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Before the

Subcommittee on Seapower

COMMITTEE ON
ARMED SERVICES

# UNITED STATES SENATE

OPTIONS AND CONSIDEATIONS FOR ACHIEVING A 355-SHIP NAVY FROM NAVAL ANALYSTS

Tuesday, July 25, 2017

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HEARING TO RECEIVE TESTIMONY ON

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U.S. Senate

Subcommittee on Seapower

Committee on Armed Services

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The subcommittee met, pursuant to notice, at 3:12 p.m. in Room SR-222, Russell Senate Office Building, Hon. Roger F. Wicker, chairman of the subcommittee, presiding.

Committee Members Present: Senators Wicker [presiding], Rounds, Shaheen, Kaine, and King.

OPENING STATEMENT OF HON. ROGER F. WICKER, U.S. SENATOR FROM MISSISSIPPI

Senator Wicker: The Senate Armed Services Subcommittee on Seapower convenes this afternoon to receive testimony from prominent naval analysts on achieving the 355-ship Navy.

We welcome our four witnesses: Dr. Eric Labs, Senior Analyst for Naval Forces and Weapons at the Congressional Budget Office; Mr. Ronald O'Rourke, Specialist in Naval Affairs at the Congressional Research Service; Dr. Jerry Hendrix, Senior Fellow and Director of the Defense Strategies and Assessments Program at the Center for a New American Security; and Mr. Bryan Clark, Senior Fellow at the Center for Strategic and Budgetary Assessments.

Our subcommittee is grateful for these witnesses appearing before us. Their thoughtful analysis will be most helpful as we consider options for increasing the size and enhancing the capability of our Navy.

Today's hearing represents another step in this subcommittee's effort to examine the Navy's 355-ship requirement. We have received a classified briefing on the requirement, heard from shipbuilders and suppliers, held a shipbuilding hearing with Navy officials, and received testimony from Reagan administration officials last week. Our actions this year will set a firm foundation for an

intelligent and responsible expansion of the fleet in the future.

To that end, I would note the bipartisan SHIPS Act legislation which would codify the Navy's requirement for 355 ships as U.S. policy. The full committee has adopted the SHIPS Act into the fiscal year 2018 NDAA, and our House counterparts have done the same and gotten it passed by the entire House of Representatives.

The seapower title also authorizes additional funding for five ships above the administration's budget request while maintaining effective cost control measures on existing programs.

Each of our witnesses has made important contributions toward analyzing Navy force structure, including the Navy's 355-ship requirement.

Dr. Labs' annual analysis of the Navy's 30-year shipbuilding plan is really anticipated and widely read. His special report this April, which projected costs and time frames to achieve a 355-ship Navy, is particularly relevant. In this report, he found that 2035 is the earliest date upon which a 355-ship fleet could be achieved. That is 18 years from now. His report estimates that reaching 355 ships would require doubling the historical spending on shipbuilding to about $33 billion per year for a number of years. In comparison, the Navy's budget request

included about $20 billion for shipbuilding in fiscal year 2018.

He also found the Navy would need 19,000 more sailors to man these extra ships, $15 billion more for associated aircraft, and also that annual fleet operating costs would increase by 67 percent, or $38 billion, compared to today's fleet.

My understanding is that his analysis did not consider the effects of extending service lives for existing ships or reactivating decommissioned ships.

Mr. O'Rourke's government service as a naval analyst began in 1984 during our last naval buildup. His frequent reports on specific shipbuilding programs, as well as broader naval issues are read closely by this subcommittee, by government and industry leaders, by our allies and partners, and by our competitors. His latest Navy force structure report published last month highlights the Navy's proposed mix of ships within the 355-ship requirement. He determined that the Navy would need to add at least 57 ships over the 30-year shipbuilding plan to achieve and maintain a 355-ship fleet. This effort would require a minimum increase of $4.6 billion in the annual shipbuilding budget unless the service lives of existing ships are extended beyond currently planned figures and/or retired ships are reactivated.

As a retired Navy captain and highly regarded analyst, Dr. Hendrix is intimately familiar with Navy capability gaps and modernization needs. He has written many compelling reports and articles, including one which I have previously entered into the record entitled "How Trump Can Build a 350-Ship Navy," coauthored with Robert C. O'Brien for Politico. In this article, he asserts that a 350-ship fleet could be attained as early as 2024 by increasing the Navy's top line budget, roughly $20 billion, cumulative over the next 8 years. To achieve this timeline, he proposes several out-of-the-box actions, including service life extensions, reactivating decommissioned ships, and building foreign designs in U.S. shipyards.

Finally, as a retired Navy commander and top aide to a former Chief of Naval Operations and prominent analyst, Mr. Clark has been assessing and making recommendations on Navy force structure needs for over a decade. As with all the witnesses, his body of work is an excellent resource for this subcommittee. Today I would like to focus on his congressionally directed future fleet architecture study called "Restoring American Seapower." His study calls for a 382-ship Navy by 2030, a figure which would cost an additional $4 billion to $5 billion for shipbuilding every year. The study's in-depth analysis of capabilities, platforms, and operating concepts and posture were

compelling, and I hope to see many of these recommendations implemented.

The subcommittee is interested in the views of these four witnesses on the options and considerations for achieving a 355-ship Navy. Specifically, I hope our witnesses discuss what factors are driving the need for a bigger Navy, the right mix of ships for our future fleet, timelines and costs for achieving the Navy's requirement, innovative options to grow the fleet, including extending service lives and reactivating decommissioned ships, the additional support necessary to generate and maintain the fleet buildup, including personnel, aircraft, weapons, other equipment and maintenance, and finally, actionable items that this subcommittee should consider to lay a firm foundation for a fleet buildup. I look forward to our witnesses' testimony.

I have spoken to Senator Hirono on the floor. Her statement will be included at this point in the record.

[The prepared statement of Senator Hirono follows:]

[SUBCOMMITTEE INSERT]

Senator Wicker: And we will begin with testimony by Dr. Labs. Sir, you are recognized with the thanks of the subcommittee.

STATEMENT OF DR. ERIC LABS, SENIOR ANALYST FOR NAVAL FORCES AND WEAPONS, CONGRESSIONAL BUDGET OFFICE

Dr. Labs: Thank you, Mr. Chairman. Chairman Wicker, Senator Hirono, and members of the subcommittee, it is a pleasure to be here today to discuss the Navy's proposal to build a 355-ship fleet.

Mr. Chairman, with your permission, I would like to summarize my statement for the record and have it entered, without objection, if I may.

Senator Wicker: Without objection, it will be entered at this point.

Dr. Labs: My written testimony focuses on the costs of force structure and implications for industry of building a 355-ship fleet over 15, 20, 25, or 30 years. It is based on the recently released CBO report titled "Costs of Building a 355-Ship Navy." In my remarks today, I will focus on the key points of that report.

Building a 355-ship fleet, as outlined in the Navy's December 2016 force structure assessment, will require a substantial investment of time and money. Even so, the Navy will not be able to reach that fleet of 355 ships for 18 years using new ship construction. I would like to note here that it is possible to build a larger fleet sooner than that, but the Navy's force goal of 355 is actually based on a specific set of goals for the major combat components of

the fleet: 12 aircraft carriers, 12 ballistic missile submarines, 66 attack submarines, 156 large and small surface combatants, 38 amphibious ships, and numerous logistics and support ships. If those goals were relaxed or the Navy determined it could keep ships in service longer than previously planned, then it would be possible to reach a fleet of 355-ships much sooner than 2035.

To build a larger fleet would require increasing the shipbuilding budget substantially. CBO estimates that it would cost $26.6 billion per year over 30 years to buy the approximately 330 new ships needed to meet and sustain the Navy's force goals. That is about a 60 percent increase in the average shipbuilding budgets of $16 billion over the past 30 years or even the $17 billion of the past 5 years.

Critically, however, how fast the fleet is built up has a significant effect on shipbuilding budgets over the next decade. The 15-year buildup, for example, would need shipbuilding budgets that range from about $20 billion to as much as $35 billion per year over the next 10 years. In contrast, the budgets of the 30-year buildup range from $20 billion to $28 billion over the next 10 years.

In addition to new ship construction costs, CBO estimated that it would require an extra $15 billion in aircraft to outfit the additional ships with their aviation detachments and, in the case of a 12th aircraft carrier, the

additional air wing.

A larger fleet of 355 ships will also require larger numbers of sailors and civilians, along with higher operation support and maintenance budgets. Compared with today's fleet of 275 ships, a 355-ship Navy will need approximately 19,000 more sailors to crew those ships and another 29,000 military and civilian personnel in various support roles. Annual operating and support costs would average $75 billion over the next 30 years compared to $56 billion for today's fleet.

Similar to the new ship construction costs, operation and support costs are rising faster than inflation. Thus, in real terms, that is, adjusting to remove the effects of inflation, O&S budgets will steadily increase over time as new ships are added to the fleet and the year-over-year real growth of operating and supporting that fleet requires appropriating more money.

Finally, let me spend a few moments on the shipbuilding industrial base. All the Navy's new ship construction is performed by five large and two smaller yards. Enlarging the fleet to 355 ships would place a higher demand on the shipbuilding services of the seven yards, as well as on the extensive base of parts and components vendors. Under different time frames for building a larger fleet, average annual shipbuilding rates over the next 10 years would

increase 12 to 15 ships per year. To meet that demand, all seven yards would need to increase their workforces, and several would need to make improvements to their physical plant. CBO estimates that the workforces across those yards would need to increase by about 40 percent over the next 5 to 10 years. Managing the growth and training of those new workforces, while maintaining the current standard of quality and efficiency, would represent the most significant challenge that the industry would face.

In addition, industry and Navy sources indicate that as much as $4 billion would be needed to be invested in the physical infrastructure of the shipyards to achieve the higher production rates of the 15- or 20-year buildups. Much less investment would be needed if the time horizon is 25 or 30 years.

However, certain sectors face greater obstacles in constructing more ships faster than others. Without going into too much detail here, increased submarine and carrier construction posed the largest challenges to industry, submarines in particular, while surface combatant and amphibious ship construction much less so. In short, building the fleet more quickly would pose much greater but not insurmountable challenges to the shipbuilding industry.

Thank you, Mr. Chairman, and I am happy to answer any questions the subcommittee may have.

[The prepared statement of Dr. Labs follows:]

Senator Wicker: Thank you, Dr. Labs.

Mr. O'Rourke?

STATEMENT OF RONALD O'ROURKE, SPECIAL IN NAVAL AFFAIRS, CONGRESSIONAL RESEARCH SERVICE

Mr. O'Rourke: Chairman Wicker, Ranking Member Hirono, distinguished members of the subcommittee, thank you for the opportunity to appear before you today to discuss options and considerations for achieving a 355-ship Navy.

Mr. Chairman, with your permission, I would like to submit my written statement for the record and summarize it here briefly.

Senator Wicker: Without objection, it will be submitted and accepted.

Mr. O'Rourke: Navy force structure and shipbuilding has been a central focus of my work at CRS since 1984. As you noted, Mr. Chairman, I worked on these issues during the Reagan era naval buildup. I remember that period quite well.

Increased shipbuilding for achieving the 355-ship fleet would have a substantial cost on the order of billions of dollars per year. On the other hand, there would be some potential economies in that effort. For one thing, increasing annual shipbuilding rates can reduce costs due to improved economies of scale. Doubling rates for ships that are procured every year, for example, might reduce their cost by roughly 10 percent. Increasing rates, moreover, can increase opportunities for using competition to restrain

costs. In addition, using multiyear procurement or block buy contracting can reduce costs by about 5 percent without economic order quantity purchases and by about 10 percent with EOQ purchases. The Navy in recent years has made extensive use of multiyear contracting in its shipbuilding programs, saving billions of dollars that have been used to procure additional ships.

And finally, cross-program purchases of common materials and components such as those authorized under the National Sea-based Deterrence Fund can reduce costs further at the margin, becoming the latest element of what might be viewed as a quiet revolution in recent years in Navy ship funding and contracting practices.

Construction rates cannot be markedly increased overnight. Even so, Congress has the option of fully funding additional ships in the near term, starting as early as fiscal year 2018 with the understanding that those additional ships would not begin construction until the industrial base is ready to build them.

Fully funding additional ships in the near term could send a signal of commitment to industry and a signal of deterrence to potential adversaries such as China.

The option of fully funding additional ships as early as fiscal year 2018 includes even nuclear-powered ships such as attack submarines for which there has been no prior year

advanced procurement funding. Congress has done this in the past.

Unmanned vehicles can expand Navy capabilities. Beyond a certain point, however, they will not be able to serve as substitutes for manned ships and aircraft. So beyond a certain point, they cannot act as a general reason for not procuring ships and aircraft in needed numbers.

Discussions of how to get to a force of 66 attack submarines can obscure a serious prior issue, which is how to address the dip or valley in the attack submarine force level that is projected to start in the 2020s. China has taken note of this projected valley.

In addition to procuring additional Virginia class boats, there are some supplemental options for mitigating the valley. The Navy is now exploring the possibility of increasing the service lives of certain existing surface ships, particularly DDG-51's, which could make it possible to defer the procurement of some new destroyers, permitting that funding and industrial capacity to instead be used for building other ships. Extending DDG-51 service lives could involve increasing funding for maintaining and modernizing them with the funding increases perhaps starting right away.

The Navy is also exploring the possibility of reactivating recently retired ships, particularly Oliver Hazard Perry class frigates. The technical feasibility and

potential cost effectiveness of this option is not clear. At a minimum, however, exploring it can be viewed as a matter of due diligence.

The industrial base in general appears capable of taking on the additional shipbuilding to achieve the 355-ship fleet. Ramping up to higher rates would require additional tooling at shipyards and supplier firms, and additional workers would need to be hired and trained. So production could not jump to higher rates overnight. Some parts of the industrial base, such as the submarine portion, could face more challenges than others in ramping up to higher rates.

And finally, building the additional ships that would be needed to achieve the 355-ship fleet could create thousands of additional manufacturing and other jobs at shipyards, at supplier firms, and elsewhere in the economy.

Mr. Chairman, this concludes my remarks. Thank you again for the opportunity to testify, and I look forward to the subcommittee's questions.

[The prepared statement of Mr. O'Rourke follows:]

Senator Wicker: Thank you very much, Mr. O'Rourke.

Dr. Hendrix, you are recognized.

STATEMENT OF DR. JERRY HENDRIX, SENIOR FELLOW AND DIRECTOR OF THE DEFENSE STRATEGIES AND ASSESSMENTS PROGRAM AT THE CENTER FOR A NEW AMERICAN SECURITY

Dr. Hendrix: Thank you, sir. Chairman Wicker, thank you for your invitation to address the topic on how the Navy might reach its stated requirement of 355 ships as quickly, economically, and efficiently as possible.

I wish to ask for permission to submit my extended written statement for the record while I summarize my remarks.

Senator Wicker: Without objection.

Dr. Hendrix: Thank you, sir.

Today I will present a series of options that my friend and frequent coauthor, Robert O'Brien, and I have suggested as providing ready paths to 355 ships. It is important to note that none of the ideas that follow are radical and that each has been used in the past, to include most recently during the Reagan administration's campaign to bring the Cold War to a successful conclusion.

First, it is important to note that the number, 355, as enunciated by the Navy is not arbitrary, but rather represents a minimum number of ships required to provide persistent presence in the 18 maritime regions of the world identified by combatant commanders where the United States has strong national interests.

Second, it is just as important to note that the time frame associated with the buildup to 355 ships is as critical as the raw number itself. Both China and Russia have taken advantage of the United States' recent strategic focus on counterterrorism campaigns in Afghanistan and Iraq to assume challenging profiles on the high seas. To head a future crisis off, the U.S. Navy must expand rapidly enough to convince others that eventual military victory at sea is not even remotely possible. To accomplish this goal, the Navy must reach the 355-ship range within 10 years.

Many tend to focus on new ship construction as the primary path to battle force growth at sea. For instance, in January, the Navy developed an accelerated shipbuilding plan that effectively took warm Virginia class, Burke class, LX(R), and oiler ships and turned their production lines from warm to hot, adding 29 additional ships over and above those contained within the current 30-year shipbuilding plan. However, this approach, limited as it is by the capacity of current programs, only achieves a ship count in the mid-330s. However, there are in fact other paths to 355 ships within the time frame discussed.

It is to the Nation's advantage that the Navy is scheduled to take delivery of 80 new ships of varying classes between now and the end of fiscal year 2024. Given the current battle force count of 276 ships, these new ships

alone would allow the fleet to reach 355 ships. Unfortunately, during the same period, the Navy plans to decommission 49 ships from service. These factors combined result in a net 31-ship increase to 307 ships. However, if a portion of the ships scheduled for decommissioning, for instance the five Ticonderoga class cruisers or the nine mine countermeasure ships, could be kept in service for another 5 to 10 years through service life extension programs, we could have a battle force of 321 ships by the end of fiscal year 2024.

Another option for rapid growth can be found in the ready reserve, or ghost fleet. Famously during the administration of Ronald Reagan, four Iowa class battleships were moved from the reserve fleet to the active fleet as Reagan built towards a 600-ship Navy. Currently there are 10 retention assets in the reserve fleet, to include a conventionally powered aircraft carrier, three light amphibious carriers, and five amphibious platform docks. There are also 11 Perry class frigates currently designated for foreign military sales. If 12 of the 21 ships described were returned to the active fleet within 5 years of initiating reactivation, this would leave a gap of 23 ships to achieve the 355-ship goal.

This brings us back to the original discussion of new ship construction. Of course, new construction will have to

be part of the Navy's buildup. The places in the inventory where the Navy needs additional investment are fast attack submarines, which will fall to a population of 41 boats from its Cold War high of 102 by 2029, and multi-mission frigates, which have declined from 115 ships in 1987 to 0 today. Multi-mission frigates, as described by the recent requirements document from the Navy, will be critical to the Navy maintaining its persistent presence across the global maritime commons, as well as restoring a capacity to conduct anti-surface, antisubmarine, and convoy escort missions in support of military operations across the globe. Some care should be given to an ice-hardened design or variant that would allow for operations in the Arctic.

The Navy needs a robust new multi-mission frigate design, perhaps based on a proven foreign design such as the robust European FREMM or an ongoing program here in the United States such as the national security cutter currently being built for the Coast Guard. To be clear, there is neither the time nor the need to consider a new clean sheet design for a frigate, which the Navy needs a fair number of. Selecting a mature design could allow the Navy to take delivery of a new frigate within a 5 to 6-year period, depending on which design is selected. Such ships would provide naval presence in those areas of the world that are on the fringes of our interests but also where law and order

are most likely to be challenged. While perceived as strong, the global system of self-governance is actually quite fragile and is in need of constant attention that only a Navy of 355 ships can provide.

Efficiencies can be found in the production of these ships by pursuing authorization for multiyear block buys of vessels. Such actions would provide stability to shipbuilders and downstream parts suppliers, stabilizing or expanding good paying jobs and strengthening the Nation's defense industrial base.

While shipbuilding is the focus of this hearing, I would be remiss if I did not take a moment to bring to your attention the importance of getting the right capabilities balance back into the air wings of our aircraft carriers. Ensuring that the mission tanker, an unmanned aircraft designated as the MQ-25 Stingray, is designed to meet certain key mission-enabling requirements, such as being able to fully tank two F-35 Charlies at 500 to 600 miles from the carrier, will be one of the major decisions of the next year. A bad decision could lessen the relevance of the carrier and hence weaken American sea power.

Senator Wicker: Let me stop you right there.

Dr. Hendrix: Yes, sir.

Senator Wicker: Who is making that decision, and how is it going?

Dr. Hendrix: Sir, the requirements document is in development, and ultimately that decision will be made by Navy leadership, secretary level.

Senator Wicker: Go ahead. Well, thank you for letting me interrupt there.

Dr. Hendrix: Thank you, sir.

I have presented some options with regard to service life extensions for current ships in the fleet and returning ships to active service from the ready reserve fleet. I also recommend increased production of submarines and small combatants in order to grow the capabilities in anti-surface, antisubmarine, and convoy escort in which we are woefully short.

In closing, let me once again thank you for the honor of addressing you today. John Adams described the Navy as the shield of the republic. May it always be large enough to remain so.

[The prepared statement of Dr. Hendrix follows:]

Senator Wicker: Thank you, Dr. Hendrix.

And Mr. Clark. Mr. Clark, I bet you have a prepared statement that you would like entered into the record.

STATEMENT OF BRYAN CLARK, SENIOR FELLOW, CENTER FOR STRATEGIC AND BUDGETARY ASSESSMENTS

Mr. Clark: I would, yes. And could I have that entered in the record, and I will just summarize here?

Senator Wicker: Without objection. Does any member object?

[No response.]

Senator Wicker: Hearing none, it will be accepted.

Mr. Clark: I will summarize it here then.

Chairman Wicker, Senator Hirono, thank you very much for inviting us to testify here today on the ability of the U.S. Navy to reach a 355-ship fleet and methods to get there more quickly.

The Navy today is in transition. Each class that the Navy is building right now is undergoing a change from a current variant to a new variant or an entirely new class that is more capable than its predecessor.

At the same time, we are in transition in our strategy for the United States. We are encountering the intensification of great-power competition with countries like China and Russia. We are reviewing our national defense strategy right now to look at how to balance those needs to address those great powers with requirements to address missions like counterinsurgency and counterterrorism. And also we are facing new approaches

that great-power competitors are using against us like gray zone warfare of informationized warfare as China practices it.

Although in our analysis of the requirements to address those future strategic missions in our study we found that we needed a 382-ship Navy, in reality that is only 340 battle force ships in terms of what the Navy would count itself. So a 340-ship fleet compared to what the Navy is saying they need is a 355-ship fleet. I would argue that that is about the same. If you look at the requirements that we each came up with, they are very similar. So there is very little difference between what we at CSBA came up with and what the Navy came up with in the overall requirements.

That is important, though, because that future fleet needs to be bigger regardless.

Senator Wicker: What accounts for the larger number?

Mr. Clark: So the larger number is a number of patrol ships that we recommend the Navy buy that they would not currently count under their battle force ship counting rules.

Senator Wicker: Thank you.

Mr. Clark: The fleet needs to be larger, and it needs to be in about this 355-ship range, though, regardless to address the need to tackle today's readiness crisis in the

fleet, which results from a mismatch between supply and demand for naval forces. We also need a bigger fleet to address growing requirements in new regions that have been quiet for the last 25 years since the end of the Cold War, places like the Mediterranean, northern Atlantic, Europe, also the South China Sea. So we have increased the presence that we need of naval forces in those regions, which has put a demand on the Navy that exceeds what its supply is able to give. And that leads directly to the readiness crisis that you hear naval leaders talk about today.

The future fleet, though, will need to be as capable or more capable than the current fleet. So to address the fact that we have great-power competitors that have long-range sensors and weapons and the advent of the kinds of capabilities in their militaries that we have in our own and have used for decades here, we are going to have to have a fleet that is just as capable as the one we have today but probably even more capable with the use of new capabilities and sensors and weapons, electronic warfare, and unmanned systems.

That is going to drive what the fleet architecture looks like. We will not be able to go to a fleet that is less capable than the one today in an effort to buy it more cheaply or more quickly. We are going to have to think of ways to be able to build a fleet that is as capable as the

ships that we have now.

So one example of that is the advent of gray zone warfare. If we are going to address the actions of a country like China in the South China Sea, we could send ships there to respond to what they are doing against the Philippines and Japanese, but we would encounter the fact that they have long-range sensors and weapons they can use to threaten our naval forces. Our naval forces would then need to be able to survive and persist in that environment and fight or else we are going to be forced to conduct attacks on the Chinese mainland to degrade their sensors and weapons ashore. That requires us to have a more capable fleet that is able to survive that environment without those highly escalatory attacks ashore.

This more capable fleet is going to have to be built out of the one we have today, and it is probably going to have to rely on new construction to a greater degree than bringing ships out of retirement or in adding lower-end ships that would be less capable.

A perfect example of that is this discussion about the new frigate. So the frigate that the Navy is looking to build, based on the request for information that recently came out, could have a wide range of capabilities. It could be everything from what the existing LCS brings, which is a modest amount of offensive capability with relatively low

survivability, or it could be a highly capable frigate that is able to do air defense for itself and others, as well as conduct offensive operations. We would argue that the more capable frigate is more representative of what we need in the future security environment because of the ability of great powers like China and Russia to threaten our naval forces at sea and force us into this dilemma of either protecting our naval forces where they are or attacking the Chinese or Russian systems ashore and escalating what could be a gray zone confrontation into a major war. Obviously, we are not going to want to do that. So that deters us from taking those actions, and it can degrade the security assurances we provide to countries that are now facing Chinese and Russian aggression.

Now, with regard to the overall fleet mix, what that argues is that we need more of a big/small mix in the fleet rather than a high/low mix in the fleet. Some of the discussion we have heard talks about bringing ships out of retirement or buying additional numbers of smaller, less expensive combatants to grow the fleet to 355 more quickly. Those ships that we would bring in, though, would not be capable of defending themselves and being able to conduct offensive actions in some of these highly contested areas like the South China Sea or East China Sea or the Baltic. They would then become liabilities rather than assets in

these regions and force us to do something to protect them in turn.

So the big/small fleet would, instead, be large ships and small ships, but both having similar capabilities but with different capacities. So, for example, cruisers and destroyers are larger ships that are capable of defending themselves and other ships and long-range offensive attacks against enemy ships and targets ashore. But a frigate and even a small missile craft could do the same thing as the destroyer, but just at a smaller scale. Those ships would be able to defend themselves in those kinds of environments as well and would be assets rather than liabilities.

To more quickly get to this 355-ship fleet of highly capable ships, a number of options have been discussed: multiyear procurement, using concepts like the Sea-Based Deterrence Fund where we can provide funding in one year that could be applied to some future years procurement, other options for funding ships more flexibly than we are today. Those are options to increase ship production and to be able to do it more efficiently and perhaps save money as we have found with multiyear procurements that usually give us a savings of 10 percent per ship. We can also ramp up production of existing ships within the shipbuilding industrial base, as the Navy has described with their recent paper talking about an increase of 29 ships over the next 7

years.

The cost of that future fleet, though, will be much higher than the fleet of today. And we estimated in our study that a Navy of about 350 ships will require about 15 to 20 percent more procurement funding and about that same amount of additional operations and maintenance funding in the out-years. But a decision on how much exactly to spend and how big a Navy to reach can be changed over the course of time, but if we do not start now trying to grow the fleet, we will not have those options down the road to decide exactly how big it needs to be. So I would argue at this point we do not necessarily need to come up with a plan to get to 355 exactly starting today, but we need to start moving in that direction so that we have the option to be able to eventually get to 355 tomorrow.

If we fail to grow the Navy with the highly capable ships that will be necessary to operate in the kinds of environments they are going to face, we are going to undermine the security assurances we provide to our allies, and that will affect the U.S. position in the world and it will have dilatory effects on our economy and our relationships with our allies and partners.

Thank you very much, and I am looking forward to your questions.

[The prepared statement of Mr. Clark follows:]

Senator Wicker: Well, thank you for four excellent examples of testimony.

Mr. Clark, you say we first need to get started with the first year. I could not agree more. So I noted in my little statement that not only have we put the Wicker-Whitman SHIPS language in both NDAA bills, but we have authorized additional funding for five ships above the administration's budget request while maintaining cost control measures.

Is that a good start for the first year?

Mr. Clark: Yes, sir. That is exactly the kinds of start we need to have, start adding additional ships now drawing upon the industrial base that we have and the additional capacity that is available and start moving in that direction as opposed to try to bite it all off at once.

Senator Wicker: I think I heard you say that getting to the 355 ships solves not only a modernization problem, but it solves a readiness problem.

Mr. Clark: Yes.

Senator Wicker: Okay. Help us on that because we have been told that there is a competition between readiness and getting to the fleet size we need.

Mr. Clark: Right. And so fundamentally readiness comes down to supply versus demand. And so today the demand for naval forces exceeds what the supply can deliver using

the current readiness processes, the fleet response plan that the Navy uses to generate ready forces. So to be able to meet the COCOM's demands, what they have been doing is short-circuiting that process and sending ships out with not as much maintenance or not as much training to be able to meet the combatant commander requirements.

Also, because they are being deployed on short notice without a lot of ability to schedule, they are having to reschedule maintenance and do maintenance at the last minute, which is more expensive and less efficient. So maintenance that needs to get done on ships is being deferred until some future date when they become available.

So all those things are happening today, but it is fundamentally because the fleet is too small for the demands being placed on it. So in the near term, we need to be thinking about maybe saying no to some of these deployments to be able to shift money into procurement of ships to solve the problem that we are going to have tomorrow.

Senator Wicker: Dr. Hendrix, does that make sense?

Dr. Hendrix: Absolutely. Sir, one of the things that we have noted is that as we have fallen from 400 ships to 350 to 300, now to 276, is that we are still attempting to forward deploy the same number of ships. So I think today it is 104 ships are out to sea. The problem is that when you a deployment cycle where it takes four ships to keep one

forward deployed, the assumption is that 25 percent of the fleet will be in maintenance in some sort of a yard capacity with workmen working on it. But when you are still trying to do 100 forward, but you only have 276, then you have to shorten up the cycle somewhere, and the cost payer now has been in maintenance and readiness because you cannot shorten the training cycle working them up and you do not want to shorten the deployed cycle, nor do you want to decrease the number of ships forward. And so it has been in maintenance and readiness that the fleet has taken time out of the schedule, and that is why we see ships going out that, quite frankly, do not look that they are adequately prepared and the maintenance records are showing that the material readiness of the fleet has been falling off.

Senator Wicker: And, Dr. Hendrix, let me ask you about something you said on page 2 of your prepared statement. And you said it on the record also. You mentioned the People's Liberation Army/Navy, the fact that we have more or less incentivized them to try to achieve dominance in destabilizing a sphere of influence in the western Pacific. And you say that the Navy needs to reach 350 or 355 as swiftly as possible to effectively deter them from thinking that this is even possible.

Dr. Hendrix: Yes, sir.

Senator Wicker: If we sent out the clear signal this

year and next year that we are going to do this and that we are going to put the money where it is needed and we are serious about it in the long run, what actions do you think the Chinese Army/Navy would take that would indicate we have actually convinced them that military victory at sea is not remotely possible?

Dr. Hendrix: Sir, one of the things you look at -- you know, great-power competition is an attitudinal function of the way that states interact with each other. States begin to build momentum towards certain ideas, certain perceptions that take a life of their own over time, and as the U.S. Navy has declined and as our strategic focus has shifted ashore and to Iraq and Afghanistan, this has created a condition where China believes there is an opportunity to grow and compete and create their own sphere of influence essentially in the western Pacific. And so by coming out strong both with our buildup as well as with our language and with posturing ourselves through exercises, forward deployment, and by meeting them on some of these issues that they are raising, such as freedom of navigation operations on these artificial creations that they made in the South China Sea, then you convince them today and then the day after that that a wartime challenge against the United States will not be successful. And so this is part of the ongoing competition amongst nations.

What you might expect them to see is a change in their posture, the change in their language as they begin to see an exercise of greater numbers of ships in the area, the forward presence, and the fact that we are taking a more aggressive form, for instance, doing FONOPS. They are operating in a normal military mode as opposed to just an innocent passage profile. Those types of things convince them that this is not a competition that they are going to be able to win with us as we come on and be more strong and steadfast.

Senator Wicker: And that actually worked in the 1980s, did it not, with a different adversary.

Dr. Hendrix: Yes, sir, both in some of the Black Sea operations and the Baltic Sea operations that we had against the Soviet Union where we actually had ships rub up against each other out there, had an action of actually demonstrating to the Soviet Union that the United States was not going to back down.

Senator Wicker: Thank you. There will be more questions.

Senator Kaine, you are recognized, sir.

Senator Kaine: Again, thank you to the witnesses.

Just two items that I would like to ask about.

First, we had some wonderful testimony last week, and I want to read it with some precision here. Secretary Lehman

was with us last week, and we were talking about the Navy buildup of ships during the Reagan era. And he said something, and this was the quote. Quote: 90 percent of the deterrent power of this buildup could be achieved in the first year. He said it was achieved in the first year and we could do it again.

And I think what he meant by that -- and I went back and forth with him a little bit -- is in the first year we started strong, and the other side, in that case the Soviet Union, really believed we would continue. It was a long buildup, but there was a dramatic start and no doubt that we would pursue it.

Not only did we have the 355-ship amendment as part of the bill that came out of this committee to the floor, but we also had a let us get rid of sequester.

If we continue to have budgetary challenges, sequester, threats of shutdown, CR, et cetera, even if we say we are going to do 355, we are not exactly sending the kind of clear message we need. And so would you agree that how we overall handle the budgetary issues going forward is part of what makes that impression that the investment we are on is likely to be carried through? And that is for all of you.

Mr. Clark: For me I would argue that is definitely the case. Our adversaries, our competitors look at our budgetary situation and see that as a weakness or a

vulnerability that we have and are looking to exploit it in how they coerce their neighbors. So part of this gray zone effort of China and Russia is going to their neighbors and saying you do not seem to have the kind of support from the United States or the United States cannot lend you the kind of security assurances that you would need. Maybe you should just go along with us.

Senator Kaine: Other thoughts?

Mr. O'Rourke: The importance of signal sending is precisely why I talk in both my written statement and in my opening remarks about the option that Congress has for fully funding ships in the near term, starting as early as fiscal year 2018, even if those ships will not be ready for production until sometime down the road. The signal sending to competitor countries, particularly China, that can be accomplished by that is potentially substantial, and it is one of the reasons I emphasized it in my testimony. And one of the things I pointed out is that you can even do this with nuclear-powered ships, such as attack submarines, for which there has been no prior year advance procurement funding. And I also pointed out that Congress in fact has done this in the past. They have fully funded ships upfront, including nuclear-powered ships for which there was no prior year AP funding.

Senator Kaine: Thank you.

Please, Dr. Labs.

Dr. Labs: I would agree with what Mr. O'Rourke said and the other panelists. If you think about great-power politics and deterrence, a lot of it is a signaling game, and those signals take many different forms. It is not just one. So the amount of money that you want to spend on a particular set of programs such as shipbuilding is going to be a signal. So if you increase that shipbuilding, you are sending a signal. The amount of money that you spend on the defense budget overall will be another signal. The things that you say and how you then operate those forces is yet a third signal. And we can keep iterating through that. So all of this becomes signals. So your overall approach to your defense budget, your overall approach to your shipbuilding budget, and everything else is all going to play into the game of great-power politics and have the role and bringing up deterrence to be effective.

Senator Kaine: Let me ask a second question that has bedeviled the committee a little bit. Being from Virginia, carriers are something I know a little bit about. And we have had many a hearing in this committee where we have looked at the cost overruns on the Ford that was just commissioned, which is a wonderful, wonderful piece of technology.

The cost overruns were driven heavily by not just a new

design but also new technologies that were put as part of the design. So it is one thing to redesign the hull and so many aspects of that carrier. It is another thing to put in a new kind of arresting gear mechanism, new kind of a catapult mechanism.

So what advice -- if we were going to try to dramatically build up with some new platforms, what advice would you give to us about the way to incorporate new designs and new technologies into new designs? Is it sort of a phasing concept? Dr. Hendrix, it looks like you want to jump in on that one.

Dr. Hendrix: Yes, sir. I think there is a historical lesson to be learned from the development of the Aegis Mark 7 system, which was build a little, test a lot, the idea of building in the iterative process so that you really fully mature things as they come through time. We knew in the 1990s -- and I remember this quite distinctly as a junior officer -- that we were going to take a significant risk with the Ford class design by the fact that we were going to ask to incorporate at a minimum three major system redesigns in one platform, which is something that we had not done probably since the 1950s when the technology was much more rudimentary, for instance, when we did the Washington class ballistic missile submarine.

And we made some bets, and quite frankly, some of those

bets have paid off. Some have not. And so the Ford is coming along somewhat slowly. Had we made a decision, for instance, to only incorporate one new aspect of design, perhaps the EMALS, aircraft launch system, on the first one and then incorporate the second one on the second in the class, that that would have been a bit more iterative. But I think one of the major lessons learned is to kind of look back at Admiral Wayne Meyer and the lessons that he taught us on developing the Aegis system.

Senator Kaine: Please, Mr. O'Rourke. If I can, Mr. Chair. I am a little bit over.

Mr. O'Rourke: I would like to build on what you just heard with some additional comments.

In terms of the cost growth of the carrier, the specific question -- Eric and I have talked about this over the years, and I think it is our view that the cost growth stemmed primarily from the fact that the original estimate was just unrealistically low. And the Navy knew that at the time. They assigned a fairly low confidence factor to that estimate. So we should not be surprised that the cost of that ship wound up being higher than what that earlier estimate was.

But building on the lessons that you just heard, in my own written statement, I have a summary of generalized lessons learned for shipbuilding that have accumulated over

the years. These are things that a lot of people have mentioned over and over again that get to the broader issue that you are raising with your question. And this is what I would say. There are eight or nine things here.

First is to, at the outset, get the operational requirements for the program right. Understand what you are trying to do. And as Jerry said, do not try necessarily to do too much with any one program.

Secondly, impose cost discipline upfront, and that includes using realistic cost estimates rather than optimistic ones.

Employ competition where possible.

Use a contract type that is appropriate for the amount of risk involved.

Minimize design-construction concurrency, which is one of the oldest lessons in shipbuilding.

Properly supervise the construction work with an adequate number of properly trained supervisors of shipbuilding personnel.

Provide stability for the industry, where possible, by using multiyear procurement or block buy contracting.

And maintain a capable government acquisition workforce that understands what it is buying so that it can act as a force for doing all these other things.

These lessons are not new. They are actually very old.

The problem is not identifying them. The problem or the challenge is living up to them without letting circumstances lead program execution efforts to drift away from them over time.

Senator Kaine: I am over my time, but I very much appreciate that.

Thank you, Mr. Chair.

Senator Wicker: Thank you, Senator Kaine.

Senator King?

Senator King: Thank you, Mr. Chair.

Just to follow up a concrete case, as you may know, in the national defense bill, there is a 15-ship multiyear procurement for the Flight III DDG. Representing Maine, Bath Iron Works is somewhat concerned that it is not fully matured and one has not been built yet, and we are talking about a block buy and a fixed price contract.

Mr. Hendrix, it seems to me in learning the lessons of the original Aegis and also of the carrier, is this an area of concern?

Dr. Hendrix: It is an area of concern, sir. However, the Block 3 variant of the Burke is built on an existing infrastructure that is well understood so far as power capacity, air conditioning, propulsion systems, and so on. There are some modifications that will come in with that. Most of the advancement, of course, is in the radar systems,

some of the advanced sensors. So while we realize that it is a stretch to move from Flight II to Flight III, there should be a level of confidence that can be done with some sense of what the actual cost would be associated with it in order to move forward. I just drove over the bridge there to look down and see the Zumwalts being built and BIW building the Burkes. Confidence in that yard is high traditionally. And so we would hope that we see that bid come in soon.

Senator King: So really it comes down to a factual determination of how much change is there in the design and how that will impact the rest of the ship. And that is a kind of detail that really has to be resolved between the Navy and the yards.

Dr. Labs: One of the ways I would have answered Senator Kaine's question relates directly to yours, which is the difference between the DDG-1000 and then the Flight III Arleigh Burke. The DDG-1000 was going to have 10 brand new technologies and all new design. It has proven to be a very expensive ship taking a very long time to build before we get it operational. We are still quite some ways away before we have truly an effective combat unit there.

The Flight III Burke is doing an evolutionary change to the Arleigh Burke class, not unlike what we did with the Flight IIA compared to the Flight I and II. So you have a

higher degree of confidence that you are going to be able to make that system work even though there are going to be kinks to work out. There always is in any new shipbuilding program. But an evolutionary approach is going to allow you to get those ships into the fleet faster, new technologies into the fleet faster than you would if you tried some sort of all new, clean slate design where you are putting everything in at once, and you are going to have to spend a long time figuring out how to build it and how to make it work.

Senator King: But again, it comes down to a factual determination of how much is evolutionary and how much is significant change that is yet not finalized.

Dr. Labs: Yes, sir.

Senator King: By the way, I discovered firsthand a defect in the design of the George Washington class aircraft carrier. I spent some time on the aircraft carrier, and I was very excited that I was staying in the admiral's quarters. That was the good news. The bad news is I learned the admiral's quarters were right under the catapult. So because they were doing night operations, that was a problem. But it was not a very serious one.

Reactivation. There has been a lot of discussion. We have had it come up several times. Give me your thoughts. We do not have to go all the way down the panel. Is it

feasible to reactivate mothballed ships, or is that a waste of time and money? I mean, if we have got a perfectly functioning hull, is that a place to start, or should we not go down that road, again thinking about the fact that the 355-ship Navy will cost somewhere on the order of $8 billion a year incrementally over the current shipbuilding budget. So would this be a cost-saver? Would it be more trouble than it is worth? I would like your thoughts. Mr. O'Rourke, what do you think?

Dr. Labs: Briefly, I think that not unlike what you just said before, that is going to come down to a factual determination on a hull-by-hull, ship-by-ship basis. So there may be situations where some of the ships are in good enough condition. The problem is that when the Navy knows they are going to retire a ship, they stop investing in the ship. They stop maintaining it well and efficiently. So there are going to be investments that are going to need to be made just to bring the ship back up to the condition that we would have liked it to be. And then you are going to have to decade whether you need to upgrade and improve the combat systems aboard those same ships that you are reactivating. So all of that is going to take time, money and effort.

Senator King: The cost would be of shoehorning a modern combat system into an old hull.

Dr. Labs: That is exactly right. So some ships are going to be able to do that. If we take the five Ticonderoga class cruisers, the first five, there was an original plan when the Navy was doing the cruiser modernization that they would take those five ships, they would spend a healthy amount of money to upgrade them, including installing VLS cells in them. For various reasons, that never came to pass mostly for budgetary reasons. But that is the type of thing that could be done. But you are going to have to evaluate that to see whether it is worth the time and the effort compared to how long it would take you to bring new units into the fleet.

Senator King: Yes, sir. Dr. Hendrix?

Dr. Hendrix: Yes, sir. The one thing about that -- and there are I think three existing of those first five hulls. They have 10 years less of sea life on them because they have been parked for most of the last decade. It is not going to be inexpensive to make that investment. And in fact, the total of doing the three ships is going to be well over a billion, maybe south of $2 billion to do the three ships. However, the cost of one new cruiser, to build it from keel up, would be in excess of $2 billion, certainly close to $3 billion. And so the idea -- you know, what is that tradeoff? Also, those platforms will not last as long once we make that investment. But the hope is that by then

we have ramped up the infrastructure that we will be building new ships to replace it. It buys us 10 years, but it gets us three hulls with some spy and some VLS on them.

Senator King: Has there been a study of this option per se? In other words, how many hulls are out there? How many could be renovated? I think it would be helpful to the committee to have some data on this.

Senator Wicker: I think it would b very helpful. And Mr. O'Rourke has his hand up.

Mr. O'Rourke: Yes. I mean, the Navy is actually doing that study right now. As a matter of due diligence, they need to explore that so that they can answer this question and say, yes, we looked at and it either did or did not make sense.

When you look at these older ships, there are really two issues. One is the age and condition of the ship. And some of these ships are not as young as the committee may have heard a week ago. For example, the Navy is looking in particular at these Perry class frigates. Those frigates are almost 30 and 31 years old.

Senator King: I remember when they were being built in Bath.

Mr. O'Rourke: Exactly.

Senator King: In the 1980s.

Mr. O'Rourke: That is right. They all served to the

end of their expected service lives. The youngest ones are 25 or 26. So they have only a handful of years.

But it is not just a matter of age and condition. It is a matter of why are you bringing them back. If you were to bring them back, could they actually do something that needs to be done. We are not just chasing numbers for their own sake. You do not just bring ships back to bring them back and put a mark on a chalkboard. You are doing it because you believe that that ship in its reactivated capacity can actually do something of value to the Navy that is worth the cost that you put into it.

So you have to, first, look at the condition of the ship and say can you even bring that thing back. But then you have to ask yourself why and what missions could it perform. And there may be something creative here we can do with the Perry class frigates or some of the other ships that are in the inactive fleet. And there were about 48 of them in the inactive fleet as of last September. But that is what you would need to look at. The Navy is doing that study, and I think they owe the answer back to you in the coming weeks and months.

Senator King: Thank you.

Senator Wicker: Mr. Clark?

Mr. Clark: A better approach might be to think about keeping some ships in operation longer rather than

reactivating old ones that have a kind of unknown material condition. We have a number of LSDs or amphibious landing docks that are getting ready to retire over the next decade. Some of those can be kept in service longer and so some of the lower end missions that you might use a frigate for. And it would cost less to do that than it would be to pull a ship out of retirement.

Senator King: Life extension as opposed to renovation.

Mr. Clark: Right. And we have done that with -- amphibious ships in particular have been a common choice to do life extensions on and get more use out of them to do a different set of missions than they were originally designed to accomplish. So that may be a better option than trying to start up with something that is an unknown quantity.

Senator Wicker: Dr. Hendrix, you wanted to add another brief comment.

Dr. Hendrix: I would make just a note that the Perry class are some of the most sought after ships for sale to our allies and partners who refurbish them and then make them last anywhere from 10 to 20 years after that. And so the idea of -- surely there is a value there. And the types of missions they probably would be most appropriately used is the way that our allies and partners do, which is doing coastal patrol, convoy escorts, some ASUW type missions, not in the highly contested environments but in more permissive

environments where international security and laws need to be upheld. So that would be the appropriate place for that type of a ship.

Senator Wicker: In fact, this committee put a business case analysis requirement in the fiscal year 2018 NDAA to look at reactivation options. So in response to this, if it stays in the law and is signed by the President, the Navy will be required to provide us with these details in the coming months.

Thank you, Senator King.

Senator Shaheen?

Senator Shaheen: Thank you, Mr. Chairman.

And, Senator King, I am surprised to hear the catapult kept you up. I thought, as governor, you learned to sleep through anything.

[Laughter.]

Senator Shaheen: I just wanted to follow up a little bit on the questioning around the Perry class frigates because, as you know, Admiral Richardson stated last month that the Navy is considering the possibility of bringing those back. And you indicated, Mr. O'Rourke, that there is a study underway to take a look at that. But do we have currently the need, as you described, Dr. Hendrix, to use those ships in a way that would free up other ships to do other operations? And so is that a realistic idea that we

can do that, and do we have any idea what it would take to modernize them?

Dr. Hendrix: Ma'am, there are some estimates out there on what the cost would be, anywhere from $80,000 million to upwards of $180 million per ship to bring the Perry's back and do the modernization. Those are some of the numbers that I have been provided. Actually, our colleagues probably have better estimates on that than I do.

However, the types of missions where they might be used, you know, things in the Mediterranean, things in like the Gulf of Guinea, some of these areas where we are providing offshore security patrols and so on, those are the types of arenas that we would see this. This is not what I would look at as front line for something like the South China Sea, but some of the areas in Mediterranean patrol and so on that the Perry's would most be appropriately. Those would relieve other ships, new ships, more highly capable ships to be able to be targeted at other areas of more challenging arenas.

Senator Shaheen: Thank you.

Do you want to add anything to that, Mr. O'Rourke?

Mr. O'Rourke: There is one other mission that comes to mind. In part of my testimony, I try to raise awareness of the national fleet policy, which is the statement signed by the Coast Guard and Navy leaders to coordinate their

policies and optimize our investment in sea power at a national level. And the Coast Guard will tell you that they do not have enough platforms to prosecute the majority of the intelligence reports they get out of the southern sector of inbound, seaborne illegal drug importation. They know it is happening. They have the intelligence. They do not have the platforms to act on it.

Senator King: 75 percent.

Mr. O'Rourke: That is right. And when those ships land in the United States and those drugs get dispersed, it is a lot more expensive to stop the drugs at that point than it would have been to stop the ship at sea.

So one possible mission, a low impact mission for a Navy ship, if you wanted to see whether something might make sense from a mission standpoint, would be to bring them back to supplement the platforms that the Coast Guard has for intercepting drugs in the Caribbean region or also in the Pacific off the coast of California. They would still be Navy ships. They would still operate with Navy crews, but they would have Coast Guard law enforcement detachments on them. And the Coast Guard might welcome an opportunity to improve its drug interdiction capability because when we took the Perry class frigates out of service, the Coast Guard noted that and they expressed disappointment with the fact that they were losing access to those platforms as one

of the set of assets for conducting that mission. So that is one mission you could bring them back for.

And by the way, you could even perform that mission to some degree with naval reservists on 2-week duties because they are just going out of Florida doing that thing and coming back.

Dr. Labs: Senator, could I add one thing to the Perry discussion? Several years ago, Ron and I put this question to the Director of Naval Surface Warfare at the time because I was exploring an option about extending the lives of the Perry class frigates and along the lines of the way the Australians improved and modernized those ships. And at that time, the Navy said that they had looked at this issue and they found -- I cannot remember all the details, but they looked at this issue and said largely because of the material condition of the ships, they did not think it was either smart or cost effective to do so. So when the Navy reports back on this current look here, it is certainly something that should be looked at carefully. I personally will be curious to see how it compares to what we were told several years ago along those same lines.

Senator Shaheen: So define more clearly what you mean by the material makeup of the ships.

Dr. Labs: Well, it has been 3 or 4 years I think since we had that conversation, but there were specific issues

relating to the material condition of the hull, that it was getting very thin so it was going to be very expensive or very difficult to sort of improve it so that you get enough a life expectancy out of the ship to make the investment worthwhile. There would be issues related to improving the combat and the sensors on the ships to make them more -- because you want something that is good. If you are going to bring it back and spend money on it, you do not want to just keep it for 2 years. You would like to keep it for, I would think, 5-plus years. And you are going to need to improve sort of the actual combat capabilities of the ship as well.

Mr. O'Rourke: The ships are old. Their plumbing gets old. So if you want to bring them back, you start looking at ripping out their insides. That is why a low impact mission like sending them down to the Caribbean might be more within the realm of feasibility.

And there is one more limitation on those ships. They are weight-limited. In the latter years of their service, they got very close to their weight limit and you could hardly put anything new on them without having to find something else to take off. And so, again, if you were just doing it for this drug operation, you might not have to worry about putting too much new heavy equipment onto the ship, and it could be easier to manage from that regard as

well.

Mr. Clark: Senator, if I may, one thing I will add on this discussion about lower end missions is today the Navy is not doing very many of those missions. Since 2013, since sequestration basically, the Navy has not been conducting a lot of these patrol missions in Southern Command, in the Mediterranean, and elsewhere. So we would be bringing these ships back into service to do a mission that the Navy has kind of walked away from and left to allies or the Coast Guard. And so it would be complementary but not necessarily relieving a larger combatant ship to do --

Senator Wicker: So it is not really part of the requirement that the leadership is giving us. Is that your point?

Mr. Clark: Yes, sir.

Mr. O'Rourke: It is part of the national requirement but not the Navy's specific requirement.

Senator Shaheen: Can I ask one more question, Mr. Chairman?

Senator Wicker: Certainly.

Senator Shaheen: I know my time is over.

Senator Wicker: Well, we all went over.

Senator Shaheen: Mr. Labs, in your report you talk about the costs to improvements to the shipyard that are needed to build ships at higher rates. And when you talk

about those improvements, are you talking about infrastructure improvements, additional workforce? What specifically?

Dr. Labs: I divide that into sort of two different sections. So you will definitely need to increase the size of your workforce. As indicated in the report, if you want to build up to some of the levels that I discussed, a 40 percent increase in work forces.

But when I talk about the cost of the physical plant, the upwards perhaps of $4 billion, depending on how fast you want to build up the fleet, that is physical plant. So that is going to be things like pier spaces. Most of that is associated with the submarine industry. So the lion's share of that $4 billion, upwards of $3 billion, would be needed to improve the physical plant of the two submarine yards so that they can produce attack submarines at rates of three per year, in addition to the forthcoming Columbia class.

Mr. O'Rourke: Can I add one quick addendum, and it relates to submarines, which is one of the options for mitigating this valley in the attack submarine force that we are projected to go to would be to extend the service lives of some of the existing Los Angeles class submarines, the youngest ones, not by very far, just by 3 or 4 years. So a 33-year submarine would instead serve to 36 or 37 years. We have had at least three Los Angeles class attack submarines

that have been extended to that age, and if you could take the youngest 688's and do that same extension, they could help fill in the front half of that valley. And you would do that with extra maintenance performed on those ships. That is maintenance that would be performed at the naval shipyards.

Now, to the extent that they are running up against capacity, you would then want to think about having investments made at the naval shipyards to take better care of the 688's, to extend their lives a few years to help fill in the front part of the valley. And like I said in my opening statement, China has taken note of that valley, and we now can see that in their own naval literature.

Senator Shaheen: Well, you bring up something that I think is very important that I know and Senator King have been working on because we have the Portsmouth Naval Shipyard between our States, and that is the importance of making those investments so that the shipyard can do the maintenance that is required on the Los Angeles class and on the other subs that are being created because that is absolutely critical if we are going to keep them so that they are seaworthy.

Senator Wicker: Mr. O'Rourke, how old are these younger LA class submarines that you are proposing --

Mr. O'Rourke: The very youngest one -- I guess it is

the Cheyenne that came off the line last -- under a 33-year life, it would exit service in 2029. That is the year that we hit the bottom of the valley. So that ship and the sister ships that came just before it -- if you can get them 3 or 4 years over to the right by extending their service lives that much, they help fill in that downward slope on the front half of the valley.

And, again, we have already operated at least three of our 688's -- the hull numbers were 698, 699, and 700 -- to those ages. So if you baby these ships and take good care of them, then in some cases at least it might be possible to do that. I am not talking a large number of these. It is a handful, but a handful could make a difference in helping to fill in this part of that valley.

And I am concerned about that valley because, as we go through it, it not only puts a greater operational strain on our attack submarine force to do all those missions with fewer boats, it can also, in the eyes of competitor countries, be taken as a signal of reduced conventional deterrence. In other words, there is a greater risk of war as we go through that period if we do not pay attention to this issue.

Senator Wicker: Before I recognize Senator Rounds, let me just observe that the future Secretary of the Navy is sitting three rows behind you gentlemen. He seems to be

listening very intently to all of this.

Senator Rounds?

Senator Rounds: Thank you, Mr. Chairman.

I am going to follow up on this a little bit more because I like the idea of going to a 355-ship Navy, but I have also got a concern that once you have got it, you have got to take care of it. And I am just curious. How do we talk about adding more ships and more boats when at the current time we have got attack submarines like the USS Boise sitting at dock rather than being in depot and we have got two more besides that one as I understand it right now that we cannot get to at this stage of the game? We can have all we want, but if we not taking care of the stuff we have got and if we do not have a plan in place to get them back in and operational, it is just like not having them at all.

My question -- Mr. O'Rourke, I will direct this to you and you can redirect it if you need to. What are we doing about the backlog on depot work right now? And what is our plan so that if we do increase the number that we are going to have, what are we going to do to increase the capabilities of more depot work to keep those in a sustained position on an active basis rather than sitting at dock?

Mr. O'Rourke: The Navy has testified they are trying to dig themselves out of that hole right now. The emphasis

had been on getting out a maintenance hole that they fell into over a period of years with the conventional surface ships. But as you noted, they have got a problem now with the submarines as well. They just have to spend the time and the money to develop the workforce and invest in the capital plant needed to work their way out of that.

But there is something else you can do as well, which is to pay attention to the operation and support, the O&S costs of the ships that we are building. We are building a lot of DDG-51's for the future fleet. Now, those are great ships. They have a lot of capability, and the success of that program, as indicated in the testimony from a week ago, is reflected in, among other things, the fact that we have been procuring that ship for so long. The two DDG-51's in this year's budget are to be the 78th and 79th ships in the class. That is an amazing number of ships, and it is testimony to how capable and well respected that design is.

But the one thing we have not done with that design all through this period is take major steps to have a significant reduction in its O&S costs. So if you are going to flood the future fleet with a lot of DDG-51's and you are not taking steps to reduce your O&S costs, you will lock the future fleet into a situation of unavoidable, relatively high O&S costs, which can really tie the hands of future leaders in terms of their ability to pursue other program

priorities with whatever budgets they may have in the future because they have inherited a very large number of ships that we have not taken steps in a major way to reduce their O&S costs.

Senator Rounds: Let us just take a look at the actual boats that you have got that are at dock right now. You have got them there. This is the third one of these Seapower Subcommittees in which we have brought this up. We recognize that they have a hole that they are in. At what point will we have a discussion about what we are doing to get out the hole? And how do we address that when we are talking about adding more ships to our inventory? But I did not hear anything. I do not see anything yet. Maybe there is something that I am not aware of in which we are actually proposing to increase our capability to maintain this increased number that we are talking about. You got to include that.

Mr. O'Rourke: The Navy has started this effort maybe 3 or 4 years ago to start digging out of the hole, but it will take years to get out of it with the surface ships at least because you have to wait for all the different ships to rotate into their maintenance availabilities over a several year cycle. So we are in the midst of that right now. And it costs money. There is no way around it. But if you do not do it, you have what is called a fester factor where,

because you did not invest in maintenance at one point, it becomes an even greater requirement down the road. And you fall behind like you would if you are not making your credit card payments.

Senator Rounds: I really do not mean to beat a dead horse, but I guess I am going to try it one more time. If it has been 3 years and we actually have nuclear attack submarines that are sitting at dock and we still do not have a plan in place to get out or at least there is not a plan that we have heard yet, it seems to me that that is one area where we could actually have three more attack subs operational if we had the depot work being done in an expedited fashion or at least in some fashion if we have known about it for 3 years. Would you agree with me on that?

Mr. O'Rourke: I agree. There is no magic to this. You just have to spend the time and money to do it.

Senator Rounds: Let me add one more. I like the idea of having the additional carrier. With that also comes THE reason for having the carrier and that is the air group that comes with it. What is the plan in place, as we add the carrier, to actually acquire, maintain appropriately, and operate the air carrier group that would go with that additional carrier? I know I am over, but I would like to have that.

Mr. O'Rourke: Just very quickly, the Navy study that talked about building the additional 29 ships also talked about building 342 additional aircraft. And a big chunk of that 342 can go toward forming up the additional air wing that would eventually be needed for the 12th carrier. But we do not get to a 12th carrier on a sustained basis until about 2030 or later. So there is a little bit of time between now and then to form up that air wing.

Senator Rounds: Presuming that we are doing that, though, we are looking at -- F-35's I am assuming would be the aircraft of choice in this case?

Dr. Labs: In some ways you can build both. You can build the F/A-18's and the F-35's. In my report and in my opening statement, we estimate that you are going to need the additional aircraft for the additional surface combatants and the additional air wing. The air wing is driving this cost. It is going to cost about an extra $15 billion. But Mr. O'Rourke is correct. That carrier does not show up until about 2030. So you can lay those aircraft in over the next 10 years, and then you are going to have a fully equipped air wing by the time that comes around.

Senator Rounds: That is acquisition cost only that you are talking about.

Dr. Labs: That is acquisition cost only.

Senator Rounds: Right now, the F-35 -- we are

expecting that there is an additional operating cost during its lifetime of an additional 70 percent, somewhere in that neighborhood?

Dr. Labs: That is right. So for the rest of the fleet, in terms of the estimates that CBO produced in terms of the operation and support costs, that includes the entire fleet. So that would include the cost of that additional aircraft carrier, as well as the additional air wing.

I completely agree with you. Without having the specific answer to the three submarines that are tied up at the pier, the estimates that we produced in this report incorporate the fact that you are going to have to support, operate, and maintain this fleet and this budget over a long period of time. And given the nature of sort of that industry, where its costs are rising faster than inflation, the budgets are going to go up and they are going to need to be appropriated if you want to maintain and operate that fleet effectively.

Senator Rounds: Mr. Chairman, I do not mean to go on. To me this is really important because I do believe that we need to increase the size of the Navy, but I just really want to have the data upfront in terms of getting it right so that we are not coming back in asking afterwards why did we not think about the added costs or, in this particular case, the costs of keeping a nuclear submarine operational

rather than having it sitting at dock. I guess this is now the time that we ought to be asking the question.

Senator Wicker: I would note for the record that our crack staff would like it known that the NDAA report requires a plan for addressing how the backlog is eliminated as the fleet grows. And the Navy owes us a report on this topic within the coming months.

Thank you, Senator Rounds.

Which of the four of you is most eager to talk about the new request for information on the new frigate?

[A show of hands.]

Senator Wicker: Yes. You did not hit your bell, Dr. Hendrix. So Mr. Clark gets to go first. What do you think of the new RFI and does it move us in the right direction? And we will start with you and let anybody --

Mr. Clark: I do not think it does move us in the right direction.

Senator Wicker: You do not.

Mr. Clark: I do not. I think what it does is it opens up the aperture too much in terms of what the future frigate could be. It makes it seem like it could be anything from a ship that is only able to do surface warfare and ISR missions in support of distributed lethality, the Navy's new surface concept. It could be anything from that, which is a relatively low-end ship or less capable ship, all the way up

to a frigate that can do air defense for another ship and do antisubmarine warfare.

And I think the Navy needs to, instead of opening a wide aperture and seeing what comes in, make some choices about what they need this ship to do. And it is needs to be a more capable ship that is able to do multiple missions. So it needs to do antisubmarine warfare and air defense and surface warfare, all three of them, all at about the same time. So it needs to be a multi-mission ship and not something that is a single-mission or a dual-mission ship like the RFI implies.

Senator Wicker: Dr. Hendrix?

Dr. Hendrix: Yes, sir. Thank you for the question on this because the RFI I found generally to be good. However, there are a couple of troubling points within it. Probably the one that leapt out at me the most was the requirement within it for a 3,000 nautical mile range at 16 knots. Given the reserve fuel requirements, because we never run the ships all the way down to 0, we always to keep fuel for ballast and emergencies, that would actually limit that ship to have to at least to take one refueling for even a transatlantic convoy escort. It would seem to me that any type of ship that is built and it is written into the document needs to be able to do anti-surface warfare, antisubmarine warfare, and convoy escort that it ought to be

able to do convoy escort without having to peel off and hit the tanker on the way over. So it struck me that something in the 4,500 to 6,000 mile range ought to be sort of a walking-in-the-door minimum, and the higher the better in order for it to give the most independent steaming out of it.

The other aspect of it as well -- and then this is an area where I disagree with my friend, Mr. Clark -- is I am a little concerned about the emphasis on the air defense factor in this. I believe that the ship should provide self-air defense, but we, as has already been testified to, have been buying excess capacity of air defense in the Burke class for a number of years. Where we have a real deficit is anti-surface and antisubmarine warfare.

And anytime that you cause a ship or require a ship to be good at all things, you are going to drive up the cost factor on this. And I think there is a certain sweet spot on costs that if you exceed that -- and by that, I look generally in the $700 million to $850 million range per unit -- by adding in air defense capability, certainly we start edging over a billion dollar per copy. And at that point in time we will find ourselves in an argument which is to the extent of should we not just buy some more Burkes. We really need something that we can buy in high enough numbers that we can drive up that portion of the fleet.

We talk about the need for 52 small surface combatants. Currently we consider the LCS to be part of that 52. I actually think that number is higher, that you need something in the 70 to 75 range on small surface combatants to be able to fill out the requirements from the combatant commanders around the world. And I would like to see this be a robust ASW, anti-surface, design with a 6,000 mile range. I think that that is a good starting point.

Senator Wicker: Mr. O'Rourke?

Mr. O'Rourke: This is what I will say. This is going to be our third attempt in the last 15 years to try and get right the issue of smalls surface combatant procurement. When we started the LCS program in the 2000 to 2003 time frame, the Navy did not do all the homework in my view that it needed to do to provide a firm analytical foundation for the program, and the weakness in that analytical foundation in my view that I have argued for many years now is a principal reason behind many of the difficulties that the LCS program experienced in subsequent years.

The Navy had a chance to firm up that analytical foundation when the program was restructured in 2014, but this time not so much due to the Navy's fault but rather to OSD, they missed a second opportunity to create a firm analytical foundation for what they were doing.

So this is the Navy's third bite at the apple to put a

proper, robust analytical foundation to explain to itself and others what kind of ship it wants to buy. And it needs to be able to answer three questions and not just with opinions or subjective judgments but with strong, robust numbers. And that is, first, what are your capability gaps that you are trying to address? Second, what is the best general approach for filling those gaps? Should it be a big ship, a small ship, a plane, something else, some combination? And third, when you pick that best general approach, whether it is a ship or something else, then what are some of the key attributes that the ship should have?

This is what the Navy did not do in all three instances in the two prior attempts. They have a chance to get it right again this time. It is their third chance. If they do not put a firm analytical foundation under this effort, there will be a risk of this effort also experiencing difficulties in execution in the years ahead.

Dr. Labs: Senator?

Senator Wicker: Dr. Labs?

Dr. Labs: One last point to that because that was an excellent set of comments, and I do not have too much original to add to that. I would associate myself with what Mr. Clark said about it would be good that there would be more specificity in the RFI. Without getting into a recommendation of what that specificity ought to be -- CBO

does not make recommendations, but the more specificity you have, the more you can zero in and get that ship designed and faster. You can get a better cost estimate based on what the specifications are going to be. And you want to get down a path where you want to be careful about not trying to do things too much on the cheap. I agree with Dr. Hendrix that you do not want to find yourself in a debate whether you should be buying Arleigh Burkes or a really expensive frigate. But at the same time, if you can design a ship that has a great deal of capability and you can get may be two for one, two frigates for the price of one Arleigh Burke class, then you are starting to get somewhere with what you are trying to achieve in terms of building a larger fleet in a timely manner.

Senator Wicker: Dr. Hendrix says you can swap two for six on destroyers. Do you agree with that? Have I characterized your --

Dr. Hendrix: Sir, in that case what I was talking about was for one destroyer, you could look at a couple frigates. You could also look at a couple offshore patrol vessels or missile boats by perhaps converting a joint high-speed vessel and uploading it with missiles. Given that cost range, that you could pack six smaller combatants in for the cost of one Burke. Yes, sir.

Senator Wicker: Well, we could go on.

Dr. Hendrix and Mr. Clark, do you think Dr. Labs is overly pessimistic about getting this done?

Dr. Hendrix: I have always found him to be an ebullient personality, sir. However, his fiscal caution is noted, and we have had difficulties in the past. So the fact is it is going to be a big lift to be able to do this with regard to getting the money in the right place, as has been ascertained by the last couple years of budgeting.

Senator Wicker: Are you heartened that he says we can do it 18 years?

Dr. Hendrix: Sir, of course, I think that that has to be done a lot quicker. I think that given the threat environment, that we have to bring it down. And, again, I take a different innovative approach by looking at the reserve fleet and SLEPing, whereas Dr. Labs tends to focus on new construction.

Senator Wicker: Who wants to make a last comment? No one.

Gentlemen, thank you for your excellent testimony and thought provoking. And we look forward to visiting with you in the future. I appreciate your help today.

[Whereupon, at 4:36 p.m., the hearing was adjourned.]