weeks. We feel that we have a pretty good estimate of what it will cost to complete the ship. We are continually improving our cost-estimating capabilities, but it is a challenge because it is forecasting when you don't have a lot of data for similar ships. We do believe at this point with the analysis going on now we will be able to predict the cost of the follow-on ship for LCS.

Mr. BARTLETT. Thank you very much. I hope we are not back here with a similar hearing after the ship is finally delivered.

Thank you, Mr. Chairman.

Mr. TAYLOR. The Chair now recognizes the gentleman from Pennsylvania, Joe Sestak.

Mr. SESTAK. Thanks for your time.

I am sorry, I probably missed some of what was already said.

I want to ask a couple of questions of process because I think the idea of LCS still is pretty darn good, the seaframe, get it out there, modules in and out. And Admiral Clark had a great idea. Admiral Clark really wanted to move this along but, like with anything else, victory has a thousand fathers and defeat is an orphan.

My question I think has to do with process. You have the performance of the shipyard. You have the vendors' costs and the construction standards. My understanding is that by and large, the vendor issues and the construction costs were all taken care of in October of 2005, so they were within the fiscal year 2007 budget baseline, so to speak, and those were counted right; is that right?

Secretary ETTER. Yes. That is true. We did a rebaseline in which we accounted for the Naval Vessel Rules and the reduction gear and then some ship performance issues.

Mr. SESTAK. So is it the Navy's view the shipyard performance is causing the recent growth of the LCS?

Secretary ETTER. The recent growth is partly due to shipyard performance, but we also are concerned about understanding that in more detail.

Mr. SESTAK. Is there anything else—yards, shipyard growth—since you rebaselined those other vendor costs and the ABS, you know, the standards—is there anything else that causes a recent growth, in your view, not just understanding it, but anything else?

Secretary ETTER. We know that there were some materials cost. We know that there is performance cost, and I think that there is also still some impact of Naval Vessel Rules that were not completed earlier. So we think those are the three key categories, probably.

Mr. SESTAK. It was said in the papers that Lockheed Martin had come forward as early as March 2006 and let the Navy know about these concerns. Is that the case?

Secretary ETTER. There were constant discussions with the contractor, as we saw the performance, such that the cost was growing and the performance was deteriorating. So there were constant dialogues, and it was at different points in this process where different people began to recognize that there was something here more than just the lead cost issues.

Mr. SESTAK. But should it have taken—I think it was November that you were apprised of it.

Secretary ETTER. I was aware of increasing costs, but to point out at what time did I begin to recognize that, it was something more than the lead ship costs for me that really occurred into the fall.

As we look back on the data now and you pull all the pieces together so you have it at one time, I think clearly we should have recognized it earlier. But we did not have people that had all the data together at one time, and that is part of what we have to change as we look at going forward.

We also found that some of the metrics we were using were not correctly computed and so that also caused some problems. But I would like to also offer that question to Admiral Hamilton, if I could.

Mr. SESTAK. If I could, could I ask Admiral McCullough a follow-up.

I am not that smart, but I never really understood quite the relationship between NAVSEA PEO and the Secretary's Office. Does the PEO report to you, or do you write its fitness report?

Admiral SULLIVAN. The PEO reports to Dr. Etter, as do I.

Mr. SESTAK. And who writes the fitness report?

Admiral SULLIVAN. Dr. Etter.

Mr. SESTAK. So you have an an-hoc relationship with PEO?

Admiral SULLIVAN. No. For in-service ships, if a PEO runs in-service ships, delivered ships, not acquisition ships, he reports to the CNO VME, because I am responsible and accountable for delivered ships, maintenance and modernization to the CNO VME. But

in my acquisition role, it is—if you are familiar with the support and reporting commander, the PEO is the supported commander and the NAVSEA is the reporting commander.

Mr. SESTAK. So the three-star is supporting the one- or two-star. Is that the best way to have this done, oversight set up by the Navy?

Admiral SULLIVAN. It is the way the Navy executed Goldwater-Nichols.

Mr. SESTAK. Watching how the Chief of Materiel came into the NAVSEA and other things, is it the best—in view of what has happened here and other things, is it the best way to have this oversight? I mean, you have SUBSHIPs reporting to you, correct?

Admiral SULLIVAN. Yes, sir.

Mr. SESTAK. And there were, according to how you talked to the Chairman, not enough people and yet the response is giving you an alarm about the acquisition sites, so to speak?

Admiral SULLIVAN. Right.

Mr. SESTAK. And yet you are not really responsible. You are supporting someone for it. And yet you strip people on the deckplate kind of reporting it. Is this the best way for the Navy to have set up this system?

Admiral SULLIVAN. You can always do better. When the program offices worked for the systems commands, it didn't give us overruns. It gave us the A–12s.

Mr. SESTAK. When they reported to you?

Admiral SULLIVAN. Yes, sir. So I could see it either way, but fundamentally this is a pretty good organization. The reason it was stood up this way is so that the PEO had a direct line of accountability to the service acquisition executive, and that is a very clear line of distinction. So me, as the supporting guy, independent technical authority, independent head of contracting agency, independent head of budget office, and independent cost surveillance, we did not adequately do our job for the PEO and in my reporting relationship to Dr. Etter.

Mr. SESTAK. I am sorry. Admiral, you wanted to say something?

Admiral HAMILTON. Yes, sir, Congressman. We saw rising costs over the summer time frame. We tracked that in the July through September time frame. We specifically expected to see some disruption of the earned value management metrics as a subset of the execution of the run-up to the launching of the ship in September. We also expected in September after the ship was in the water that those metrics would stabilize and that the performance would be significantly higher than the disrupted metrics in the July-August time frame. We were disappointed to find a fundamental drop-off in performance after the ship was in the water.

Mr. SESTAK. Were you aware of the increased costs during the summertime? Is that when you first got notice?

Admiral HAMILTON. We have been tracking estimated completion for this ship since the inception of the ship.

Mr. SESTAK. I mean, since—this particular cost group, I thought, came to attention only by newspapers' reports, and I know those aren't always reliable in March.

Admiral HAMILTON. As we worked on the ship together and tracked costs, the costs of the ship and our budget were aligned

through the end of September. They started to diverge at that point based on bad reporting and the earned value management system (EVMS) at the shipyard. We dove into that and attempted to correct it and understand it. As we continued to work through that and reported to our leadership, it became increasingly clear that there was some fundamental dilemma in the execution of the workforce and the tracking of that in the October-November time frame.

Mr. SESTAK. So up until September, what Lockheed Martin was telling you was everything seemed to be on track?

Admiral HAMILTON. We were within our budget and executing to that budget.

Mr. SESTAK. And that was about the time when you heard about it, Admiral?

Admiral SULLIVAN. Well, first off, the discussions between Lockheed Martin and the program office were ongoing. There are plenty of numbers that have been thrown around but the fundamental ground truth, as you know well, is EVMS system. There were problems with that earned value management system. My supervisor recognized them, as did the program office, and in I would say late Spring of 2006, worked hard over the summer with the program office and the contractor to get the management reporting system to get good numbers. And as Admiral Hamilton had said, had a couple of months of good numbers, September, October; and again, that is what showed the dramatic increase in price or in costs to the government that was going to exceed the budget.

Mr. SESTAK. So it is about the same time as Admiral Hamilton found out that you found out?

Admiral SULLIVAN. Yes.

Mr. SESTAK. And the other question I think I didn't pick up, and I am sure it is in the testimony, is what is the cost now expected to be of the fall 1–LCS, your best estimate at this time?

Secretary ETTER. At this point, it is somewhere in the range of 350 to 375 million. We are still evaluating cost estimates on the other ships.

Mr. SESTAK. So the following ships, I guess the last time it came across, there were roughly about 300 million, the LCS and fiscal year 2007 when the budget was submitted——

Secretary ETTER. The budget right now for the ships, the Lockheed Martin ships in June 2006, the contract was signed for 203 million.

Mr. SESTAK. I am sorry. I meant for number 5, 6, 7, and 8, when you start laying the speculated costs for them it is still about 300 million for them?

Secretary ETTER. We don't have an estimate for that. The original estimate had been 220. And our goal had been to get to 220 by the fifth ship. But we are now doing analysis to really understand what is——

Mr. SESTAK. So the fiscal year 2007 still had the 220 number in it?

Admiral MCCULLOUGH. The 2007 budget has the ships priced at $260 million apiece for $720 million in 2007.

Mr. SESTAK. How much?

Admiral MCCULLOUGH. 260 apiece for 521. I am sorry. In the 2008 budget the ships were priced at about $303.5 million. There is $911 million in the budget, as is currently written, for three ships in fiscal year 2008.

Mr. SESTAK. The 220 ship is now about 300.

Mr. MWANGI-KIOI. Well, the 220 was unit cost, which includes the basic construction cost that Dr. Etter says that we now estimated at between 350 and $375 million plus the government-furnished equipment. It wasn't the end cost of the ship—change proposals, program management costs, and oversight. So we had a unit cost and then we had an end cost, and 220 was the end cost.

Mr. SESTAK. Don't you include all of those costs normally in the budget? You failed to do so in 2006.

Mr. MWANGI-KIOI. Yes. That is correct.

Mr. SESTAK. So really, the original cost you just didn't accurately depict what you should have in the 2006 budget, correct?

Admiral MCCULLOUGH. That is correct. We incorrectly priced the ships, as we understood the program then. Yes, sir.

Mr. SESTAK. Because government costs and overhead are normally included?

Admiral MCCULLOUGH. Correct.

Mr. SESTAK. So when you correctly included them, it was about 300?

Admiral MCCULLOUGH. That was what we knew, when we submitted the budget. The average cost of the modules is about 55 modules, the surface module being the cheapest—and I don't want to give you numbers because I don't have them in front of me—but the most expensive one is the mine module and that is more than the $55 million average.

Mr. SESTAK. So if you are buying two modules per ship, it is about 100 million?

Admiral MCCULLOUGH. If you took the average, yes, sir. It would be about $110 million. But in the 2008 budget as we submitted it, we have rephased the modules to support more advanced warfighting campaign analysis so there won't be two modules per ship.

Mr. TAYLOR. We have a new rule in the subcommittee. Anybody who works past 6 o'clock can ask as many questions as they want.

Mr. SESTAK. Only changed when I got here, those working hours.

The Navy said it is going to have 313 ships. And I gather some of that number is based upon the Navy not anticipating any bigger piece of the pie, kind of somewhat of a continuing line of what it has, Operation and Maintenance (O&M) and Military Personnel (MILPERS) kind of remaining flat and at least not increasing, and Research and Development (R&D) going down somewhat, maybe even staying down. But the real key of that 313, my understanding is that all ships will come in at estimated prices.

What does something like LCS do to that number of 313 ships? I mean, if those are really what undergirds the assumptions of 313?

Admiral MCCULLOUGH. What we have looked at, Congressman, is we have increased the shipbuilding budget from $11 billion to about $14 billion over the past year in the 313 balance risk, affordability, industrial-based concerns, in the 20—15 to 20—20 time

frame in accordance with the Quadrennial Defense Review (QDR) direction to support the warfighter, and there is risk in budget when we laid it out on a $13.4 billion 2005 dollar-escalated line.

Mr. SESTAK. On what line?

Admiral MCCULLOUGH. 13.4, 2005——

Mr. SESTAK. Procurement?

Admiral MCCULLOUGH. Supply Chain Management (SCM) budget. Only ship procurement. Not only the things that we use in the SCM budget. And we understand there is risk in that, but we believe we can make the 313 plan.

Mr. SESTAK. What does something like that, when the cost of the ship has increased so much, do to that estimate?

Admiral MCCULLOUGH. I will tell you, sir, that that is currently under review, and when we get that information, we will gladly provide it to the committee.

Mr. SESTAK. LCS cost overrun. This isn't the first time though, right, where initial estimates have been much lower than what finally came out on whether it is DDX or DDG 1000 or whether it is LPD, or whatever; is that correct?

Admiral SULLIVAN. We typically have, if you look at the history, lead ship costs we underestimated by an average of about 20 percent. We try to put in the adders for all of the first-time costs and sometimes we get it. Most of the time we don't.

Mr. SESTAK. And then the average cost of the follow-on ships, they are usually how much above?

Admiral SULLIVAN. We are usually very close on follow-on ships within 5 percent either way.

Mr. SESTAK. Thanks very much.

Mr. TAYLOR. Last year in this bill, then-Chairman Bartlett included very strong language that the price cap for this ship was going to be 220 million. What I have failed to have heard is a proper explanation of—and I will give the panel an opportunity to address—is that as the reduction gear is late, someone had to make the decision to continue construction of the ship, knowing that the cost of that ship was going to rise dramatically because of the rework that would take place when that gear shows up later; it has to be installed.

Someone had to know it was going to cost a lot more than $220 million. Who is the someone? Who did they seek the approval of and at what point did they intend on notifying Congress of those additional costs? Because the alternative is for someone to have said to Congress, knowing the Chairman's interest in controlling the cost of this ship, "Mr. Chairman, we are at a crossroads. We've got a former CNO who wants the ship built quickly. We have got you, that told us that the cost of this is going to be 220 million. What is it that you want? Do you want it done quickly, or do you want it done expensively?" and we didn't hear that. I don't believe the Chairman heard that on his watch. I know that no one from your office contacted me.

I think it is a very fair question. When was that decision made, and at the time what did you anticipate the costs to be and how close was that anticipated cost to the real cost that we incurred?

Secretary ETTER. Mr. Taylor, we had in our budget during the summer approximately $270 million to cover this ship, and that

was to cover the increases in the Naval Vessel Rules, the gear issues, and ship performance. So up through the summer, the anticipation was that we had enough dollars to cover this. It was only as we began to understand that from the various estimates we were getting and the errors we were finding in the earned value metrics that we were starting to have problems. And as those problems began to become more clear, we became more concerned.

I agree with you, there was not sufficient transparency in the organization. That is one of the things that we must change and we are already in the process of doing that. But we did not have a process that allowed the individual pieces of the problem that people were seeing to come together and then, by coming together, be able to bring that information up through the organization so that we could identify the problem and go to our leadership and go to you to explain the issues.

Mr. TAYLOR. Have you had a chance to look at the prepared testimony from the Lockheed Martin team?

Secretary ETTER. I have seen some of the text they have written, yes.

Mr. TAYLOR. Do you agree with their statements? If there is any point of disagreement that you have, I would like to hear it now, because you won't have an opportunity to respond, since they will be coming after you.

Secretary ETTER. I do not agree with some of the ways in which they explain the Naval Vessel Rules, and I think I would offer this to Admiral Sullivan to discuss.

Admiral SULLIVAN. Yes, sir. As we discussed before, the rules were, in fact, developed in parallel with the bid process and the source selection process. Lockheed Martin was good enough to provide me a copy of their independent analysis of what has gone wrong here, and we agree with most of it.

I just wanted to put the point in that that analysis will tell you there are 14,000 changes from the February version of the rules to the May version of the rules which were invoked in the contract. And, yes, if you do a word search of the document by a "shall," "will," "is to be," you get 14,000 instances of that. Again, remember it said the rules apply to all surface combatants. If you take out the rules sections that don't apply to LCS because they are for acoustics or shock or something, you get—that takes out about 5,000 of those "as to be," "will," "shall" references. And then if you take the sections of the Naval Vessel Rules where we had a previous document such as our old general specs or an IEEE spec, that gets out another 8,000. And I will sign up to not 14,000 changes in the rules, I will sign up to 14,000 word changes in the rules. But you get down to a number that is around 800 to 1,000 real changes. And that is a big number anyway. But it isn't 14,000.

I wanted to make that clear.

Mr. TAYLOR. Admiral McCullough, anything to add to that?

Admiral MCCULLOUGH. I reviewed portions of the testimony that affect the requirements, and I have no disagreements with the testimony with respect to requirements and the ship. The operational requirements have not changed since the inception of the LCS concept.

Mr. TAYLOR. How about any other part of that document? Do you have any disagreements with——

Admiral MCCULLOUGH. I concur with what Admiral Sullivan said.

Admiral HAMILTON. I believe the characterization of the Naval Vessel Rules changes, as stated by Admiral Sullivan, as a better characterization than that in the Lockheed Martin prepared testimony.

Mr. TAYLOR. Any follow-up questions?

Mr. SESTAK. When will you have the estimate of what the new costs will be for the following LCSs based on what you heard?

Secretary ETTER. At this point, I would not be able to give you a specific date, but we are certainly working very hard to get that because as you know, in order to look at whether or not we—what we do with—to the stop work. That was a 90-day stop work, so that is part of the motivation to getting to that point to work with that.

We also need to look at what our acquisition strategy is going to be for follow-on ships. That is another very important piece of this.

So both of those things rely on getting a cost estimate for the next ship. So this is very high priority for us.

Mr. SESTAK. Before the budget is approved or anything, will you have the information over here? Is it a matter of weeks or months? This springtime?

Secretary ETTER. It is a matter of weeks that we will have this information.

Mr. SESTAK. And one last question, just because I think process is so important. How many direct reports do you have? How many direct reports do you have?

Secretary ETTER. I have 12 PEOs I have within my organization in the Pentagon. I believe it is like 10 to 12 deputies that cover various areas.

Mr. SESTAK. And they all report directly to you?

Secretary ETTER. They report to me and then the Naval Systems Command (SYSCOM) commands, such as Admiral Sullivan, for the things that support the PEOs.

Mr. SESTAK. And then there are three?

Admiral SULLIVAN. Five.

Mr. SESTAK. So about 30 direct reports?

Secretary ETTER. Yes.

Mr. SESTAK. Thank you very much.

Mr. TAYLOR. Is that it?

The Chair recognizes the Ranking Member.

Mr. BARTLETT. I didn't hear a crisp answer to our Chairman's question. Who finally imposed this unrealistic delivery schedule on you? I think that was your question, sir. I didn't hear a crisp answer to it.

Secretary ETTER. I believe at the time that the program was started, it was the senior leadership of the Navy agreed that it was important to do this to meet the threat.

Mr. BARTLETT. And nobody told you, that you know of, this is probably going to run costs up, that this isn't a realistic schedule?

Secretary ETTER. Not that I am aware of.

Mr. SESTAK. If I may.

Mr. TAYLOR. Absolutely.

Mr. SESTAK. Is it true, though, that this rapid acquisition strategy was something—would it be wrong to say that the Navy leadership, Admiral Clark in particular, was interested in, but the Navy bought off on it. I mean, slides were being shown for how long it took to build a ship in World War II and remember all of those slides?

Admiral SULLIVAN. Given that we thought we were working with a commercial derivative that would not take the complexity and the rework needed to turn it into a military ship, and given the fact that the entire team was leaning very far forward to try to get this ship to the fleet as soon as possible, yes, we were optimistic.

Mr. SESTAK. So it was something where everyone seemed as though it was going to work? I mean, I think somebody was looking for an individual, but is it fair to say that the individual organization as a whole was buying off on this and it wasn't imposed? Or am I wrong?

Secretary ETTER. We all thought we could do it, the Navy and the contractors.

Mr. SESTAK. Then it really comes back to how do you have a process where someone does put up their hand and say this isn't working?

Secretary ETTER. Well, we have to have that process. And that is a part of what we are looking to change right now within the organization. We had a long list of things that we are changing, and we are going to learn from these lessons. Just one example of that is I have already scheduled essentially acquisition standdowns, and we are going to have meetings in three different locations to get our program managers together and to use that time to help share with them what we are learning from this program.

We have an E–MAG review that is being done. And the admiral that is chairing that is going to be presenting the lessons learned and the things that should have been flags to us about this problem. We will be presenting that in three locations where most of our program managers are: In San Diego, Pax River, and then here in the Washington area.

Mr. SESTAK. The PEO of the ship was an 06 not of ships. Of the LCS program, program manager.

Admiral SULLIVAN. An 06?

Mr. SESTAK. That is why they kept me in requirement.

Was he given an undue task when he had really two different class ships here? He is not here today. I gather he is not on the job any longer. An 06. And yet he had two very different class ships, but he doesn't have a job anymore. Is that the right way to approach it?

Secretary ETTER. He did not have sufficient support that he needed for this program.

Mr. SESTAK. But he doesn't have his job anymore; is that correct?

Secretary ETTER. That is correct.

Mr. SESTAK. He is the accountability?

Secretary ETTER. I am not sure what you are implying.

Mr. SESTAK. He was removed because of performance.

Secretary ETTER. He was put on administrative leave. The PEO recommended to me that he be put on administrative leave and that is what we have done. We are in the process of——

Mr. SESTAK. So he was held accountable. Would you, looking back on it, do you think it was fair to him to have two very different class ships that he was responsible for?

Admiral HAMILTON. There are several program offices that work for me and PEO SHIP, and several of those program managers have a multitude of ship classes that they are producing within their program offices. The complexity of those tasks are different, program office to program office.

The challenge in the LCS program office was to manage to a common interface. Inspire two different designs and production teams to conduct their work in a constrained timeline with a constrained budget and very constrained supporting resources. And that program office team moved heaven and earth to try to make this happen on the timeline it was given. And in large part I believe they did very well.

Mr. SESTAK. I would agree. I mean no one—Admiral Sullivan—well, nobody, as Mr. Bartlett said, who works harder or anything. I was curious that something happened in the process that wasn't accountable this time. I didn't know if it all came to this 06 or not. One guy.

Thank you very much. I hope it doesn't.

Mr. TAYLOR. Again, I want to thank our panel. There are a number of members who have submitted questions for the record. I have a very long number of questions for the record, but given that the hour is late and we still have another panel.

Last, I want to say starting with our uniformed personnel how grateful we are for your government service, and I know tonight hasn't been pleasant for anyone, starting with myself. But the bottom line is we have some fundamental changes that have to take place. We have other naval weapons programs coming down the pike. This cannot be the norm. And if you thought tonight was unpleasant, this is nothing if we see this type of behavior with the DDX program or any other program, now that we see these sorts of changes.

The other part is, in fairness, we are going to write a defense authorization bill over the next 90 days. If there are portions of your budget that are inadequate to do the duties that are required of you, we need to know about it. If there aren't enough people at the academy or anywhere else in the Navy to properly supervise programs like this, now is the time to tell us. We welcome that testimony.

But the bottom line is what would happen with this program cannot become the norm. And when I look at the two Coast Guard programs that are simultaneously going on in some of the same yards, or some of the same contractors, it sure looks like it is the norm to me. And we have got to put a stop to it.

So thank you collectively for years of service, for military personnel; Secretary Etter, for putting your life on hold for choosing to serve our Nation. But we want to fix this.

And I want to tell you, just a few minutes ago on the House floor, Congressman Murtha, Chairman of Defense Appropriations,

stopped me. It is fully his intention and my intention to try to fund two ships this year. We want to reverse that trend, and we want to reverse that trend this year. But without the cooperation of the uniformed personnel and without your cooperation, without solving these problems, we are not going to get this. And I want to let you know I want to get there. I hope you do as well.

So thank you very much.

The Chair now welcomes our second panel: Mr. Fred Moosally, the President of Marine Systems Division in the Lockheed Martin Company; Mr. Richard McCreary, the Vice President and General Manager of the Marinette Marine Corporation; Mr. Mike Ellis, Executive Vice President and Chief Operating Officer of Bollinger Shipyards; Mr. Kevin Moak, the Chairman of Gibbs & Cox, Incorporated, naval architects.

Thank you, gentlemen. You may proceed.

STATEMENT OF FRED P. MOOSALLY, PRESIDENT, LOCKHEED MARTIN MS2

Mr. MOOSALLY. Thank you for the invitation to appear here today. We have submitted a formal and detailed written statement for the record, and I have a brief remark to move along here because of the time.

You have introduced our partners here on the Lockheed Martin LCS team. I think what we have covered a lot here in the previous panel was part of my remarks about senior leaders in the Navy, senior leaders in the Navy commenting on the LCS. So I won't discuss that further.

As I mentioned earlier, Lockheed Martin's team includes Naval architects Gibbs & Cox, shipbuilders Marinette Marine and Bollinger, and we are the prime contractor for this program, with the overall responsibility for program performance, and it is a responsibility that we take very seriously. We have made significant financial investments and used the talent of our team to build the first in this class of revolutionary warship. It has not been without challenges, as you have pointed out, and as typical in first-of-class warship construction.

FREEDOM is a prototype vessel set in a new acquisition paradigm using R&D funding, as you point out, in a cost-plus contract structure. LCS has gone from concept to first ship in the water in just over 4 years, 60 percent faster than historical shipbuilding norms.

In addition, LCS 1 is the first combatant designed to the Navy's new Naval Vessel Rules and the first surface combatant classified by the American Bureau of Shipping.

As such, we are paving the way in learning countless lessons for the design of future U.S. Navy surface combatants such as DDG 1000 that are also being designed to the same standards. Once industry has removed the unique challenges of early learning, we are confident of achieving a smooth production process at both of our builders' yards and providing the U.S. Navy with its most affordable surface combatant ever.

We have faced four major challenges in building FREEDOM. First, a desire by the Navy to get this ship to the fleet yesterday, allowing the warfighter to use its capabilities as quickly as pos-

sible. While completely understandable, this aggressive schedule contained risk, some of which is now clearly seen as causing cost growth.

Second, there was significant design changes within the implementation of the Naval Vessel Rules shortly after our contract was awarded in 2004, which caused significant overlap between design and construction and resulted in a high degree of risk and cost challenges.

There were over 14,000 new technical requirements, and I heard what Admiral Sullivan said. We have translated those 14,000 into about 12,690 of the LCS 1 that we are building. These changes require significant review and adjudication to determine which of these rules apply to Lockheed Martin LCS design.

This in turn drove many of our over 600 engineering change proposals on the lead ship. Make no mistake about it, FREEDOM and her sister ships will be better warships because of this change, to the great advantage of the sailors who will sail her into harm's way, and the ship is being built to tougher standards than originally required and bid by industry.

These improvements came with a major impact on cost and schedule. There were a variety of external factors: the availability of the right steel at the right time; the miscutting of the ship's reduction gears that affected FREEDOM in unique ways. Fourth, there were first-of-class discovery issues associated with the process of transitioning a new ship design into production.

Collectively, these four issues forced a less-than-efficient construction sequence, adding risk and cost to the effort. These first-of-class issues are regrettable. However, the U.S. Navy and the Lockheed Martin team thoroughly understand these issues and have procedures and suppliers in place so that future ships will not face these same challenges.

FREEDOM is a warship, not a commercial ship. She is the first surface combatant designed to meet the rigors of high speed, extreme ocean conditions, and extended service life. The whole structure is built of high-strength steel that provides resistance to fatigue and weapons effects and will exceed a 30-year service life. By way of comparison FREEDOM's structural scattlings in many cases exceed that of the FFG–7 class which are of similar size and displacement, and are battle-proven in terms of survivability. She also has the survivability and damage control that will enable the ship and crew to survive battle damage and return safely to port.

We have learned much in building FREEDOM, and we will undoubtedly learn other lessons when we build our first LCS in Bollinger shipyards, but we have done our best to flatten the learning curve by having Bollinger people present at Marinette at every phase of construction, observing and assisting with the process and taking those lessons learned toward our second ship.

Indeed, Bollinger has built the largest and one of the most complex modules for FREEDOM. So there is the beginning of LCS building experience at our second shipyard.

Mr. Chairman, FREEDOM and her sister ships will be superior warships. Sailors will take them to sea, will be proud to sail them, and pleased with their capabilities. The Lockheed Martin LCS team will take lessons learned from building FREEDOM and apply

them in an efficient and rapid way to our future vessels in this class, to the standard our sailors deserve and our taxpayers expect. As a former sailor myself, you have my word on that.

Thank you again for this opportunity, Mr. Chairman. I look forward to your questions.

Mr. TAYLOR. Thank you.

[The joint prepared statement of Mr. Moosally, Mr. Moak, Mr. McCreary and Mr. Ellis can be found in the Appendix on page 76.]

Mr. TAYLOR. Anyone else on the panel wish to speak?

Mr. Ranking Member.

Mr. BARTLETT. Thank you very much for being here. Clearly, in hindsight, you all were complicit in agreeing to the schedule which was almost certain to increase costs. Do you have any documentation that you told the Navy that if they insisted on the schedule that we were going to monstrously overrun the budget?

Mr. MOOSALLY. No, we do not. And I don't think we ever believed that—you know, this is hindsight—when we look back on what the effect of the Naval Vessel Rules—and we certainly at the time didn't know it when we learned of the reduction gears. As he said, I will say there was a sequence of disclosures on the reduction gears that went from 2 months and we thought we could work around the 2 months' delay that ended up being 6 months. So there was a series of three delays on the reduction gear.

I must say we thought we understood the Naval Vessel Rule impacts and when you give, as Admiral Sullivan indicated, when you are handed the Naval Vessel Rules—we are given that 2 days after contract award—the Naval Vessel Rules require interpretation to each class of ship, and that took a period of time. I have heard 9 months. You have got a contract and start building a ship 9 months later.

During that time, we were involved in taking the Naval Vessel Rules, seeing how they applied to our ship, an interpretation of how they applied to our ship, working with the Navy technical authority and ABS. That took a period of time to see how that was applied, and we thought we had characterized that. But in fact, as we went through that process—and it took longer than we thought—we didn't capture all of the costs within the ECPs that we had submitted with regard to NVR.

And I think you have characterized that very well, Congressman Bartlett, that we didn't capture that. And in hindsight, we could say, well, maybe we should have said hey, let's stop. Let's make sure we have complete understanding between ourselves and ABM technical authority and the program manager of how do we, in fact, interpret the Naval Vessel Rules, and have mature drawings that we would have to build this ship.

But we were kind of looking, just like I said here, we were—we had the task of trying to get this program out on a schedule, because it was needed by the warfighter, and that is how we behaved.

Mr. BARTLETT. There was a rebaselining dialogue, was there not? How long were you engaged in that before you agreed with the Navy that this was a realistic schedule?

Mr. MOOSALLY. We had a rebaselining of the schedule in September in 2005. The original delivery of the ship was December 2006.

We had an overtarget baseline discussion with the Navy in September of 2005, and in fact, got the schedule rebaselined to June of 2007. We did not rebaseline the cost at that time. And we are still working with the Navy to rebaseline the cost of the ship, but we rebaselined the schedule in September or October of 2006.

Mr. BARTLETT. It seems fairly apparent from everybody's answers that the primary problem for the overrun here was an unrealistic schedule. I am just amazed that there was nobody that waved a red flag and said hey, this is not going to work. We had three different organizations involved here. We had the shipyards who were building them, who have experience in building ships of this size; we had the prime contractor, Lockheed Martin, watching; and we had the Navy people. And nobody apparently waved a red flag.

Do we have a mechanism for people to anonymously tell us that what we are doing is probably not going to work? I understand the chain of command, and I understand whistle-blowers which—and what happens to whistle-blowers discourages people from being whistle-blowers. But it is inconceivable to me, Mr. Chairman, that somebody in one of these three organizations didn't understand this wasn't going to work.

What I would like to see as a result of this is some kind of thing here: We sit, everything is going just fine, and nobody is coming and whispering in our ear, hey, you better take a look at that. This all comes pretty much as a big surprise to us. I would like to have some mechanism for us, Mr. Chairman, that, you know, some e-mail address or something with an e-mail traffic that is untraceable, that you know, gee, you better look at this because all is not going well. Every one of your workers are taxpayers and their dollars could have bought more ships if this hadn't——

Mr. TAYLOR. Will the gentleman yield?

Mr. BARTLETT. Yes, sir.

Mr. TAYLOR. Captain Ebbs is going to make that happen.

Mr. BARTLETT. I appreciate that very much.

Last question. What questions should have been asked by us of the former panel that we didn't ask, that we would be wiser having asked them?

Mr. MOOSALLY. I can't think of any. I think that, you know, in my view, the Navy was pretty straightforward on what happened on this program, why we were focused on schedule. We're a "can do" outfit. We tend to think "can do." we tend to think we can overcome obstacles that were thrown at us. This didn't happen all at one time. It was sequential over a period of time, going from two months to six months.

And you know, a lot of the stuff, if you look in 20/20 hindsight, yes, if we had done something different to slow the thing down, to readdress the schedule, till we had all of the drawings, I would say yes. But our mentality, the way we thought was hey, the Navy needs this ship, schedule is king, and we are going to work to get this workaround here, start out with steel, get in the right steel—because the steel, as it turns out, there is only one manufacturer of the kind of steel in the country, and that is going to Humvee.

So we worked very hard to workaround so we could get steel from everywhere we could to build this ship. And then we had the

reduction gear problem. We were told initially that the gear was cut wrong. It would be about a two-month delay. Then the tooling broke down and that extended it again.

But it is all sequential. And as we look back, had we known a lot of the stuff was going to happen, would we have behaved differently? Yes, probably. I think you framed that very well when you were talking about schedule. And I think the Navy, we would agree with the Navy. We were all focused on we have got to get the ship out here, the fleet needs this ship. It is a new paradigm. We were kind of breaking ground here. We are the first ship to go through the NVR rules and clearly it is not a fact of well, here is the NVR rules, go put this disk in a computer and fix your drawing. It requires months of interpretation and discussion with the Navy authorities to understand how those rules apply to the ship that we were building.

And then I could ask Mr. Moak at Gibbs & Cox how that affects the drawing approval process.

STATEMENT OF KEVIN MOAK, CHAIRMAN AND PRESIDENT, GIBBS & COX

Mr. MOAK. Thank you for allowing us to be here tonight.

We did work closely with ABS early on to develop a schedule. As these changes came in, we actually had to take products that we had previously developed and sent to ABS for approval, and withdraw them in some cases and redo them as a result of the rules changes. We did not understand as well as we probably should have—I am not sure anyone could have—but we did not understand all of the downstream impacts until we got further and further into it. In fact, it took a process of over 3 months of working directly with the United States Navy and ABS in development of the build spec based on the NVR rules. During that time, there was a lot of discovery on all parties' parts on things that we are going to need to change. And all of those impacted the schedule of delivery of product, not only to ABS for approval, but also to the shipyard to start construction.

Mr. BARTLETT. Thank you.

That is all the questions I have right now, Mr. Chairman.

Mr. TAYLOR. Admiral Sestak.

Mr. SESTAK. Thank you, sir.

Hi, sirs. Good to see you.

One thing I may have just missed. When they did what they call the rebaselining in September-October time frame, that was not all-inclusive of the moneys that were discussed on the vendor issues and the construction standards?

Mr. MOOSALLY. Well, you are talking about the NVR.

Mr. SESTAK. Yes, the NVR.

Mr. MOOSALLY. We were on a fast timeline, so one of the things that we obviously did not do correctly was to estimate the impact of the NVR rules when we put the ECPs together, the 600 ECPs together for more money as a result of the NVR invocation on this ship. So we didn't estimate that properly.

Mr. SESTAK. I didn't mean that. I am sorry. What I was trying to get to is you did come together with the Navy and what you knew at that time for NVR, what you knew at that time for the

reduction in gear, all that was, by and large, accounted for what you knew at the time.

Mr. MOOSALLY. What we knew at the time, I would say not all the reduction because the reduction gear, like I said, was sequence. I would say about a third of what we believed the impact—what ended up being the total impact on reduction gears was in the October 2005 rebaseline. The rest of it flowed to later on.

Mr. SESTAK. So that gets to the Secretary's point, is I had a thought from listening to everything and some reading that, by and large, the Navy felt that since that period of time, the primary cause of the increasing cost had been shipyard performance. They then came back and said no, there was some other NVRs, some other costs. But it still left in the impression that she discussed it that in the Navy's mind, the continuing increase in cost was shipyard performance. Do you agree with that?

Mr. MOOSALLY. I think if you relate shipyard performance to production efficiency, then it has been affected by, you know, further disclosure of the impact or ripple effect of the NVR rules. And I am not going to sit up here and say we have done things 100 percent correct. We haven't. We have learned a lot on this program ourselves, and we have made some mistakes. But we didn't understand. And I would say a lot of the inefficiency is the fact that we are still, in some cases, going through rework, because we either discovered a first-of-class ship where the drawings don't exactly match when you get down there and physically put something together, or the ripple effect of NVR rules.

For example, I will just give an example. If there is a pump that has to be turned around because the vendor furnished—the material was different and we got a new pump because of an NVR change, then that affects understanding how that affects a piping or piping hangers or so forth, then we didn't take all of that into account into some cases. So there is this ripple effect that was not accounted for, and Dr. Etter said is still having an effect somewhat, although that is leveling out and we are getting it behind us as we continue to build the ship and we are 75 percent complete now.

Mr. SESTAK. What does that say about the rapid acquisition strategy that the Navy was trying to undertake in view that the next rapid acquisition strategy would be for a new class of ships or would be for a new type of platform?

Mr. MOOSALLY. I would say that the big lesson learned here is, stay out of overlap in design and build, especially when you have a two-year build cycle. This ship was going to be built in no two years, but four, because of the issues. I think we could build it in two years but you have to have a mature design package. You can't be changing drawings on the run.

And unfortunately, we bid, as Admiral Sullivan said, a commercial ship. ABS class ship was our bid. The Navy decided, for good reasons, to make this ship a surface combatant which would be very survivable, which it is. And that caused a lot of change.

And I would say, looking back on this stuff, that if you are going to have a two-year shipbuilding cycle, then you have to have a mature design that we all agree on. We all sit in the room: This is the ship we are going to build. This is the characteristics of the ship. And I believe if you give that—and this is one of the reasons

we went with our mid-tier shipyards—if you give them a design that is mature, that they can get the job done,and they can do it cheaper, I believe, than anybody else.

And one of the reasons we went with the yard is because they do a lot of commercial work. And a good example is during the stop-work order where Bollinger didn't have the ship down there to do work on, they were able to bring in a commercial job so they wouldn't have to lay off their workforce. This is the beauty of mid-tier yards who have commercial work as well as government work, so they are not totally relying on a government contract.

Mr. SESTAK. Admiral Sullivan said that normally the cost for the initial ship of a class is about 20 percent more and the cost of classes of ship after that are about 5 percent. I was surprised at those figures. I thought they were much more than that and I think——

Mr. MOOSALLY. Some are. I think some are. If you look at the data, I think there are first-in-class ships that are much more than 20 percent.

Mr. SESTAK. If you look at DDG 1000 or SEAWOLF or a number of others, or LOS ANGELES or others, and I will ask—I will go back to that.

My question has to do with the Navy, understandably, wanting 313 ships, but historically these costs keep coming up. What is the right industrial base strategy that has to be undertaken and how can it be undertaken? You have talked about competition, you know, by the mid-tiers. We have watched this time and again. I mean, there is really nothing new here. What is it that we can try to arrest this cost growth to get the Navy to the requisite number of ships?

Mr. MOOSALLY. I think what we have to do is all sit down in a room together—and I am talking about the decision-makers in the Navy, the requirements section, the technical authority, the acquisition authority, and the contractor—and decide, once you have a contractor, or even before you get a contractor, put up for bid and decide what we are going to build. What are the requirements both from an operational standpoint and a technical standpoint? And then draw the line in the sand and say we are not going to change any requirements unless we all sit in a room and decide we are going to do that together. And therefore you don't have the last-minute requirements that come in that now you have got to deal with that are going to raise costs.

And there has got to be a way to get—I will call it a cosigned check—where everybody is in a room saying what are we going to build.

Mr. SESTAK. Of those thousands of changes that came across in requirements—they were all requirements, right, sir?

Mr. MOOSALLY. They are technical requirements, not operational requirements.

Mr. SESTAK. Were they all born in the PEO shop?

Mr. MOOSALLY. No. I think they were, the Navy—when they looked—when I talked about the NVR rules the Navy decided—I think Admiral Sullivan said they were going to make this a tough warship, not a commercially based, ABS-based ship. So when that happens, then the NVR rules became the replacement, I will call it, for Gen Specs or Mil Specs.

Mr. SESTAK. So that was unique to this case?

Mr. MOOSALLY. This was the first ship that those NVR rules have been invoked. And then what happened is you have to sit down out of all of those changes and decide which ones are going to be applicable to this ship, and that takes time. That takes——

Mr. SESTAK. To go back to your case of how to address shipbuilding at large, let us throw away the NVR because it was a unique situation here. Do these changes still come about at all times—because that seemed to be what you focused most on, is that everyone in a room so the requirement doesn't change.

Mr. MOOSALLY. Right. We all have to understand—we all have the same——

Mr. SESTAK. So the cost that really comes out is on the Navy side that they keep changing requirements. Is that what you are saying?

Mr. MOOSALLY. I don't want to say that. Obviously, there are costs that would happen on things like the reduction gear that we are responsible for.

Mr. SESTAK. Not in this case. But the value of getting everybody in a room to sit around, I mean, it sounds good, but is the only purpose of that to keep requirements suppressed?

Mr. MOOSALLY. I think to understand—we have to obviously—I think there has to be. And we have control boards that are set up, the Navy does. We have as industry to make sure that we, in fact, when you have a requirement——

And if you look at this, the ship class was based on the $22 million K process. So what you have to do if you are going to keep it—if you are going to have a cost gap, then you have to do trades. If you are going to add things, then okay, am I going to take something off? If you are going to be trading cost and requirements, then you have to do that across the board.

Mr. SESTAK. The only reason I am asking is that it just seems that almost every class I can think of with the exception of one, the cost has been significantly different than what was the initial estimate. And if you get everybody in a room and if it is just the requirement suppression, then that means the industrial base is fine, correct?

Mr. MOOSALLY. Well, you are going to have—as I said, you are going to have—any first of class ship you are going to have discovery because of, you know, when you start building a ship—and I think all ships are complex to some degree, you are going to have first the class discovery and it is going to be probably more than you had budgeted for.

Mr. SESTAK. All right. Thanks very much.

Mr. TAYLOR. Mr. Moosally, in listening to your description of some of the troubles, it really does cause me to ask the question, is the person responsible for that contract or for building the ship? What would be your personal professional preference? Would you prefer to have the United States Navy or the United States Coast Guard put a set of specifications out for bid and bid on their thoughts? Or would you prefer the design/build concept? Speaking from the industrial side.

Mr. MOOSALLY. Yes, sir. I understand. I think that either one can build. I think the design/build concept can work, as I said, if we

do that in such a way that there is not huge overlap and if we all decide—and in this case NVR rules—that we are going to interpret the NVR rules together and come to a common understanding of the technical implications and the technical requirements that the NVR rules give us, and I think if we have a common understanding and adjudication of that up front and then have that design, mature design to go forward with, I think that would do it. We would be able then to together decide this is what we are going to build, this is the schedule to build what we are going to—what we have decided to build, and I think it will work. I think that what—the model that we set up on LCS can work going forward with a mature design, and the problem that we have had, as everybody points out, we had a lot of churn, design churn caused by the NVR rules coming to us basically almost simultaneously with us getting a contract, and that caused a lot of churn on the program as we went on to decide, okay, here is the NVR rules, how do we interpret all this change and lay that out in our design and get approval on it. So that is kind of what happened. So if you are going to go that route, there has to be some sequencing here that you don't have a lot of, I will say, overlap between design and construction.

Mr. TAYLOR. Going to the National Security Cutter, which your company has also.

Mr. MOOSALLY. Well, sir, I would have to take a little exception. We are not the prime contractor on the National Security Cutter.

Mr. TAYLOR. Okay. Your company is involved in.

Mr. MOOSALLY. We are providing the C4ISR system on the National Security Cutter.

Mr. TAYLOR. One of the things that came out in the Coast Guard hearing was a very senior admiral, I want to say he is the deputy commandant, looked at the design and said, if we build a ship like this, and it was just way down in the build, just the most difficult place to get to after the fact, if we build a ship like this, we will be back in within two to three years fixing things, and we have significantly shortened the life of this ship as far as its durability. I am using that as a for instance because my question is, when your folks looked at the changes that were made because the reduction gear got there late, things being built out of sequence, things having to be torn apart and rewelded, replaced, is there anyone in your organization who is saying we are creating a problem that this ship's life expectancy is going to be less than it should have been, that this ship is on track to fail in two or three years and we will be right back in here fixing something?

Mr. MOOSALLY. Yes, sir. I would like to answer a little bit of that and I would like to turn it over to Gibbs & Cox, who is a naval architect, who has had a lot of experience starting with DDG–51s and FFG–7. We believe we have a very tough ship here with a 30-year life and don't believe that what we have done in terms of out of sequence work has affected that. And all the model testing done independently by Carderock has shown that even in hurricane winds this ship really rides well, is very survivable. So I don't feel that is the case Mr. Chairman, but would you like to comment on that?

Mr. MOAK. Sure. I would be happy to. In terms of the types of things you are talking about that would affect the service life of the

ship, sir, I believe primarily we would be interested in talking about the structural adequacy of the ship. The fact that the shipbuilder had to build out of sequence did not affect in any way, shape, or form the actual service life effectiveness of the ship. That is based on the actual structural design. The design itself did not change based on out-of-sequence work. The problem was that there were—it was never the structure that was causing the problems, it was quite frankly the distributive systems that caused them difficulty in the out-of-sequence work because we were unable to provide that information to them once we went out of sequence in as rapid a fashion as we had hoped, and therefore there were situations where they did, in fact, as they built out of sequence, they had problems where they—we didn't give them enough information early enough based on all sorts of reasons, which I am happy to go into, that caused them in many cases to have to go in later and change things that were already there, but that did not affect the basic structure of the ship. So the sequencing of the build doesn't affect the service life of the ship.

Mr. TAYLOR. So if frames were cut and rewelded, if plates were cut and rewelded, if piping had to be cut and rewelded, that none of those things in your professional opinion would lead to a situation where in 5 years someone coming before this committee and says——

Mr. MOAK. That is correct, sir. I do not believe in my professional opinion that that is going to happen.

Mr. TAYLOR. Okay. Mr. Moosally, and again we are trying to do two things. This committee wants to deliver the message that the sort of mistakes that were made on the LCS are not acceptable to the American taxpayer and not acceptable to this committee. The second thing, we are trying to prevent it from happening again. Part of trying to prevent it from happening again is to understand how it happened. And what continues to trouble me, as the gears were delivered late, as the ship is being built out of sequence, as timelines keep getting extended, trying to walk through the construction of this vessel in my mind, I can see that some things could happen early on and some would say, not that big a deal, not that expensive. But as the gear takes longer and longer to be delivered you are getting farther and farther into the ship and someone has to be saying, this is getting serious, this is getting expensive. And at what point did someone in your organization or at what point did someone in the Navy say, we would save a lot of money, we would actually save time if we just stopped where we are?

Mr. MOOSALLY. Well, I will say in working with the Navy, and we have obviously kept them informed what was going on, we talked to the Navy about how we were going to do that, that we are on a can-do mission that we are going to deliver the ship as soon as we could because the requirement was, it was a schedule-driven requirement, schedule is king, and we worked very hard. Like I said, we look back on this now with hindsight and I can tell you, our team worked very hard to overcome every obstacle, the steel, the reduction gears the bad vendor furnished information (VFI), the workarounds to do our very best to deliver this ship as fast as we could. In hindsight, was that a mistake? I guess maybe we could say—we could have slowed down and stopped work. We

would have had to lay off a lot of people up at Marinette because of the kind of work they were doing and there certainly would have been a cost associated with that, like there would be with any stop work order. So there was a trade. In hindsight, we may want to look at it. We didn't do it. I will be very honest with you, Mr. Chairman. We didn't do it. We had the mindset and the mentality that we can do and we are going to build this ship for the U.S. Navy as fast as we can, and we are going to work obstacles like gears and steel and out-of-sequence work.

Mr. TAYLOR. So you never at any time raised in effect the red flag to the Navy of saying, we are going to be way over budget?

Mr. MOOSALLY. We by contract are required to give the Navy a cost report every month. So this is not like we didn't—we have to do that every month, okay, so they—it is not—we didn't hide any costs or schedule—and plus, we supplemented that with a number of meetings that took place with the program manager and the PEO. So we were there hand in glove, teammates and partners with the Navy all the way on this. And there was constant transparency or continuous transparency between our cost and our schedule, performance entities.

Mr. TAYLOR. If there is constant transparency, why is it in the past three weeks I get a call saying a certain naval officer is being transferred from his job but it has nothing to do with LCS. A day later I get a call, another naval officer has been relieved of his position overseeing LCS. Two days later I get a call from Under Secretary of Defense saying I am putting a stop work order on. Obviously there wasn't transparency. For that scenario to have occurred, something is wrong, sir.

Mr. MOOSALLY. I can't answer that question. As I said earlier, we are required by contract to send a cost performance report to the Navy every month and we certainly did that, and I have no idea why those things happened.

Mr. TAYLOR. I have a question Mr. O'Rourke would like to know, how do you feel like your shipyard is performing now?

Mr. MOOSALLY. I think they have worked very hard. They have overcome a lot of, I will say, overlap between design and build here. I think we have worked very hard to overcome a lot of obstacles. I think they are performing well. We haven't been rebaselined with our new costs we are projecting. We are on a path. We have laid out a plan to have our cost performance index approved on a curve and I think we are kind of working on that, but if you want to comment.

STATEMENT OF RICHARD MCCREARY, VICE PRESIDENT AND GEN. MANAGER, MARINETTE MARINE CORP.

Mr. MCCREARY. Mr. Chairman, members of the committee, thank you for the opportunity to give you testimony today. From the aspect of cost preformance index (CPI) performance on the ship, at this point in time in Marinette we are by no means satisfied with the performance, but the big cost drivers in that CPI performance are out-of-sequence work, which costs a multiple of what it costs to do it in the right sequence and new work; that is, discovered work that is unbudgeted, that has been driven by the Naval Vessel Rules and other issues that we are still uncovering on the ship.

And it is those kinds of drivers that have created such a large problem for us. From a productivity standpoint we believe overall we have done reasonably well despite all of these things and have done a root cause analysis on the productivity, and our overall root cause analysis would indicate that our own productivity problems—and by no means do I take pleasure in telling you this—are around an eight percent problem, and we have been taking steps to address that. Some of that has been because of the churn, but nonetheless, the other portions of this are really very much attributable to the other aspects that I gave you.

Mr. TAYLOR. If you were asked or directed by the Navy to build a second vessel starting tomorrow, do you feel like you have a clear understanding now of the Naval Vessel Rules or are there still some things in your mind where you are not completely sure whether you are building it according to the regulations as far as the Navy is concerned?

Mr. MCCREARY. We are still on FREEDOM because the drawing package is not fully developed as far as the change paper getting incorporated into the drawing package. Still finding some things in distributive systems where we are making changes to make the systems work properly. We believe that we are very near to the tail end of that because we are almost to the point where distributive systems are largely completed. Once we get to that point, the only real risk factor going forward for FREEDOM in our eye is in the whole test and trials mode because it is a prototype and very complex propulsion system. So that is the one other factor as we go forward, but that has nothing to do with a build process per se. That has to do with working out whatever the issues might be in the propulsion train.

Mr. TAYLOR. Mr. Moosally, last question. And again I appreciate you staying so late.

Mr. MOOSALLY. Yes, sir.

Mr. TAYLOR. We as a Congress are simultaneously—well, I think it is fair to say that my ranking member, every member of this committee very much wants to reverse the downward trend in shipbuilding. None of us are happy that in the past six years the fleet has shrunk by approximately 60 ships. The only way we are ever going to turn this around is by putting more ships in the budget, but also for those ships to operate for 30 years. One of the things that has come off in many of the conversations that I have had regarding this problem is a sort of acceptance that the first ship of every class, you make your mistakes and I think some people—I am not faulting anyone. Well, your first ship is a throwaway ship. I don't think we can afford a throwaway ship, not at these kinds of prices. We certainly can't on DDX or anything. What assurances can you give this committee that when the Navy approaches us for a ship, it is going to be a viable weapon in the inventory for 30 years?

Mr. MOOSALLY. Well, Mr. Chairman, I will say this, I have been retired from the Navy now for about 16 years but I still have blue and gold running through my veins and I want to make sure—because I love the Navy and I still feel like a big part of it, and I certainly personally and I know our company and my teammates want to deliver the best ship possible and we believe today that

this is a 30-year ship, and we hope that that is proved out. I mean, we have—as Mr. McCreary said, we have testing evaluation to go through, but we feel very strongly about the survivability, the toughness of the ship. We have seen the model testing we have done at Carderock, the ship looks superb in hurricane winds. We certainly want to make sure that those sailors, the men and women who man that ship are safe, and hopefully as comfortable as they can be in rough seas. So I feel comfortable that we will have a 30-year ship on this first ship.

Mr. TAYLOR. And you know—and again not to belabor the point but to make a point, you know the first five of the AEGIS cruisers were retired at 20 years old. An incredible waste of taxpayers money, an incredible waste of their capability. Do you see anything in this ship, either in the modular concept, in the drive train, in the hull design, anything in this ship where five years later someone is going to be coming before this committee and say, we saw that coming, we didn't address it because there was a need to get this ship built on time?

Mr. MOOSALLY. I believe that—and my experience in the Navy and in ships is there is always, just like your home, there is room for improvement, and we have—I believe the Navy probably still has a ship alteration (SHIPALT) program. We go and look at things. Things when you run the ship that probably ought to be changed for more efficiency, better maintenance, and so forth. I am sure there will be changes on this ship but I think the beauty of these ships in particular, you have this modular concept and a lot of volume there that is not basically taken up with permanent installations of weapons, and the whole idea of LCS is you can change out modules and reconfigure the ship for whatever threat you are facing with Littorals. I also believe because the work we are doing in the area for a lot of people, foreign nations are interested in this ship, the work we have done to look at how you could adapt this ship to the needs of other countries, there is a lot of volume in this ship that allows you to do that. So I think there is a lot of room for spiraling this ship up as the Navy gets out there and operates a number of these LCSs, and through operations finds out that they want to change things, either through things like maintenance, the whole maintenance philosophy that we can build into the ship or new flights of the ship or how you operate the ship.

Mr. TAYLOR. Mr. Bartlett.

Mr. BARTLETT. Thank you very much. You now have had a lot of experience with these new Naval Vessel Rules and you are now very much wiser for the experience of this program. Are you now ready with this increased wisdom and knowledge to enter into a—well, let me ask it this way. At what ship are you able—are you willing to enter into a fixed price contract that is not going to blow up? That you are going to deliver on time and if you can't do that, at least at the cost that you—how soon will you be ready? This, sir, is not rocket science, as I said before. This is a sea frame. It is, you know, it is a battleworthy fast ferry. At what point will you be able to enter into a fixed price contract and we would be comfortable that you are going to perform?

Mr. MOOSALLY. Well, let me say that I understand the complexity issue. I believe that this—first of all, I know it is not complex

from a combat system standpoint compared to the Aegis system we built for the Navy, but I would say the engineering propulsion system on this ship is very complex in comparison with the ships that are out there today and we think that is the long pole in the tent as far as the technical complexity of the ship. So I would agree with the rest of the ship—the combat system isn't as complex certainly as a lot of other ships we have out there. We are under contract for cost-plus contracts on the first ship. The first ship is an Research, Development, Test and Evaluation (RDT&E) ship, the second ship is Shipbuilding Conversion (SCN). And certainly we would feel comfortable in talking to the Navy about fixed price after we get through the testing evaluation phase on the first ship. As part of the stop work order we are relooking at the pricing of the ship with the Navy, the first ship, the second ship, and I am sure we will be talking to the Navy after the first ship just the answer to the very question you asked of what kind of contract terms and conditions would we accept on the—I would say on the third ship going forward, and I am sure we are going to be asked on the second ship that we haven't started building yet. We will be answering those questions with the Navy and certainly we have to feel comfortable that I would say, first of all, we are not going to start a second ship without a complete drawing package because we are not going to go through the concurrent overlap, concurrent design/build overlap we have had here on the first ship. And at some point when we get those mature drawings and have that experience behind us I am sure we will be talking to the Navy about some fixed price contract of some kind.

Mr. BARTLETT. Mr. Moak, are we not going to have mature drawings when we accept delivery of this first ship?

Mr. MOAK. I am sorry. Accept delivery of which one?

Mr. BARTLETT. Will we not have mature drawings?

Mr. MOAK. Of LCS 1, you are asking?

Mr. BARTLETT. Yes, sir.

Mr. MOAK. Yes, I believe we will. In fact, that is the process which will be in place.

Mr. BARTLETT. So they will certainly be mature. Are you readier when you build the third one?

Mr. MOOSALLY. Ready or not, I think that is what we will be looking at is a fixed price contract.

Mr. BARTLETT. Let me ask the representative from Bollinger, are you comfortable, sir, that from the experience of the other yard and information that is now available to you that you are going to be comfortable with the delivery date and the cost that you are going to be agreeing to?

STATEMENT OF MIKE ELLIS, EXECUTIVE VICE PRESIDENT AND CHIEF OPERATING OFFICER, BOLLINGER SHIPYARDS, INC.

Mr. ELLIS. Mr. Chairman, members of the committee, thank you for allowing us to testify. To answer your question, Congressman, we are comfortable with the schedule. We are comfortable with the delivery date and the cost that we have submitted to the Navy at this point. As Mr. Moosally said, we have a design that is scheduled to mature as we build this, our second vessel, and we are com-

fortable with that. Our engineers working with Gibbs & Cox have met all their timelines to date on this schedule. So materials, schedule, those are the things that we look forward to being able to answer your questions and based on what we have seen so far, the answer to your question is yes.

Mr. BARTLETT. So the next time you appear before this subcommittee there will be a celebration, you delivered the ship on time and on budget rather than another hearing like this?

Mr. ELLIS. We certainly hope so, sir. Yes, sir.

Mr. BARTLETT. Thank you. I certainly hope so, too. Thank you, Mr. Chairman.

Mr. SESTAK. Thank you, Mr. Chairman. Just two comments. Admiral Hamilton said it was about September that they began to hear about the—he used some technical term or acquisition term where it appeared as though the budget was differing from schedule or whatever.

Mr. MOOSALLY. I think he used the word ''separate.''

Mr. SESTAK. When did you, Lockheed Martin, first tell the Navy that these are some real issues we have here, something the papers said it was about March or so.

Mr. MOOSALLY. Like I said, every month. If you got a copy——

Mr. SESTAK. When did that begin?

Mr. MOOSALLY. Cost performance report, it is a monthly report, you give the most likely, best case, worst case, there are three columns on it.

Mr. SESTAK. Yes, sir, I know that. But when did you see at Lockheed Martin the cost going awry?

Mr. MOOSALLY. It was on a monthly basis.

Mr. SESTAK. When did that month begin? What month was that?

Mr. MOOSALLY. It was probably somewhere in the summer of 2005.

Mr. SESTAK. Summer of 2005. You said it was September of 2006—I meant after the 2005.

Mr. MOOSALLY. Summer of 2006, yeah. I am sorry.

Mr. SESTAK. I guess my only comment is I guess—there is two things as I look at it all, not just LCS, but because I think this really is—this has happened before. I find on the one hand there is a conspiracy of optimism where we have this overconfidence in our ability to produce on the industrial side, and on the uniform side we believe, and we believe at times because it fits, and it makes the budget come out. The problem is the second point is, is what are the consequences? I mean, is it an O–16 removed? I don't think that is it. I don't think it is the people. They are trying their best. But in this conspiracy of optimism, the programs—despite this annual perennial cost growth, the programs continue. There really aren't consequences, and I just don't know as we go into the future and as the Navy is trying to get the requisite number of ships with the war at $14 billion a year, the Expeditionary Fighting Vehicle, as you saw on the front page of *The Washington Post*, Coast Guard cutter, of course that is not in the Defense Department although Navy does pay portions of what goes on it, Army modernization program, 92,000 more troops that we need they say, GPS, you know, I am concerned. It gets back to my question about how do you approach this so it doesn't happen? Because the con-

sequences may not be where Congress stops it and says, maybe it should have at other times, you know, this is unacceptable. We don't want this national treasure—you know, this positive degree of optimism just keeps rolling on but truly it becomes that—boy, there are all these other competitions, these other issues that are competing for the marginal dollar, and the Navy doesn't get its requisite number of ships. What is the process again? To somehow come to grips with, is there a better way when you look at shipyards around the world and other places, is there a better way to bring the parties together to somehow in addition to requirements, suppression once they are stated, to truly bring it in on what they are saying they are going to bring it in upon? Is there anything else to be done?

Mr. MOOSALLY. I think there is always room for improvement. You know, we talk about a lot of Lean 6 Sigma things and I think there is a lot of things we can learn how we are going to do things differently. The full circle is government and industry working together.

Mr. SESTAK. Lean 6 was throughout the Navy, as you know, the last sigma was the last few years. I mean is there any process?

Mr. MOOSALLY. I think there is a way to improve process but as I say, you have to look at the entire process from beginning to end and it just can't be the government or just can't be industry. It has to be us working together to improve the way we do things and I think there is certainly an opportunity to do that.

Just the two things that I learned in the Navy is invest correctly in people and in systems, but be accountable. It just seems as though this conspiracy of optimism, somehow we have to come to grips with it because it isn't permitting us to plan well in what I think 77 million baby boomers retired and all that, it is not going to permit us to get the kind of capability we want out there in the future. And somehow some accountability in this process isn't brought out, and it is just not relenting in 2006.

Mr. SESTAK. Thank you.

Mr. MOOSALLY. Thank you.

Mr. TAYLOR. Last question for Mr. McCreary. When did the CPI decrease to an unacceptable level? And did you work with the Navy immediately to correct that? What was the timeline?

Mr. MCCREARY. In general, sir, I would tell you our CPI was never acceptable to us virtually from the beginning as we started dealing with a lot of the change, and that was probably after—that was probably after the first quarter of 2005, and I mean, compared to our usual experience on other government and commercial programs, because of the rate of change and so on, we never were at a point where we thought that we were performing overall in the program the way we would want to. And the real issue there was we were trying every work-around and every strategy to try and improve that at a time when we were finding more and more and more new work and change work. And unfortunately we never caught up, and never—I don't honestly believe had any real way to catch up because it was a constant process of discovery.

Mr. TAYLOR. So if it was never acceptable, when did it get so bad that an Under Secretary of Defense had to stop the program?

Mr. MCCREARY. Well, I believe that it was a steady decline in the summer of 2006 prior to launch, and you heard, I believe the Navy testified that the expectation was that post-launch we would start to see an improving CPI, and in fact I believe that we will start to see an improving CPI as we get through the majority of this change, and the rate of change has been decreasing, but it was not immediately upon launch, and we still are dealing with a lot of that change. But as I say, the change—the rate of change is decreasing, and we are—because of the maturity as far as the percentage of completion, roughly 75 percent complete, getting to the time when distributive systems will be complete, and once we get there, we then move into the phase of doing work on the ship that we originally had intended to do on the ship.

Mr. MOOSALLY. In the water?

Mr. MCCREARY. In the water, correct, as opposed to in the module stage or in the erection stage. And those have been the effects that have just compounded the problem.

Mr. TAYLOR. How many of these problems were you aware of when you were gracious to host the committee to your shipyard in late August, early September? Because my recollection is everything was fine, everything was on budget. I don't recall the presentation made by your yard as being anywhere near——

Mr. MOOSALLY. I don't believe we would have covered that. We would not—certainly would not have provided information that wasn't accurate. And I don't believe that we discussed CPI during that tour, but like I said, the Navy has been aware, we have worked with the Navy and I believe the Navy testified that they have insight into our CPI every month.

Mr. TAYLOR. Well, we will have some additional questions for the record. And again I very much appreciate you being here. Mr. Ranking Member, do you have any questions?

Mr. BARTLETT. Thank you all very much for your service and apologies that it took so long. Thank you for being so patient. If questions come to you that we should have asked the prior panel, we have several days in which we can submit questions for the record to them. Would you please indicate to us questions that you think you and us would be the wiser for having asked them? If you will do that, we will ask those questions for the record.

Mr. MOOSALLY. Yes, sir.

Mr. BARTLETT. Thank you very much.

Mr. TAYLOR. Committee stands adjourned.

[Whereupon, at 8 p.m., the subcommittee was adjourned.]

A P P E N D I X

FEBRUARY 8, 2007

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

FEBRUARY 8, 2007

NOT FOR PUBLICATION UNTIL RELEASED BY
THE HOUSE ARMED SERVICE COMMITTEE
SUBCOMMITTEE ON SEAPOWER AND EXPEDITIONARY FORCES

STATEMENT OF

THE HONORABLE DR. DELORES M. ETTER
ASSISTANT SECRETARY OF THE NAVY
(RESEARCH, DEVELOPMENT AND ACQUISTION)

AND

VADM PAUL E. SULLIVAN, U.S. NAVY
COMMANDER, NAVAL SEA SYSTEMS COMMAND

AND

RADM CHARLES S. HAMILTON, II, U.S. NAVY
PROGRAM EXECUTIVE OFFICER, SHIPS

AND

RADM BARRY J. McCULLOUGH, U.S. NAVY
DIRECTOR OF SURFACE WARFARE

BEFORE THE

SUBCOMMITTEE ON SEAPOWER AND EXPEDITIONARY FORCES

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

ACQUISITION OVERSIGHT OF THE U.S. NAVY'S LITTORAL COMBAT SHIP PROGRAM

FEBRUARY 8, 2007

NOT FOR PUBLICATION UNTIL RELEASED
BY THE HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON SEAPOWER AND EXPEDITIONARY FORCES

Assistant Secretary of the Navy
(Research, Development and Acquisition)

The Honorable Delores M. Etter

Dr. Etter was nominated on September 6, 2005 by President George W. Bush to serve as the Assistant Secretary of the Navy for Research, Development and Acquisition. Dr. Etter was then sworn in on November 7, 2005. As the Navy's Senior Acquisition Executive, Dr. Etter is responsible for research, development, and acquisition within the Department of the Navy. From August 2001 to November 2005, Dr. Etter was a member of the Electrical Engineering faculty at the United States Naval Academy. She was also the first recipient of the Office of Naval Research Distinguished Chair in Science and Technology. Her academic interests were in digital signal processing and communications. Her research interests included biometric signal processing, with an emphasis on identification using iris recognition. She has also written several textbooks on computer languages and software engineering.

From June 1998 through July 2001, Dr. Etter served as the Deputy Under Secretary of Defense for Science and Technology. In that position, she was responsible for Defense Science and Technology strategic planning, budget allocation, and program execution and evaluation for the DoD Science and Technology Program. Dr. Etter was the Principal U.S. representative to the NATO Research and Technology Board. She was also responsible for the Defense Modeling and Simulation Organization, the High Performance Computing Modernization Office, and for technical oversight of the Software Engineering Institute. Dr. Etter was also the senior civilian in charge of the DoD high-energy laser research program.

From 1990-98, Dr. Etter was a Professor of Electrical and Computer Engineering at the University of Colorado, Boulder. During 1979-89, Dr. Etter was a faculty member in Electrical and Computer Engineering at the University of New Mexico. She served as Associate Vice President for Academic Affairs in 1989. During the 1983-84 academic year she was a National Science Foundation Visiting Professor in the Information Systems Laboratory in the Electrical Engineering Department at Stanford University.

Dr. Etter is a member of the National Academy of Engineering. She is also a former member

of the National Science Board and the Defense Science Board. She is a Fellow of the Institute of Electrical and Electronic Engineers (IEEE), the American Association for the Advancement of Science (AAAS), and the American Society for Engineering Education (ASEE). She served as President of the IEEE Acoustics, Speech, and Signal Processing Society from 1988-89, and was Editor-in-Chief of the IEEE Transactions on Signal Processing from 1993-95.

Dr. Etter was a member of the Naval Research Advisory Committee from 1991-97, and chaired the committee from 1995-97. She has received the Department of the Navy Distinguished Public Service Award, the Secretary of Defense Outstanding Public Service Medal, and the Department of Defense Distinguished Public Service Medal.

United States Navy Biography

Vice Admiral Paul E. Sullivan
Commander Naval Sea Systems Command

A native of Chatham, N.J., Vice Admiral Sullivan graduated from the U.S. Naval Academy in 1974 with a Bachelor of Science degree in Mathematics.

Vice Adm. Sullivan served in *USS Detector* (MSO 429) where he earned his Surface Warfare Qualification. After transferring to the Engineering Duty Officer Community, he served at the Norfolk Naval Shipyard, Naval Sea Systems Command, Supervisor of Shipbuilding in Groton, Conn. and on the staff of the Assistant Secretary of the Navy (Research, Development and Acquisition). During his engineering duty assignments Adm. Sullivan earned his Submarine Engineering Duty Officer Qualification.

Vice Adm. Sullivan holds dual degrees of Master of Science (Naval Architecture and Marine Engineering) and Ocean Engineer from Massachusetts Institute of Technology.

Vice Adm. Sullivan served as program manager of the *Seawolf*-class Submarine Program (PMS 350) and the *Virginia*-class Submarine Program (PMS 450).

Upon selection to flag rank, Vice Adm. Sullivan served as Deputy Commander for Ship Design Integration and Engineering, Naval Sea Systems Command from 2001 to 2005.

Vice Adm. Sullivan became the 41st Commander, Naval Sea Systems Command in July 2005.

United States Navy Biography

Rear Admiral Charles Samuel Hamilton, II
Program Executive Officer for Ships (PEO Ships)

Rear Admiral Hamilton is a native of Amityville, N.Y. He attended Duke University, graduating in May 1974 with a Bachelor of Science in Zoology. He was commissioned in the Navy in May 1974 through the NROTC Program at Duke.

Rear Adm. Hamilton's sea tours include *USS Hawkins* (DD 873); *USS Coontz* (DDG 40); *USS Callaghan* (DDG 994); *USS Fox* (CG 33); and command of *USS O'Brien* (DD 975).

Rear Adm. Hamilton's shore tours include Program Resource Appraisal Division (OP-91), Office of the Chief of Naval Operations; *Aegis* Cruiser Destroyer Branch, Office of the Chief of Naval Operations (OP 355F); and Military Staff Specialist for Naval Warfare in the Office of the Under Secretary of Defense (Acquisition and Technology).

In May 1996, Rear Adm. Hamilton became Program Manager for the Arsenal Ship, which was designed to provide massed precision fires in support of Fleet Commander's warfighting requirements.

From April 1998 to February 2000, Rear Adm. Hamilton served as Deputy for Fleet in the Program Executive Office Theater Surface Combatants (PEO TSC-F).

Rear Adm. Hamilton served as Program Executive Officer for Surface Strike (PEO (S)) from February 2000 until November 2002. Following consolidation of the PEO structure in November 2002, Rear Adm. Hamilton became Deputy PEO for Ships.

In April 2003 Rear Adm. Hamilton was named Program Executive Officer for Ships. PEO

Ships provides the Navy with a single, platform-focused organization responsible for the research, development, systems integration, construction, and lifecycle support of current and future surface combatant, amphibious and auxiliary ships to include: DD 963, FFG 7, DDG 51, CG 47, DD(X), LCS, MCM, MHC, LPD 17, LHD, LHA(R), MPF(F), Sealift Ships, CLF Ships, Special Mission Ships, Coast Guard Deepwater Support, Small Boats and Craft, Command Ships, and MSC vessels.

Rear Adm. Hamilton's graduate education includes Naval Postgraduate School, Monterey, Calif., where he graduated with distinction, receiving a Master of Arts in National Security Affairs, and the National War College where he graduated with distinction and was awarded a Master of Science in National Security Strategy.

Rear Adm. Hamilton's awards include the Defense Superior Service Medal (oak leaf cluster in lieu of second award), Legion of Merit (gold star in lieu of second award), Meritorious Service Medal (with three gold stars), Navy Commendation Medal and various unit and service awards.

United States Navy Biography

Rear Admiral Bernard J. "Barry" McCullough
Director, Surface Warfare (CNO N86)

From Weirton, W.Va., Rear Admiral Bernard J. "Barry" McCullough graduated from the United States Naval Academy with a Bachelor of Science Degree in Naval Architecture and was commissioned on 4 June 1975. Additionally, Rear Adm. McCullough completed Naval Nuclear Power training and received a Master of Science degree in Strategic Resource Management from the Industrial College of the Armed Forces at National Defense University.

Most recently, Rear Adm. McCullough was Commander, Carrier Strike Groups Six/Commander *USS John F. Kennedy* Strike Group. He also served as Commander Carrier Strike Group Fourteen/ Commander *USS Enterprise* Strike Group. Rear Adm. McCullough's major command was in *USS Normandy* (CG 60) from February 1999 until February 2001.

Prior to commanding *Normandy*, he served as Commanding Officer in *USS Scott* (DDG 995) and *USS Gemini* (PHM 6). Other sea assignments were: Operations Officer for Commander Second Fleet/Striking Fleet Atlantic, Engineer Officer in *USS Enterprise* (CVN 65), Engineer Officer in *USS Virginia* (CGN 38), and Main Propulsion Assistant in *USS Texas* (CGN 39).

Rear Adm. McCullough's shore tours include serving as Commander, Navy Region Hawaii and Naval Surface Group Middle Pacific, the Director for Strategy and Analysis, J5, at U.S. Joint Forces Command, First Battalion Officer at the United States Naval Academy and as the Department Head for the D1G Prototype Nuclear Power Plant at Nuclear Power Training Unit, Ballston Spa, N.Y. Rear Adm. McCullough assumed his current responsibilities as Director, Surface Warfare in July, 2005.

His decorations and awards include: Defense Superior Service Medal, Legion of Merit, Defense Meritorious Service Medal, Meritorious Service Medal, Navy Commendation Medal, and Navy Achievement Medal. Additionally, he is authorized to wear numerous unit and campaign awards.

Mr. Chairman, distinguished members of the Subcommittee, thank you for the opportunity to appear before you and discuss the current status of the Littoral Combat Ship (LCS) program, specifically to discuss the acquisition and construction of the first four ships of this important class.

First, the Navy would like to thank the Subcommittee for its continued interest in naval shipbuilding and the LCS program. In particular, the Navy appreciates your personal attention to issues affecting the industrial base, including onsite visits by members of your Subcommittee to shipbuilding sites over the past year.

Introduction

As you know, the LCS program is of critical importance to our Navy. With its great speed and interchangeable modules, the ship will provide unprecedented warfighting flexibility. LCS is the cornerstone of the future Navy, and provides critical capability to the fleet. Its fast, agile, focused-mission platform is designed for operation in near-shore environments yet is capable of open-ocean operation. It is designed to defeat asymmetric "anti-access" threats such as mines, quiet diesel submarines and fast surface craft. The modular design integrated into a completely functional weapon system promises to deliver a warship class that will be highly effective, and allows LCS to be tailored specifically for the mission at hand -- flexible solutions to deliver needed capabilities to evolving threats.

In order to deliver this needed capability to the Fleet as quickly as possible, the LCS acquisition strategy has employed several innovative features that provide both opportunities and challenges. The LCS acquisition strategy calls for a rapid 24-month build cycle for each seaframe, as opposed to the five or more years that have become the norm in naval shipbuilding. In addition to speeding the delivery of operational capability to the Fleet, the accelerated build timeline is designed to create cost benefits by encouraging reductions in the use of risky and time consuming technology development, by reducing the risk of technology obsolescence that can occur between final design and procurement and construction, and by lowering program overhead costs.

This shortened cycle, however, presents challenges and can exacerbate performance issues. Unexpected vendor issues or design changes are more difficult to accommodate. Schedule and cost pressures also stem from the unique conditions and events that occur in and around an acquisition program, such as concurrent design and production, start-up construction experience with a first time design, and the impact of unforeseeable external events.

The LCS program philosophy has been to counter these cost pressures with a cost-as-an-independent-variable (CAIV) strategy that entails setting realistic cost thresholds when defining operational requirements and managing aggressively to achieve those thresholds. Requirements discipline is also essential so industry has a stable baseline to build. Contractor design and sub-system procurement decisions remain within industry tradespace as they optimize their Seaframes to meet the system level requirements – this tradespace is required to make CAIV work.

Despite employment of CAIV and requirements discipline, the Navy has found significant cost increases with LCS 1, the lead Lockheed Martin (LM) hull, and decided it was prudent to stop work on LCS 3 while conducting a thorough review of the program. Work continues on LCS 1 (LM) and the two ships under contract with General Dynamics (GD), LCS 2 and LCS 4. The Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN(RDA)) has tasked an independent team of acquisition specialists to review all facets of the program to date. Their findings will better position the Navy to determine the most effective and efficient course of action to ensure the most cost-effective and timely delivery of this critical capability. The Navy is reviewing all of its options and will decide the course of action that is in the best interests of the Navy for the program. The Program Executive Office, Ships (PEO Ships) has also initiated a separate review to determine the root causes for the cost overrun so that changes can be made as we move forward with this program.

As requested by this Subcommittee, the Navy is providing testimony regarding the history of the LCS program, the execution of the program to date, and the current cost situation and planned Navy way ahead. This information will begin with a discussion of the critical requirement for LCS and the capability the ships will bring to the Fleet. This section will include, at your request, a history of the Navy requirements for LCS. The next section will discuss the history of the LCS acquisition including an acquisition timeline, and a preliminary discussion of issues leading to the current situation. Also at your request, this section will address contract and program oversight, including discussions of the relationships between the ASN(RDA), the Naval Sea Systems Command (NAVSEA), and PEO Ships. The final section will discuss the way ahead.

LCS Capability and Importance to the Navy

CAPABILITY GAPS

LCS and its associated Mission Packages are designed to fill capability gaps that have been identified in the Anti-Mine, Anti-Surface and Anti-Submarine warfare areas, particularly in the littoral, or the shallow water close to shore, environment. At the inception of the LCS program in 2003, Functional Area, Needs, and Solutions Analyses were conducted that identified these capability gaps and evaluated alternatives to solve them. Alternatives evaluated ranged from changes in Doctrine and Policy to filling the gaps with existing platforms (including modification to those platforms) to construction of a new class of ships. The results of the analyses demonstrated that relatively small, fast ships, capable of operating in shallow water, and tailored to missions in the warfare areas of Anti-Mine, Anti-Surface, and Anti-Submarine were the best way to fill the capability gaps. The analysis also showed that the ship needed to be reconfigurable and adaptive to meet dynamic mission challenges of Mine Warfare, Anti-Submarine Warfare, and Anti-Surface Warfare.

Based on all the analyses an Initial Capabilities Document (ICD) was created that defined the need and capability gaps and provided a recommended solution. The ICD was approved by the Joint Requirements Oversight Council (JROC) in January 2004. The ICD identified the capability gaps for assured maritime access in the littorals. An Analysis of Multiple Concepts (AMC) was done concurrently with the ICD analysis to address the capability gap. The AMC

and other supporting analyses were approved by the Office of the Secretary of the Defense (OSD) as the Analysis of Alternatives (AOA) for the LCS program in January 2004. From the AMC, a Capabilities Development Document (CDD) was drafted to designate Key Performance Parameters (KPPs) with threshold and objective levels defined. Details on various KPPs are provided in the sections below describing the Seaframe and Mission Package requirements. The CDD for LCS was approved by the JROC on May 25, 2004. No changes to the CDD have been approved by the JROC since May 2004.

In 2007 the Navy still has capability gaps in the littoral Anti-Mine, Surface and Submarine areas, and the LCS and its Mission Packages are still the best way to fill those gaps. There is nothing that has happened since 2003 that has decreased the need for LCS. On the contrary, since 2003 there are other areas that LCS has been identified as a force multiplier such as maritime interdiction operations and special operations support as part of the ongoing Global War on Terror. LCS may also play a role in Humanitarian Assistance and Disaster Relief as well as security assistance operations with our allies. The capability gaps that existed in 2003 remain today and the requirements to meet these gaps have not changed.

SEAFRAME REQUIREMENTS

KPPs and Additional Attributes (AAs) that were defined in the CDD were passed to the acquisition community. These requirements were vetted and approved by both the Navy and the Joint Staff via the Joint Requirements Oversight Council (JROC). The requirements have not changed.

The KPPs for the Seaframe are Sprint Speed, Endurance Range, Mission Package Payload, Draft, Core Ship Crew Size, Interoperability Compliance, and Focused Mission Execution.

Sprint Speed: Analysis shows that there is a marked decrease in the capability of LCS to protect a high value unit against a small boat raid if the LCS sprint speed falls below 40 knots. The threshold value for this KPP is 40 knots and the objective is 50 knots. High sprint speed is less important in the anti-mine or anti-submarine areas.

Endurance Range: LCS is required to self-deploy or deploy with Strike Groups. Analysis of most often used deployment routes from the likely LCS homeports to areas of interest shows that the longest legs in the transit that would allow pulling into port for refueling is just under 3400 nautical miles (nm). The threshold for this KPP is 3500 nm and the objective is 4300 nm.

Mission Package Payload: Speed, range and payload are all interrelated – increases in payload decrease speed and range for a given ship. Trade-off analysis using likely systems that would make up the mission packages showed that 180 metric tons was the proper threshold and 210 metric tons the objective.

Draft: Review of the geographical areas where LCS may operate, such as the Persian Gulf and the Korean Peninsula, show that LCS with a draft of 20 feet has a significantly greater area to operate in than any other surface combatant. The threshold requirement is 20 feet, the objective is 10 feet.

Core Ship Crew Size (Manning): Analysis of the workload for sailors on the ship, including watchstanding, maintenance and other required tasks using systems optimized for a reduced crew size, shows that with only moderate risk a crew size of 50 personnel can perform all required tasks. Compare this to the crew size of a Perry-class frigate of approximately 215, an Arleigh Burke-class destroyer at 300 and a Ticonderoga-class cruiser at 340. Manning is the largest cost in the lifecycle of our current ships. The manning KPP is set at a threshold of 50 personnel and an objective of 15 personnel.

Interoperability Compliance: The focused missions of LCS are conducted primarily by off-board manned and unmanned vehicles that operate away from the ship. Communications with these vehicles is vital to completion of the missions. LCS needs to communicate with other ships and theater assets to operate seamlessly in any area of responsibility. The Interoperability KPP defines communications and information exchange requirements for LCS.

Focused Mission Execution: The original analysis for LCS indicated that a system is needed that is reconfigurable and adaptive to meet a capability gap. In order to be both reconfigurable and adaptive, various mission packages were chosen as the best method to address the capability gaps. A KPP was written to ensure that LCS had specific support for the differing packages. This support occurs in handling all the external communications, provide handling and launching systems for the off-board water vehicles and a flight deck and aviation support for helicopters and unmanned aerial vehicles. The ship, when integrated with the mission packages, must be able to execute the focused missions and demonstrate the warfighting capability of each mission package through a detect-to-engage sequence.

Self Defense: Though not a KPP, the ship is required to protect itself from Anti-Ship Cruise Missiles and low numbers of Small Boat Raids regardless of the mission package installed.

Other Seaframe Requirements: There are other seaframe requirements such as Range, Hull Service Life, Provisioning Endurance, Replenishment, Operational Availability, Aircraft Capabilities, Watercraft Launch and Recovery Capabilities and Time for Mission Package change-out. The details of these requirements are not discussed because these are not Key Performance Parameters. The CDD also includes an acquisition cost objective and threshold which is discussed in more detail later.

MISSION PACKAGE REQUIREMENTS

The mission packages are being developed independently from the seaframe, though the interface between the two is well defined in the Interface Control Document. There are three separate mission packages being developed to fill the three capability gaps identified earlier: Anti-Mine, Anti-Surface and Anti-Submarine Mission Packages. Each of the packages is required to meet specified weight and manning requirements: the weight requirement is to be 180 metric tons or less including aviation fuel, and the mission package manning requirement is not to exceed 35, including the aviation detachment.

Anti-Mine Requirements: The Anti-Mine Mission Package is to hunt, identify, localize and neutralize mines within a given area within a certain amount of time, or to neutralize mines through influence sweeping at a specified rate. The mine types for these requirements include bottom mines, moored mines, and floating mines. Using these MIW mission systems, the ship is to be able to clear an area or a route through a mined area for other ships to transit.

Anti-Surface Requirements: Operations close to shore make the raid of small boats in large numbers a formidable threat to Strike Group operations. Requirements for this mission package are to detect, track and engage large numbers of small boats.

Anti-Submarine Requirements: This package is to search, detect, localize and neutralize quiet diesel-electric submarines that are operating in the shallow water environment to prevent these threats from interfering with Strike Group operations nearby.

FORCE STRUCTURE

Force structure requirements were developed and validated through detailed joint campaign and mission level analysis, optimized through innovative sourcing initiatives (Fleet Response Plan (FRP), Sea Swap, forward posturing) that increase platform operational availability, and balanced with shipbuilding industrial base requirements. This force structure was developed using a capabilities-based approach measured against the anticipated threats for the Fiscal Year 2020 timeframe. The force structure accounts for both the forces needed for the Navy to fight and win in any Major Combat Operation (MCO) as well as to fight the GWOT and execute Maritime Security Operations. The resulting distributed and netted force, working in conjunction with our joint and maritime partners, will provide both actionable intelligence through persistent, Maritime Domain Awareness, and the ability to take action where and when a threat is identified. The same force can be rapidly aggregated to provide the strength needed to defeat any potential adversary in an MCO. The warships represented by this shipbuilding plan will sustain operations in forward areas longer, be able to respond more quickly to emerging contingencies, and generate more sorties and simultaneous attacks against greater numbers of multiple targets and with greater effect than our current fleet.

The analysis concluded that a Fleet of about 313 naval vessels is the minimum force necessary to meet all the demands, and to pace the most advanced technological challengers in the 2020 timeframe, with an acceptable level of risk. The Navy continues to analyze operational requirements, ship designs and cost, acquisition plans and tools and industrial base capacity to further improve its shipbuilding plan.

The Navy's ship force requirement of 313 naval vessels as reflected in Table 1 represents a target level of capability and capacity necessary to meet the projected warfighting requirements for the FY 2020 time period and is compliant with the *QDR 06* and *Strategic Planning Guidance*.

Table 1. Future Naval Force Structure

Type/Class	Required
Aircraft Carriers	11
Surface Combatants	88
Littoral Combat Ships	55
Attack Submarines	48
Cruise Missile Submarines	4
Ballistic Missile Submarines	14
Expeditionary Warfare Ships	31
Combat Logistics Force	30
Maritime Prepositioning Force (Future)	12
Support Vessels	20
Total Naval Force	313

The most recent Annual Long-Range Plan for Construction of Naval Vessels for FY 2008, delivered to Congress with the 2008 President's Budget, outlines a build plan for 32 LCS in the Future Years Defense Plan (FYDP) (FY2008-FY2013) and achieving full LCS objective of 55 in FY2018.

In the 2008 President's Budget, there are 33 Mission Packages programmed to be delivered in the FYDP: 11 MIW, 6 ASW and 16 SUW packages. The combination of the 55 LCS seaframes and 64 mission packages across the program of record combine to provide the necessary warfighting capability to pace the 2020 threat.

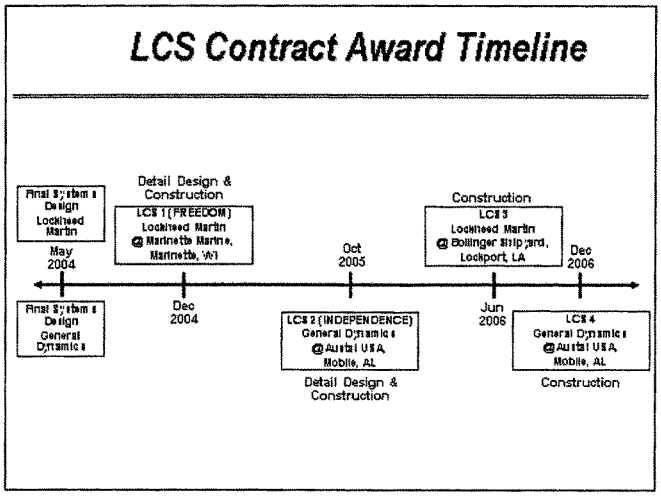
LCS Acquisition – Detail Design and Construction Contracts, Issues to Date, and Oversight

ACQUISITION STRATEGY OVERVIEW

The LCS acquisition strategy is focused on cost as an independent variable (CAIV) execution, rapid fielding of capability to address critical Fleet operational gaps, and an open competition business model at all levels as a means of cost control.

Following previous phases of LCS acquisition including preliminary design, in May 2004 the Department of Defense awarded both LM and GD separate contract options for final systems design with options for detail design and construction of up to two LCS ships. First of class construction options were awarded to a LM-led team in December 2004, and a GD-led team in October 2005. Both designs are under construction. The program was subsequently accelerated by the appropriation of two additional ships in FY2006, one of which was awarded to the LM led team in June of 2006 and one to the GD-led team in December of 2006. The program's planned Milestone B acquisition decision has been delayed in order to evaluate the findings of the current program review.

A timeline outlining the award of ships 1-4 is presented below:



DETAIL DESIGN AND CONSTRUCTION CONTRACTS

The LCS Flight 0 contracts for Final System Design and Detail Design and Construction were awarded on a Cost Plus Incentive Fee/Award Fee basis. This Subcommittee requested a specific discussion on the use of a cost-type contract for LCS. Use of a cost-type contract for detail design and construction of the LCS ships was consistent with the requirements of DoD FAR Supplement (DFARS) 235.006, in effect in 2004 when the contracts were awarded, which provided:

> *"(b)(i) Do not award a fixed-price type contract for a development program effort unless—*
> *(A) The level of program risk permits realistic pricing;*
> *(B) The use of a fixed-price type contract permits an equitable and sensible allocation of program risk between the Government and the contractor; and*
> *(C) A written determination that the criteria of paragraphs (b)(i)(A) and (B) of this section have been met is executed—*
> *(1) By the Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD (AT&L)) for—*
> *(i) Research and development for non-major systems, if the contract is over $25 million;*
> *(ii) The lead ship of a class; or*
> *(iii) The development of a major system (as defined in FAR 2.101) or subsystem thereof, if the contract is over $25 million;"*

These regulatory requirements, which implemented Section 807 of the National Defense Authorization Act of 1989 (Public Law 100-456), were recently repealed in the National Defense Authorization Act for Fiscal Year 2007. However, in developing the Acquisition Strategy for the LCS Flight 0 contracts and based on the regulatory guidance then in effect, the Navy assessed that the program risks were such that use of a fixed price type contract would not permit an equitable and sensible allocation of program risk between the Government and the contractor for Detail Design and Construction of the LCS lead ships.

TENETS OF LCS ACQUISITION STRATEGY

There are several specific tenets of the LCS program that affect first-of-class construction. The competitive strategy used for the LCS program is the construction of LCS Seaframes in mid-tier shipyards. These shipyards perform predominately commercial work, maintaining business processes and overhead structures that keep them competitive in the world market. By taking advantage of these resources in regions across the country, the Navy gains the benefit of their commercial efficiency, reduces exposure to regional market and environmental risks, and has the potential to shift construction yards as required to maintain cost and performance thresholds. In order to continue to capture these benefits, the LCS program has moderated traditional Navy requirements where possible to allow commercial processes to remain intact, maintaining the health of the mid-tier shipyards, reducing costs of the program, and maximizing the competitive industrial base for full-rate LCS procurement.

The LCS acquisition strategy includes continued procurement of two distinct Seaframe designs. This decision is based primarily on the cost control benefits derived from maintaining a competitive environment within the program. By forcing the two industry teams to compete, they are incentivized to continue the aggressive CAIV design/construction management, open business model, and cost focus. Maintaining two independent industry teams also provides the benefit of mitigating risks specific to either team and providing flexibility to the government to make operational or cost performance decisions in the future without undue disruption to Navy force structure plans.

Within each of the Seaframe industry teams, the application of an open business model pushes the benefits of competition down to the system and subsystem levels. The government has defined an industry tradespace that gives the teams the ability to recompete system selections and services within the performance based program requirements. The result is a continuous focus on cost and performance, with active bidding by competitors trying to dislodge incumbents from the design, and maintenance of a broad vendor base throughout the program life.

Finally, a similar open business model is applied to the spiral design efforts associated with the LCS modular mission packages. Under the direction of the Navy and an industry mission package integrator, new mission module systems are evaluated for cost and performance improvements over baseline systems. The modular open system architecture and defined seaframe/mission package interface specification of the program enables the Navy to capture these mission module opportunities for improvement with minimal integration cost and risk. This translates into continuous competition across a wide sector of industries associated with

mission module systems, resulting in best cost and performance value with each Mission Package procurement.

The LCS program differs from traditional ship construction programs in some fundamental ways that provide both opportunities and challenges.

The LCS acquisition strategy calls for a rapid 24-month build cycle for each seaframe, as opposed to the five or more years that have become the norm in naval shipbuilding. In addition to speeding the delivery of operational capability to the Fleet, the accelerated build timeline is designed to create cost benefits. By defining the build cycle constraint as a foundation of the program, this informed industry design and system selections to reduce risky and time consuming technology development. Only developmental systems that were absolutely required to meet performance requirements have been included in the LCS designs. Beyond system selections, the two-year build cycle also increases technology stability, reducing the risk of technology obsolescence that can occur between final design and procurement and construction. Finally, this shorter construction window should result in a direct reduction in program overhead costs. A certain portion of fixed overhead costs from lower tier vendors up through the industry and government program offices are minimized by simply shortening the construction period.

This shortened cycle, however, presents challenges and can exacerbate performance issues. Unexpected vendor issues or design changes are more difficult to accommodate. The most unpredictable, but often the most significant, source of schedule and cost pressure stems from the unique conditions and events that occur in and around an acquisition program, such as concurrent design and production, start-up construction experience with a first time design, and the impact of unforeseeable external events.

In addition to the aggressive 24-month build cycle, the LM lead ship detail design and construction effort was initiated simultaneously and the lead ship commenced construction only seven months after the start of final design.

The LCS program's use of a cost-as-an-independent-variable strategy entails setting realistic cost thresholds when defining operational requirements and managing aggressively to achieve those thresholds. Cost thresholds must balance mission needs with projected out-year resources, taking into account existing technology, maturation of new technologies, and anticipated process improvements in both DoD and industry

Requirements discipline is essential so industry has a stable baseline to build. The original LCS CDD specified seven KPPs and sixteen AAs that define desired LCS performance. Each parameter includes a threshold level that must be achieved and an objective level that is a "stretch goal." No specific equipment requirements are identified and capability in excess of that required by the CDD is not allowed. Contractor design and sub-system procurement decisions remain within industry tradespace as they optimize their Seaframes to meet the system level requirements – this tradespace is required to make CAIV work.

One of the LCS AAs is a cost per ship threshold of $220M (in Fiscal Year 2005 dollars) with an objective of $150M[1]. This cost target is explicitly included in a document normally devoted to operational requirements definition, and is thus flowed down as a requirement from the CDD through the shipbuilding contracts to the industry teams. Because the vision for LCS includes a relatively large number of ships (55 in accordance with the 30-Year Shipbuilding Plan), Navy leadership decided to focus principally on recurring ship cost and the absolute need to control growth so that the entire class could be procured within a constrained shipbuilding budget. The cost range selected was based on informed judgment of Navy leadership given the set of desired capabilities and the understanding that setting a very aggressive target was an absolutely essential part of any acquisition strategy to keep cost under control. The program was launched with aggressive cost and schedule goals, and an understanding that to get there the Navy had to be willing to trade capability if necessary.

Two of the most frequent reasons cited for acquisition cost growth are changing program requirements and government-directed design changes. The LCS program has proactively addressed each of these to prevent potential cost growth and maintain the CAIV threshold through continuous efforts to sensitize program stakeholders to the costs of requirements changes. The LCS program has implemented a disciplined change control process intended to eliminate non-essential design perturbations and allow only those change proposals that are critical to the success of the program. The LCS Configuration Control process manages, controls, and documents changes in the configuration of the Seaframe. Only those changes meeting the following criteria are approved:

- Fact of Life (change driven externally where no choice exists -i.e. equipment can no longer be procured)
- Safety (personnel or equipment)
- System Won't Work (government responsible change necessary to achieve required performance)
- Affordability (reduced cost or no cost changes)

The cost threshold, and all of the proactive cost management approaches dedicated to achieving it, do not eliminate continued uncertainties in future ship pricing and corresponding risk of cost growth. For this reason, the program's budget was updated to reflect the Navy's independent estimate conducted in March 2005, which includes risks associated with key shipbuilding cost factors. This risk-sensitive approach to budgeting, and the inclusion of normal execution costs for a Navy shipbuilding program, yields programmed unit procurement costs in the out-years greater than the $220M (FY05) CAIV threshold provided to industry. This is a reasonable and prudent budget practice that does not in any way signal a change in the Navy's commitment to the aggressive regimen of cost controls and the $220M (FY05) ship construction cost threshold.

DETAIL DESIGN AND CONSTRUCTION CONTRACTS EXECUTION ISSUES

The Navy has found significant cost increases with LCS 1, the lead LM hull, and on January 12, 2007, decided it was prudent to stop work on LCS 3, the second LM ship, while conducting a

[1] Capability Development Document for Littoral Combat Ship, April 2004, paragraph 6.2.8

thorough review of the program. Work is continuing on LCS 1 (LM), LCS 2 (GD), and LCS 4 (GD).

ASN(RDA) directed the LCS Program Office to conduct a thorough review of the program. ASN(RDA) has also tasked an independent team of acquisition specialists to review all facets of the program to date. Their findings will better position the Navy to determine the most effective and efficient course of action to ensure the most cost-effective and timely delivery of this critical capability. The Navy is reviewing all of its options and will decide in the coming weeks the course of action that is in the best interests of the Navy for the program.

However, based on execution history and early reviews, several major contributing factors to the cost growth are evident. The Navy wishes to stress that these are preliminary findings only. The path ahead for root cause analysis and resulting courses of actions is discussed later.

The Navy identified cost drivers for LCS 1 as concurrent design-and-build while incorporating Naval Vessel Rules (NVR), reduction gear delays created by a manufacturing error, and, insufficient program oversight. More recent drivers identified by LM include design volatility/concurrency; design complexity; shipyard productivity and process cost. These recent drivers will be more fully assessed by the ongoing program review.

Early in the contract execution period for LCS-1 (January – October 2005), declining cost performance was noted which was primarily attributed to the incorporation of the NVR and the reduction gear delays previously mentioned. These issues will now be discussed. Finally, oversight of the contracts will also be discussed.

NAVAL VESSEL RULES – HISTORY AND INCORPORATION IN THE LCS PROGRAM

An understanding of technical authority and NVR is necessary before discussing their specific impact on LCS.

NAVSEA is responsible, under Title X, as Technical Authority for Navy ships. In its technical authority role, NAVSEA is responsible for safety and performance of ships. Therefore, NAVSEA reviews and approves ship specifications and major ship design drawings and products. Since 1991, staffing has been reduced by 48% at NAVSEA headquarters from 4871 to 2331 personnel. As a result, NAVSEA needed to find innovative ways to fulfill its technical authority responsibilities. Particularly problematic has been maintaining the currency of Navy shipbuilding specifications and standards.

In order to address the challenges of technical authority under this environment, in February 2003, NAVSEA and PEO Ships made two joint decisions. The first was to work with the American Bureau of Shipping (ABS) to develop a set of standards that could be applied to non-nuclear naval combatant ships. The second was to utilize ABS to class both LCS and DDG 1000 using the new rules. Classification is a means to certify adherence to the rules through design approval and construction surveillance. Those decisions rested on the rationale that the Navy would benefit by extending our already extensive relationship with ABS built over the

course of many USNS ("T-Ship") programs. Fifty-five T-Ships have been successfully delivered using this model over the period 1990 to present. The key difference is that ABS would be Classing DDG 1000 and LCS using the new military design rules jointly developed with NAVSEA.

The NVR are intended to be tailored for a specific application by the Shipbuilder or their Design Agent during the design phase of a program, and then those tailored requirements are made contractual via direct citation in the Shipbuilding Specification. They address many key aspects of the design such as safety, stability, structural integrity, propulsion and electric plant design, ship wide network connectivity, and equipment electromagnetic compatibility. Shipbuilders and other members of Industry participate along with the Navy in the ABS Naval Technical Committee, which is the collaborative body charged with regulating this issuance of the NVR. That body has been focusing on the cost of technical requirements with the objective of making them truly the minimum acceptable standard that will provide the needed level of combatant performance.

The Navy maintains the lead in the early stages of competitive design programs like LCS (i.e., prior to Detail Design Phase). This involves the NAVSEA community to conduct evaluations of the technical feasibility of ship concept proposed in order to develop a full understanding of the inherent risks and to provide as clear an understanding of costs (both non-recurring and recurring) as can be supported by the level of detail provided. The Navy maintained the lead for evaluation and approval of the ship design through the LCS Final System Design phase (formerly known as the Contract Design Phase). Following the conduct of the Final Critical Design Review for each ship at the end of Final System Design, the Naval Technical Authorities issued a Design Approval decision that focused on the content of the Industry prepared Build Specifications and supporting design documentation, including drawings, reports and calculations. The Navy design approval was conditional in nature, and the documentation noted deficiencies and provisional aspects that needed to be contractually carried forward into the next phase for resolution by the Industry Teams.

Following the ship construction award, the lead for design approval of those aspects of the ships addressed in the NVR was shifted from the Navy to ABS. In that context, ABS is acting in their conventional role of an independent third party certification agent, and also as the designated agent of NAVSEA. The ABS involvement in the Detail Design and Construction phase is intended to confirm satisfactory compliance with the applicable design rules through three key activities: 1) Review and approval of engineering products (e.g., drawings and analyses), 2) Source inspection (in the vendor's plant) of major components (e.g., engines), and 3) Survey of the ship under construction.

The ABS and the Shipbuilder establish a contractual relationship to coordinate the flow of detail design products through the approval process. Because the ABS reviews the large number of construction drawings used in the Shipyard, drawing reviews can become the pacing aspect of scheduling early in any construction program. If design products are provided out of sequence to the ABS, or products do not comply with the invoked rules, the agreed upon timeframes are in jeopardy. When those circumstances are present Shipbuilder/Design Agent generated delays are

likely to occur, as is the case on the LCS program. In such cases, engineering rework results, and iterative re-submittals of product to the ABS become necessary.

Throughout the ABS review process NAVSEA retains ultimate accountability and full technical authority, as required under their Title X responsibilities. That means they are consulted by either the Design Agent or ABS to adjudicate any proposed exceptions to the invoked rules, and during construction, they evaluate the acceptability of non-compliant material conditions.

Another dimension of Naval Technical Authority involvement in the LCS Detail Design and Construction phase is the constant interactions surrounding CAIV cost trades recommended by the Industry Teams and technical adjudication of formal Requests for Deviations under the shipbuilding contract. NAVSEA reviews such requests, and evaluates each one on its individual merits before recommending a risk-based decision to the Program Office. Due to safety and service reliability considerations, many of these deliberations became difficult decisions to determine what ultimately could be accepted under the contract. As a result, the NAVSEA Chief Engineer has for months conducted bi-weekly meetings with the PEO Ships staff to give these issues in-depth consideration and quickly arrive at a conclusive decision or course of action. These activities have been focused on accommodating the Shipbuilders' needs in a timely manner and holding the line on costs, while maintaining safety and fitness for military, worldwide service.

To smooth the execution of these activities, intensive efforts were applied to establish Coordination Plans between the ABS, the SUPSHIP and each Shipbuilder early in the Detail Design and Construction phase. However, a number of execution difficulties have arisen (e.g., coordination of waterfront ship surveys and tests), and corrective measures on individual issues are being aggressively managed between the ABS, the Shipbuilders/Design Agents and the Naval Technical Authorities. To regulate this process more finely, NAVSEA has established a structured set of Business Rules that are being reevaluated on a regular basis.

Both teams have expressed difficulty in incorporating NVR, and LM and Marinette Marine have identified it as a major root cause of the cost overruns. The NVR was first published after Final System Design (FSD) proposals were submitted to the Navy, but both LCS teams were aware of the NVR development process, interacted with ABS to ensure insight into interim criteria, and had that information to influence and cost their respective design proposals to meet the RFP requirements. The Request for Proposal clearly stated that LCS should be designed and built in accordance with ABS Guide for Building and Classing Naval Vessels. It was so important enough to the government, that "Ability to Produce a Classed/Certificable Design" was one of four Technical Evaluation factors for the Final System Design/Detail Design and Construction competition. The NVR guide was published one week prior to FSD contract award to each team. LM had approximately 9 months to incorporate NVR into its FSD before fabrication began in February 2005. GD had approximately 18 months to incorporate NVR before fabrication started.

The Navy does not deny that NVR has been a contributor to cost. The impact of NVR was first considered early in 2005. The Navy worked with the LM team to identify those impacts and negotiate adjustments to the LCS 1 contract, which has provisions for the incorporation and classing of LCS to NVR. In order to accommodate these impacts, the program completed an

over-target baseline in October 2005 and increased the budget for LCS 1 in the President's FY 2007 Budget in February 2006.

REDUCTION GEAR MANUFACTURING ERRORS

The LCS first-of-class ships have also experienced some delays in delivery of critical components. The most significant of these resulted from a series of errors and failures in the manufacturing of a main reduction gear that delayed its delivery by eighteen weeks and created a total impact of twenty-seven weeks. The total delay of the manufacturing errors was not immediately recognized, with notifications of additional delays occurring over several months. Due to its size and location in the ship, typical build sequences place the reduction gears into the ship early and the remainder of the ship is built around it. As a result of this error, construction was resequenced multiple times in attempts to mitigate schedule impact but the net result was significant to both schedule and cost performance on the contract.

Another contributing factor has been the unprecedented spike in basic prices of critical shipbuilding commodities. For example, over the past three years steel prices have increased in excess of 125%, and copper has increased by more than 300%[2]. These dramatic increases have direct and significant impacts on LCS seaframe end costs. The primary mitigation method within program control is to maximize the stability of the acquisition such that the industry teams can enter long-term agreements with suppliers and minimize variability in their material costs.

ACTIONS RESULTING FROM EARLY COST GROWTH

As a result of the early cost growth due primarily to the incorporation of NVR and the reduction gear manufacturing error, the Navy and LM conducted a joint assessment of schedule impact and re-plan options, including an assessment of the Estimate-at-Completion (EAC) costs. Schedule was also assessed. In October 2005, the Navy approved what is termed an "over-target baseline" essentially resetting the baseline against which cost and schedule performance is measured. Delivery of LCS-1 was also shifted from December 2006 to June 2007. Subsequently the Navy prepared a budget issue and increased the LCS-1 budget in Fiscal Year 2007 based on the revised over-target baseline.

Cost growth has continued on the LCS-1 contract since this over-target baseline. LM has identified to the Navy that these cost increases include the impact of design volatility/concurrency; design complexity; shipyard productivity and process cost. These recent drivers will be more fully assessed by the ongoing program review.

OVERSIGHT OF THE LCS PROGRAM

The LCS program is held to the same oversight and reporting standards of any major Department of Defense acquisition program. For example, monthly cost performance reports are submitted by contractors. However, a period of up to six or seven weeks of latency exists. With LCS program's compressed construction schedule, this lag time creates management challenges. Further complicating the utility of these periodic performance metrics is the need to evaluate

[2] Bureau of Labor and Statistics, Producer Price Index Commodity Data, www.bls.gov

trends over time in order to gauge overall performance and the effectiveness of corrective actions taken to improve it. Compared with the more lengthy production cycle of a traditional combatant, the LCS program's schedule constrains opportunity to effectively evaluate and direct optimal corrective action that thoroughly considers both schedule and cost mitigators.

Oversight of the program involves PEO SHIPS, NAVSEA, and ASN(RDA). The roles of each of these organizations will be discussed including current shortfalls. The ongoing review will determine whether or not these shortfalls are significant contributing factors to the cost overruns, and what corrective actions the Navy will take.

PEO SHIPS and LCS Program Office Oversight of the LCS Contracts

PEO Ships is directly accountable to the Service Acquisition Executive (ASN(RDA)) for all acquisition matters regarding non-nuclear ships. Under Title X, PEO's are directly accountable for cost, schedule, and delivery of their ships and are vested with the funds and resources to carry out their assigned programs. NAVSEA reports to ASN(RDA) for acquisition matters, including support functions to the PEOs, but NAVSEA also reports to the Chief of Naval Operations for in-service ship maintenance, overhaul, logistic support, and modernization. In practice, there is shared tasking and numerous "supporting" and "supported" roles between NAVSEA and the PEOs.

The LCS program office (PMS-501) exercises technical and programmatic oversight of the LM industry teams via a comprehensive team representing all systems engineering disciplines.

Prior to option exercise for detailed design and construction, the program office conducted multiple, detailed reviews of industry design development progress to insure compliance with requirements and support for production.

After detailed design and construction option award, the program office conducted multiple reviews of shipbuilding progress, focusing on design support for production, manning levels, material procurement and facility readiness. These reviews culminated in a Production Readiness Review (PRR) to insure the contractor's readiness to start fabrication. The agenda for a PRR included:

- Detailed Design Status
- Shipyard Staffing Plan
- Material Procurement Status
- Integrated Master Schedule Development
- Production and Quality Assurance Organization and Plan
- Earned Value Management System.

The program office held quarterly Ship Production Progress Conferences (SPPCs) with the contractor to review all aspects of ship design, construction and support. The agendas for an SPPC included:

- Design/Technical Issues
- Logistics Readiness Review
- Test and Trials Planning/Status

- Program Cost
- Contract Status
- Post Delivery Planning

The program office also held Integrated Baseline Reviews (IBRs) of the contractor's earned value management system to enable accurate and timely submission of monthly Cost Performance Reports (CPRs).

Throughout the design and build phases of the effort, the program office also maintained regular review of contract deliverables and cost status and held biweekly Program Manager to Program Manager meetings to discuss progress and resolve specific issues.

Program Office department leads (technical/test, financial, production, logistics) operate independently between formal reviews, interacting with Industry Team counterparts, on-site SUPSHIP, field activity and NAVSEA headquarters personnel to mange ongoing issue resolution, program performance and action item closure.

The program office submits a Defense Acquisition Executive Summary (DAES) report to the ASN (RDA) and OSD on a quarterly basis. The DAES provides a periodic update on program test and evaluation, logistics requirements, cost, schedule, funding, and contract performance.

The PEO is also closely involved with the Program Office in management of the program. The PEO has near daily interactions with each of his programs including weekly program status, monthly metrics, and quarterly program performance reviews. The PEO serves as Fee Determining Official for multiple award fee contracts, approves Acquisition Plans, and reviews source selections prior to Contract Awards. The PEO provides guidance and strategy for annual financial reviews including POM/budget submissions, the SCN Execution Review and the O&M,N review. He ensures that the inputs from the PMs are integrated and prioritized prior to submission. The PEO reviews and attends Congressional and OSD/OMB Program Reviews once again ensuring that an integrated position is presented. For significant events, e.g. Hurricane Katrina recovery efforts or preparations for a DAB for an ACAT 1 program, the PEO will interact with the PM on a daily basis shaping strategy and providing a coherent picture to Navy leadership. The PEO periodically visits construction sites at BIW, NGSS Pascagoula, NGSS Avondale, Austal, Marinette Marine, NASSCO to conduct program reviews in yard.

NAVSEA Relationship with PEO Ships in LCS Acquisition

The Naval Sea Systems Command (NAVSEA) has supported the PEO Ships and the LCS Acquisition Program in three principal functional areas: (1) contracts, (2) ship detail design approval, and (3) oversight by the Supervisors of Shipbuilding, Conversion and Repair (SUPSHIP) Gulf Coast and Bath, Maine.

With respect to acquisition, NAVSEA's Title X responsibility spans a wide range of activities critical to program success, including:

- Head of Contracting Agency
- Budget Submitting Office and fiduciary administrator

- Legal Counsel
- Logistics Policy
- Technical Authority and oversight including design review and approval of major design products technology development and de-risking at the Warfare Centers
- On-site day-to-day contract administration and oversight at contractors' plants

Two significant developments have challenged the NAVSEA/PEO Ships team over the past 15 years. These developments are:

- Staffing reductions of 51 percent in Headquarters (NAVSEA and PEO's) and 50 percent in the SUPSHIP offices that execute shipbuilding contracts.
- Significant workload increase, characterized by growth in Acquisition Category I programs from 17 to 22, increase in major ship designs from 15 to 21, increase in ships under construction from 20 to 44, including 5 lead ships, and major increase in complexity in software systems with growth to 16 surface ship combat systems baselines.

LCS Contract Support

NAVSEA Contracts provides all Procurement Contracting Officer services to the PEO/Program Manager team. These services include contract strategy, structure, writing, negotiations, contacts with the shipbuilder, and major contract change execution.

The LCS program has been supported in the NAVSEA Contracts Directorate by a program-dedicated, senior Contracting Officer with supporting contract specialists and interns. Since the program's inception in 2002, the NAVSEA Contracting Officer has been responsible for awarding contracts for each phase of the LCS program.

The LM contract is administered by Defense Contract Management Agency (DCMA), with a supplemental delegation to SUPSHIP Gulf Coast for administration of the ship construction subcontracts with Marinette Marine (LCS 1) and Bollinger (LCS 3). The GD contract is administered by SUPSHIP Bath.

Ship Detail Design Approval

As stated in the discussion on NVR, NAVSEA is responsible, under Title X, as Technical Authority for Navy ships. In its technical authority role, NAVSEA is responsible for safety and performance of ships. Therefore, NAVSEA reviews and approves ship specifications and major ship design drawings and products. More details on NAVSEA's role in approval of the LCS Detail Design were discussed thoroughly previously.

Oversight by Supervisor of Shipbuilding, Conversion and Repair (SUPSHIP)

For Navy shipbuilding contracts, the SUPSHIP Contract Administration Office provides the contract administrative services that are directed by the Federal Acquisition Regulation (FAR). These services include contract administration, engineering surveillance, quality assurance, logistics, and financial administration of the assigned contracts.

SUPSHIP Gulf Coast and SUPSHIP Bath, Maine are accountable to the Commander, NAVSEA for field execution of contractual and technical responsibility for the Navy's LCS shipbuilding effort under the overall contracts. SUPSHIP provides engineering, technical and other services beyond the traditional FAR contract administrative services functions, most of which are unique to the shipbuilding industry such as crew support, ship/combat systems testing oversight, sea trial support and coordination, and outfitting material management. The SUPSHIP Commanding Officers have dual reporting responsibilities to NAVSEA and PEO Ships, and the SUPSHIP Program Manager's Representatives have dual reporting responsibilities to the SUPSHIP Commanding Officers and the LCS Program Manager.

The LCS contract with LM is unique in that the prime contractor is not a shipbuilding company. Consequently, the designated Administrative Contracting Officer for the overall LCS contract is DCMA vice the SUPSHIP. SUPSHIP Gulf Coast was delegated the contract administration responsibility by the Procurement Contracting Officer for the shipbuilding effort being accomplished at Marinette Marine Corp. in Wisconsin for the LCS-1 and Bollinger Shipyard in Louisiana for the LCS-3. SUPSHIP Gulf Coast's responsibility covered ship construction and test only. For the GD contract for LCS-2 and LCS-4 being constructed at Austal in Mobile, Alabama, SUPSHIP Bath was delegated the contract administration responsibility by the PCO.

An on-site SUPSHIP Gulf Coast Project office manages the contractual, business, and technical requirements unique to the shipbuilding environment. The on-site SUPSHIP Gulf Coast LCS project team at Marinette Marine Corp. is currently staffed by eleven personnel. SUPSHIP Bath has a similar arrangement at Austal and is currently staffed at eight personnel. SUPSHIP Gulf Coast provides oversight of the LCS program at Marinette Marine Corp. in the following areas:

- **Technical**
  - Design review. SUPSHIP Gulf Coast reviewed LCS drawings in conjunction with the ABS for compliance with NVR, and other specifications and contract requirements. SUPSHIP Gulf Coast has reviewed 602 drawings resulting in 123 Quality Deficiency Reviews. SUPSHIP Gulf Coast engineering works in collaboration with the NAVSEA Engineering Directorate Ship Design Manager and the PEO Ships LCS Program Manager (LCS Program Manager) to resolve outstanding Quality Deficiency Reviews.
  - Deviations and waivers. SUPSHIP Gulf Coast Waterfront engineer has performed on-site interface with Marinette Marine Corp. and shipchecks of technical issues. Examples of SUPSHIP Gulf Coast interface are independent review of Marinette Marine Corp. launch calculations and preparations; and coordinating resolution of the Request For Deviation to load fuel for Generator light off.

- **Quality Assurance**

Waterfront oversight of contractor production efforts. In conjunction with the ABS, SUPSHIP Gulf Coast witnesses critical tests and processes and issues Quality Deficiency Reviews where the contractor fails to meet specification and NVR requirements.

- **Contract administration and Earned Value**

As discussed, Procurement Contracting Officer functions for LCS are performed by the NAVSEA Contracts Directorate. Administrative Contracting Officer functions for LM's LCS contract are performed by DCMA. SUPSHIP Gulf Coast performs Contract Administration Office functions for Marinette Marine Corp. on the shipbuilding effort. SUPSHIP Gulf Coast performed initial review of Marinette Marine Corporation's Earned Value Management System and provided recommendations to the Administrative Contracting Officer at DCMA concerning conditional approval status. SUPSHIP Gulf Coast also performed review and analysis of contractor-submitted Earned Value Management System data and submitted its analysis to DCMA for roll up and submission to the LCS Program Manager in a monthly report.

- **On-site project office and Program Manager's Representative**
  - At construction contract award (May 2004), the SUPSHIP Gulf Coast program management representative (Navy Commander Engineering Duty Officer) assigned to SUPSHIP Gulf Coast Pascagoula traveled to Marinette on a weekly basis. Since August of 2006, a Navy Commander Engineering Duty Officer has been assigned full time as SUPSHIP Gulf Coast project officer on-site to coordinate SUPSHIP Gulf Coast Contract Administration Office duties and support to the LCS Program Manager.
  - On-site SUPSHIP Gulf Coast Project Team at Marinette Marine Corp. increased from initial two personnel in February 2005 (start of construction) to the current level of 11.
  - The SUPSHIP Gulf Coast Project Team on-site manages all Contract Administration Office functions and reports on weekly basis both to the LCS Program Manager and SUPSHIP Gulf Coast. In addition the SUPSHIP Gulf Coast project team provides daily status reports via email (to SUPSHIP Gulf Coast and LCS Program Manager) concurrent with major milestones readiness (e.g., launch, Generator light off).
  - Quarterly LCS program reviews (government and industry) were conducted beginning in April 2005 with contractor presentations. Dates of quarterly reviews were: April 2005, June 2005, August 2005, October 2005, February 2006, May 2006, October 2006 (production and technical issues only).

- **Production Status Reporting**

SUPSHIP Gulf Coast Project Team personnel on-site perform an independent analysis of contractor physical progress on a weekly basis that is reported to the LCS Program Manager and SUPSHIP Gulf Coast.

- **Test Status Reporting**

Test status is observed by the on-site team. Status is reported to the LCS Program Manager and SUPSHIP Gulf Coast on a bi-weekly basis. Test holdups that are caused by Government furnished material or information are reviewed by the on-site team.

Overall, SUPSHIP Gulf Coast on-site personnel provide the LCS Program Manager and SUPSHIP Gulf Coast an independent assessment of physical progress, design compliance, and quality assurance. A beneficial element from this independent assessment is the constructive

feedback to the shipbuilder for potential improvements to processes. Additionally, SUPSHIP Gulf Coast on-site personnel regularly conduct independent in-process inspection and test witnessing to validate the process and product. This includes significant efforts related to coatings, welds, tanks, piping, machinery installation, and monitoring of the shipbuilder's corrective action programs. Further, SUPSHIP Gulf Coast subject matter experts have traveled to Marinette Marine Corp. from Louisiana and Mississippi to train Marinette Marine Corp. personnel on specific procedures and requirements for cableways.

ASN(RDA) Oversight of the LCS Program

The Assistant Secretary of the Navy for Research, Development and Acquisition (ASN(RDA)) serves as the Navy Acquisition Executive. The Assistant Secretary has authority, responsibility and accountability for all acquisition functions and programs, and for enforcement of Under Secretary of Defense for Acquisition, Technology and Logistics procedures.

In addition to the oversight functions of PEO Ships, the LCS Program Office (PMS 501), and NAVSEA for LCS acquisition, ASN(RDA) has also remained closely involved with LCS. ASN Staff closely review the quarterly Defense Acquisition Executive Summary (DAES) reports provided by each major defense acquisition program, including LCS. The DAES reports include key metrics tracking program performance, schedule, and cost against the approved Acquisition Program Baselines (APB's). In addition, the DAES reports include an assessment of cost and schedule performance for major contracts.

In addition to the routine DAES reports, ASN(RDA) has also required key programs, including LCS, to submit monthly volatility metrics in the areas of program complexity, requirements fluctuation, budget instability, schedule instability, and program manager-contractor optimism. Volatility in any of these areas can increase cost and schedule pressures.

For LCS, ASN has also held biweekly meetings beginning in March 2006. The total LCS program involves several Program Executive Offices – Ships for the seaframe, Integrated Warfare Systems (IWS) for the seaframe combat system, Littoral and Mine Warfare (LMW) for the mission modules, Strike Weapons and Unmanned Aviation (W) for unmanned air vehicles in the mission packages, and Air Anti-Submarine Warfare, Assault, and Special Mission Programs (A) for manned aircraft in the mission packages. In addition to regular LCS program status updates, the biweekly meetings have focused attention on integration issues across the seaframe, combat system, and mission packages.

In addition, ASN(RDA) has held a series of meetings, beginning in June 2006, to focus on the future acquisition strategy for the LCS program. Options under consideration included continuing program of record, singling up on a seaframe, and going to a common combat system/weapons system hardware. These discussions will provide the framework for the future Milestone B discussions.

In addition to the regular ASN oversight of the program, members of the staffs of the Deputy Assistant Secretaries of Navy for Ship Programs (DASN SHIPS), for Integrated Warfare Systems (DASN IWS), for Management and Budget (DASN M&B), and for Acquisition Management (DASN AM) interact day-to-day with the PEO's and Program Offices for LCS.

These personnel are regularly apprised of program acquisition status and issues, and also interact with the staffs of the Chief of Naval Operations, other organizations within the Secretary of the Navy (particularly, ASN for Financial Management and Comptroller), and the Office of the Secretary of Defense regarding LCS issues.

LCS Program Way Ahead

During the 90-day stop work period, the Navy will complete an Industry / Government Root Cause analysis; evaluate contractual terms / conditions for proceeding forward on LCS 3; assess LM management team's ability to deliver LCS 1 and LCS 3; revalidate earned value management system at Marinette Marine, Gibbs & Cox, and LM; re-baseline cost and schedule; revalidate contract performance status, and cost control processes in place; conduct an independent Program Management Assist Group (PMAG) and take corrective actions. The Navy will then perform a similar assessment for LCS 2 and LCS 4. Based on the findings and recommendations the Navy will develop a proposed financing plan regarding the cost growth. The Navy expects these initial actions to be complete within the first 30-45 days following the LCS-3 stop work.

The Navy is also determining how much of the lead-ship cost increase will carry over to follow ships, assessing company actions to regain cost control, and evaluating changes to improve Navy program management and oversight. The Navy will also develop an acquisition strategy for LCS 5 and follow which factors in the results of the LCS assessments and chosen course of action. This acquisition strategy assessment is expected to be complete within 90 days.

Conclusion

As the Chief of Naval Operations, Admiral Mike Mullen, recently stated, "The LCS program remains of critical importance to our Navy. With its great speed and interchangeable war fighting modules, the ship will provide unprecedented flexibility." This program was designed from the outset to provide this critical capability to the Fleet as quickly as possible. The innovative acquisition features employed to do this carried risk as well as opportunity. CAIV was a key tool in the design of the LCS system.

Despite the cost growth on LCS-1, the Navy continues to remain committed to cost control. Cost overruns on Navy shipbuilding programs cannot be tolerated. The Navy will, along with industry, identify the root causes of the cost increases, and provide a solution. As determined necessary by the current program review, the Navy will take immediate action to maintain control of the program and enhance oversight to keep costs affordable.

In order to maintain the trust and confidence of the American public and Congress that the Navy is being good stewards of tax dollars, the Navy intends to remain transparent as decisions are implemented that affect the status of the LCS program.

Not for publication until
Released by the
House Armed Services Committee

Statement of

Fred P. Moosally, President, Lockheed Martin MS2

Kevin Moak, Chairman & President, Gibbs & Cox

Richard McCreary, Vice President & General Manager, Marinette Marine Corporation

Mike Ellis, Executive Vice President & Chief Operating Officer, Bollinger Shipyards, Inc.

Before The

House Armed Services Committee

Subcommittee on Seapower and Expeditionary Forces

February 8, 2007

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Mr. Chairman and distinguished members of the Subcommittee, thank you for the opportunity to discuss the progress we are achieving on the U.S. Navy's LCS Program. This document addresses, in detail, the major issues that are driving cost growth on the LCS 1, lessons learned, and corrective actions we have implemented on LCS 1 and plan to implement to ensure LCS 3 construction does not experience the same challenges. Speaking for the men and women of Lockheed Martin and our partners Gibbs & Cox, Marinette Marine and Bollinger Shipyards, we are very proud to be associated with this important National Defense program. LCS will be a key component of the Navy's Surface Combatant force which is a critical capability for projecting American power abroad and supporting the Global War on Terror. Each of us, in accomplishing our daily tasks on the program, has a deep sense of the importance of achieving the very best for the Navy and our nation.

The Lockheed Martin (LM) Team is committed to delivering LCS ships at an affordable price and has invested tens of millions of dollars in design efforts, business process improvement, and other areas to ensure our team supports the Navy's needs for efficient shipbuilding over the life of the LCS Program. As you will read in this document, our team has experienced cost and schedule growth on LCS 1 due to:

- The initial program's aggressive acquisition plan, which resulted in a moderate risk program plan that provided little flexibility in the areas of cost and schedule from the outset.
- With little schedule flexibility from the outset, the program was significantly impacted by the insertion of new shipbuilding standards and build specifications (shortly after contract award and at the conclusion of Final Design) that introduced extensive changes, above those expected for a lead ship. The Naval Vessel Rules introduced over 14,000 new technical requirements which required review and adjudication to determine applicability to the Lockheed Martin LCS design. This in turn drove many of the over 600 engineering changes on the lead ship.
- Adverse material shortages (e.g., steel needed for U. S. Army wartime requirements) and a vendor supply issue on a major component (i.e., main reduction gears delivered six months late) that forced out-of-sequence ship module construction in order to minimize the impact to the overriding program management goal --- schedule.
- First-of-Class issues associated with the process of transitioning a new ship design into production.

Collectively, these challenges forced significant program inefficiencies through out-of-sequence construction, excessive unplanned concurrency between design and production, and significant rework, all of which are still impacting the LCS 1 cost and schedule.

The Team has conducted lessons learned assessments and implemented corrective actions throughout the LCS 1 design and construction program. We recently conducted a detailed root cause analysis and developed additional corrective actions, all of which are being implemented into the LCS 3 program plan to ensure we do not experience the same challenges on that ship.

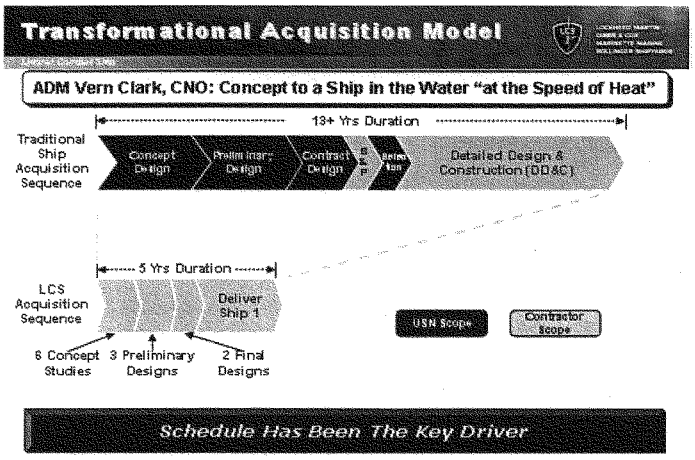
The LCS Program is a transformational acquisition. And while we have not achieved all of our goals on the lead ship, we are on track to deliver this ship 60% faster than under a traditional

acquisition process. In addition, LCS 1 is the first combatant designed to the Navy's new Naval Vessel Rules and the first surface combatant classed by the American Bureau of Shipping (ABS). As such, we are paving the way and learning countless lessons for the design of future U.S. Navy Surface Combatants such as DDG 1000, which will also be designed to these same standards. Despite the cost growth associated with these achievements, we are on track to ensure that LCS will be the most affordable surface combatant in the U.S. Navy.

Overview

The LCS Program had its origins in 2002, when the U.S. Navy established top level objectives and funded industry for exploratory studies for a Focused Mission High-Speed Ship. This ship was envisioned to be a networked, agile, surface combatant capable of defeating anti-access and asymmetric threats in the littorals. LCS was to be procured under a "transformational" accelerated acquisition strategy that would enable the ships to be designed, constructed, and delivered to the Fleet in less than half the time of a traditional acquisition using best commercial shipbuilding practices, commercial off the shelf (COTS) equipment, and a spiral development process. This strategy was reinforced by senior Navy leaders who frequently stressed the need to get LCS to the Fleet with all deliberate speed. Schedule was the overarching program priority since the program began. The Navy also adopted commercial shipbuilding standards and would have the ship constructed and classed under the American Bureau of Shipping (ABS) rules. The ship would also be completely designed by industry. It was believed that this acquisition strategy would lead to significantly lower acquisition costs and a $220M (FY05) unit cost target was established beginning with the lead ship. Unlike previous programs the cost target was included as a program requirement in the JROC approved Capabilities Development Document.

Another key element of the acquisition strategy was to utilize RDT&E funds and cost-plus contracts to pay for the lead ship of each design, as they were in many ways considered prototypes. Cost-plus contracts are the right contracting vehicle for lead ships since requirements are typically immature, and result in significant changes.



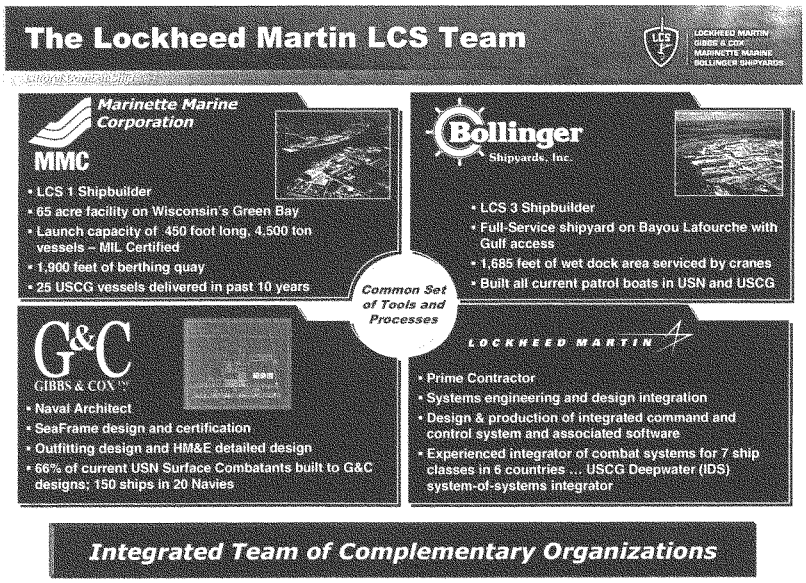
Lockheed Martin (LM) LCS Team Approach

Lockheed Martin's approach to LCS was to assemble a team of "mid-tier" shipbuilders and an independent Naval Architect to design and construct the ship. The Navy had consistently encouraged participation from smaller shipbuilders that could more efficiently build ships similar in size to LCS as well as being able to use commercial shipbuilding processes. In 2003, Lockheed Martin established formal agreements with Gibbs & Cox and shipbuilders Marinette Marine and Bollinger Shipyards. Two shipyards were brought on the team to ensure there was sufficient capacity to meet the Navy's steady-state build rate of up to six ships per year.

Lockheed Martin serves as the prime contractor and mission system provider for the team. LM's experience includes development and prime contract management of the Sea Shadow, Sea SLICE, and AGOR 26 vessels for the Office of Naval Research (ONR) as well as serving as the systems integrator and combat system developer for eight classes of Naval Surface combatants in six countries. Over 150 ships currently in service in 20 navies around the world, including the battle proved FFG 7 and DDG 51 class U.S. Navy surface combatants, were built to Gibbs & Cox, Inc. designs. Marinette Marine (Marinette, WI) and Bollinger Shipyards (Lockport, LA) have the facilities and capabilities to build ships similar in size to LCS. Marinette Marine has successfully completed commercial, ABS Classed and Government shipbuilding contracts in their long history, including U.S. Navy Mine Countermeasure Ships, U.S. Coast Guard Buoy Tenders and Ice Breakers, and multiple Ferries and Tug Boats. Bollinger Shipyards owns and operates 13 full service Shipyards on the Gulf Coast with a workforce of over 3,000. Bollinger's three new construction yards have built and delivered 597 vessels in the last twenty years. This includes 166 military vessels for various branches of the Government (U. S. Navy, U. S. Coast Guard, and U. S. Army), and 431 commercial vessels. These mid-tier shipyards are lean and have the flexibility to balance commercial and Government workload to ensure that the Navy does not have to pay overhead costs to maintain capability during periods of limited Government

funding. Marinette and Bollinger have proven that they are also capable of constructing unique, one-of-a-kind vessels on fixed budgets and schedules if they begin with stable requirements and a mature design package.

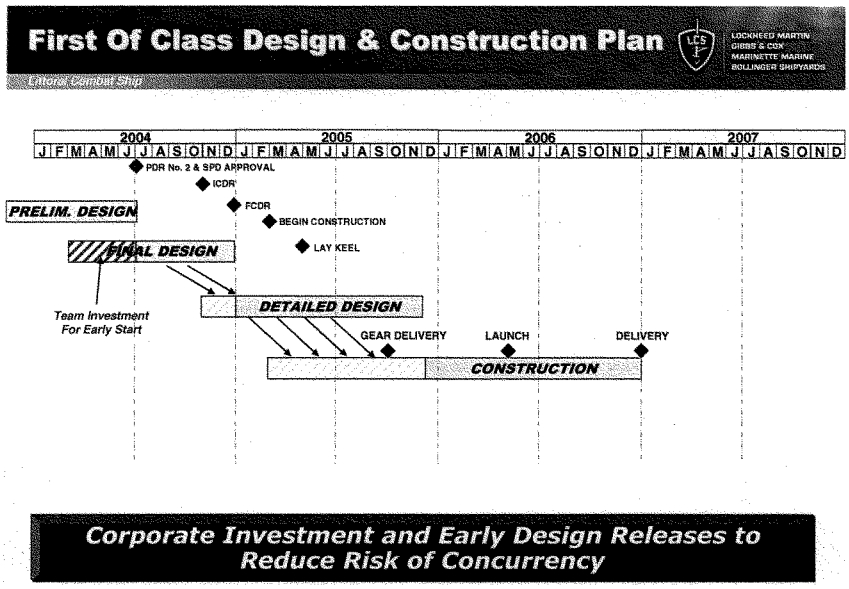
The LM team entered the LCS competition with a new semi-planing monohull design based on similar ships built by Fincantieri of Italy. The team developed and implemented a common program approach to ensure maximum learning between shipyards. This included a common computer aided design system, common hull block breakdown and build sequence, and extensive sharing of construction processes. The approach was to form one integrated shipyard with the capability to construct LCS ship modules at either yard. In fact, this was proved during the construction of LCS 1 when Bollinger successfully constructed the largest and one of the most complex hull modules for Marinette Marine.



The LM Team developed a comprehensive phased approach to accomplish Preliminary Design (6 months), Final Design (7 Months), Detailed Design and Construction (24 months) and deliver the LCS using commercial shipbuilding approaches, non-developmental components from domestic and international COTS vendors to meet the cost and schedule goals set forth by the Navy acquisition plan and required in the LCS Request for Proposal (RFP). Given the aggressive acquisition schedule, this plan also time-phased the design and construction activities to allow the designs to be completed and approved by NAVSEA and ABS prior to construction. This approach would allow Marinette Marine (MMC) to construct modules that were pre-outfitted to

85% or more prior to erection. Such an approach is critical for cost-effectively building the ship and historically, MMC has been able to achieve these levels of pre-outfitting on both commercial and government shipbuilding programs.

Preliminary Design began in July of 2003 and culminated in a successful Preliminary Design Review in January of 2004. Final Design proposals were delivered to the Navy in January of 2004 with final design anticipated to start in May of 2004 after award. During the 5 months between the end of Preliminary Design and the start of Final Design the LM team made a significant investment to begin Final Design ahead of contract award to reduce the risk of completing the final design in the required 7 months. The requirements baseline at the January 2004 Preliminary Design Review included the Oct 2003 Naval Vessel Rules (NVR), a draft release of the Feb 2004 NVR, and the 2003 High Speed Naval Craft (HSNC) rules. The LM team in conjunction with the Navy and ABS also established an ABS rules matrix to identify alternate rules to use where no specific rules were listed in the draft NVRs. Using this requirements baseline from PDR the team transitioned into Final Design ahead of contract award. These investment activities included Gibbs & Cox, Marinette Marine, Bollinger Shipyards and Lockheed Martin executing the proposed processes and tools and employing the key personnel identified in our proposal. This period allowed the team to mature the design and start 133 (59%) of the functional design drawings required for submittal to ABS and complete 53 (24%). This effort further reduced the risk going into the 7 month Final Design phase.



As part of the proposal activity, the LM team, negotiated Firm Fixed Price (FFP) subcontracts for 12 major systems, which would remain valid for subcontract execution after the prime contract was awarded. In addition the team executed Letters of Intent with three critical long lead suppliers, whereby these suppliers agreed to undertake design and production planning activities at their own cost and risk, in advance of contract award. These activities were intended to minimize overall cost and schedule risk. The requirements for these components were based on the Preliminary Design requirements baseline, as documented in formal Purchase Technical Specifications. The team also submitted for approval a Specified Performance Document defining the official performance baseline for the program. The mature design that resulted and the negotiated supplier base were part of the LM team's risk mitigation approach to deal with the aggressive acquisition schedule set by the Navy. Despite these mitigation efforts we assessed the schedule as a moderate risk.

LCS 1 Program Execution Challenges

Final Design and Detailed Design & Construction was awarded to the LM team on 29 May 2004. A U.S. Navy / LM Team kickoff meeting was held on 3 June 2004. At kickoff the team was informed that the requirements baseline had changed substantially. A new version of the NVR, dated 21 May 2004, was to be invoked as well as an extensive list of modifications to the Specified Performance Document. The new NVR included over 14,000 new technical requirements and 23 previously unreleased major sections which required review and adjudication to determine applicability to the Lockheed Martin LCS design. This in turn drove many of the over 600 engineering changes on the lead ship. This substantial change to the requirements baseline (driven by the new NVR) caused the team to revisit much of the design accomplished during the Preliminary Design Phase and invalidated the progress made possible with team investment during the early start of Final Design. The LM team pre-contract schedule progress funded with corporate investment was negated by these NVR-driven design changes.

Comparison of the May 2004 and February 2004 NVR Specifications

	Draft Feb 2004 NVR			21 May 2004 NVR		
NVR Part	**Pages**	**# Tech Rqmts**	**# of Sections**	**Pages**	**# Tech Rqmts**	**# of Sections**
Part 0 - Intro/General Provisions	166	1537	9	184	713	11
Part 1 - Hull and Structure	140	1042	4	220	1643	6
Part 2 - Propulsion and Maneuvering	238	2265	2	628	6386	7
Part 3 - Electrical Systems	270	2383	5	417	2967	5
Part 4 - Control and Navigation	210	1680	4	233	2229	5
Part 5 - Auxiliary Machinery Sys	199	1409	6	765	9223	15
Part 6 - Habitability and Outfit	421	2217	14	156	2410	16
Part 7 - Military Environment	10	24	3	17	19	3
Part 8 - Materials and Welding	650	2704	18	587	3845	20
Total	**2,304**	**15,261**	**65**	**3,207**	**29,435**	**88**

On 12 June 2004 the team conducted a second PDR (six months after the original PDR) to reset the requirements baseline. Although PDR was considered successful by the Navy / Industry Team, many of the completed preliminary design and final design products had to be reworked. To maintain schedule the team began Final Design in parallel with this Preliminary Design re-work to meet a December 2004 Final Critical Design Review milestone. During this period the team updated the material Purchase Technical Specifications and began to renegotiate our fixed price contracts with suppliers. Development of the Build Specification began in this early phase, to document and reflect the design as it was evolving. The resulting concurrency in designand construction negatively impacted the team's ability to clearly assess, depict or predict the overall schedule impact due to the cumulative impact of all the changes.

Throughout the process of incorporating the Naval Vessel Rules and the build specification updates, the ship's cost, weight and performance were closely monitored. As cost broached the $220M target, the LM Team continuously offered solutions and reductions to the Navy for consideration. The same was true for the increased weight driven by changes that added capability, redundancy and/or survivability improvements, but impacted performance. The Team formed a "weight management" group with the NAVSEA technical staff where all impacts were assessed and all options to remove weight, implement material changes, and use alternative commercial practices were offered through an ongoing review process. The same structure was established for cost increases as both LM and the U.S. Navy engaged in an iterative process to examine options to remove as much as $60M across a period of 18 months. Some of these recommendations were accepted, but many were deemed unacceptable since they could infringe on the performance factors still considered as top priorities. Throughout the churn of the process, clear offers were presented by the LM Team to balance both cost and weight. While the LM Team established an expedited process for generating and qualifying cost / weight reduction ideas, the Navy's process for considering and approving these options was not similarly streamlined.

In January 2005 the team conducted a successful Production Readiness Review and construction started in February 2005. At this point the team was executing Final Design and Detailed Design & Construction in parallel to maintain schedule. The team experienced two substantial supplier production issues early in construction. The design called for HSLA-80 steel for the shell plate below the waterline for its high strength, light weight and fracture toughness. This steel alloy is unique to military applications and is available from only one domestic supplier. The team was informed by the mill that a higher priority Army program would delay our material for several months. After an exhaustive search for alternate supplies the team decided to redesign the effected hull modules to use alternate steel alloys to maintain the production schedule. In early May 2005 the team was also informed by MAAG Gear AG that a production error that damaged a critical gear forging and would cause a 2-3 month delay in the delivery of a reduction gear. The team responded, and the Navy concurred, with a plan to re-sequence module construction to accommodate the delay. A series of additional manufacturing issues with the reduction gear ultimately caused this delay to grow to 6 months. The team was also forced to renegotiate many of the fixed price material contracts to reflect NVR-related changes. This drove cost increases and schedule delays for HM&E and combat system components such as the machinery control system, switchboards, load centers, and navigation systems.

Main Reduction Gear
MAAG Gear AG is the subcontractor for the LCS main reduction gear. MAAG is responsible for approximately 50% of the gear scope, including the overall design, fabrication of the gear casings and supply of auxiliary equipment. MAAG's subcontractor, General Electric (GE), is responsible for the balance of the scope, including the manufacture of the rotating components, final assembly, and test. The LCS gear is a very complex design, incorporating lightweight gear production technology, capable of handling the high power levels of the MT 30 gas turbines and diesel engines in a CODAG arrangement with a sophisticated propulsion control system.

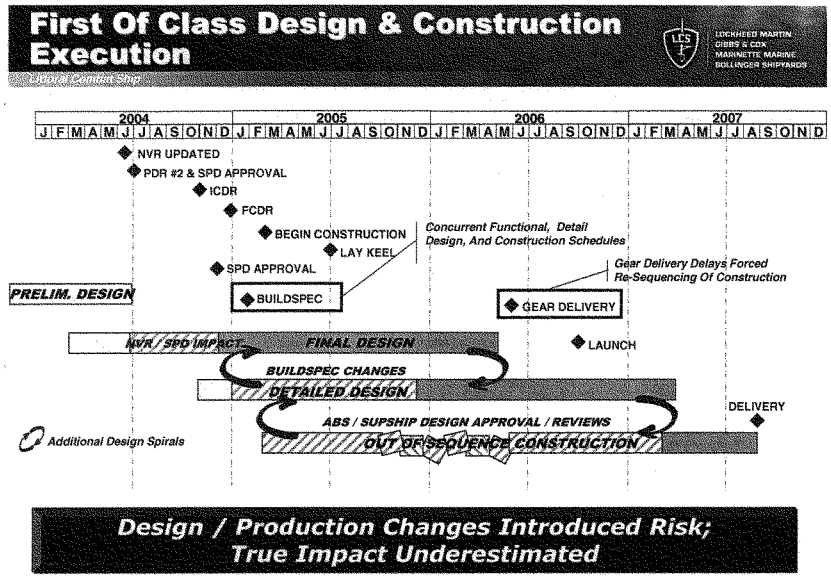
The subcontract delivery dates for the gear had no schedule flexibility, as the opportunity to develop any schedule margin was not available given the design cycle and shipyard material need dates. Delivery of the LCS 1 gear set (two combining gears and two splitter gears) was six months late despite being placed on order with Lockheed Martin investment in September 2004, three months prior to Detailed Design & Construction contract award. Most of the delay is attributable to a number of manufacturing, tooling, assembly, and test issues at the GE gear plant in Lynn, Massachusetts. MAAG Gear AG was under a firm fixed price subcontract from Lockheed Martin and was therefore required to pay for all the re-work on the defective gear. In addition, they were responsible for paying liquidated damages for the late delivery of the gear set, which flowed through LM's contract to benefit the Government.

The six month delay in delivery of the reduction gears came despite Lockheed Martin's comprehensive subcontract management approach that encompasses source selection, acquisition review, purchase order definition, change management, program reviews and closeout. Subcontract Management Teams are established to manage major subcontractors and consist of both the Program Office and Sourcing. The Teams are cross-functional with core members from Procurement, Engineering, Quality Assurance, and Program Management. Other support personnel such as Contracts, Finance and Systems Engineering, are called upon to support the Team as required. The Subcontract Management Team is responsible to ensure successful achievement of the cost, schedule, and technical performance of each subcontract. The Team ensures that technical, contractual, quality and financial requirements are communicated, levied, understood, agreed to and performed by the subcontractor. Subcontractors are required to submit data requirements and metrics on a regular basis. Problem identification and corrective action implementation are conducted for negative trends. Quality acceptance of hardware is conducted on the subcontractor's site with interim inspections when and where applicable.

Throughout the program execution the LM Team responded to requirements changes, design changes, material shortages and delays with alternatives that would maintain the schedule-focus of the program. This aggressive focus on schedule resulted in increased cost of material, rework, inefficient production sequences and substantially less pre-outfitting than planned and collectively resulted in a substantial growth in cost. With the launch of LCS 1 the balance of construction will take place on the waterfront vice the controlled environment of the erection building, further impacting the efficient completion of construction and outfitting.

Over the course of the design and construction effort, the team has also experienced increasing levels of oversight from activities such as NAVSEA, SUPSHIP, PEO-IWS, NSWC-DD, and

NAVAIR which is typical of a traditional acquisition model, but was not expected for the transformational, streamlined LCS acquisition approach. For example, the ABS drawing review and approval cycle time of 4-6 weeks, typical of a commercial approach, became a 12-16 week cycle time and required multiple re-submissions of drawings and approval from a combined ABS, NAVSEA and SUPSHIP approach. This caused uncertainty and indecision within the team on the roles and responsibilities and how the team should respond to direction that was given from multiple sources. This caused an even further delay in the completion of the design, forcing even more inefficient overlap of design and construction.



While it is clear that the introduction of the Naval Vessel Rules after contract award and the subsequent Build Specification post completion of Final Design, caused major re-design (from the commercial design we proposed) and significant overlap in design and construction, these requirements ensure that the U.S. Navy is acquiring a surface combatant with the survivability and service life commensurate with other U.S. Navy Surface Combatants of similar size. The LCS is the first surface combatant designed to meet the rigors of high speed, extreme ocean conditions and extended service life. The LM LCS is built of high strength steels with alloys that provide resistance to fatigue and weapons effects. Analysis shows that the basic hull structure will exceed a 30 year service life and can withstand ocean storm conditions at maximum speeds as well as survive hurricane force wind and wave conditions. The hullform has been tested for performance, strength and survivability by government laboratories using government approved methods. By way of comparison, the LM LCS structural scantlings in many cases exceed that of

the FFG-7 Class ships which are of similar size and displacement and are battle-proven in terms of survivability.

The table below provides examples of the NVR-related changes and their corresponding benefits.

NVR Requirement	Benefit
Anti Icing for Gas Turbines	Improved Operational Performance
Navy Standard Watermist, AFFF and HPF system, welded pipe in Machinery spaces	Improved Damage Control
EMI testing to MIL Std 461	Reduced susceptibility of electronics to EMI
Battle Dressing Tank, Eye wash stations, Redundant HW heater	Longer Service Life
Tamperproof Switches on Watertight Doors	Improved Damage Control and survivability
Long Radius Pipe bends	Longer Service Life
Welded vs. Brazed firemain, Navy Certified Sprinkling system components, Quantity of Fire Plugs	Improved Damage Control and survivability
MIL Spec Pumps and Motors, Strainers, and instrumentation	Improved firefighting, Improved Reliability for Sea Water Systems
Increased Thermal and Fire Insulation	Improved Damage Control and Survivability
Dedicated ABT for AFFF	Improved Damage Control and Survivability
Grade A / B components shock qualification	Reduced risk of failure due to shock

As we progressed through LCS 1 design and construction, Costs increased for the reasons previously discussed. This cost was disclosed to the Navy Program office (PMS501) in the LM Team's contractually mandated, monthly Cost Performance Report (CPR). In addition, the LM team conducted bi-weekly meetings with the Navy's Program Manager (PMS 501) and provided briefings to PEO Ships in September 2005, April 2006 and November 2006 on LCS 1 cost growth and the root causes and corrective actions.

LCS 1 Lessons Learned and Their Application to LCS 3

Throughout the performance of the LCS 1 contract, the LM Team has been accumulating lessons learned on LCS 1 through the following approaches:

- Over 75 visits to Marinette Marine totaling 420 man-days by employees of Bollinger Shipyards to conduct module by module reviews and facilitate job knowledge transfer.
- Conducting focused reviews concentrating on particular aspects of the program (e.g. design, procurement, production control, etc.).
- Reviews as a standing agenda topic during Ship Production Progress Conferences.

- Quality improvement/Lean Six-Sigma events focused on the quality as well as the speed of the process.

Lessons learned were also captured through less formal processes such as the following:
- Soliciting of inputs within the various performing Integrated Product Teams; and
- Discussions with people working on other contracts involving similar work

A database is used to store the lessons learned and to relate and track the associated actions, either as part of the risk and opportunity management process or on the master action item tracking list.

As noted above, LCS 1 suffered from the failure of a major system (Main Reduction Gears) and the availability of a critical raw material (HSLA 80 Steel). Both events had significant impacts on the program driving a significant amount of out-of-sequence work and inefficiency, which in turn created more design churn. Although the team cannot anticipate every catastrophic supplier issue, Lockheed Martin has put in place relevant mitigation steps to reduce the probability that supplier issues will recur. The LM Team has undertaken a vigorous process to reduce the likelihood of experiencing LCS 1 challenges on LCS 3.

For instance, unlike LCS 1, the team has had the opportunity to create schedule flexibility for the LCS 3 gears. The required subcontract delivery dates for major equipment are 1-3 months in advance of shipyard need. In addition, the Lockheed Martin subcontract management team thoroughly reviewed with MAAG and GE each LCS 1 gear failure along with all other issues that caused delays. Root causes were identified and corrective actions have been implemented to minimize the likelihood of repeated failures. GE has also changed their management structure at the Gear Plant. Lockheed Martin is on site at GE weekly to review progress and status, and the production of the LCS 3 gear set is progressing ahead of schedule. In addition, Lockheed Martin has been assured by GE's CEO that GE will meet its delivery commitments. At this time, the LM Team believes the appropriate corrective actions have been implemented, and the LCS 3 gear is being effectively managed to support the in-yard need dates and thus avoid the issue experienced on LCS 1.

Regarding raw material availability, Bollinger has ordered steel from Mittal, the only U.S. supplier of HSLA-80, for LCS 3 and scheduled delivery with sufficient lead time to support the original planned production start at the end of January 2007. In July 2006, Mittal suffered a major equipment failure at their rolling mill. The main drive motor for their rolling mill failed and the repair time resulted in a six week outage at the mill. During the period of outage and re-start, Mittal had received additional priorities for armor from the Army. Lockheed Martin has submitted a request for a revised program plan delaying production start to March 2007 to accommodate the steel delay. Currently, Mittal has shipped over 50% of the HSLA 80 steel requirements for LCS 3 and over 80% of all types of steel required for LCS 3. Lockheed Martin has also entered into discussions with Algoma Steel (Canada) as a preliminary step to develop a second source to Mittal. Algoma has preliminarily agreed to make investments to develop the HSLA chemistry and perform necessary qualification testing. Lockheed Martin would also recommend that the U.S. Navy seek a DPAS rating for the LCS program that would guarantee priority over commercial business at the mills. This would further mitigate some of the risk

associated with the procurement of this crucial material to support the LCS two-year construction schedule.

Lockheed Martin has already implemented a standard set of material management metrics with Bollinger to identify the time phased requirements for material release and actual performance against plan. A Lockheed Martin material program management representative has been embedded with the Bollinger procurement team to not only track the material management performance metrics, but to drive actions to meet the material release plan. As Bollinger transitions from the material ordering phase to the delivery phase, a supplier management process that will include expediting manpower to status supplier material delivery dates, elevate potential supplier delivery risk issues early, and on site supplier progress reviews for major and/or critical systems will be used. Lockheed Martin representatives will participate in on-site supplier reviews with Bollinger. Additionally, all LCS 3 Product Technical Specifications were updated to reflect the final configuration of LCS 1 and to include any LCS 3 improvements to address cost, weight and producibility. This will ensure the vendors can accurately provide Firm Fixed Price Proposals for these systems without the risk of change and possible cost increase. Lockheed Martin is confident these actions will facilitate on-time delivery of the right material to support the production sequence and eliminate cost growth due to changing or ambiguous requirements.

The LM Team has also contracted with Fincantieri to assist the shipyards with developing more cost effective manufacturing approaches based on their experience producing the MDV 3000 Fast Ferry vessels, which share a similar hull form with the LM LCS design.

We have recently completed another detailed root cause analysis and developed additional corrective actions which have been or will be incorporated into the LCS 3 program plan. A few examples are:

LCS 1 Lesson Learned – Early design products sent to Production contained open issues such as missing vendor information and yet-to-be adjudicated requirement changes creating significant design/build concurrency and leading to construction inefficiencies due to out of sequence work. LCS 3 implements a program schedule that allows for completion of all design products, including full review and approval of all design products by the shipyard and ABS prior to the start of production on each module.

LCS 1 Lesson Learned – Material availability adversely impacted efficient production process resulting in out-of-sequence work and re-work. LCS 3 placed orders for critical equipment as early as possible to ensure in yard and production need dates were met. The effectiveness of this effort is evident in 75% of Tier 1 and 2 subcontractor materials already on order for LCS 3.

LCS 1 Lesson Learned – The U.S. Navy Team roles, responsibilities, authority and accountability within the LCS program were not defined resulting in confusing and conflicting line of authority and accountability. LCS 3 finalized an agreement with the NAVSEA Technical Authority, SUPSHIP and ABS on the drawings they will be reviewing and the schedule for responses and comments. All parties have met their commitments and the drawings have been delivered according to schedule.

LCS 1 Lesson Learned – Despite all our efforts to reduce the schedule risk, key processes such as Configuration Management were overwhelmed by the significant number of changes. For LCS 3 we have implemented an on-line process for vendors to review the data that they delivered for LCS 1 and to certify that it has not changed. The changes for LCS 3 have been assessed and approved through our configuration management process and the volume of changes on LCS 1 will not occur on LCS 3.

LCS 1 Lesson Learned – The team managed performance and drove behavior with metrics that did not comprehensively measure progress and provide the leading indicators required to forecast cost issues with the volume of change and the speed of the program. For LCS 3 we have developed metrics to track the many handoffs of data and products during the design, production, test and acceptance of the LCS Platform. For design products, updated drawings for LCS 3 are jointly reviewed by Gibbs and Cox and Bollinger against clearly defined format and content requirements. To date, all drawings have been completed on schedule.

LCS 1 Lesson Learned – Timing of application of resources to oversee the design and construction of the platform. As the LCS 1 design and construction progressed and the magnitude of design change became clear, Lockheed Martin increased its oversight of the shipyard from 3 to 13 people to assist in engineering, material procurement, business process improvement, and construction management. This approach is being further modified to support construction of LCS 3 at Bollinger Shipyard.

Program Accomplishments

Despite these lead ship challenges the LCS Program has achieved some remarkable accomplishments and is charting a course to a new approach to Navy Shipbuilding. The early program accomplishments include:

- Significantly reducing (~60%) the cycle time to design and build ships
- Implementing new shipbuilding standards (Naval Vessel Rules) and classifying a warship through the American Bureau of Shipping (ABS)
- Introduction of mid-tier shipyards that have the flexibility to move from military to commercial contracts and shift workforce as required, negating idle time and overhead cost impacts to the Government.
- Introducing new hull forms, the most powerful gas turbine in Navy inventory (first in nearly 30 years), and waterjet propulsion to the surface combatant fleet.
- Introducing the first "open architecture" surface warship combat system and total ship computing environment (TSCE)
- Introducing the first Surface Combatant designed/produced from the start with reduced manning and automation concepts to further reduce total ownership cost.
- Bringing mission modularity to the Fleet via a reconfigurable SeaFrame

Conclusion

From the outset of the LCS Program the LM Team has valued the regular and productive discussions and relationships with the U.S. Navy PEO and Program Office. The most obvious benefit from these discussions is the status of the LCS 1 construction at 75% complete and in the

water in little more than four years from program inception. The LCS team and the U.S. Navy worked closely and collaboratively in a very dynamic environment of change, innovation, and high visibility. The LM Team will continue to emphasize the importance of written and verbal communication with the U.S. Navy to address and resolve issues, raise risks and concerns, and keep the program moving positively. We are confident that the majority of the cost growth on LCS 1 is unique to the lead ship and will not translate to future ships of the class.

Mr. Chairman, FREEDOM and her sister ships will be superb warships; the right ships for this time in our Nation's history. Sailors who take them to sea will be proud to sail them and pleased with their capabilities. The Lockheed Martin LCS team will take the lessons learned from building FREEDOM and apply them in an efficient and rapid way to future vessels in the class, and we will perform on this program to the standard our sailors deserve and our taxpayers expect. We are firmly committed to working with the U.S. Navy to resolve the cost growth issues and to ensure that this cornerstone program for the U.S. Navy can move forward with Fleet introduction in a timely fashion. Thank you again for the opportunity to present and explain the progress we are achieving on the LCS program.

DISCLOSURE FORM FOR WITNESSES
CONCERNING FEDERAL CONTRACT AND GRANT INFORMATION

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(4), of the Rules of the U.S. House of Representatives for the 110th Congress requires nongovernmental witnesses appearing before House committees to include in their written statements a curriculum vitae and a disclosure of the amount and source of any federal contracts or grants (including subcontracts and subgrants) received during the current and two previous fiscal years either by the witness or by an entity represented by the witness. This form is intended to assist witnesses appearing before the House Armed Services Committee in complying with the House rule.

Witness name: **Fred P. Moosally**

Capacity in which appearing: (check one)

___Individual

_X_Representative

If appearing in a representative capacity, name of the company, association or other entity being represented: Lockheed Martin Maritime Systems & Sensors

FISCAL YEAR 2007

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
None			

FISCAL YEAR 2006

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
N00024-06-C-2300	NAVSEA	$4,030,000	LCS-Israeli Feasibility Study Contract

FISCAL YEAR 2005

Federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
None			

Note: The Littoral Combat Ship (LCS) prime contract, N00024-03-C-2311 was awarded to Lockheed Martin Corporation on 17 July 2003. This contract required completion of the LCS final ship design and construction of two (2) LCS.

Federal Contract Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) with the federal government, please provide the following information:

Number of contracts (including subcontracts) with the federal government:

Current fiscal year (2007):___LCS specific - none_____;
Fiscal year 2006:__One (1) LCS specific awarded_____;
Fiscal year 2005:__LCS specific - none_ _____.

Federal agencies with which federal contracts are held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

List of subjects of federal contract(s) (for example, ship construction, aircraft parts manufacturing, software design, force structure consultant, architecture & engineering services, etc.):

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

Aggregate dollar value of federal contracts held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

Federal agencies with which federal grants are held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

Aggregate dollar value of federal grants held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

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Witness name: **Richard T. McCreary**

Capacity in which appearing: (check one)

___Individual

_X_Representative

If appearing in a representative capacity, name of the company, association or other entity being represented: Marinette Marine Corporation

FISCAL YEAR 2007

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant

FISCAL YEAR 2006

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
HSCG23-06-D-ARB001	U.S. Coast Guard	Overall Contract Value: $420,753,430 Task Orders Exercised to-date: $45,009,858	Detail Design and Construction of Response Boat-Medium vessels (1-180)
N00025-03-C-0002 (Option I) Original Contract Awarded in 2003	U.S. Navy	Option I Value: $125,967,999	Detail Design and Production of Improved Navy Lighterage System modules: ▪ Warping Tugs, ▪ Causeway Ferrys, ▪ Roll On/Roll Off Discharge Facility

BOA-NMC-Marinette Task Order #060800390	**Agency:** Navy Metalworking Center, **Operated by:** Concurrent Technologies Corporation	$56,226	Support the Development of a Low-Cost Friction Stir Welding System related to LCS Program
N00014-03-C-0413 CNTS-MLR0210-S318 Subcontract #2007-317	**Agency:** Center for Naval Shipbuilding Technology, **Contractor:** Advanced Technology Institute	Ceiling Amount: $500,000 Funding Available: $260,000	Study to improve material management processes and systems.

FISCAL YEAR 2005

Federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
N00024-06-C-2214	U.S. Navy	$999,820	Phase I Preliminary Design and Documentation for the Analyses Needed to Develop a Concept/Preliminary Design for a Missile Range Instrumentation Ship (T-AGM(R))

Federal Contract Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) with the federal government, please provide the following information:

Number of contracts (including subcontracts) with the federal government:

Current fiscal year (2007): 0 ;
Fiscal year 2006: 4 ;
Fiscal year 2005 1 ;

Federal agencies with which federal contracts are held:

Current fiscal year (2007): ;
Fiscal year 2006: U.S. Coast Guard and U.S. Navy ;
Fiscal year 2005 U.S. Navy ;

List of subjects of federal contract(s) (for example, ship construction, aircraft parts manufacturing, software design, force structure consultant, architecture & engineering services, etc.):

Current fiscal year (2007): _____;
Fiscal year 2006: ship construction; analyses of construction processes;
Fiscal year 2005 design development for ship construction;

Aggregate dollar value of federal contracts held:

Current fiscal year (2007): $0.00;
Fiscal year 2006: $171,294,083;
Fiscal year 2005 $999,820;

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

Federal agencies with which federal grants are held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

Aggregate dollar value of federal grants held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

DISCLOSURE FORM FOR WITNESSES
CONCERNING FEDERAL CONTRACT AND GRANT INFORMATION

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(4), of the Rules of the U.S. House of Representatives for the 110th Congress requires nongovernmental witnesses appearing before House committees to include in their written statements a curriculum vitae and a disclosure of the amount and source of any federal contracts or grants (including subcontracts and subgrants) received during the current and two previous fiscal years either by the witness or by an entity represented by the witness. This form is intended to assist witnesses appearing before the House Armed Services Committee in complying with the House rule.

Witness name: **MICHAEL C. ELLIS**

Capacity in which appearing: (check one)

___Individual

_X_Representative

If appearing in a representative capacity, name of the company, association or other entity being represented: **Executive Vice President and Chief Operating Officer Bollinger Shipyards, Inc.**

FISCAL YEAR 2007

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant

FISCAL YEAR 2006

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
N00024-03-C-2311	Dept of Defense	$117,468,127	LCS Ship Program

FISCAL YEAR 2005

Federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant

Federal Contract Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) with the federal government, please provide the following information:

Number of contracts (including subcontracts) with the federal government:

Current fiscal year (2007):____LCS specific – none _____;
Fiscal year 2006:_____One (1) LCS specific award _____;
Fiscal year 2005:_____LCS Specific – none _____.

Federal agencies with which federal contracts are held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____Dept of Defense_____;
Fiscal year 2005:_____.

List of subjects of federal contract(s) (for example, ship construction, aircraft parts manufacturing, software design, force structure consultant, architecture & engineering services, etc.):

Current fiscal year (2007):_____;
Fiscal year 2006:_____Ship construction _____;
Fiscal year 2005:_____.

Aggregate dollar value of federal contracts held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____ $117,468,127 _____;
Fiscal year 2005:_____.

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Current fiscal year (2007):_none _____;
Fiscal year 2006:_____none_____;
Fiscal year 2005:_____none_____.

Federal agencies with which federal grants are held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

Aggregate dollar value of federal grants held:

Current fiscal year (2007):_____;
Fiscal year 2006:_____;
Fiscal year 2005:_____.

DISCLOSURE FORM FOR WITNESSES
CONCERNING FEDERAL CONTRACT AND GRANT INFORMATION

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(4), of the Rules of the U.S. House of Representatives for the 110th Congress requires nongovernmental witnesses appearing before House committees to include in their written statements a curriculum vitae and a disclosure of the amount and source of any federal contracts or grants (including subcontracts and subgrants) received during the current and two previous fiscal years either by the witness or by an entity represented by the witness. This form is intended to assist witnesses appearing before the House Armed Services Committee in complying with the House rule.

Witness name: Kevin Moak

Capacity in which appearing: (check one)

___Individual

_X_Representative

If appearing in a representative capacity, name of the company, association or other entity being represented: Gibbs & Cox, Inc.

FISCAL YEAR 2007

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
N00024-03-C-2311	PMS 501	$188,200.00	LCS Special Studies CLIN 17 Funding
N00024-03-C-2311	PMS 501	$563,600.00	LCS Detail Design CLIN 7 Funding
N00024-05-C-2309	FMS	*	GOI LCS Optional Study: Signature Analysis

*** Zero Funding in 2007 but active**

FISCAL YEAR 2006

federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
N00024-05-C-2309	FMS	$77,600.00	GOI LCS Optional Study: Signature Analysis
N00024-05-C-2309	FMS	$1,875,200.00	GOI LCS Feasibility Studies and Preliminary Design
PO 635229	PMS 501	$777,700.00	LCS - Work Pack Support for Marinette Marine
N00024-03-C-2311	PMS 501	$5,400,000.00	LCS Second Ship CLIN 9

			Funding
N00024-03-C-2311	PMS 501	$527,800.00	LCS Special Studies CLIN 17 Funding
N00024-03-C-2311	PMS 501	$9,549,800.00	LCS Final & Detail Design CLIN-4 & 7
N00024-03-C-2311	PMS 501	$302,900.00	LCS Detail Design CLIN 6 Special Studies

FISCAL YEAR 2005

Federal grant(s) / contracts	federal agency	dollar value	subject(s) of contract or grant
N00024-03-C-2311	PMS 501	$535,000.00	LCS Special Studies CLIN 17 Funding
N00024-03-C-2311	PMS 501	$8,923,800.00	LCS Final & Detail Design CLIN-4 & 7
N00024-03-C-2311	PMS 501	$123,800.00	LCS Detail Design CLIN 6 Special Studies

Federal Contract Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) with the federal government, please provide the following information:

Number of contracts (including subcontracts) with the federal government:

Current fiscal year (2007): Two;
Fiscal year 2006: Three;
Fiscal year 2005: One.

Federal agencies with which federal contracts are held:

Current fiscal year (2007): NAVSEA – PMS-501 and FMS;
Fiscal year 2006: NAVSEA – PMS-501 and FMS;
Fiscal year 2005: NAVSEA – PMS-501.

List of subjects of federal contract(s) (for example, ship construction, aircraft parts manufacturing, software design, force structure consultant, architecture & engineering services, etc.):

Current fiscal year (2007): Detail Design LCS and LCS Israel Feasibility Study;
Fiscal year 2006: Final/Detail - Design LCS and LCS Israel Feasibility Study;
Fiscal year 2005: Final/Detail - Design LCS.

Aggregate dollar value of federal contracts held:

Current fiscal year (2007): $751,800.00;
Fiscal year 2006: $18,511,000.00;
Fiscal year 2005: $9,582,600.00.

Federal Grant Information: If you or the entity you represent before the Committee on Armed Services has grants (including subgrants) with the federal government, please provide the following information:

Number of grants (including subgrants) with the federal government:

Current fiscal year (2007): _____;
Fiscal year 2006: _____;
Fiscal year 2005: _____.

Federal agencies with which federal grants are held:

Current fiscal year (2007): _____;
Fiscal year 2006: _____;
Fiscal year 2005: _____.

List of subjects of federal grants(s) (for example, materials research, sociological study, software design, etc.):

Current fiscal year (2007): _____;
Fiscal year 2006: _____;
Fiscal year 2005: _____.

Aggregate dollar value of federal grants held:

Current fiscal year (2007): _____;
Fiscal year 2006: _____;
Fiscal year 2005: _____.

QUESTIONS AND ANSWERS SUBMITTED FOR THE RECORD

FEBRUARY 8, 2007

QUESTIONS SUBMITTED BY MR. TAYLOR

Mr. TAYLOR. Were Navy Acquisition personnel receptive to your concerns, did they provide the necessary resources and guidance to overcome the challenges, and were you ever disconcerted about the way the Navy Acquisition personnel were addressing your concerns?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. The Lockheed Martin Team maintained constant dialogue with the LCS Program Office and the Navy's program manager listened to our program concerns. Early in the program, we established bi-weekly Program Manager-to-Program Manager meetings to discuss key issues and identify solutions to problems as they arose. Each issue was thoroughly vetted and decisions were made to accept or reject each potential solution. In addition, Lockheed Martin provided the Navy LCS Program Office regular production status and cost data including Contract Performance Reports (CPR) which have been submitted monthly since the program began. As design changes were made and costs continued to grow we moved to weekly status meetings where we discussed cost reduction opportunities. When the Lockheed Martin Team presented alternatives to reduce costs the Navy Program Manager provided guidance on whether these alternatives could be implemented.

Mr. TAYLOR. Did anyone on the Lockheed Martin team make a request to PEO Ships, Admiral Hamilton, or the LCS Program Manager, Captain Babcock, to convey cost growth concerns to Dr. Etter prior to December 18, 2006?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. The monthly Contract Performance Reports that Lockheed Martin submitted since the start of the program highlighted the Best Case, Worst Case, and Most Likely cost estimates based on actual costs experienced and estimates to complete construction. In addition to these mandatory, regular cost reports, our team provided multiple in-depth presentations that included cost updates to the program office and also briefed PEO Ships on LCS costs on 15 September 2005, 25 April 2006, 16 August 2006, 31 October 2006, 29 November 2006, and 18 December 2006. Our expectation was that the data would be reviewed at the appropriate Government levels. We were surprised to learn, in December 2006, that senior Navy leaders were surprised by cost growth on LCS given all the communication we had with the Program Office and PEO.

Mr. TAYLOR. Was construction ever conducted on LCS 1 using designs that were not approved?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. No, the entire functional design was approved at the December 2005 Final Critical Design Review (FCDR) and the Build Specification was approved in January 2006 prior to construction start in February 2006. Subsequently, ongoing interpretation of sub-tier specification references and ABS analysis and modeling resulted in changes to these designs. Final adjudication of the Build Specification with Naval Vessel Rule (NVR) implementation also caused changes to designs that impacted construction by creating significant design-construction overlap.

Mr. TAYLOR. If so, who was the approval authority within Industry and the Navy to proceed with Construction, and what consequences did you experience by using unapproved designs?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. N/A

Mr. TAYLOR. Did you fully understand the design approval process and the identity of all approval authorities? Did this process or those individuals change due to the incorporation of NVR?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. The design approval authorities were identified from the beginning as the American Bureau of Shipping (ABS), Naval Technical Authority (NTA), and the Navy's Supervisor of Shipbuilding (SUPSHIPS). However, the approval processes, roles, and responsibilities were not clear. LCS 1 is the first warship designed to NVR and classed by ABS and, as a result, this was the first time that all three of these organizations were required to coordinate design review and approval.

Mr. TAYLOR. What incentives do you have, under a cost-plus contract, to minimize costs to the taxpayers?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. Cost plus contracts are appropriate for the LCS lead ship as it is an RDT&E funded "prototype" vessel with significant development risk. Cost plus vehicles are an effective way of balancing the significant risk between Industry and Government when there is no effective way to accurately estimate costs due to the uncertainty of contract performance.

A number of factors motivate the Lockheed Martin Team to minimize costs on LCS. First, the LCS acquisition plan placed a $220M (FY05 dollars) cost cap on ship price. Failure to meet this price in the initial proposal submission would prevent award and this cap is still in place for follow-on LCS ships. Second, the LCS program has remained competitive with two primary suppliers, Lockheed Martin and General Dynamics, working to provide the best LCS solution at the minimum price to maximize the number of ships awarded to their teams. Third, the current LCS contracts are Cost-Plus Incentive/Award Fee (CPIF/AF) structures. There are two components of the fee available for contractors to earn. The incentive fees are earned only if the contract cost does not exceed a certain threshold. The award fees are earned through the Government's evaluation of the contractor's ability to control, adjust, and accurately project costs using the award fee criteria stated in the contract. The evaluation results in an award fee payment if the contractor has met the minimum criteria. Lockheed Martin's Incentive/Award Fee has been significantly impacted as a result of the cost growth on LCS 1.

Evidence of Lockheed Martin's commitment to minimizing the cost and risk in the program includes our corporate investment to mature the ship design prior to contract award to ensure we could meet production schedules with minimum risk. We have continued to make significant investments in the program to help offset cost increases and to ensure we can produce affordable LCS platforms.

Mr. TAYLOR. In what ways was it communicated to you that schedule was the primary priority for the LCS program?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. From the beginning of the program the emphasis was placed on producing LCS "at the speed of heat" in accordance with direction by the CNO Admiral Clark. In fact, the FY03 President's Budget identified a seven month Final Design Phase and 24 month Build Cycle, unprecedented in Naval surface combatant programs. Senior Navy leadership continued to emphasize an accelerated schedule to meet urgent fleet needs. Lockheed Martin's LCS contract award fee criteria also reflected the schedule priority with the majority of the criteria emphasizing meeting program schedules and timely milestone completion. The priority for this event driven criteria was:

- Schedule
- Technical
- Cost

Examples of schedule driven milestones tied to award fee include start construction, keel laying, landing of gas turbines, water jet installation, and launch.

Mr. TAYLOR. Lockheed testified that it sends monthly reports with LCS cost information to the Navy. In which of these monthly reports did Lockheed first attempt to alert the Navy regarding the potential for significant cost growth on LCS–1?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. The Contract Performance Report (CPR) is a mandatory management report submitted monthly starting from contract award. Each report shows Best Case, Worst Case, and Most Likely cost estimates and describes the risk associated with each number. Specific cost drivers were highlighted and discussed in each report. We began to recognize and report cost increases as early as September 2005 and costs increased steadily throughout 2006. As challenges such as material delays continued to impact cost we continued to report growing cost estimates in the monthly reports.

Mr. TAYLOR. Does Lockheed believe that its representations to Navy officials in 2006 about cost growth on LCS–1 were being transmitted to senior Navy leadership-meaning the Secretary of the Navy, the Chief of Naval Operations, and the Navy Acquisition executive-in a sufficiently full and timely manner?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. Lockheed Martin is not aware of who or when "senior Navy leadership" was notified. However, we were surprised to learn in December 2006 that senior Navy leaders were surprised by cost growth on LCS.

Mr. TAYLOR. How would you characterize the performance of the shipyard in building LCS–1 in the months since that ship was launched?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. Neither Lockheed Martin nor Marinette Marine Corporation (shipyard) is satisfied with the performance since the LCS–1 launch; however, there are many factors driving this performance including.

- High degree of out of sequence work

- Significant Navy directed design changes which are driving higher than expected rework on the ship

Two primary drivers are negatively impacting performance. The first is the amount and type of work that is being done post-launch, pier-side, that was originally planned to be completed more efficiently within the construction/erection facilities pre-launch. This work was delayed until after launch in order to meet the launch schedule as agreed to between the U.S. Navy and Lockheed Martin. The second is the unanticipated amount of re-work we are still experiencing as a result of NVR-related design changes. While not as rapid as we had predicted, the performance trend has been positive for four of the last five months.

Mr. TAYLOR. Is there any concurrency in design and construction on LCS–3? If so, how much of an adjustment in the construction schedule for this ship would be needed to eliminate this concurrency? If this adjustment is made, how would it affect Lockheed's ability to execute in a timely way any additional LCSs that are authorized for FY 2008?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. No, as a result of lessons learned on LCS–1, we have developed a plan to complete the LCS–3 design updates and changes prior to the start of construction of the associated item. This effort was on schedule before the stop work order was issued. Given this plan to eliminate concurrency, Lockheed Martin expects to be able to execute any ships awarded in FY 2008 on schedule.

Mr. TAYLOR. Do the estimated costs of LCS–1 or LCS–3 reflect systems, components, or materials provided by vendors at reduced prices, as part of an effort by those vendors to secure a role in the 55-ship LCS program? If so, how much more expensive might these systems, components or materials become on later LCSs? Is this a source of concern regarding the potential for cost growth on follow-on LCSs?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. Lockheed Martin's subcontractors do not disclose this information. However, the sub-contractor cost increases we have experienced from LCS–1 to LCS–3, appear to be primarily due to economic inflation.

Mr. TAYLOR. If one of the two yards building Lockheed's version of the LCS proves to be consistently superior to the other in building LCSs, is Lockheed prepared to consolidate production of its LCSs at the superior yard?

Mr. MOOSALLY, Mr. MOAK, Mr. MCCREARY and Mr. ELLIS. The Lockheed Martin team has two shipyards to ensure that we can meet the U.S. Navy's maximum production rate planned for LCS. These two shipyards provide the added benefit of being able to share design, material procurement, and production resources as necessary to ensure each ship is delivered on schedule and within budget. Lockheed Martin continuously evaluates the performance of all subcontractors, including the shipyards. We will consider all alternatives and take appropriate action in the event a subcontractor is not performing in accordance with expectations. Our objective is to provide the most cost effective, highly capable LCS platforms to the U.S. Navy and the taxpayers.

Mr. TAYLOR. What added value do you believe Lockheed Martin provides as the lead systems integrator?

Mr. MOOSALLY. Lockheed Martin is not a lead Systems Integrator on the LCS program. Our role on LCS is the prime contractor and Mission System provider. As the prime contractor we are establishing a new shipbuilding paradigm by enabling cost efficient mid-tier shipyards like Marinette Marine and Bollinger Shipyards to participate in a complex shipbuilding program like LCS. Lockheed Martin brings significant experience in managing large, complex defense programs. Our shipbuilding experience includes the design and prime contract management of the Sea Shadow, SLICE, AGOR 26, and E-Craft vessels. We have over 30 years of combat system integration experience on 7 ship classes for 6 different navies. We designed numerous electronics spaces on DDG–51 Class ships as well as the entire topside spaces on CG–47, DDG–51, the Spanish F100 Class Aegis Frigate, and the Norwegian F 310 Class Aegis Frigates. This experience includes the detailed design and integration of all combat system related ship compartments. Lockheed Martin also brings the ability to surge capabilities only when needed, so the Customer does not have to pay for significant management overhead when the specific capability is no longer needed. On LCS–1 we have provided significant program management, master planning, material procurement and quality assurance personnel to augment the shipyard's indigenous resources. As the Mission System provider, we are responsible for the design, development, production and support of the LCS Core Mission System including command & control, sensors, weapons, communications, etc.

Mr. TAYLOR. When you submitted your proposal in response to the Request for Proposal for Preliminary Design, you were aware that the Navy had established an

objective and threshold cost targets. At any time, did you believe that Lockheed Martin could not deliver LCS Seaframes that could not meet the threshold target?

Mr. MOOSALLY. No, when we submitted our proposal we showed that we could meet the $220M cost cap. After contract award, the Navy directed the implementation of the Naval Vessel Rules (NVR) which resulted in significant design changes and greater than planned design-build concurrency. Coupled with material delays for steel and reduction gears, these issues caused cost growth resulting in a price above $220M. As stated by VADM Sullivan during his testimony to the HASC on 8 February 2008 ". . . the ship that we bid and the ship that we costed out is not the same ship that we're buying today . . ."

Mr. TAYLOR. Which cost drivers do you believe will result in re-occurring cost for LCS?

Mr. MOOSALLY. Inflation as well as additional labor and material costs associated with engineering changes implemented on LCS–1.

Mr. TAYLOR. You have built many other ships for the government, Coast Guard Ice-Breakers, Barges, Tug Boats; did you ever start those ships without final design plans?

Mr. MCCREARY. Yes. MMC has constructed ships for commercial and government customers and has started construction without some of the final (detail) design plans being completed. MMC's process is a modular construction process. The Detail Design is partitioned by zone and completed in support of the zone construction schedule. Our approach includes the following prior to construction start:

a. The Functional Design (diagrams, calculations, scantlings) is complete and submitted to ABS for approval

b. Long Lead Equipment specifications are complete and equipment is placed on order

c. Detail Design is started and completed for each construction zone 2 to 4 months prior to the construction start for that zone.

Mr. TAYLOR. Did you ever "push back" to the Lead System Integrator when you were directed to proceed with construction even though the final plans were not available?

Mr. MCCREARY. Our team planned to construct the LCS vessels in a manner similar to MMC's and Bollinger's experience utilizing the modular construction process. In using that process, Functional Design as well as the Detail Design for the Zone under construction is completed 2 to 4 months prior to construction start. On the LCS, our team completed the Preliminary Design and had "invested" in furthering that design prior to contract award in order to mitigate the risk associated with developing the Detail Design. Upon contract award, design specifications were changed due to Naval Vessel Rule implementation. After construction start, when many design plans were arriving incomplete, MMC, on multiple occasions, made the Prime Contractor (Lockheed Martin) aware of that fact and the resulting impact it was having, and was going to have, on construction cost and schedule. MMC and the Prime Contractor made the customer aware of the situation and worked to minimize the impact.

Mr. TAYLOR. What steps have you taken to transfer learning curve efficiencies to Bollinger shipyards?

Mr. ELLIS. Bollinger engineers and production supervisors were involved with Marinette Marine in major construction planning decisions on LCS–1 and established a formal lessons learned capture process at the beginning of the LCS program to accelerate Bollinger's learning.

Our Team is executing LCS–3 in an environment unlike that of LCS–1. LCS–3 has a more mature design, with 80% of detailed design unchanged from LCS–1 and 70% of LCS–3 design already approved by ABS. In addition, we are utilizing the existing vendor base to stabilize Vendor Furnished Information (VFI). Our Team conducted a comprehensive assessment of risks from LCS–1 for applicability on LCS–3 and is proactively putting in place corrective actions on LCS–3. The following are factors that are mitigating risks experienced on LCS–1:

- All purchase orders have been placed for LCS–3 material in advance of the required dates and 63% of all required material is already on order, all with delivery commitments in advance of in yard need dates.
- A dedicated LM LCS–3 Team was established five months in advance of contract award, containing key personnel with extensive program management experience on U.S. Navy ACAT I programs.
- A comprehensive set of metrics has been established to track performance on LCS–3. The metrics are reviewed on a weekly basis, at the performing area level and with executive management.

- A path finder approach has been implemented for LCS–3 to closely watch and measure performance the first time a process is executed (e.g. design release process). This vigorous process allows us to identify issues and take corrective actions before repeating the same mistake numerous times. The approach has yielded a 48% reduction in the average time for review of drawings.
- A negotiated Memorandum of Understanding with ABS that establishes timelines for ABS review and approval of design changes.
- The work performed by Bollinger on LCS–1 to construct the largest and one of the most complex ship modules has given our production staff first hand experience in building from LCS design products in advance of construction start on LCS–3. This early exposure has allowed the Team to accelerate the LCS–3 production learning curve and demonstrate design producibility at both shipyards

Mr. TAYLOR. At which of your shipyards, do you plan to build LCS?

Mr. ELLIS. LCS–3 will be constructed at our Lockport, LA facility. We will draw upon the resources of over 3000 employees from 14 Bollinger shipyards to ensure the success of LCS–3.

Mr. TAYLOR. As Lockheed Martin became aware of the implications of NVR and the delay in delivery of the reduction gear, did you keep the Navy fully informed of all these issues?

Mr. ELLIS. Yes, as we assessed the impact of NVR and the significant number of resulting design changes, and experienced issues such as the material delays, we communicated with the Navy through numerous methods including day-to-day programmatic communications, our bi-weekly Program Manager-to-Program Manager meetings, monthly Contract Performance Reports (CPR), and periodic briefings and site visits with PEO Ships throughout 2005 and 2006.

Mr. TAYLOR. What process does Lockheed Martin have in place to ensure that if additional specifications and/or requirements were added to the program from this point forward they would be thoroughly reviewed to ensure we understand the full cost and schedule impact BEFORE we move forward?

Mr. ELLIS. Now that the LCS ship design is nearing completion and LCS–1 is over 75% constructed we have a true baseline from which we can assess material and labor changes with much greater accuracy. Together with the Navy as we move to LCS–3, we have implemented changes in the Configuration Management (CM) process to better track design changes and effectively asses change impact to cost and schedule. Specifically:

- LCS Team made the decision that no change will be implemented until all design impacts are thoroughly reviewed and approved by ABS and the Navy Technical Authority and cost and schedule impacts have been assessed and agreed with Lockheed Martin Team and the Navy.
- Established strict schedules with ABS and Naval Technical Authority to ensure potential changes and issues are highlighted early.

○