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**FUTURE FORCE STRUCTURE
REQUIREMENTS FOR THE
UNITED STATES NAVY**

HEARING

BEFORE THE

SUBCOMMITTEE ON SEAPOWER AND
PROJECTION FORCES

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

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FUTURE FORCE STRUCTURE REQUIREMENTS FOR THE UNITED STATES NAVY

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON SEAPOWER AND PROJECTION FORCES,
Washington, DC, Thursday, June 4, 2020.

The subcommittee met, pursuant to call, at 10:02 a.m., in room 2118, Rayburn House Office Building, Hon. Joe Courtney (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. JOE COURTNEY, A REPRESENTATIVE FROM CONNECTICUT, CHAIRMAN, SUBCOMMITTEE ON SEAPOWER AND PROJECTION FORCES

Mr. COURTNEY. I am going to call the Seapower and Projection Forces Subcommittee hearing to order. And I want to begin—I just want to begin by saying, noting the fact that this is actually the first official proceeding of the House Armed Services Committee since early March, and it is—again, already we know we have got good participation from the subcommittee to join us here today. And obviously, we have great witnesses here this morning.

I want to just, first of all, though, begin by thanking the staff for really doing great work in terms of uncharted waters. It is a good Seapower metaphor that, you know, again, we have set up what I think is a very workable process today to make sure that we can conduct this proceeding in accordance with the new rules that were adopted on May 15 that, again, allow the subcommittees to, again, officially act, using technology for some members, and, obviously, affording others the opportunity to be here in person.

Again, just sort of a little bit of housekeeping, and then I am going to make a brief opening statement and yield to my great colleague, the ranking member, Mr. Wittman, to weigh in, and then we will have the members or the witnesses begin with their statements.

Again, just as is obvious, we have numerous members of the subcommittee participating remotely today. Members participating remotely are reminded to keep themselves on mute until they are recognized to speak. In addition, remote members are reminded that once they do start speaking, there is a slight delay in the camera feed switching its focus to you. As a result, please include a brief preamble of some kind before you start into your questions to the witnesses, which I know most Members of Congress are very good at those preambles, so that shouldn't be, I think, a problem at all.

Again, I would like to remind all members, this is the first time the committee has done such an event, and I ask for your patience

as we do our best to make it work. If necessary, I will briefly go into recess to address any significant technical issues, but I don't anticipate that today, again, because I think the staff has done such a great job.

One other reminder is that people really need to keep—the members need to keep their videos on during this, just to, again, make, sure that, you know, we keep a head count in terms of who is participating. That is apparently, I think, part of the regulations which the House Rules Committee issued.

I would note, again, we have got great witnesses and great content to discuss today. There also, I think, is another layer of significance to this pursuant to the House rule that was adopted on May 15. Again, in order for committees to move towards markup, they actually have to conduct two official proceedings before that can happen. And again, the plan right now for Armed Services is that this morning's subcommittee hearing will constitute one of those two required events. Again, it is Mr. Smith's plan to have a full committee event coming up shortly, which, again, will satisfy that additional procedural requirement, and then we can move into full markup of NDAA [National Defense Authorization Act] which, again, we have lost some time because of COVID [coronavirus], and—but again, I would just note, and I know Rob can attest to this is that the subcommittee staff, not just on Seapower, but all the subcommittees, have been working hard since March. So, that again, I think a lot of the marks are really pretty much on the runway, ready to go, again, the minute we get clearance in terms of both process and timing to move forward on the mark.

And at this point, the tentative schedule will be that the subcommittees will have a premark and mark probably, you know, late June, and again, the plan is to have a full committee mark the first couple days of July with floor action sometime later in the month of July, which, again, will keep us reasonably on track in terms of trying to get an NDAA done certainly before October which is always the ideal situation.

So again, today's hearing is the "Future Force Structure Requirements for the United States Navy." Again, we are sort of resuming a conversation which started back in February when the President's budget was submitted. We did have some input from Pentagon leadership, Navy leadership, Chairman of the Joint Chiefs, as well as a subcommittee hearing with some of the assistant secretaries. Mr. Geurts came over, along with some of his colleagues, to talk about the budget.

Again, there was definitely a number of issues which I think our subcommittee had concern about regarding the Navy's budget submission. Again, we have been operating right now on a force structure assessment that goes back to 2016, you know. The world doesn't stand still. Issues are changing, you know. I think a lot of ideas about, you know, whether or not that force structure assessment needed to be revisited, you know, was certainly something that was a big topic of discussion, really going back into 2019. We had been promised by the Department of the Navy an updated force structure assessment late in 2019, then early in 2020, then a little later in 2020, and now, again, we, to this day, still have not received an updated force structure assessment. In addition, we did

not get a 30-year shipbuilding plan, which is required by law. I know some of the testimony this morning will get into that.

So again, as we approach the mark for 2021, I mean, the committee's going to use its good judgement. Again, we have got, you know, experienced members that have been through a number of these situations in the past. But again, it really, I think, emphasizes the importance of this morning's hearing to get really good input from great witnesses about, really, what we should be keeping focused on as, again, we move forward with the 2021 mark.

I mean, I think the one issue that I think a lot of us on this subcommittee know full well is that when you talk about Navy budget decisions, it is a long game, and you really cannot sort of allow a pause button to get hit from one year to the next because frankly, it carries a legacy and a hangover that is really just going to, you know, basically haunt future Congresses and future naval leaders.

So, again, as I said, we have got certainly a lot to talk about here this morning. We have three great witnesses starting off with Admiral Gary Roughead, a former CNO [Chief of Naval Operations] back in the 2008 to 2011 or 2012 time period. Again, a distinguished record in the Navy. He had six commands, different ships during that time period. Again, worked in the Atlantic, worked in the Pacific, worked on the Hill, you know, headed up the Naval Academy. Again, you know, somebody whose background, again, is just really very strong and very solid. And again, his testimony today I think will be very helpful in terms of the issue that we are discussing here this morning.

Bryan Clark, who, again, has been a frequent witness over the years, again, also served in the Navy as a submariner, and again, has worked with different think tanks and policy groups in Washington, is now a senior fellow at the Hudson Institute. And again, I think one of the comments in his testimony that the Navy is arguably facing a once-in-a-century combination of challenges and opportunities as it embarks on a new family of ships, kind of summarizes really how critical, you know, the topic is today, as well as the mark that we are about to proceed on.

And finally, we also have Ron O'Rourke, who is a specialist in naval affairs for the Congressional Research Service. Again, he is someone who has been working at that job since 1984. His wealth of knowledge and experience in terms of what he brings to this topic is really almost unmatched, in my opinion. And, again, his historical institutional memory in terms of, you know, the issues of force structure going back again to different times in our country's history is just invaluable. And again, I just think all of us should be very, very grateful for the work that he does at the Congressional Research Service, not just on this subcommittee but the Congress as a whole.

So again, we have got a great lineup of witnesses, and we have got members who are itching to ask questions. I am going to yield now to the ranking member, Mr. Wittman, to weigh in again and help kick things off this morning.

STATEMENT OF HON. ROBERT J. WITTMAN, A REPRESENTATIVE FROM VIRGINIA, RANKING MEMBER, SUBCOMMITTEE ON SEAPOWER AND PROJECTION FORCES

Mr. WITTMAN. I want to thank Chairman Courtney for yielding, and I want to thank our witnesses for participating today. Our witnesses are esteemed naval theorists whose years of blood and sweat to support our naval forces should be particularly insightful as we review our maritime force structure.

Naval shipbuilding is a long game. With some ships taking over 8 years to construct, and billions of dollars in investments, it is important that we be able to translate the National Defense Strategy into a coherent shipbuilding plan. I look forward to our witnesses' thoughts on how they best propose to better allocate resources to accomplish our defense vision.

In my estimation, there are three particular issues that I hope to address today, which include our undersea strike capabilities, unmanned technologies, and our support naval instruments. As to undersea strike, I continue to believe that our Nation rightfully relies on the silence of the sea to mask our strategic undersea strike capabilities. I support our latest force structure assessment that highlights the diminishing resources of our attack submarines, and advocates for a significant increase in this area.

I read an article earlier this week that seemed to indicate the Department's support to accelerate unmanned, underwater capabilities to replace the diminishing undersea strike capability. While unmanned, underwater vehicles are essential to augment the attack submarines, I am not convinced that they are currently able to replace the manned force structure.

Additionally, I was disappointed that the budget request had sacrificed an attack submarine and believe it essential that Congress reverse the perilous decline of our attack submarines.

As to unmanned capabilities, I am particularly concerned that these nascent products are being billed as being capable of replacing strike capabilities. There are a multitude of issues associated with the development of unmanned vehicles. Concerns with their reliability, their ability to operate in comms [communications]-denied environments, their ability to sustain operations, and their ability to strike using the law of war, are all points to a developing capability, not one that is mature. And I don't believe that they are a product that is currently ready to enter into the fleet. We need to develop baseline requirements and rapidly adapt commercial capabilities, but we should painstakingly review the application of these assets to ensure their sufficiency during times of war.

I also want to take a moment to highlight the many instruments in naval force structure that are essential to our Nation's success. Many of these capabilities are not immediately apparent, but are fundamental to projecting power. For example, while many of our citizens believe the United States Coast Guard is constrained to our Nation's coastline, the reality is that this committee supports these forces and our daily diplomats provided to a wide variety of host nations who yearn to be better aligned with our United States ideals.

We support a 60-ship Maritime Security Program that are daily integrators of our logistics training. We support all of our oceanic

cable repair capability to ensure continuity of international communications, on whose backbone rides over 99 percent of international data. And we support increased tanker capacity, in which last year, this subcommittee took the first step towards supporting the diminishing international tanker fleet who will be essential to allowing our naval forces to operate in a disaggregated manner.

My point in highlighting the softer instruments of naval power is to ensure that all of these elements are adequately integrated into a cohesive naval strategy. It is not simply enough for us to count our Navy ships and assess critical weaknesses. It is paramount to develop all of our naval capabilities, and align them in a common purpose.

In conclusion, I remain concerned that our emphasis on naval force structure highlights some of our strategic weaknesses. The integration of commercial sector practices and other maritime instruments are essential to projecting power. We need to be diligent in reviewing the real opportunities of developing capabilities. We need to be brave and lay out a coherent Navy force structure that integrates the Navy, the Marines, the Coast Guard, and the Merchant Marine into one battle force capable of dissuading aggression.

We emphasize joint operations with our partners around the world. It is time for us to emphasize the integration, the full integration of the Navy, the Marine Corps, the Coast Guard, and the Merchant Marine. If we fail to do so, our Nation will look wantonly on our inaction during this critical time.

And again, I appreciate Chairman Courtney for having this important hearing, and I yield back the balance of my time.

[The prepared statement of Mr. Wittman can be found in the Appendix on page 53.]

Mr. COURTNEY. Thank you, Mr. Wittman. And again, before we start with the witnesses, again, just a gentle reminder to my colleagues. Under the House rules, you need to keep your video feed on. Most of—it looks like a bunch of you are, but, apparently, the staff said a couple are still not. Again, if somebody has to take a phone call or do something and leave, again, you can just turn it off and then come back, but again, please remember to please keep the video feed on.

And with that, I would now—it is my pleasure to recognize the witnesses. We will start off with Admiral Roughead and go right across the room.

**STATEMENT OF ADM GARY ROUGHEAD, USN (RET.),
FORMER CHIEF OF NAVAL OPERATIONS**

Admiral ROUGHEAD. Thank you very much, Chairman Courtney. Thank you for the opportunity to appear before the members of this subcommittee to discuss the future force structure requirements for the United States Navy. It really is a pleasure for me to be here with the other witnesses who I have long held in very, very high regard for their knowledge and their experience on this particular matter.

I would ask that my full statement be entered into the record, but I do want to touch on a couple of quick points. As both of you have mentioned, getting future force structure right is really hard, and it does take a long time. The uncertainties of rapid technolog-

ical change, predicting what the geopolitical military and geoeconomic environment is going to be, adds to that difficulty. Assessing global naval trends, and then deciding on should the force be large enough for presence, which is now best defined, I think, by this idea of gray zone competition, where you have to be there, in some way, to influence events, or is it about combat?

I do believe that there is too little discussion on the effect of combat losses on major capital assets. We have been free of that burden for a long time, but in peer competition, I am not sure that one can assume that we are going to have an immaculate war.

There has also, in my mind, been an overfixation on the total number of ships as opposed to the nuanced numbers of specific types of ships that support viable operational plans. There is also the need to understand just how small our allied navies have become. And in the past, we have always looked to our allies to support us, but those navies are extraordinarily small. And then, as Mr. Wittman mentioned, the supplying of naval forces at sea is a challenge, and particularly, the ability for us to provide rapid sea-lift to support combat operations is woefully inadequate.

I think in the future, there is going to be reluctance for this country to commit ground troops on foreign soil, and there will be reluctance for other countries to accept those ground troops. China is going to continue its rise as a maritime power and as an naval power, and I think it is important to make that distinction, that their maritime industry, whether it is shipbuilding, shipping lines, port networks around the world, that is going to continue apace.

The probability of Taiwan becoming a military flashpoint, I think, will increase. But I also believe, as has been said, that submarines and the undersea domain are a winning hand, and we have to preserve that, but our adversaries are going to look at ways to diminish our undersea capabilities.

I do not believe that there is going to be a significant increase in allied naval force structure, and the reliance that we will have on U.S. flag shipping is not going to diminish.

The new technologies that are so promising, I think that we are often overly optimistic in how quickly they will arrive. And in that optimism, we do not plan for gap-filling capabilities that allow us to be prepared and be ready, should our forces be called into action.

Accordingly, I think there should be a high-low mix of surface ships, and I would say that the high end will operate more in the Western Pacific dealing with China, and that in the Middle East, which we will not be free of, because of the geoeconomic importance of that region, is best addressed by a low-high mix. The Atlantic will require significant antisubmarine warfare capability, because I think that the Russians are going to be active with their submarine fleet in the Atlantic.

As was mentioned, submarines, very important, but the dip that takes place in submarine force structure numbers later in this decade, I think, is dangerously, dangerously low. The guideline of four ships to make one in a particular area of operations, I think, will remain valid, and that doesn't make any difference if it is manned or unmanned, and that is a rule of thumb that I think needs to be adhered to.

Logistics will continue to matter greatly. I have already talked about our sealift. The Ready Reserve Force now, in my mind, is a tremendous opportunity to take advantage of the depressed shipping industry and be able to acquire some of those older—what I would call older new ships, or new older ships, even if they are foreign built, to be able to close that gap, and now is the time where I think some good deals can be made.

I firmly believe that unmanned is in our future, but we have to be more aggressive. We have to be more risk tolerant. And I am pleased that the committee shares the view of really having to focus on unmanned capability. We have let too many years go by without aggressively pursuing that.

Invariably, your committee is going to have to deal with the issue of aircraft carriers, and in this world where we will be less likely to put our young men and women on the ground in a foreign land, other countries less willing to accept them, I do believe that those sovereign American airfields are important, are versatile, and that they can move power in and out of areas faster than any other military service in the world.

The last point I would like to make is that all of what we talk about with naval force structure is only made possible by the maritime industry that supports it. Whether it is shipbuilders, the suppliers to those shipbuilders, those that manufacture aircraft, the technology that goes into unmanned systems, the seafarer that sails on our sealift ships, all of that is in a very, very fragile condition, and that is an area that even though we can talk about the physical things, we really need to look at human capital. How do we incentivize it? How do we make it attractive for individuals to want to pursue careers in that area, and also, for companies to want to make investments?

I don't minimize the challenges that you have, the budget challenges that are before you that will only worsen, in my mind, in the coming years, but America, as a maritime nation, with our interests around the globe, we need to focus on force structure, and I thank the committee for the opportunity to share my thoughts.

[The prepared statement of Admiral Roughead can be found in the Appendix on page 55.]

Mr. COURTNEY. Thank you, Admiral.

Mr. Clark.

STATEMENT OF BRYAN CLARK, SENIOR FELLOW, HUDSON INSTITUTE

Mr. CLARK. Chairman Courtney, Ranking Member Wittman, and distinguished members of the committee, thank you for inviting me here today to talk about the Navy's future force structure requirement. It is an honor to be here with Admiral Roughead and with Mr. O'Rourke, two gentlemen that I have worked either for or with over the years, and I have great respect for, so thank you.

The Navy, as you noted, is at a crossroads. Right now, 20 years after the drive for transformation led to us starting a series of programs—like the *Ford*-class carriers, *Zumwalt* destroyer, and littoral combat ship—that had problems over their life cycle, difficulties with technology insertion, and continue to be costly endeavors, we are now embarking on a new family of ships in almost every

vessel class of the Navy. And as you noted, we are facing this kind of once-in-a-century combination of challenges and opportunities.

We have got a set of rising peer competitors, certainly in China, facing the United States, fiscal constraints that are likely to constrain the ability of the U.S. to develop better versions of today's fleet. There is a, you know, challenge with regard to the viability of our primary capital ships similar to what we had back in the interwar period. And then, the last thing is we have got new technologies that are going to potentially disrupt our force designs and those of our potential adversaries.

So, the Navy needs to address, to come up with a new force design to address this new period. That new force design needs to be guided by a theory of victory, or operational concept under which the Navy is going to be able to contribute to kinds of operations it is going to need to do in support of the National Defense Strategy. We don't really have that clear theory of victory or operational concept today.

There is a lot of really good work going on inside the Department of Defense to develop joint warfighting concepts, distributed maritime operations, littoral operations in a contested environment. Those concepts are all driving in a good direction to try to come up with a new way of fighting that doesn't involve strictly attrition-based warfare, which is sort of the approach we took largely after the Cold War ended.

They are driving us toward what is essentially a return to maneuver warfare, or decision-centric warfare, where we plan on using our forces to create dilemmas for adversaries that prevent them from being successful more than us being able to project power and take over locations of our own choosing.

So, this decision-centric move in warfare is going to require us to have a fleet design that reflects some new characteristics, different than the characteristics of our previous fleet. So, defensive capacity in each ship, in each combination of ships that is able to prevent an adversary from executing a rapid and successful attack on them while they are deployed in theater, offensive weapons capacity that allows them to actually fight back and deliver strikes and attacks against the enemy, and create a threat that the enemy has to respect but distributed in such a manner that the enemy can't take them out with a single large salvo attack of their own. Diversity for force structure at various scales so that we can have options to conduct countermeasures to gray zone operations being done by our adversaries, like China and Russia.

Today, we have a limited set of options. We can only send in large force structure elements to deal with a gray zone altercation. I think the most recent example of China and Malaysia, where we sent an LCS [littoral combat ship] to intervene on behalf of the United States was a really good example of the kind of smaller scale forces we need to have that we don't really have in large numbers in today's fleets.

So those options need to be afforded by having a greater diversity of force packages. And then, also, complexity. If our goal in fighting is going to be to try to create dilemmas for an adversary, we can't do that using a small number of very large, expensive capital ships; we need to have a greater diversity and rebalancing of the force to

create a more complex picture for an adversary to deal with that might force them to either be dissuaded from starting an act of aggression, or to seek an off-ramp once that act of aggression starts.

And then finally, and most importantly, we need to have a fleet that is actually affordable. So both from the perspective of buying the fleet and then owning the fleet, we need to ensure our force design reflects a concern about sustainability, and that is something that today's fleet doesn't necessarily reflect to the degree it probably needs to.

So we have a window here where we can start making some changes in the Navy's force design to reflect these characteristics and a new way of fighting, and a new theory of victory in warfare against pure adversaries that have a level technological playing field, and have a home-field advantage that we are going to have to contend with.

But that window is going to close. We are already facing fiscal challenges that constrain our ability to evolve the fleet quickly, and we have rising peer adversaries that are not going to wait for us to get our act together. So, they are going to take advantage of the opportunity provided by either our reticence to intervene, or the COVID-19 impact on our potential operations and those of our allies. So, if we don't act towards a new force design now, this may encourage adversaries like China to be more aggressive, near and abroad, against our allies.

The elements of this new fleet are fairly straightforward. We need to think about rebalancing the fleet to incorporate a larger number of smaller platforms, as Admiral Roughead said, to create this greater diversity and opportunity for more complex force structures. We need to incorporate new technologies in a reasonable and realistic way. As Congressman Wittman mentioned, unmanned systems aren't necessarily going to be able to replace manned platforms in this future fleet right away or even ever, necessarily, but they can complement it, and they can provide opportunities to increase the complexity and the capability of the forces that we are deploying.

We need to protect the health of the industrial base as part of this, and then we also need to think about building a stronger, as Admiral Roughead said, logistics capability to allow a more distributed and disaggregated force to be sustained in theater.

These are all possible. So, we—in my written statement, I included a description of one force that might do that. The math that we have been working on with both the Office of the Secretary of Defense, and with the Navy works out. You can build a force that has got these characteristics and these elements. It is just making some choices in the relatively near term that is necessary to allow it. So I hope that the Congress and the Navy are going to be able to drive those changes, and come up with a force plan that I think could be more credible and something that both our industry and our U.S. allies would be able to depend on. So, thank you for your time.

[The prepared statement of Mr. Clark can be found in the Appendix on page 65.]

Mr. COURTNEY. Great. Thank you, Mr. Clark.
Mr. O'Rourke.

**STATEMENT OF RONALD O'ROURKE, SPECIALIST FOR
NATIONAL DEFENSE, CONGRESSIONAL RESEARCH SERVICE**

Mr. O'ROURKE. Chairman Courtney, Ranking Member Wittman, distinguished members of the subcommittee, thank you for the opportunity to appear before you today to testify on future Navy force structure requirements. This is a topic I have worked on throughout my 36 years as a CRS [Congressional Research Service] specialist in naval affairs. And I want to echo the remarks of my co-witnesses that it is an honor to appear with Bryan Clark and Admiral Roughead at this hearing.

With your permission, I would like to submit my written statement for the record and summarize it with a few brief remarks. As requested, my testimony includes a discussion of a 30-year shipbuilding plan in the next force structure assessment. The annual 30-year shipbuilding plan is intended to provide Congress with supporting information for conducting effective oversight of DOD [Department of Defense] plans for the Navy, and for assessing and marking up the Navy's proposed shipbuilding budget. The 30-year plan does this by helping Congress assess a number of key issues, including whether the Navy intends to procure enough ships to achieve and maintain its force level goals; whether DOD ship procurement plans are likely to be affordable within future defense budgets; and whether the Navy is making reasonable assumptions about ship procurement costs and service lives. It also helps Congress assess the potential industrial base implications of the Navy's intention for ship procurement.

Since the submission of the fiscal year 2001 budget 20 years ago, which was the first time that a 30-year plan was required, there have been three times when DOD was legally required to submit a 30-year plan, but did not do so. Two occurred during the first years of the Obama and Trump administrations when the absence of a 30-year plan was understood to reflect the need for a new administration to spend its first year reviewing and revising the previous administration's defense plans.

The third occurred in fiscal year 2006 when DOD provided only a brief document that included few details about projected ship procurements. If DOD does not submit a fiscal year 2021 30-year plan, it would be the first time since fiscal year 2006 that an administration, not in its first year in office, was required to submit a 30-year plan, but did not do so.

The delay in submitting the fiscal year 2021 30-year plan raises a potential institutional issue for Congress regarding executive branch compliance with statutory requirements that are intended to support Congress' role in conducting oversight of executive branch operations and authorizing and appropriating funds. This potential institutional issue is not the only one that Congress may consider in connection with the Navy's fiscal year 2021 budget. An additional one is posed by the budget's treatment of the procurement dates of the aircraft carrier CVN-81 and the amphibious ships LPD-31 and LHA-9.

The Navy states that its proposed fiscal year 2021 budget requests eight new ships, but that figure includes LPD-31, a ship that Congress procured in fiscal year 2020. Excluding that ship, the Navy's proposed budget requests seven new ships rather than

eight. That is less than the 11 ships that the Navy requested for fiscal year 2020, or the 13 that Congress procured in fiscal year 2020 or the 10 that the Navy projected under last year's budget that it would request for fiscal year 2021.

In dollar terms, the Navy, for fiscal year 2021, is requesting about 15 to 17 percent less funding for the shipbuilding account than it requested in fiscal year 2020 or what Congress appropriated for fiscal year 2020, or what last year's budget projected would be requested for fiscal year 2021. The Navy states that its 5-year plan includes 44 new ships, but that figure includes the amphibious ships LPD-31 and LHA-9 that Congress procured in fiscal year 2020. Excluding these 2 ships, the 5-year plan includes 42 new ships, which is 13 less than the fiscal year 2020 5-year plan, and 12 less than last year's budget projected for the current 5-year period.

Statements from Navy officials suggest that the new force structure assessment that the Navy reportedly completed months ago, called the INFSA [Integrated Naval Force Structure Assessment], could shift the fleet to a more distributed architecture that includes a reduced proportion of larger ships, an increased proportion of smaller ships, and a newly created category of large, unmanned vehicles. Such a change could alter the mix of ships to be procured and the distribution of shipbuilding work among the Nation's shipyards. More recently, it has been reported that OSD [Office of the Secretary of Defense] has been reviewing the INFSA, and conducting its own analysis of Navy force structure requirements, and that the INFSA won't be released until OSD completes its work. Given its potentially significant changes in force level goal and fleet architecture, not having access to the INFSA could impact Congress' ability to assess and mark up the Navy's fiscal year 2021 budget.

The remainder of my testimony explores various factors relating to the future size of the Navy; to procurement of submarines, aircraft carriers, surface combatants and amphibious ships; and to the process for how these ships might be built. Bryan Clark mentioned that this is a once-in-a-100-year opportunity to think about redesigning the Navy, but if you are going to do that, it may also present an opportunity to think about reconsidering the ways that we build ships, and my testimony includes some remarks on that.

Chairman Courtney, this concludes my statement. Thank you again for the opportunity to testify, and I will be pleased to respond to any questions the subcommittee may have.

[The prepared statement of Mr. O'Rourke can be found in the Appendix on page 78.]

Mr. COURTNEY. Great. Well, thank you to all the witnesses again. Without objection, all the written testimony will be submitted for the record, and I appreciate the summarization that each one of you did. Again, we are going to try, and again, make sure everyone gets a crack at asking questions here, so I am going to try and start by leading by example by trying to adhere to the 5-minute rule as best as possible, and I know Mr. Wittman is similarly situated. If we have time for a second round, we will obviously accommodate that.

Mr. O'Rourke, again, thank you for, you know, your really thorough breakdown in terms of the institutional issue that you described, you know, about the need to get a 30-year plan. Just two quick follow-ups. The process that the 30-year plan by law follows is that it is submitted at the same time as the budget, and then that also triggers a follow-on window of action by the Congressional Budget Office [CBO], which, again, sort of marches in a, you know, order so that, again, we can do our job. Again, if you could just sort of, for the record, just state what that 60-day follow-on that CBO follows when the 30-year plan is triggered.

Mr. O'ROURKE. The same law that requires the Department of Defense to submit the 30-year shipbuilding plan also requires CBO to then take that plan and conduct its own independent cost estimate of the cost of implementing the 30-year shipbuilding plan so that Congress can have that estimate to compare to the Navy's own cost estimate. And the CBO report that is done as a part of that law forms an important part of the annual discussion over the Navy shipbuilding plan. It provides very important perspective to the Congress, and is part of the way in which the 30-year shipbuilding plan and the legal requirements surrounding it support congressional oversight of the Navy's proposed shipbuilding budget.

Mr. COURTNEY. So, at this point, again, there is no CBO analysis because there was no 30-year plan that has been submitted. Is that correct?

Mr. O'ROURKE. If the 30-year plan—as long as the 30-year plan is not submitted, CBO does not have a firm basis from which to proceed to make its own report. At some point, CBO may try to put together a synthetic equivalent of what they think the Navy might have done, but, of course, it would be preferable for CBO—if CBO had access to the actual 30-year plan to see exactly what the Navy might be planning, particularly because there are changes in the 30-year plan from one year to the next, and not all of those changes can sometimes be anticipated or synthetically created.

Mr. COURTNEY. And you sort of laid out a legislative history regarding the 30-year plan requirement, which goes back to the early 2000s, when it was enacted. Again, actually Congress, at one point, did kind of tinker or consider the possibility of waiving the 30-year plan for a 2- or 3-year period, but then, actually, I think, reconsidered and reestablished, again, the annual 30-year shipbuilding plan.

In terms of just Congress' own bipartisan support for this process, again, it really has shown that it really wants this, because it waived it for a year or two, but then decided by law that we should, again, reestablish that requirement. Is that correct?

Mr. O'ROURKE. Exactly. A few years ago, Congress amended the law to require that it be submitted only once every 4 years in the same year that a Quadrennial Defense Review would be submitted. But when we got into the implementation of that new situation, it was actually the House Armed Services Committee, among others, that found that situation unsatisfactory, and requested that the Navy submit a 30-year plan anyway, which the Navy eventually did in somewhat truncated form, but all the data was there. And Congress, having gone through that situation, then decided to

amend the law back, once again, to reinstate the requirement for the plan to be submitted each year.

Mr. COURTNEY. Well, thank you for that perspective. Again, when Secretary Esper and General Milley were here, again, we obviously raised this issue because it was missing when the budget came over. And, again, I think a number of us pretty forcefully, you know, indicated this is not a feel-good law. This is necessary for us to make investment decisions which, again, are a long game and really require a longer perspective.

One other just quick point, and I hope you guys can see this. But again, Admiral Roughead, you mentioned how our submarine force is sort of the invisible queen on the chessboard. Mr. O'Rourke described them as the jewel in our fleet. Again, we also talked about the trough that is fast approaching. For your benefit, because I know that is kind of fine print from where you are sitting, again, we are roughly at about 52 attack submarines, and then you can just see as the *Los Angeles*-class fleet gets into pretty high volume retirement, the blue line shows the fact that we were going down to 42 by 2027, and then starts to climb back up as the two-a-year program of record for *Virginia* class kicks in and recovers. The orange dotted line shows what the budget that came over this year would do, which is, it actually worsened the trough.

Again, Admiral, you sort of mentioned—"dangerous," I think, was the term you used. Again, looking at that chart, I mean, we are actually—that budget would really aggravate that problem. Is that correct?

Admiral ROUGHEAD. Absolutely. And I think to overlay a couple of the other things that I mentioned, there is no question that the demand for submarines, particularly in the Western Pacific, is going to increase, so you have that factor that needs to be considered. There is also little doubt in my mind that activity in the Arctic is going to intensify, and the ship of choice up there, in my view, is going to be the submarine.

So, in addition to this drastic dip that exists, I also envision significant increase in demand. And I don't want to be a prophet of doom, but I think it is important to think about combat or mission loss of submarines.

In World War II, we lost 52 submarines. Very few people recognize that fact. So, you know, those are factors that have to be accounted for and overlaid on that force structure chart, in my view.

Mr. COURTNEY. Great. Well, thank you. Again, after the budget came out, the Navy did send over their unfunded priority list, and number one from Admiral Gilday was to restore and protect that two-a-year program of record. So obviously, your testimony is helpful in terms of guiding the subcommittee as we move forward on our mark.

And with that, I will go to the ranking member, Mr. Wittman.

Mr. WITTMAN. Well, thank you, Mr. Chairman. I would like to thank our witnesses, again, for joining us. I would like to go and begin to talk about our proposed unmanned surface vessels. You know, the fiscal year 2021 budget request from the administration looks to get into serial production of unmanned surface vessels. And listen, the Navy's been experimenting with unmanned surface vessels for a number of years, but it is one-off experimentation. I

think there are a lot of questions still left out there: reliability, operational employment, law of war applications.

So, my question is this to the panel members, and Admiral Roughead, I will begin with you. Do you think the Navy's ready to enter into serial production to immediately get to that point? Are they ready to fully integrate this into the fleet? And what elements do you think have to be overcome in order to completely and effectively integrate unmanned surface platforms into the naval force structure and operational plans that we have right now?

Admiral ROUGHEAD. Thank you for the question. If by saying entering into serial production to start a ship class of unmanned surface ships, I would say no. But I really do believe that there needs to be a much more aggressive push to develop some operational prototypes that can be used, that can allow us to go after what I think are going to be some of the challenges. Just the networking of those ships, the security of where they may be operating, but those are things that you can develop over time.

So I really do believe that we have to look at it and not consider some of these prototypes to be a program of record, because once you get into that mode, you get into a very lockstep process with too much time, in my mind, to fill the gap. And even though your question was on unmanned surface ships, I reflect that we flew an unmanned aircraft off of an aircraft carrier in 2012.

Mr. WITTMAN. Yeah.

Admiral ROUGHEAD. 2012. That has not happened again.

Mr. WITTMAN. That is right.

Admiral ROUGHEAD. Eight years, in my mind, of a hiatus in trying to advance this new technology is not aggressive by any stretch of the imagination. So I think that there have to be provisions for the Navy to construct some of these, for them to be able to deploy them, even before they meet all of the operational wickets, so that we can learn, and from that, work out some of the issues that you highlighted.

Mr. WITTMAN. Very good.

Mr. Clark.

Mr. CLARK. Absolutely. I agree with Admiral Roughead that we should be thinking about fielding some prototypes on unmanned vehicles in general, and then there needs to be a space during which we do concept development and evaluation to determine what their eventual configuration should be, and then also, how they might contribute to the fleet. So, there always should be some gap of several years between the time you finish that prototype and field it, and then get into serial production of whatever the eventual version of it might be.

The other thing that comes in with unmanned vehicles is there are some challenges and opportunities that are there, particularly with the large unmanned surface vessel the Navy is proposing. The challenges are, obviously, reliability, how we are going to fix it if it breaks down at sea. There is law of war considerations about can it protect itself, or can it simply be herded off and boarded by other players like the Chinese. And then the CONOPS [concept of operations] are questionable, like, well, if it is an unmanned vessel that is going to have to operate in concert with manned platforms, because it does have this vulnerability to being boarded and taken

away, well then, you are constraining its ability to contribute to the fleet, because now it is basically just another missile magazine that is going to follow along a destroyer or a cruiser, which limits some of the valuable—you know, the value that it might provide given the cost.

And then the opportunities that we might leave on the table are the fact that it could, if it was manned, contribute to the fleet as another manned combatant doing security cooperation or operating in regions where our larger combatants can't go, and give more diversity to the fleet and command opportunities for junior commanders. I think that is something to consider.

So we have been proposing that instead of this large, unmanned surface vessel, the Navy, instead, pursue a corvette, that is maybe similar-sized but is a manned platform, and the cost difference between the two is actually not that significant. But yeah, in general, we should be thinking about the CONOPS when we start thinking about where the unmanned vehicle might be a player in the future fleet architecture.

Mr. WITTMAN. No, I agree, and I think you all bring up great points. Another thing, too. Secretary Esper mentioned, and I think it is another concept to look at, and that is, lightly manned.

Mr. CLARK. Right.

Mr. WITTMAN. You know, look at this as a transition, aggressively pursue this, because Admiral Roughead, as you pointed out, it is not the absolute number. It is the types of ships that we have as part of that number, and then their operational capability. And then total fleet integration, as I talked about, is integration across everybody that has a maritime presence. That has to be key.

Let me jump into one other question, and then I will make sure we get to our other members. One of the things that really concerns me, and I know many of the other committee members too, is logistics. How do we make sure we support operations in the long term? And we have seen the Navy's very anemic response to recapitalizing the Ready Reserve fleet. We have seen recently, too, the capabilities that just aren't there. We see the Coast Guard pulling certifications for those ships. We see, in the turbo activation, some pretty startling lack of operational capabilities there that we see before us.

With this tepid recapitalization process that we have seen, and we have given permission for the Navy to do some things, they are finally starting to do it after what I think are unacceptable delays and projected retirements of these ships, and many of them very old. In fact, I argue many of them belong in the Smithsonian, they still use steam plants, as you know. Getting a steam plant-certified engineer is very difficult these days, you know. We ought to retire them to the Smithsonian, not keep them operational.

That being said, what do you believe are the implications of diminished surge capacity, not just for the Navy, but for the total force structure, and especially when it comes to what we may see in the future, and what our operational plans dictate if we are talking about all of this capability and presence necessary, Admiral Roughead, as you said, in the Indo-Pacific area? If our adversaries see warships there, but they know that those warships are not

going to be able to be supported very long, the question is, is how capable are those warships of creating a deterrence?

So, Admiral Roughead, I will begin with you and then go down our panel members.

Admiral ROUGHEAD. That was one of the points that I made in my oral and in my written statement——

Mr. WITTMAN. Yes.

Admiral ROUGHEAD [continuing]. That we neglect logistics, and logistics is how this country has won wars.

Mr. WITTMAN. Yes.

Admiral ROUGHEAD. And I will share an exchange I had with a Chinese admiral during the time that I was on Active Duty where he made it very clear to me that our logistics ships were a primary target——

Mr. WITTMAN. Yeah.

Admiral ROUGHEAD [continuing]. Because if he can take out logistics, he takes out the lifeblood of the fighting ships, if you will.

Mr. WITTMAN. Yes.

Admiral ROUGHEAD. The other thing that is important is that I do believe that many of the ports that we routinely rely upon, particularly out in the Western Pacific, are going to be vulnerable, and so how are you able to sustain that force if you can't go in? You know, we have operated in the Middle East with, really, logistic impunity. We have been close to ports. It has been a benign flow on the sea lanes, and we have to rethink that.

So, the distances that we are talking about in the Pacific are huge, compared to what we have been used to, and I think that if there is one thing that the committee really needs to pay attention to is, okay, we have the fighting force, how do we keep it fighting? And logistics will be how you do that to include how do you replenish at sea? Some of the new weapons that will be coming along.

So, I would highly recommend a spotlight being put on the logistics force. There is a line I read many, many years ago as a young officer that logisticians are a sad, embittered race of men, and I think that is true, but they are the ones that we rely on in war.

Mr. WITTMAN. Absolutely.

Mr. Clark.

Mr. CLARK. Absolutely. I agree. And there are problems in basically the two different elements of the logistics force. There is the Combat Logistics Force that supports those operating forces at sea that are deployed overseas. There are challenges there with regard to its fit, meaning it may not be designed to support a more distributed Navy, because it is composed of a relatively small number of relatively large logistics vessels. So, we need a more distributed logistics force to support that more distributed operating Navy.

And then the sealift force, we have got aging ships that need to be recapitalized, we need expand the MSP, the Maritime Security Program, to help fill in where those aging ships are unable to deploy. And then probably the most egregious part of the sealift fleet is the tanker fleet, where we only really have access in the U.S. Government to about 9 tankers of the 80 or so that we need to be able to support a large operation overseas, both Navy and the other parts of the joint force.

So, having some kind of way to access more tankers to support the joint force in a large overseas contingency is going to be a critical element of, you know, kind of future policy decisions for the Congress.

Mr. WITTMAN. Mr. O'Rourke.

Mr. O'ROURKE. Yeah, very quickly. I agree with the earlier comments that planning for these kind of ships is always at the tail end after we figure everything else out. It is almost an afterthought. And I break things down the same way that Bryan did in terms of the UNREP [underway replenishment] ships for the battle fleet. There has been a general proposition that distributed maritime operations will require a different combination of support ships, but we have seen very little about what that new combination might be, other than a few scattered words in last year's 30-year shipbuilding plan.

And in terms of surge sealift, if we are not going to recapitalize that adequately, it is going to get to a much larger question about what our national strategy is, because those surge sealift ships support a national strategy of intervening in the affairs of Eurasia, so as to prevent the emergence of regional hegemony in one part of Eurasia or another. So, if you don't do that, you are not following through on your national strategy, and you are calling it into question.

And very quickly, if you will indulge me, I have, like, 30 seconds on your earlier question about unmanned surface vehicles.

Mr. WITTMAN. Yes.

Mr. O'ROURKE. And you raised many technical challenges and risks, and the other witnesses talked about those as well. I think to add to that, very quickly, I would say we need to understand better what the Navy has done to show analytically that this concept for distributing the Navy in this way not only makes sense, but that it is the best or most promising possible way forward.

We have had an assertion that this is the way to go, but I am not sure how much analytical underpinning there has been for it.

And also, as Bryan mentioned, it is one thing to say you are going to do this; it is another thing to develop the operational concepts to actually figure out how you are going to operate these ships and not just be a topic of hand-waving, you know, and briefing slides with electric bolts on them. And so, the analytical basis and the operational concepts need to be developed if they haven't already, and that needs to be shared with the Congress so that Congress can look at that and factor it into its assessment and markup of these proposed budgets.

Mr. WITTMAN. I agree.

Thank you, Mr. Chairman. I yield back.

Mr. COURTNEY. Great. Thank you, Mr. Wittman.

So now, we will turn to member questions. Again, under the House rules, again, folks who are joining us remotely are on, you know, parity with folks in the room, again, by seniority. So, our first member question will come from Mr. Langevin, followed by—next up after him will be Mr. Conaway.

Mr. LANGEVIN. Very good. Thank you, Mr. Chairman. Can you hear me okay?

Mr. COURTNEY. I hear you fine, Jim.

Mr. LANGEVIN. Great. Well, good morning, everyone. First of all, let me start out, Chairman Courtney, congratulating you for being the first subcommittee chair to hold a hybrid hearing. And given the fact that you are and I are—our districts abut in Connecticut and Rhode Island, I find that I am the first member to ask a question virtually, so New England and Red Sox Nation are leading the way.

So, to our witnesses, I want to thank both of our witnesses—all three of our witnesses today, Admiral Roughead and Bryan Clark and Mr. O'Rourke, for attending today's hearing, and accommodating to the new format of these hearings. I appreciate your flexibility, as everyone across the country is doing their part to practice social distancing and get through this pandemic that we are dealing with right now. I have got some practice doing this with Bryan, as he recently virtually interviewed me a few weeks ago. It is good to see you again.

So, let me begin my first question with Admiral Roughead. If the future defense budgets remain flat, which Navy programs do you believe are a higher priority? And the current CNO stated that the top priority is the *Columbia*-class program. Would you agree or disagree with that?

Admiral ROUGHEAD. Yes, sir, I would. I think that in the world that we will be entering into, particularly with conventional challenges that we will be facing, we have to ensure that we have a strong, robust, and modern nuclear deterrent. And, of course, you know full well the importance of our sea-based deterrent, so I do agree that that is the number one shipbuilding priority.

Mr. LANGEVIN. Thank you. And attack submarines remain behind their goal of 66, where we should be, yet we face challenges with expenditures, with expanding production. How can the Navy mitigate this upcoming risk? To all three of our witnesses, whoever would like to chime in.

Mr. CLARK. In terms of mitigating the shortfall of attack submarines, one option is going to be for the Navy to extend the lives of existing submarines and try to get a few more days or hours or, rather, deployments out of them, so the Navy is making that effort right now. That is one option.

Another option would be to increase production of existing submarines, *Virginia* class, as they are in production. The industrial base will be challenged to do that, but I think it is a worthwhile effort. The Navy may need to consider accepting longer construction timelines, considering that the construction yards will be building both *Virginia*-class Block V and *Columbia*-class submarines. So, if more submarines were bought to add to the two per year, certainly they want to fill in the one that is missing from this year's budget. There would be an opportunity to do that, and it may just be a partnership between the Navy and industry to come up with an appropriate timeline for construction of those submarines. But that is an option to help fill that gap that the Navy could pursue.

Admiral ROUGHEAD. Mr. Langevin, I apologize. My hearing is not what it used to be. But just to amplify on what Bryan mentioned, I really do think that this is a place where a good, hard look has to be taken at the submarine industrial base, because in addition

to the desire to increase the build, I think it is important that the submarine industrial base be able to return submarines back into service quickly. And I think that if we are only looking at the base as building the boats, we are not looking at the big picture.

So, I really do think this is one area in particular where we really need to look at the physical aspects of the base, but we also have to put a hard light on the workforce, and how do we attract young people to want to be part of this enterprise.

Mr. LANGEVIN. Thank you. Mr. O'Rourke, did you have any comment?

Mr. O'ROURKE. Yes, very quickly. In terms of mitigating the shortfall, there are various options that can be pursued. And when the chart was shown earlier, it actually brought back some memories of mine. I have been reporting and testifying on the projected SSN [nuclear-powered attack submarine] valley since March of 1995, and when I first did that, it was in this room before I think the Procurement Subcommittee. Duncan Hunter, Sr., was the chairman of that subcommittee at the time. And to illustrate that coming shortfall, I stood up and presented a chart that was the same size and looked very much like the one that was presented just a few minutes ago.

So, there are some things that can project that if you don't take great steps to change it, those things will come true, and now it is baked into the cake.

So, what do we do about it now that we are in the situation? One is what Bryan mentioned, that the Navy is already moving forward with to refuel five, or as many as seven existing 688s [*Los Angeles*-class SSNs], and get several years of additional service out of them. That could help fill in the back half of the valley a little bit.

You can also take steps to maximize the readiness of the attack submarine force during the bottom years of the valley. Whether that means adjusting your maintenance schedules or just putting extra money into them, you want to make sure that if you are only going to have a minimum of, like, 42 submarines in the late 2020s, you want to make sure that they are in the best possible condition during that period of time for deployment.

You can also think, perhaps, about forward homeporting an additional one or two submarines in Guam or some other forward location.

Mr. COURTNEY. The time has expired. So, again, I'm sure this topic will continue. So, thank you.

Mr. LANGEVIN. Thank you, Mr. Chairman, and I will yield back.

Mr. COURTNEY. Thank you, Mr. Langevin. Next up is Mr. Conaway. He is followed by Mr. Norcross.

Mr. CONAWAY. Thank you, Mr. Chair, I appreciate that.

It is a bit surreal that we are having these conversations because in the light of the fact that our Nation has just spent or committed to spend \$3 trillion, money that was not budgeted anywhere at any point in time, was not contemplated having been spent in any of these projections. And so, I don't think Members of Congress yet have absorbed that. I don't think our Nation has absorbed that. So, all of these conversations will have to be reset, I think, at some point to reflect the reality of that spending that has absolutely

nothing whatsoever to do with the topics of today. But we can't ignore it nor I think should we ignore it going forward.

But, with that said, Admiral Roughead, you mentioned that a ratio of four ships to one deployed is a good rule of thumb. Would you apply that to our carrier fleet as well?

Admiral ROUGHEAD. Yes, sir. I apply it to everything. The only way that you can skew that number is, as was just mentioned, by forward homeporting. And, quite frankly, I do not see aircraft carriers more than the one that we have forward now being able to do that because of the complexities of the air wing maintenance, what have you.

So, if in fact you want the presence in the Middle East and the Western Pacific, that is a good rule to have, and it drives the numbers. If you don't do it, you begin to short maintenance, you begin to short training, and you begin to short the opportunities that our people have to recharge back home.

Mr. CONAWAY. So the numbers that we have right now at 11 won't work. And then if he went to 10 or 9, then you are going to have, at best, 2 ships deployed under that [inaudible]. So, thank you for that.

I have been around a little while and long enough to watch the LCS come and go and come and go and the issues there.

As we talk about all of these new classes of ships and new capacities and new capabilities, everything else, are there lessons that we have learned through the exercise of designing the LCS trying to—perhaps being overly optimistic about what the capabilities would be, that variety and versatility that we thought that ship would have. Are there lessons learned through that that the system can use to avoid similar impacts of these new classes of ships that are being proposed. Any of the panelists want to start?

Admiral ROUGHEAD. Yes, sir, from my perspective, I do believe that lessons have been learned with the Navy shifting away from the littoral combat ship. I think we put too much stock in some of the mission modules and how quickly they will come along. So, I do believe that we are shifting back now to something that is a bit more certain.

One of the other areas that I would just offer as a caution: In many instances where we have talked about crewing concepts for ships so that we can get more out of them because we will use double crews, we often short the back end of what makes that model work. And, you know, we offer up our SSBN or ballistic missile submarine force as the poster child for how you can do blue and gold crews, but people often do not recognize the vast investment that was made and continues to be made into making that scheme possible.

So, as we look at maximizing availability of ships and if we do it with innovating crewing concepts, you have to pay for it.

Mr. CLARK. I would agree. And one of the lessons we learned was that technology insertion needs to be done in a more realistic fashion with some time period for the development of the substituent technologies before you start building the ship. So, getting land-based prototypes done, beginning the investment to put that kind of technology onto another ship so you can evaluate it in an operational setting.

So LCS incorporated a lot of new technologies into the mission modules that were not really fully developed or even partially developed before the ship actually was fielded. So, getting those technologies developed in advance of the ship being pursued is a key element of it. And then also having this gap between the initial fielding of prototypes and the actual serial production of the ship will be important to be able to refine the design and ensure that the ones that are built in a serial fashion actually reflect a design that makes sense given the CONOPS that the ship is going to pursue.

Admiral ROUGHEAD. Just two points that I would add to what has already been said. First is that the Navy moved very quickly at the outset of the LCS program to try and shorten the acquisition cycle time for that class. And some people would argue that the Navy wound up paying for that over the longer run by having to make a lot of adjustments in that program along the way.

Secondly, this was built not as a multimission ship, but as a focused mission ship that would have one primary mission at any given point, depending on what mission module is placed on the ship. And that gave it less of an ability to respond to changes in strategic circumstances. And the Navy has traditionally built multimission ships that can adapt to changing world circumstances. And moving forward, we face a lot of uncertainty about what the international security environment could be, and that might argue in favor of once again building ships that have a broader set of capabilities that would enable them to better adjust to shifts and changes in the international security environment over their life cycle.

Mr. COURTNEY. Thank you, Mr. Conaway.

Next up is Mr. Norcross. He was signed in. I don't see him on the video screen. I don't know if he is still with us or not.

Don, are you there? It doesn't appear so.

So next up is Mr. Moulton who also—I see him on the screen. So, Seth, you're up.

Mr. MOULTON. Thank you very much. I would like to just first of all start with a couple of just quick comments based on what I have heard, and thank you all very much for joining us this morning.

First of all, I couldn't agree more that this is not about the total number of ships but about their capabilities. From what I can tell, the Chinese see the future in unmanned vehicles: surface, subsurface, aerial, and space. And in my mind, we are unquestionably moving too slowly. We have got to move more quickly. And we have got to recognize that experimentation is okay. One of the things the private sector has to learn in the tech age is that it is okay to fail; you just want to fail quickly so that you can learn from those failures and move on. And I think that caution is really putting our national security at risk, given how long it has taken to produce and field these unmanned vehicles.

One lesson I learned as a warfighter in the Marines is the need to move quickly. It is better to move fast and break things than to hold back. Holding back is what gives your enemy an advantage, and I fear that is where we are.

I also learned a bit in the Marines about getting to the fight in care of the U.S. Navy. And my first trip across the Pacific was in a cruise ship built in 1968 that I believe is still in service carrying Marines and has a steam propulsion system, as Mr. Wittman described. And, you know, we only lost all power and went completely dead in the water turning sideways to the waves once in the journey. That was an interesting experience.

But I imagine that part of the reason that we were building steam-powered ships as recently as 1968 is in fact because there were Members of Congress who said we are not quite sure about this new technology, this turbine stuff, and diesel engines, or whatever else, and we should hold back and use the trusted and hold true. And I think now we are suffering the consequences.

So one of the people I think who is really trying to change this and trying to push this forward is the new Commandant of the Marine Corps, and he is asking some really tough questions and questioning some long-held assumptions about the role that Marines should play.

I would love to hear from you what you think about General Berger's comments and his plans to divest of certain defense programs to make room for new ones. I am with Mr. Conaway that we cannot avoid the reality here that we are going to have to make some tough decisions, some new tough decisions based on the budget realities we face coming out of this pandemic.

Admiral ROUGHEAD. Well, thank you for the question, sir. And I would—I applaud the Commandant for taking a fresh look at how the Marine Corps is going to operate, more distributed, lighter. I think that is the role of the Corps in the world in which we are going to live.

I would, however, say that it can't be done in isolation. We need to look at how that force will be supported, how it will be supplied, and how it will be networked into the broader joint force, and I would say starting with the naval force. So I applaud what is being done, but I think it is important to really dig into the operational concepts and to make sure that all pieces of determining what that force's effectiveness will be need to be examined closely.

Mr. CLARK. Yeah, I think the work that the Commandant has done with his team to develop the elements of a new force design for the Marine Corps is terrific. It is moving in the right direction. Because for a long time we questioned the ability of the Marines to do a large-scale amphibious assault in the manner they did during the Korean War or the Second World War.

Now, looking at that force design, as Admiral Roughead said, we are going to have to think through the operational concepts and what that implies for the kinds of forces we need. The force structure work that we have been doing, that I included in my written statement, reflects some of those insights about the fact that the amphibious fleet is probably going to become larger and more diverse and have a larger number of smaller platforms that will enable moving Marines around in these island locations where they might be standing up expeditionary bases.

But there is a lot of work that still needs be to done to evaluate, how are Marines going to get to that fight? Are they going to be prepositioned, or are they going to be brought in when the conflict

starts to begin? Are they going to be moved around in a way that allows them to exploit their mobility? How is that going to happen? And then what is their role? And I think the work that the Marines are doing right now to evaluate their role in the joint force is going to be really important because a small Marine force based in a place like the Philippines or the southwest island chain of Japan can make a difference, but that difference is going to be mostly in impeding the progress of Chinese power projection over the first island chain, rather than in denying areas of the sea to Chinese military forces in China's own backyard. So, thinking through—

Mr. MOULTON. What is small, light, and nimble in the Marine Corps mean for the United States Navy? Because I think part of the general's—the Commandant's concern is that a troop ship like the one I was just describing is a big target. I think that, at the same time as China sees a future in unmanned vehicles, they also see our aircraft carriers as massive targets that they quite enjoy.

Mr. COURTNEY. Make this one quick.

Mr. CLARK. Small and nimble is generally going to mean a company-sized type force or a ship that is able to carry that company-sized force, like 100 to 200 people with their equipment. That is what we are talking about is that kind of scale.

Mr. COURTNEY. Thank you, Mr. Moulton.

Next up is Mrs. Hartzler, and she will be followed by Ms. Sherrill.

Mrs. HARTZLER. Thank you, Mr. Chairman, and thank you to all our witnesses today.

I usually like to stay within my lane as far as subcommittee questions, but this one is more—falls under Tactical Air and Land Forces Subcommittee. But I think it is also relevant to our discussion here of the overall Navy future force structure. And it has to do with the discussion about the Navy's management of their strike fighter fleet. I have raised concerns over the Navy's decision to eliminate 36 new F/A-18E/F Super Hornets from its fiscal year 2022–2025 Future Years Defense Plan. I think this could create greater risk for combatant commanders and increases the Navy's current strike fighter shortfall in fiscal year 2021 from 49 to 58 aircraft, which amounts to about 1 carrier wing's, air wing's worth of aircraft. If you factor in attrition requirements, it is actually even worse than that.

I understand the Navy hopes to fix this shortfall in the 2030 timeframe with initial fielding of its next-generation fighter, the F/A-XX, which is in the concept development stages now. And I appreciate the need to focus on development of next-generation capability. And I understand the Navy, like all the other services, have to make hard decisions given constrained budget top lines. However, I think the new Super Hornets would have the most immediate impact on the inventory and fleet readiness, given that it will take almost a decade at least before the F/A-XX is slated to be delivered, and that is assuming this program is able to stay on schedule and be affordable. I recall the Navy took a similar approach to FA-18 procurement approach about 10 years ago with aspirational goals to maintain strike fighter inventory levels with planned procurement of F-35Cs. That plan was not realized, and the Navy in turn had to restart production of Super Hornets to help mitigate

operational risks. And I am wondering if we are repeating history here.

So, Mr. Clark, you have also expressed some recent skepticism regarding the Navy's management of the strike fighter fleet. In your view, what is the consequence of paring back the production of new Super Hornets, and should we keep this production line going until we have a better understanding of F/A-XX and its timeline?

Mr. CLARK. Yes, thank you for the question. Great point about the strike fighter shortfall in the near term and balancing that against the development of a future aircraft. I think the F/A-XX is going to need to be probably a derivative, an existing airplane rather than some complete new clean-sheet design, given the fiscal constraints we are under and also given the uncertainty about what the future of unmanned aircraft in the air wing is going to be. Therefore, keeping production lines going for both of our existing strike fighters is a good idea to allow you that—they both to be an option for this future F/A-XX.

Mrs. HARTZLER. Very good. You all know that the cost of the Navy's force structure has to take into account not only the initial cost of procurement of weapons platforms, but also the personnel, training infrastructures, sustainment costs, and logistics chain that the Navy requires for its platform.

I am growing increasingly concerned that the sustainment cost of these sophisticated weapons system are taking up the larger percentage of the Navy's annual budget. There is certainly a necessity for revolutionary capability, but at what cost.

So, once again, Mr. Clark, you have studied not only the effects of current weapons platforms, but also how the Navy intends to sustain them over their life cycle. Are you concerned about what the growing sustainment costs of platforms might do to the procurement budgets in future years?

Mr. CLARK. Yes, as a matter of fact, it is already making impacts on the procurement budgets. Some of the changes we saw in this year's budget, the reductions in platforms such as FA-18 are both impacted by their rising operations and maintenance cost for the Navy. So, a future fleet design needs to incorporate explicitly the long-term total ownership cost of platforms. And, also, we need to think about how to make each platform less expensive over its lifetime. So that needs to be incorporated into its design. If we don't start making those changes, we are going to continue down this road of cutting production to support the current fleet, and, eventually, the fleet will just shrink down to a force that is going to be much smaller than of that today because that is what we can afford to own given the nature of the platforms and their costs.

Mrs. HARTZLER. Do you see any ways that right now those sustainment costs could be reduced with the fleet that we have?

Mr. CLARK. There are some ways we can better manage the fleet and its maintenance. So if we better organize the schedule of ships so that they can go in and get the maintenance done at the most efficient time possible and avoid delays, make sure we do adequate inspections to ensure we have a good work package before ships go into maintenance, those are factors that can be used to—or those

are ways we can drive down the cost of the subsequent maintenance.

Mr. COURTNEY. Great. Thank you, Vicky.

Mrs. HARTZLER. Thank you. You bet.

Mr. COURTNEY. Next, Ms. Sherrill was on, but I think she—we may have—she may have gotten pulled away.

So, in order on the Democratic side is Mr. Golden, and then he will be followed by Mr. Byrne.

Mr. GOLDEN. Thank you very much, Chairman, and thanks for getting this hearing pulled together.

In his prepared statement, Mr. O'Rourke observed that the upcoming IFSA [integrated force structure assessment] could result in a once-in-a-generation change in the Navy's fleet architecture.

Mr. Clark also proposed a similar revolutionary approach to Navy in its recent "Taking Back the Seas" CBSA [Center for Strategic and Budgetary Assessments] report. As you all know, any major change in naval procurement in fleet architecture requires a corresponding adaptation by the shipbuilding industrial base. This isn't a change that can occur overnight either. Shipbuilder selection and training requires long-term strategic planning and meaningful sustained congressional oversight so we can ensure our robust skilled shipbuilding workforce. The Navy's fiscal year 2019 and 2020 reports to Congress on the annual long-range plan for construction of naval vessels identified the shipbuilding defense industrial base as fundamental for achieving the Navy shipbuilding requirements. That seems a rather obvious observation, or at least it should be. And it also made clear that it was a unique national security imperative that required congressional management and protection.

So, I wanted to ask Admiral Roughead, given your experience and expertise, I would appreciate hearing from you on how to achieve this transition in a manner that protects and builds our shipbuilding workforce. Specifically, how do we go through this proposed transition and architecture without repeating the harm caused by previous boom and bust shipbuilding cycles, what types of investments do we need to see in training to achieve this change? What obstacles do you foresee, given shipbuilder demographic challenges that we are struggling with right now?

Admiral ROUGHEAD. Yes, sir, and thank you for that question. I think it is one of the most important ones of what the committee has to deal with. You know, the fragility of the base and the limited number of shipbuilders and suppliers that we have to support shipbuilding, I really do think we have to acknowledge that. And as we think about future force structure, I really do believe that industry has to come in in the beginning and talk about how they can adjust what the impact of certain investments will or will not be on their future. We have not done that. I would argue that, even among the shipbuilders, they are probably reluctant to come together and talk about it because of the competitive issues. But I honestly believe that we as a country, we don't have the luxury to not have a more integrated approach on how we want to go forward.

I would also argue that we have to be far more aggressive in appealing to young people and providing the fundamentals that allow

them to work in what some may perceive as an antiquated industry, but really when you get to it, there is a lot of high-tech stuff that is going on there. And so being able to create opportunities, particularly in the areas around the major shipbuilding centers, to build and encourage young people to want to go into that industry is going to be very important.

Mr. GOLDEN. Thank you for that feedback. Very important.

You earlier talked about needing a high-low mix in surface warships. Could you talk a little bit—I think, during your time as Chief of Naval Operations, you were actually very much involved in development of the missile defense capabilities of Flight III DDG [guided missile destroyer] that we are bringing into the fleet right now, the SPY-6 radar system.

Can you talk a little bit about where you see in the Navy's fleet architecture the role of the Flight III DDG or some kind of future large surface combatant? What role should they play today and in the future?

Admiral ROUGHEAD. Yes, sir. I think that, when I talk about the high end, these are the ships that we can put in very challenging undersea warfare areas, that can perform air defense and also increasingly missile defense, that can begin to accept the defensive systems against hypersonics. So that is where I see the higher end ships, the Flight III and then the large surface combatant when we get there.

So I think it is important that we do the high-low mix because just going back in my time, it was always frustrating to take a very high-end ballistic missile defense-capable guided missile destroyer and send them down to chase Somali pirates. That to me was a wasted asset when you can have a smaller combatant go down—less capable combatant go down and do that. And that is why I think the high-low mix is the only way that we can go forward.

Mr. COURTNEY. Great. Thank you, Admiral.

Thank you, Jared.

Next up is Mr. Byrne, and he will be followed by Mrs. Luria.

Mr. BYRNE. Thank you, Mr. Chairman. I appreciate the witnesses being here today. It has been really good. A lot of our discussion has been about the need for a distributed maritime presence, both for the Navy and Marine Corps, lot of talk about smaller classes of ships.

Let me ask you about two classes of ships we haven't talked about. One is the expeditionary fast transport vessel, and the other is the light amphibious warship. Can each of you comment on how important you think that is going forward for the future of both the Navy and the Marine Corps?

Admiral ROUGHEAD. Yes, sir, and again, I am not privy to where the Marine Corps may be thinking. But, you know, that is the type of ship that I think can be effective in the Commandant's concept of, how can you configure it to move the types of weapon systems or sensors that you may want to put in some distributed areas? How can you move large number sort of troops? I recall my first visit to the LCS that was being built down in Mobile. When I came back—

Mr. BYRNE. I am very familiar with that.

Admiral ROUGHEAD. I figured you would be, sir.

When I came back, the first person I went to see was to walk down the hall and to talk to the Commandant in the Marine Corps because I said you, you know, can configure this ship to move a significant number of Marines over a short period, and in archipelagic areas like the Philippines and Indonesia, they are ideally suited for types of things like that.

So, I would hope that that is where the Marine Corps is thinking. I will leave it to Bryan. He might have more insight on that.

Mr. CLARK. I think absolutely both those platforms are going to be important. The light amphibious warship is going to be essential for that company-sized movement of forces around within an archipelago like the first island chain of the Philippines and Japan. Also, it is going to provide the Marines the ability to distribute those forces coming from a larger warship. So, a larger amphibious warship can now divulge—or distribute those Marines over a larger area and then move them around during a period of conflict. So, the light amphibious warship will be very important for that.

The expeditionary fast transport [EPF] has—that role can be done by—but it can also do a lot of other roles. I think we have—the Navy has been exploring those, the use of it for theater security cooperation, the use of it in counter—drug countertrafficking operations where its ability to act as a command post has been really important. And, also, it can be a medical platform. We had the recent experience with the *Comfort* and *Mercy* being deployed to Los Angeles and New York where they weren't really fully utilized because they are a very large ship being used for a purpose that was very different than its original intent. A smaller medical ship might be able to operate in a more distributed fashion, more efficiently provide the kind of services you might need in a location like New York that is experiencing a pandemic.

So, I think those are applications that have not been really fully explored, but the Navy is starting to do that.

Mr. O'ROURKE. Bryan stole a couple of my points, but what I will say is that the EPF is an example, to some degree, of an open architecture ship that can be adapted to a variety of missions in the future, depending on how you fit it out on the inside, whether it is for medical care or other things. And since we face some uncertainty as to the exact mix of missions that we might want to pursue in the future, that is a platform that can be seen as something that can be adapted to the mix of missions that eventually emerges because it is a ship with a lot of open spaces on it and represents an implementation of physical open architecture in ship design.

Mr. BYRNE. Admiral, let me ask you about—Mr. Clark mentioned that turning some of these smaller ships like the EPF into a hospital ship. Where do you stand on that?

Admiral ROUGHEAD. I really do think that we need to rethink our hospital ship concept. I used *Mercy* very extensively in the Pacific when I was out there. It is an extraordinary capability, but in some cases, I think it is too large. I do think that, depending on whether the Navy and the military is called in to go in and work with small remote populations, I think it can be hugely important.

The point that Bryan made, you know, you—for example, in pandemic areas, I think you could probably put in packages that have

the right pressure characteristics so that you could do some isolation of patients in ways that would be well-suited.

So, I would recommend looking at a range of ships. I do, however, think *Mercy* and *Comfort* are really large for the missions that I envision in the future. So, I would look at something smaller, and that's one option that I think is viable.

Mr. BYRNE. Thank you for your answers. I will just make one observation, Mr. Chairman. I agree with Mr. Moulton. One of the things that I think we make a mistake about sometimes is that we don't understand that we can move faster with our technology if we put our minds to it.

When it comes to the unmanned vessel, I think we need to start making our minds move a lot faster. I think if we do that, I think we will get the technology we need.

With that, I yield back.

Mr. COURTNEY. Thank you, Mr. Byrne.

Next up is Mrs. Luria, and she will be followed by Mr. Kelly.

Mrs. LURIA. I want to thank you again, gentlemen, for being here today. And something that we have talked about a lot—you mentioned it in your testimony several times—is that, and I will quote Admiral Roughead, there is an overfixation on the number of ships. And we have touched briefly with talking about different ship classes on the capabilities of ships. But something we haven't touched on is the employment of ships.

And, Mr. Clark, I am curious, what force generation model did you use in the analysis that you did, specifically for your testimony today? And just on that note, I had also referenced some work that you coauthored from 2017 with CSBA. And the number, although, you know, we discussed the fallacy of just resting on a number, was 340 ships, and in today's testimony you say 473.

So, I suspect that there is significant changes between the model that you used. And really what I am getting at is the force generation model. Admiral Roughead's comments that it is a 1-to-4 ratio as far as deployability. And then where we have gone with the OFRP, the Optimized Fleet Response Plan, do you think that that is an effective model and sustainable, and does it give enough deployed presence specifically for the investments that we are making in these ships.

Mr. CLARK. Thank you for the question. Those are great questions. The difference in the numbers is in large part due to the rebalancing of the force to incorporate a larger number of smaller platforms and a smaller number of larger platforms. So that increases the size of the fleet in terms of the number of ships, of manned ships. And, also, the force generation is an aspect of that. So, we have had to incorporate a realistic expectation for what the OFRP can deliver, which is you are generally at this point going to be 1-to-4 to 1-to-5 ships. So that increases the number of ships you need.

We also didn't try to make overly optimistic projections about forward basing of ships, which does give you some benefit in terms of the rotational cycle. But a lot of the benefit of forward basing comes from the fact you use a shorter operational cycle that gives you a higher operational tempo. So, those ships get worked a lot

harder while they are deployed overseas, rather than the more steady pace that you get back home.

So doing those things drove up the number of ships because we had to think about what is a realistic expectation for how often a ship can deploy, and we have made some assumptions in the past that were probably overly optimistic.

So, yeah, going forward, we need to reexamine the OFRP and evaluate if that is really the right force generation model. If we can go to a model that maybe generates forces more quickly, a higher OPTEMPO [operational tempo] model, which we did advocate in that 2017 study, which is more like the model we use overseas. I think it is possible to do so, but it will require us to have an industrial base that can support that throughput of ships for their maintenance cycles. And it will also require flexibility in scheduling so that, when a ship is ready to go into maintenance, it can do so, rather than waiting around for a yard to open or going on deployment and getting stuff broken—

Mrs. LURIA. So, to touch on that, when we had testimony and Secretary Modly earlier this year testified that the rough number that the Navy could hope to maintain in the near future was about 310 ships as far as adequate manning, maintenance capabilities, and the industrial base. Yet the Navy has stood by the 355 and made indications that that number is going to be higher when we see the new integrated force structure assessment. But the trajectory that they had requested, especially in this year's budget, and Mr. O'Rourke correctly noted that the numbers are actually going down from what they projected. So, they are not on a trajectory to get there.

And just in the time I have left, shifting back to capabilities. So, in your 2017 CSBA study, you mentioned a T-AKE [dry cargo/ammunition ship], so a logistic ship with VLS [vertical launching system]. And a lot of what we do is looking at capabilities and the ability to have those capabilities forward, and in that includes the VLS and the strike capability. And I really haven't heard much about this. I have talked to the MSC [Military Sealift Command] commander about it, the past MSC commander. Specifically, and do you do any work at all in sort of more innovative thought processes of how we can better utilize some of the platforms such as the MSC ships to augment our other forces and provide more fire-power forward? Can you comment on that?

Mr. CLARK. Yeah, absolutely. So, the reason we wanted to have that VLS magazine equipped T-AKE was to allow reloading of ships in a forward location. Also, theoretically, it could launch weapons from there. But, most importantly, it was a way of bringing weapons forward in a ready manner that could just be pulled out and put onto a ship. So, forward reloading and rearming of ships is going to be essential in any of these operational concepts because we can't have ships driving back to Japan or Pearl Harbor to get reloaded when their weapons usage is going to be pretty high in some of these conflicts.

So using the MSC fleet more innovatively and incorporating some platforms into the MSC fleet that can move forward and provide that ability of reload and rearm and repair forces in the field

is going to be essential if the fleet is going to be able to sustain operations.

Mrs. LURIA. Well, thank you. I just think that is a concept that requires further examination. And knowing how the mission data is loaded in a Tomahawk missile and a VLS launcher, there really isn't a need to transfer it from one ship to another with the technology that we have today. It could be a command-and-control solution.

Mr. CLARK. Right. You can launch on remote.

Mrs. LURIA. A launcher in another type of platform. And we have talked a lot about platforms that are less expensive to operate and less expensive to build. So, I think that that is an important element in evaluating our future.

Mr. CLARK. Absolutely, that is why we included the corvette as well in the fleet that we proposed.

Mrs. LURIA. Well, thank you. I think my time is expired. I yield back.

Mr. COURTNEY. Thank you, Mrs. Luria.

Next up is Mr. Kelly. He will be followed by Mr. Cisneros, who will be followed by Mr. Waltz and Mr. Gallagher.

Mr. KELLY. Thank you, Mr. Chairman.

I thank our witnesses for being here today.

First of all, I want to echo what Mr. Moulton said. I think as far as research and development and what platforms and how we use those, I think we have to execute quickly. We have to accept failures, and then fail quickly, like you said, and move forward.

The second point. I am really concerned that we are still waiting on the 30-year ship plan from the Navy. I think it is very hard to execute anything and for our industrial base to be ready to produce whatever we need when there is no plan. And when there is no plan, people just wander aimlessly because there is not anything out there to do.

So, part of it is we have got to research and develop, decide what we are going to build in the future. When we do that, then we have to violently execute. I see so often we start and stop and start and stop, and we don't allow our industrial base to build the things that we are committed to. So, whether we are talking about unmanned systems or hospital ships, we have got what we had until we got something else. Then that is why we have to have this plan.

I would go back to my question now. Admiral Roughead or Mr. Clark, the Navy is pursuing advanced technologies through its Naval Power and Energy Systems Technology Development Roadmap. Among these technologies are innovative approaches to energy storage and management. Could you describe why this is important now? As we enter critical stages of development for future systems, where would you prioritize these efforts within the Navy's research and development portfolio, and what additional steps could the Navy take to better meet its future power and energy storage needs?

Admiral ROUGHEAD. I think one of the things that we need to do, particularly in the area of unmanned systems, we have already talked in general about the need to accelerate efforts there, but when we get into unmanned underwater systems, my sense is that we are always drawn to either the weapon, the sensor, or how

these unmanned systems link with one another, which is all very important, all very interesting. But if we cannot sustain the underwater systems at sea for a long period of time, they really become very, very limited and become very expensive unusable assets. So, in my mind, there really should be a national push on long endurance, safe, underwater power if we really want to capitalize on that capability. And it is not just how long they can stay out. But in many areas where it will be important for these vehicles to operate, there is going to be high currents, and you are just going to use a lot of power. So, I think that we got—we have to get off this idea of what is the combat capability, and power is the key.

I often used to say that Admiral Rickover didn't transform submarines by designing a new hull. He transformed that entire capability by changing the power. And I think that is where the key is in unmanned.

And if I could, one of the things that we are frustrated with the pace of our development. But as I look at coming off of COVID and where countries are going to be economically, I really do believe that China is going to be spending a lot of money on its digital future and also on its energy future. They also will likely have to divert some of their shipbuilding capacity so that they don't have underemployment and probably throw that at the naval mission. And so if we think that we are on a particular trajectory and we are forecasting where an adversary may be, we better be really careful, because I honestly believe that we are going to see an acceleration in digital power and naval ship activity coming out of China as we all try to recover from our economic circumstances.

Mr. CLARK. And I concur with all of that. And I would also add that power conditioning and power generation are going to be really important to directed energy weapons. That will be an essential part of surface warfare going into the future, particularly for air defense. Electronic warfare, high-power microwave, lasers are all going to be an important element of future air defense concepts. So that will be an important area of investment as well.

Mr. KELLY. And Mr. Chairman, my next question had to deal with directed energy, and you kind of addressed that. But we need to make sure just very quickly, are you looking at building ships that house the amount of energy taken for directed energy impacts, or are we building the future and—are we looking at old ships and can we put these systems on there, or are we trying to build new ships that allow the capacity for these directed energy systems?

And, with that, I would yield back, Mr. Chairman.

Mr. CLARK. Right now, we are building ships that are going to incorporate these systems, but they will have some method of being able to condition or store the power to be able to do laser operations. And then the next generation of ships are incorporating a kind of power generation capacity to allow these systems to operate continuously.

Mr. COURTNEY. Great. Thank you. Thank you, Mr. Kelly.

Next up is Mr. Cisneros followed by Mr. Waltz, then Mr. Gallagher.

Mr. CISNEROS. Thank you, Mr. Chairman. I appreciate the—our guests being here today.

Look, like everybody else, I believe research and development is very important, and we need to invest in this. But I also worry that maybe we are moving too fast.

The Secretary of the Navy told me in my office that the DDG-1000 was a failure. We have had problems with the LCS. How do we strike this balance, you know? Might it have been better to build maybe a newer better frigate than moving to the LCS? So how do we strike this balance of really modernizing our fleet but not getting too far ahead of ourselves to where we are having these mistakes like the DGG-1000?

Admiral ROUGHHEAD. One of the things I think is to look at the ambition you have and how much technology you are trying to introduce into a new class of ship. And there is no question in my mind that our approach on the DGG-1000 was far too aggressive, and we reached for too much with the DGG-1000. But I do think that it is important that we pursue the new technologies, that perhaps we don't set ambitions of large numbers of ships in a class if our objective is introduction of technology.

I can go back in the Navy's history, and we have a lot of examples of one-ship classes where we tried something and it didn't work. We were in a far different position then with our industrial base and, in some cases, with our budgets. But I think that if we are pursuing new technology, smaller classes may be the way to go and then evolve it that way.

Mr. CLARK. I think a key area is also looking at the operational concepts, or how is the new technology going to be employed in practice before we invest significantly in actually fielding that technology? So, for example, with unmanned vessels, we talked about the large unmanned vessel and how that might be really challenging for the Navy to implement. But the medium unmanned surface vessel that the Navy is pursuing could be something they could actually go very aggressively into because it is a small vessel. It is relatively inexpensive. It has got a limited set of missions that the Navy plans for it to do. We believe that it could do more in the antisubmarine warfare realm. It could do a lot in sensing and in countersensing.

So, if you have got a good set of concepts for how the technology could be employed, it may allow you to be more aggressive in employing it because you have got the trade space kind of confined, as opposed to, for example, like LCS where you had fairly ambitious concepts that then the technology was not able to meet in, you know, short term. So, I think that is really important as an element of this.

And then the second thing would be also when we are changing ships or we are adapting a hull type over time, as Admiral Roughhead had said, we want to avoid changing all three elements of the ship at that same time—the combat system, the hull, and the propulsion system.

So, as we go from one ship class to our modification of a ship class to the next, maybe we modify only one of those things at a time to allow you to improve it over time. And that is what we have done with some of these previous one-off ship classes, is where we changed the propulsion system, where we changed the combat system, but left the rest of the ship more or less intact. And

that is a way to incorporate technology that is more realistic or less risky.

Mr. CISNEROS. Right. I appreciate that answer.

The second question I wanted to ask, and Admiral Roughead, you kind of alluded to this a little bit earlier, but China aggressively may be making a change to more aggressively increase its shipbuilding. It was already kind of headed on a path towards a 400-ship Navy. How is our naval makeup looking to meet that challenge of China? Are we building the right ships in order to interact with them in the future?

Admiral ROUGHEAD. I do believe that we are focused on the right high-low, and then particularly submarines. In my mind, it's going to be a question of capacity. I think that is going to be our greatest challenge. Because when you get inside that first island chain, not only do you encounter significant numbers of the PLA [People's Liberation Army] Navy, but their coast guard, some ships of which are bigger than some of our largest combatants, and then you have the maritime militia. So, numbers are going to be important. How you distribute the force, how you network the information, all of that is key. So, I think we have the right path forward. Capacity is going to be an issue. And then rapid introduction of technology is going to be key.

Mr. COURTNEY. Thank you, Gil.

Mr. Waltz, you are up.

Mr. WALTZ. Thank you, Mr. Chairman. Do you hear me okay?

Mr. COURTNEY. Loud and clear.

Mr. WALTZ. All right. Thank you. And thank you for having this today. Thank you to the witnesses. I just wanted to echo my colleagues' concern about the 30-year shipbuilding plan. I just can't imagine as a former CEO [chief executive officer] going to my board and asking for the amount of money that the taxpayers are producing without a long-range plan. So just to echo those thoughts and very much looking forward to seeing that from the Navy soon.

So, I have just two quick questions. I wanted to add on, and I am happy to hear the conversation on power, very concerned about power, and particularly our raw ingredients when it comes to the battery power and storage I think we are going to need as we are starting to project the need for unmanned underwater systems, unmanned aerial systems, and others. I think worth noting for the committee that right now, China, Australia, Chile, and Argentina produce 90 percent of the world's lithium. And the rest of it are in other countries besides the United States as well. We really lost that refining capability.

So, what—I would just ask for any of the witnesses to comment on the fact that our supply chain that our naval forces need to predict is incredibly vulnerable. I mean need to protect—excuse me—is incredibly vulnerable. And it is a bit of a negative cycle that those forces are absolutely dependent, particularly the Navy of the future, on the raw ingredients that the United States lost the capability to mine, manufacture, refine, and produce. And I would just welcome some additional commentary there.

Mr. CLARK. Well, it seems like we need—the government is trying to do a better job of evaluating where the supply chain vulnerabilities might be. I think the recent—the pandemic and certainly

our trade confrontation with China both created an opportunity to better examine where our supply chain goes—comes from and where we might need to shore it up by investing in a domestic source of some of those materials. So, the Defense Production Act is an option for being able to do that. That kind of research needs to be done in more aggressively going back into the research and development chain, though. It is not just a matter of what we build today; it is also where our vulnerabilities with regard to what we are going to be building in large numbers tomorrow, to your point.

Mr. WALTZ. Just to add onto that question. How much of those vulnerabilities are being incorporated into the type of Navy that we think we have the ability to produce going forward? How does that factor into that long-range planning?

Mr. CLARK. Well, it is likely, as we go into a more diverse and distributed fleet that is more rebalanced towards more smaller platforms, we are going to have more of these technologies that rely on materials and parts that come from suppliers we don't necessarily have the best relationship with.

Mr. O'ROURKE. Right now, we don't have a whole lot of visibility into the question of foreign content in our shipbuilding programs at the component, subcomponent, material, and software level. So, in my view, that is something we need to gain a better understanding of.

And in terms of certain key raw materials, Congressman, you mentioned lithium, but the issue of rare earths also comes into play here because they are critical to many of the combat system pieces of equipment that are incorporated into our ships.

Mr. WALTZ. Thank you for that. And just for my colleagues, I introduced legislation that is taking a hard look at how we can improve that here domestically, and I welcome their support.

My follow-on question is, just to state it bluntly is, and this is adding on to my colleague Mrs. Luria, is OFRP still a valid concept? Is it in real trouble? And if it is, how do we—I will just welcome more of your thoughts on how we get to the maintenance issues and the industrial base issues? I know I—I heard in some initial testimony that it is incorporated in your written—I look forward to reading that. But if you could just spend a few minutes on that, I would appreciate it.

Mr. CLARK. So, the challenge with OFRP is that we need to be able to have ships be able to do their maintenance when they are available to do it. And that is one of the challenges with having a more flexible schedule for ships that the government is pursuing with this dynamic force employment concept. So, having a predictable schedule for maintenance of ships does not necessarily align with a dynamic force employment concept. And so that is one of the challenges that is being encountered by OFRP right now. The Navy is getting better at being able to do the inspections and predictions for the maintenance so they can plan work packages better. But they need to address this scheduling challenge. And they also need to address the industrial base challenge of the industrial base that does maintenance on ships today has rightsized itself to meet the exact demand that we had maybe 5 or 10 years ago. And as that demand changes, that industrial base needs to adapt in support of that. And that is something the Navy might need to think about

investing some time or money into developing, particularly dry docks on the east coast.

Mr. COURTNEY. Thank you, Mr. Clark. And thank you, Mr. Waltz.

Next up is—Mr. Gallagher is up next. And I believe Mr. Vela has rejoined us, so he will be up after Mr. Gallagher.

The floor is yours, Mike.

Mr. GALLAGHER. Great. Thank you, Mr. Chairman. I appreciate it. Thank you to all of your witnesses. This has been incredibly helpful.

I want to follow up on something that we talked about earlier. I think in some ways our ability to learn lessons and move on from LCS and DDG-1000 is the frigate itself.

And Mr. Clark, you played a key role in CSBA's 2017 fleet architecture study that called for more than 70 frigates. Can you just talk a little bit again about why small surface combatants are so important to the future fleet, and if you see the demand for them going up or down in future years?

Mr. CLARK. Yes. Thank you for question, Congressman. Absolutely, they are important to the future fleet. They provide you the ability to distribute the capability out of a larger number of areas and a larger number of ships. One of the challenges we are already seeing with COVID, for example, is that you have got a fleet of a relatively small number of large ships. A challenge like a pandemic can take an entire ship out very quickly whereas if we have a larger number of smaller ships, you are more resilient, you degrade more gracefully. It also allows you to address challenges that maybe don't require that larger ship, as Admiral Roughead said, deploying a destroyer to go do a pirate counterpiracy exercise or operation is maybe not the appropriate use or best use of that platform and tends to then have this cascading effect into the challenge of their operational schedule being unpredictable and difficult to allow maintenance to be done in between deployment.

So, there is this interrelated effect between maintenance and the size of the fleet and its composition. So, frigates are an important element of the fleet to allow you to have that more distributed capability than what we have in today's force.

Mr. GALLAGHER. And in your network fleet design, would the frigate serve as a C4I [command, control, communications, computers, and intelligence] node for network unmanned platforms?

Mr. CLARK. Yes. So, we saw the frigate as doing the C4 function for unmanned systems doing antisubmarine warfare, countermining operations, as well as surveillance and countersurveillance operations. So, we saw it was—it had this really important role to manage unmanned systems.

Admiral ROUGHEAD. If I could just add, I am [inaudible] enough to have operated with frigates when we had a very fairly sizable class. And they really do become the workhorse. As the battle force may be focused on a particular area, the frigate, it just gives you tremendous flexibility, its size, its draft allows it to go places. And you can be confident in its own ability to protect itself and still project power. So, you know, and I can even go back in the days of Nelson and talk about frigates, but I won't go back that far.

They are going to be instrumental, and I think we are going to work the heck out of them.

Mr. GALLAGHER. That is great. I want to follow up. You made a comment, I believe, earlier in the hearing that subs will be the platform of choice in the Arctic. Can you comment on the fact that, unlike the *Los Angeles* class improved and the *Seawolf* subs, our new *Virginia*-class boats are not ice-hardened, meaning their sails and their bows are not reinforced in the manner that the previous two classes of ships are? Help me understand why did we make the decision not to require full ice-hardening for the *Virginia* class?

Admiral ROUGHEAD. My sense is it likely came down to cost. But I think I have a submariner here to my left that might want to address that.

But I still think that the submarine in the Arctic even un-ice-hardened is still going to be a significant player. And I firmly believe that we are going to see the environment change up there quite a bit during the course of submarine's lifetime. And I think that their flexibility will increase because the environment is going to change.

Mr. O'ROURKE. Just very quickly.

Mr. GALLAGHER. And then—please.

Mr. O'ROURKE. And just very quickly, I think the answer is cost. The 688s when they were originally designed were not ice-hardened. Ice-hardening was incorporated into the 688 class with the *San Juan* and 751, the improved 688s.

I think the Navy's thinking is that not every attack submarine needs to be under-ice capable. Some fraction of the fleet needs to be, and the Navy manages that over time by incorporating ice-hardening into some of its attack submarines as needed to replace the ice-hardened submarines that are retiring due to age.

Mr. GALLAGHER. Thank you. My remaining 40 seconds, Admiral Roughead, while you were saying that we made significant investments in the X-47 Bravo prototypes that could serve as unmanned combat aerial vehicles, now we seem to be limiting unmanned aircraft in the carrier air wing to a tanker role. Why do you think that is?

Admiral ROUGHEAD. I think it is a mistake. I really do believe that we need to be able to strike deeply unmanned off of an aircraft carrier. Earlier, I had mentioned the fact that we have lost 8 years in that process, and I think that we need to try to regain that ground because being able to go unmanned at a great distance, to be able to replenish an air wing at great distance with unmanned vehicles is something that is going to transform the nature of naval aviation.

Mr. GALLAGHER. I agree, and I am out of time. So, I won't make a comment how you dated yourself with the previous frigate comments, which I very much appreciated.

So, I yield back, Mr. Chairman.

Mr. COURTNEY. Mr. Gallagher does that to all of us.

So, is Mr. Vela still with us? I guess we lost him here. So, we do, if it is okay with the witnesses, have some members, I think, who would like to do a second round. I am going to reserve. I have one question. Mike Conaway, I think, in terms of the first order,

you were first on the batting order. And look, you have another question that you wanted to ask?

Mr. CONAWAY. Yeah. No questions. I just thank the witnesses for being here today, and I do think that all three of them would do the Nation a great service if they could reflect on their thoughts relative to the \$3 trillion we have committed to spend in the last 3 months and what impact that will have on our capacity to actually execute all the great things that they talked about.

So, with that, Mr. Chairman, I yield back.

Mr. COURTNEY. Thanks, Mike. I don't know if that was, you know, just an editorial comment or a question, but if anyone does want to weigh in on that, you know, you've got time.

Admiral ROUGHEAD. Mr. Conaway, I can't even begin to underestimate the challenge that this poses for the country and the burden that it will be on all of us, and particularly on you, as you have to make the hard decisions, but I do believe that being able to provide a viable Navy forward is important.

I would also, as we look at how do we stimulate and bring the economy back, that we should look at opportunities to address the industrial base, to address education systems that give our young people skills that can go into that.

I also alluded to the fact that now is the time to, perhaps, jump on some opportunities that may be there, particularly in sealift. The prices are going to be extraordinarily good for recapitalization of that fleet. Might not last very long, so I think it is important to do that. Those are just some thoughts.

Mr. CLARK. And I would also add that this is—one of the drivers behind having a fleet that is more affordable is going to be the potential concern about budget pressures coming from the amount of debt that we have been incurring to support the current response to the coronavirus.

So that is one of the drivers behind the fleet architecture that we proposed in our written statement.

Mr. O'ROURKE. Very quickly, I actually touched on this point a little bit in my prepared statement. I noted the fact that there are some people who are arguing that the expenditures that we have made to support the economy during the stay-at-home period could have the effect of putting further constraints on the defense budget in coming years because of the impact on the deficit and the debt situation. But I pointed out that even if defense spending as a whole is suppressed, that does not necessarily mean that that would carry through to the budget of the Navy. If we are going to adopt a less expensive concept for our national strategy and our role in the world, if we are going to stand off Eurasia as some people are advocating, that can actually require a Navy as capable as the one we have today, because you would, under even that more retrenched strategy, depend as much or more than we do now on using the oceans as a buffer for protecting the United States from security challenges that might arise within Asia.

And I did find it interesting that one policy group here in Washington, just within the last few days, they happened to advocate a smaller defense budget, but they went out of their way to say that within that smaller defense budget, they think that the Navy should get a larger share of that budget, because it is a key service

for implementing that kind of a national strategy, should policy-makers decide that they want to go in that direction.

So even if the defense budget goes down, the point is it does not necessarily imply or mean that the Navy budget would go down with it. What it implies is a need to make choices about what your strategy is and how to implement it.

Mr. COURTNEY. Right. Well, thank you to all the witnesses for those answers, and again, Mr. O'Rourke, again, your testimony, I did read that section that you just cited, and it's, again, really a great thought provoker for all of us, so thank you for mentioning that.

So next up, Jared, you, again, are on the batting order if you have a question you want to offer to the witnesses.

Mr. GOLDEN. Yeah. Absolutely. Thank you for the opportunity, Mr. Chair.

I wanted to follow up a little bit on my previous question as well as Congressman Gallagher was talking about the frigate class. And with my first question, I talked with Admiral Roughead about the future of the DDG Flight III's role in the Navy today. Some people have testified a little bit in your statements for the record about a potential for a Flight IV, or talked briefly about the potential for the future large surface combatant.

Mr. Clark, in your prepared remarks, you talked a little bit, and also just talking with Gallagher, you talked a little bit about how the frigate should play, like, a lead role in antisubmarine warfare or escort surface action groups. I think you also talk a little bit in your prepared statement or in one of your reports about a smaller surface combatant like a corvette class or something. I just wanted to give you an opportunity to talk a little bit about what you were envisioning for the future of the fleet force when you were talking about that.

Mr. CLARK. Sure. Thank you. We recently did a study looking at the future of the surface fleet, and we saw the need to rebalance it more than the Navy is already pursuing. So, the frigate is a great step in the right direction to provide an alternative to a destroyer that essentially provides the same capability as a destroyer, but with a smaller capacity, and in ASW [antisubmarine warfare] it would actually provide some additional capability.

So, we see that need to rebalance away from the destroyer as the only surface platform, to add the frigate to the LCS, and then we also saw a need to further distribute the fleet by adding this corvette.

The challenge with the frigate is that although it is smaller and less expensive than the destroyer, it is still, you know, a \$1 billion ship or so, and it is going to limit how many you are able to buy and deploy and maintain in the field. It also has an operation and support cost associated with it that will constrain how much you can use them as an element of the fleet.

So we needed another platform that was even less expensive to build and to maintain that could act as a distributed source of fires and that could act as a security cooperation platform in peacetime, and we saw that corvette as being a way to do that. So the corvette would be maybe a 3,000-ton vessel that would be an alternative to the Navy's proposed large unmanned surface vessel, and it would

carry vertical launch system and missiles so that it could provide fires, and, perhaps, rotate through surface action groups as an element to do that. And then it could also act as a counterpiracy platform, maritime security platform, and do training and operations with our allies and partners overseas.

So that rebalancing of the surface fleet to a more diverse set of platforms was really important to manage costs, but also to provide a fleet that is maybe better suited for the environment that we are embarking on, where we are going to have this range of gray zone through great power high-end competition where we need a more diverse set of platforms to support that.

We saw the destroyers as being the key element to providing missile defense, both to larger force formations like carrier strike groups and amphibious ready groups, as well as places ashore that require ballistic missile defense that can be relocated, and that is something they do today. So, we saw the DDG's role evolving as well in that future surface fleet.

Mr. GOLDEN. Thank you for that, and I just wanted to give you the opportunity. I had read that. I thought it was interesting, and I appreciate the testimony.

Mr. COURTNEY. Great. Thank you, Jared.

So next up is Mr. Gallagher, followed by Mrs. Luria.

Mr. GALLAGHER. Thank you, Mr. Chairman.

Mr. O'Rourke, to go back to your comment about budgetary constraints, I mean, are you suggesting, I mean, that we need to be having the broader conversation about the size of the budget that seapower consumes relative to land power and air power, particularly if we have, as I believe we do, a National Defense Strategy that prioritizes seapower in INDOPACOM [United States Indo-Pacific Command]?

Mr. O'ROURKE. That is always a question that the Congress or policymakers, in general, can consider, and questions like that and others, I think, are certainly going to be on the table as we move into whatever the world is going to look like after we get past the current pandemic situation.

There are a lot of uncertainties about what the pandemic may do to change the international security environment going forward, and that particular question is one among several that can be considered as we examine what our national strategy should be, and our military strategy within it.

Mr. GALLAGHER. And then one follow-up on the ice-hardening conversation. As we look at the retirement of our *Los Angeles*-class subs over the next decade, with the exception of the five to seven boats I think we are looking to refuel again, it appears as though we are going to lose a lot of the ice-hardened subs. So, is there any conversation about a new ice-hardened variant of the *Virginia* class, and I apologize if you commented before and I missed it.

Mr. O'ROURKE. I haven't heard of it, but I would suspect that within the Navy, they are very aware of that factor, and my presumption would be that they are planning on continuing that capability through modifications to the *Virginia* class that would be procured in coming years.

Admiral ROUGHEAD. And as we discussed earlier, I think it is important that we begin to think about the Arctic, because Russia

will be there, China will be there. So, how do we want to do it? And I wouldn't be surprised if the Navy wasn't thinking about that.

But further to Ron's point, I really do think, and I know this is a very hard, inside the building, inside the Pentagon, and also up here, but the one-third, one-third, one-third is really something that needs to be addressed, and by that I mean equal shares to the services. And I know that opens up parochial fissures and fights, but where does the country want to be? What are the types of capabilities? And the budget needs to support that.

Mr. GALLAGHER. And I completely agree, Admiral Roughead. I mean, I confess my navalist bias and my seapower bias, but it would make no geopolitical sense that, you know, the allocation of resources would fall neatly in a one-third, one-third, one-third bucket. So, I think it has to be informed by strategy, and I really appreciate those comments.

I want to ask one last question. I am sorry. I don't want to go on here on my second round. But Mr. Clark, there has been some conversation about, perhaps, a new carrier design to place the *Ford* class. Given that our air wings are now around 65 aircraft, could we go to a smaller carrier?

Mr. CLARK. In theory, we could, but we have done a lot of analysis on this in support of this work that we have been doing in concert with the Navy and with OSD. And the challenge that we found is that the nonrecurring engineering cost associated with building a new smaller carrier ends up eating up most of the cost savings that we would harvest as a result of going to that smaller carrier. And, so, we found that really, we might as well stick with the *Ford* class that gives us, you know, the capacity and the, sort of, generation capability, and the new technologies that have already been incorporated into it.

All those are good things, and once we have kind of come through the maturation of them in this very long and painful process, we should stay the course on that, because we found that shifting ended up being more problematic than staying on the current design.

What we did see instead was a value in using the large deck amphibious ship or the amphibious assault ships primarily as fixed-wing carriers. So transitioning them from being kind of a multi-purpose amphibious ship to using them almost exclusively to do fixed-wing F-35B deployments, that would give you that smaller carrier that is able to do operations in environments where they don't need the kind of sorties that a larger carrier would provide.

And the Navy and the Marine Corps are already doing that a little bit today in the Middle East. Often, that is the only air-sea-based airplanes are coming from an LHA [landing helicopter assault ship] or LHD [landing helicopter dock ship]. So, taking that concept into the future and using the F-35 Bravo to its fullest extent would be a way to get you that smaller carrier.

Mr. GALLAGHER. But didn't the Navy announce the cancellation of its future carrier study? If so, why? I mean, I know the debate gets very fraught politically in Congress, but why not have the debate?

Mr. CLARK. It may be just a matter of, you know, internal dynamics within the Navy that caused that effort to fall apart be-

cause of leadership changes, but I do think there is a lot of value in going back and continuing to evaluate what the right design for carriers is going forward, because at some point, we will want to transition, you know, away from the *Ford* class, and then that transition probably should be looking at a smaller carrier if we are going to make that nonrecurring engineering cost investment anyway.

Mr. GALLAGHER. Thank you. Thank you all for your testimony. This is very helpful.

Thank you, Mr. Chairman. I yield back.

Mr. COURTNEY. Thanks, Mike.

Next up is Mrs. Luria.

Mrs. LURIA. Well, thank you. Thank you, Mr. Chairman, for the opportunity to go into the second round. And I wanted to follow up on the theme that Mr. Golden was speaking about with Mr. Clark's response about the smaller ships, but I wanted to switch over to Mr. O'Rourke, because I know in reading your testimony, you commented on this, and I think I am quoting you. It may have been one of the other testimonies. The FFG [guided missile frigate] is one-third of the firepower, but two-thirds of the cost. And I saw that you had made some suggestions as to ways to build more platforms at the lower end. So if we are talking large surface combatant small, we really want to talk small-small, and some of the ideas and specifically coordination with the Coast Guard and how we could leverage off of the designs that they have already implemented as naval forces. Can you comment on that?

Mr. O'ROURKE. Yeah. The quote that you had is from Bryan Clark's testimony, but the general point is, is that the frigate that we have in the FFG-X is a 7,000-ton ship. And I will say just very quickly, in answer to the earlier question about lessons learned from the LCS, the LCS was a new hull design and some new equipment. The frigate is working off a parent design and is not to have any new development items on it. So, in terms of managing its technical risks, we seemed to have learned a lot of lessons from the LCS.

Now, as a frigate, it is a fairly large frigate by world standards. It is in the 7,000-ton range. And in my testimony, I talk about that creating room or opportunity to consider smaller ships underneath it, something perhaps in the manner of a 5,000-ton ship, which would be a smaller frigate or something in the 1,000- to 4,000-ton range which would be a corvette of the kind that Bryan Clark talked about.

There are many possible ship designs out there for doing that, including designs that have come out of the Coast Guard's cutter procurement program, including the national security cutter, and the designs that have been developed for the offshore patrol cutter. That creates a once-in-a-generation opportunity to think about commonalities that work across the services to get greater production economies of scale so that you could work more toward the goal of optimizing our national shipbuilding effort as opposed to suboptimizing our shipbuilding effort at the individual service level.

Mrs. LURIA. Well, thank you.

And Mr. Clark, I wanted to go back to some comments in the 2017 CSBA Restoring American Seapower study. I noted in there that you talked about the model that we are using with geographic combatant commanders and shifting that to a deterrence and maneuver model. And although we say we have global force management to source our forces around the world, often that creates geographic stovepiping of resources. And there is sharing, and the combatant commanders do work together. But can you describe your model, and specifically in terms of how you think that could help us gain more efficiency in providing presence?

Mr. CLARK. Yes. So the model we moved to is similar to what was adopted in the National Defense Strategy after that. So the model where you have forces that are focused on local operations overseas in different theaters, so there is a deterrence force for the East China Sea, and there is one for South China Sea, and there is one for the Persian Gulf.

Mrs. LURIA. And it seemed to—sorry to interrupt, but you had a lot of forward-basing of these forces.

Mr. CLARK. Right. Right. And those forces would predominantly be forward-based where they would be able to, you know, get used to the neighborhood, learn the allies, learn the potential adversaries, understand the geography. So, we saw there being a lot of value in that model which has been very beneficial for our forward-deployed naval force that is in Japan, where those forces gain that level of familiarity. And it also allows them to pursue this higher operational tempo, or this shorter operational cycle, because they don't need to relearn everything every time they go on deployment, because they know where they are going. And they know the people they are likely to deal with.

So those deterrence forces were then augmented or complemented by a blunt force, which is the carrier strike groups that would be deploying out of the continental United States that would be going on these longer deployments, that would be operating on a slower, more like the OFRP operational cycle. We saw it would be really important to look at the divergence between two different operational cycles, because we saw it being necessary to maintain presence overseas, to get a higher operational tempo out of some of our forces, and we saw the way to do that as giving them this limited responsibility as a deterrence force, where they didn't have to go through as long a training cycle for each deployment. And because they would be remote and located near the areas where they were going to deploy, the transit time would be shorter, and so they could maintain a higher operational tempo and, therefore, a greater presence.

So that model was incorporated, to some degree, into the NDS [National Defense Strategy] in the form of the blunt force that the—the blunt and contact forces that the National Defense Strategy discusses. The contact forces, like our deterrence force forward, largely forward deployed, operating in concert with our allies and dealing with adversaries, and then the blunt force was this larger force that remained offshore and operated from CONUS [contiguous United States], for the most part.

Admiral ROUGHEAD. If I could just add to that, I think the concept works well, but it also requires political flexibility, because

building ships and having them forward where they are not being maintained in the continental United States where the economies aren't benefiting from the crews, but that is political reality. And if we want to be able to be more flexible, if we want to be able to have these forward forces, that is something that, I think, needs to be addressed.

Mrs. LURIA. Well, thank you, Admiral. And I just want to close by quoting something that Mr. Clark just said in his testimony when answering a previous question. I am quoting you that you said, "The resulting lack of a product or response from the Pentagon was based off of internal dynamics of leadership changes." And I think that we are caught up in exactly that term right now, because we don't have a 30-year shipbuilding plan, we don't have a force structure assessment, and the Navy has needs. We are here to meet those needs. But if you can't tell us what they are because of the internal dynamics of leadership changes that continue to happen, it puts us in a difficult situation, and I think it puts the sailor on the deckplate in a difficult situation, because I truly feel like there is not a consistent vision. And even when we have had a 30-year shipbuilding plan, when it changes every year in years 1 through 5, that is still not a clear vision.

So, I appreciate your work. I appreciate the thought and insight you put into how we can develop our future Navy, and I look forward to hearing from the Navy what they truly want to request to meet their mission, so thank you again.

Mr. COURTNEY. Thank you. Well put, Elaine.

Next up, again, Mr. Wittman has a couple questions, and I have one, and then we will call it a day.

Mr. WITTMAN. Mr. Chairman, thank you.

I wanted to ask for our witnesses' perspective on our maritime forces interoperability. As you know, the Chinese are much better than we are by taking everything across the spectrum of their maritime capabilities, and we have seen that, what has happened there in response to the Taiwanese, to the Japanese in certain disputed areas, where the distinction between one force and another is not significant. They are amassing their naval forces or their maritime forces.

What I see in the United States is, we have the United States Navy; we have the United States Marine Corps; we have the Merchant Marine; we have the Coast Guard. Obviously, all have mission areas that are unique, but also do not operate in an interoperable way. And I would argue that there are many opportunities where they should. And if they don't, and the Chinese do in those sort of gray zone areas where the Chinese have become very, very effective in doing that, and we are looking at the challenge of amassing enough maritime forces to deter and to operate in a conflict, then it seems like to me, we ought to be using every single element of maritime force structure in the United States. It doesn't seem like we have that. Doesn't seem like we even have a plan going forward.

So I wanted to get your perspective on what should be the path forward for all of those elements of maritime forces in the United States to have a formal plan of interoperability, much like we have with other forces around the world. You know, we jointly operate

elsewhere. We do RIMPAC [Rim of the Pacific Exercise]. Why don't we have the same sort of operational exercise with all U.S. maritime forces which we never do? So anyway, I wanted to get your perspective there.

Admiral ROUGHEAD. For fear of sounding like a dinosaur, you know, I think that we have focused on the joint force, and there is no question, you know, in my lifetime, I have seen us become a much more effective military because of jointness. But I think the one thing that we seem to have neglected is to acknowledge the fact that the maritime space is different.

Mr. WITTMAN. Yes.

Admiral ROUGHEAD. And to your point, within the maritime domain, it almost is a joint force unto itself.

Mr. WITTMAN. Right.

Admiral ROUGHEAD. And I really do think, and I was part of the National Defense Strategy Commission, and we were very blunt about the fact that there were not operating concepts about how we would move forward, how we would engage. There were piecemeal parts. So I really do think that, you know, the maritime strategy that was developed for a different time during the Reagan administration, for a different adversary, but very high-end warfare, is something that needs to be done today, and I don't think we should be shy about the fact that it is maritime.

Mr. WITTMAN. Yeah.

Admiral ROUGHEAD. That it is about our maritime forces that require certain types of capabilities to come together, that we can rely on elements of the joint force. But we really need to start thinking more about the maritime domain, because I would argue that the PLA, if you look at their writings, they have transitioned, and a lot of their work is into a maritime space.

Mr. WITTMAN. Yeah.

Admiral ROUGHEAD. And I think if we do not acknowledge the fact that we have maritime needs, capabilities, and we have to integrate all of it, we are going to be behind the eight ball.

Mr. CLARK. Certainly. And you look at the Chinese case, and they have got the People's Maritime Militia, the PLA Navy, and then they have got the coast guard, all operating under a single command organization. That is something we need to look at; certainly in the Pacific Fleet that is happening today.

So, we are now starting to deploy Coast Guard cutters regularly to the Pacific. They are operating under the command of Pacific—Indo-Pacific Command and PAC [Pacific] Fleet. We need to do more of that. That is going to require maybe some force design changes in the Coast Guard, so you have got more forces that are able to deploy overseas and act in that manner, because we are the away team, you know. The home-field advantage afforded to the Chinese gives them the ability to have all these different units occupy the South and East China Seas.

So having a command structure that is organized around, you know, having all of these elements under their leadership, having more of these forces that can deploy overseas, and I think you bring up a great point with the Merchant Marine is, we do have CLF [Combat Logistics Force] forces and sealift forces deployed

over in the Pacific that could do more to contribute to our operations.

And so, as we move towards a more distributed logistics force, it is going to be able to contribute more directly to the capability of the forces that are deployed. And they can do more than simply just, you know, bringing material back and forth. They could do more of the surveillance mission. They could do more of the response mission when there is, you know, a boater that needs assistance or a piracy attack on somebody. So, there are areas where we may look at more unified operations between the Merchant Marine, Coast Guard, and the naval forces out there, but it requires these force design changes, and it requires that unified command structure.

Mr. WITTMAN. Yeah. Very good.

Mr. O'ROURKE. Very quickly, you mentioned interoperability in the Pacific. And if we are considering that on an allied basis, then I think that the first country to talk about and the most significant one is going to be Japan, because they have the largest of the allied navies in that part of the world.

And in terms of interoperability, if you talk to Navy personnel out there, one of the points they will make is that it would help if Japan's own forces became more joint than they are because their Navy and their Air Force don't work as closely together with one another as we are used to our own Navy and Air Force in the U.S. context. So that would be one thing where you could get more bang for the buck, just with the forces that you have.

Secondly, it would then be a matter of having the Japanese forces, the Navy, and also their Air Force, work with greater interoperability with us. Several years ago, our fleet may have told you that that was at a certain level and that there was a lot of room for improvement. My understanding is that there has been some improvement and that our interoperability with the Japanese forces is better.

Finally, in terms of making use of all the available force structure that is out there, I have tried to scour the world for unrealized western naval force structure, and the number one opportunity that I have identified is the Japanese attack submarine force.

For industrial base purposes, they build one per year, so that they have a steady drumbeat. So, the size of their force depends on how long they keep them in service. They keep their submarines in service for 22 years, because they have a force level goal of 22 submarines. But if they were to simply make a decision to keep their submarines in service for 30 years, more like our own service, they could grow their submarine force from 22 to 30 without building a single boat more than what they already planned to build.

And, furthermore, if they were to grow that force from 22 to 30, it would grow from that number at the very same timeframe that we are going down to the bottom of the valley. They would hit 30 within a year of when we are at the minimum of our own attack submarine valley. Now, those are diesel boats, and they can't do as much as a nuclear boat, but they can do some things.

So if we are talking about interoperability and trying to make use of available force structure, this is one option, and it is something that I have talked about with our Navy, and with the Japa-

nese Ministry of Defense as well. And so, I am watching to see whether they will pull the trigger on that because right now, they can expand their submarine force without building any more boats than they already plan to.

Admiral ROUGHHEAD. If I could just add to that, I think Ron hit on a terrific point. You know, we talk about our allies, and we have a pretty exclusive club with what is called the Five Eyes, and there are certain things that we do with them. But I really do believe that it is time that we change the nature of our alliance with Japan. Japan has some things that they need to do to accommodate that, but I really do think that that has to be an elevation because, as Ron said, they have really good stuff—

Mr. WITTMAN. Yeah.

Admiral ROUGHHEAD [continuing]. And they are very, very proficient operators. The recent changes in their interpretation of laws have made that change dramatic, and I think that we have to think differently about Japan.

Mr. WITTMAN. I think that is a great point. That mil-to-mil [military-to-military] relationship should be turned up a notch on the effort to make sure we have capability to bridge that gap. Interoperability, as you said, is not just, you know, within the United States military, within our maritime forces, it is also with our allies.

I do want to emphasize that, you know, there are parts of interoperability within our maritime forces. The problem is it is fragmented. And normally, it is Marine Corps to Navy, and then Navy to Coast Guard instead of Coast Guard to Marine Corps, and interoperability in all four of those, Merchant Marine included. So, we have pieces of that. The key is how do you fully integrate all of that? I think there is a tremendous amount of capability there that we can bring to bear, both on deterrence, and on being able to operate in contested environments, I think, too.

And then, you know, the big thing in those environments is how do you create more uncertainty? As our allies look at this and say, Wow, we didn't see this type of interoperability and then exercising that, so our adversaries look at it and go, We are not quite sure what the Marine Corps can do in conjunction with the Coast Guard or, you know, what support elements are brought by the Merchant Marines.

Those things are going to be critical, especially in times of limited resources, so use what we have got. Ron, you bring up great points about getting our allies to bring into service a greater period of time availability for those submarines, all great aspects.

So, Mr. Chairman, with that, I yield back.

Mr. COURTNEY. Thank you, Mr. Wittman. And great, great comments.

So, you know, I just wanted to close out, maybe, with Mr. Clark just for a minute, to go back to where we sort of began the conversation a couple hours ago which is—and Elaine described it, I think, aptly. It is just that, you know, we are on the brink of making, you know, a big decision in terms of a markup, and we are going to be investing money. But in my 14 years here, I have just never been in a situation where it is just, you know, kind of this radio silence in terms of what is the normal operating procedure. I don't know whether, Mr. Clark, you had any sort of thoughts

about what you see happening in the Navy and the Secretary of Defense office that is sort of holding up the show.

Again, Mr. O'Rourke's report, kind of in excruciating detail, you know, talked about some of the leaks and the, you know, press reports about, you know, whether it is going to be, you know, this number or that number, you know. Why don't we have a plan? And what is your observation as someone who is a pretty, you know, savvy guy who has been around in this town?

Mr. CLARK. Well, so what I see right now is we have got—the Navy has a plan that maybe wasn't adequately addressing some of the concerns of the Secretary of Defense's staff regarding cost, and then maybe an evolution of the fleet towards a new design. So maybe less—more conservative than what the SECDEF [Secretary of Defense] staff might have been looking for. The less—the more conservative approach towards changing the fleet also means that it might cost more, and there is a cost concern there.

So reconciling those differences is what this current study is trying to do, is evaluating what that fleet design should look like to try to deal with cost constraints that are likely to be in place while also evolving the fleet to create the capabilities we are talking about here, incorporate new technologies, create more uncertainty for adversaries, start to make the fleet a little bit more distributed compared to where it is today. But do so in a realistic way that doesn't damage the industrial base.

So, squaring all of those different considerations is what this current study is trying to do, and our contribution to it was attempting to do it as well. I don't anticipate we are going to get results out of that until basically the lead-up until the program budget review which will happen this fall. So, this summer will be the time when a lot of this reconciliation occurs. Some final answers might come out around the time that that ends, and then going into program budget review for the fiscal year 2022 budget will be when some decisions are made about what the Navy's shipbuilding plan and force structure assessment is going to look like.

So, we may not see those answers until that timeframe which will make it difficult for the Congress to decide on how to mark up the bills.

I think in terms of what the budget is going to look—or that the force structure assessment will look like is, it will look very similar to kind of what the, you know, previous plan looked like. So, we are not going to have a dramatic change. We are not going to get rid of classes of ships, for example, and start new ones from scratch, but there is going to be this need for investment in the new platforms that we need to distribute the fleet, to complement the platforms we already have. So, we are going to continue building DDG-51s and *Virginia*-class submarines, and *Columbia* class will continue, and amphibious fleet will continue. LPD production Flight II will continue, and the LHA-9 will still come. But we need to think about investing in the R&D [research and development] necessary to start those new set of platforms, and that is maybe something where the Congress can start to lay that seed corn in because the Navy is going to need that to start rebalancing the fleet for the future.

I think an important element of it also would be to ensure that the current classes that are in production are sustained and give that demand signal to industry, because otherwise, you are going to have industry starting to hold back its potential capital investment out of concern that we are throwing away classes of ships and betting on the [inaudible]. And the Navy I don't think is going to do that. I don't think that is what the Secretary of Defense's intent is either, to throw away the existing capability and bet on the new one. So, we will have to do both for a while. So, making those investments will be important, I think, and that is what the markup may need to entail.

Mr. COURTNEY. Well, I appreciate that. I mean, it is an explanation. It is, in my opinion, not a justification because just, you know, having this sort of blackout is, you know, given all of the—I wouldn't say, you know—well, yeah, urgency that we heard from, you know, members as well as the witnesses here today.

Again, it is just, as I said, something that I have never experienced on this subcommittee during my time. But your testimony today was extremely helpful in terms of providing, you know, I think great guidance both, you know, long term, short term.

Again, I just can't thank all of you enough for, you know, being here today, and your patience answering two rounds of questions. Again, kudos to the staff for, you know, really bringing this all together in an, you know, unprecedented fashion.

And, again, I think we certainly checked the box in terms of the Rules Committee's requirements today, but more importantly, I think the content of the hearing is going to give us the right guidance so that we move forward with a strong mark.

So again, thank you to all the witnesses, and with that, I will adjourn the hearing.

[Whereupon, at 12:34 p.m., the subcommittee was adjourned.]

A P P E N D I X

JUNE 4, 2020

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

JUNE 4, 2020

**Opening Remarks of the Honorable Robert J. Wittman
for the
Seapower and Projection Forces Hearing on
Future Force Structure Requirements for the United States Navy
June 4, 2020**

I want to thank Chairman Courtney for yielding. And I want to thank our witnesses for participating today. Our witnesses are esteemed naval theorists whose years of blood and sweat to support our naval forces should be particularly insightful as we review our maritime force structure.

Naval shipbuilding is a long game. With some ships taking over eight years to construct and billions of dollars in investments, it is important that we be able to translate the national defense strategy into a coherent shipbuilding plan. I look forward to our witnesses' thoughts on how they best propose to better allocate resources to accomplish our defense vision.

In my estimation, there are three particular issues that I hope to address today which include our undersea strike capabilities, unmanned technologies, and our support naval instruments. As to undersea strike, I continue to believe that our nation rightfully relies on the silence of the sea to mask our strategic undersea strike capabilities. I support our latest force structure assessment that highlights the diminishing resources of our attack submarines and advocates for a significant increase in this area. I read an article earlier this week that seemed to indicate the Department's support to accelerate unmanned underwater capabilities to replace the diminishing undersea strike capability. While unmanned underwater vehicles are essential to augment the attack submarines, I am not convinced that they are currently able to replace the manned force structure. Additionally, I was disappointed with the budget request that sacrificed an attack submarine and believe it essential that Congress reverse the perilous decline of our attack submarines.

As to unmanned capabilities, I am particularly concerned that these nascent products are being billed as being capable of replacing strike capabilities. There are a multitude of issues associated with the development of unmanned vehicles. Concerns with their reliability, their ability to operate in a comms denied environment, their ability to sustain operations, and their ability to strike using the law of war all point to a developing capability, but not a product that is currently ready to enter into the fleet. We need to develop baseline requirements and rapidly adapt commercial capabilities ... but we should painstakingly review the application of these assets to ensure their sufficiency during times of war.

I also want to take a moment to highlight the many instruments on naval force structure that are essential to our nation's success. Many of these capabilities are not immediately apparent but are fundamental to projecting power. For example, while many our citizens believe the United States Coast Guard is constrained to our nation's coastline, the reality is that this committee supports these forces, our daily diplomats to a wide variety of host nations who yearn to be

better aligned with our United States ideals. We support a 60 ship Maritime Security Program that are daily integrators of our logistics train. We support of our transoceanic cable repair capability to ensure continuity of international communications on whose backbone rides over 99 percent of international data. And, we support increased tanker capacity, in which last year this subcommittee took the first step toward supporting the diminishing international tanker fleet who will be essential to allowing our naval forces to operate in a disaggregated manner. My point in highlighting the softer instruments of naval power is to ensure that that all of these elements are adequately integrated into a cohesive naval strategy. It is not simple enough for us to count our navy ships and assess critical weaknesses. It is paramount to develop all of our naval capabilities and align them in common purpose.

In conclusion, I remain concerned that our emphasis on naval force structure highlights some of our strategic weaknesses. The integration of commercial sector practices and other maritime instruments are essential to projecting power. We need to be diligent in reviewing the real opportunities of developing capabilities. We need to be brave and layout a coherent naval force structure that integrates the Navy, the Marines, the Coast Guard and the Merchant Marine into one battle force capable of dissuading aggression. If we fail, our nation will look wantonly at our inaction during this critical time.

Again, I appreciate the Chairman Courtney for having this important hearing and I yield back the balance of my time.

Statement of Admiral Gary Roughead, U.S. Navy (Retired)
before the
House Armed Services Committee
Subcommittee on Seapower and Projection Forces
June 4, 2020

Chairman Courtney and Ranking Member Wittman, thank you for the opportunity to appear before you and other members of the Subcommittee to discuss future force structure requirements for the United States Navy.

As this Subcommittee knows so well getting future naval force design right is hard. It is particularly difficult today because of the uncertainties of forecasting rapid technological change, its likely applications, and maturity; accurately predicting geopolitical, geoeconomic, and military intentions of peer competitors especially China; assessing global naval trends and crafting responses to them for credible forward presence and those solely for combat; the absence of informed discussions and acknowledgement of the need to consider combat losses of ships, aircraft and their precious crews; an over-fixation on the total number of ships in a plan as opposed to the nuanced numbers of specific types of ships needed to support viable operational concepts; an under appreciation of how small allied navies are currently; and the overlooked challenge of supplying naval forces at sea and other combat forces ashore in contested environments.

Our current COVID circumstances and aftermath will further complicate seapower considerations. The coming year will understandably include a lively discussion and debate regarding what should be included in our perception and definition of national security with public health understandably weighing more heavily in the equation. There is a military force structure aspect to that, specifically what existing capabilities should be enhanced and what additional requirements should be added. Questions will be raised regarding the vulnerability of ships to infectious diseases which will add another aspect to and intensify the debate of the right mix of manned and unmanned capability. Although not the sole purview of this Subcommittee, or the HASC, will be the status of U.S. flagged sealift ships. This aged and small fleet, key to supporting U.S. global combat operations, is under additional strain because of dramatic decreases in peacetime cargo revenues which enable operators to sustain that fleet.

All naval force structure assessments must begin with assumptions. These are top of my mind for the coming decade:

- The recapitalization of our seabased deterrent is essential and will remain the top shipbuilding priority. (Accordingly, I will not elaborate on that program in this statement).
- The American public will continue to want to disengage militarily from the Middle East yet not wish to see our influence there diminished.
- The stability of the maritime Middle East and especially disruptions in areas around vital choke points will continue to affect the global economy.
- The U.S. will be a reluctant to commit large numbers of ground forces overseas but will retain an expectation of prompt military response.
- Other nations will be less likely to welcome significant American military presence on their sovereign soil.

- China will continue its expansion as a maritime and naval power which will complicate U.S. maritime activity in the Western Pacific and eventually in the Indian Ocean.
- The probability of Taiwan becoming a military flashpoint through misstep or Chinese aggression will increase.
- If commercial shipbuilding orders remain depressed China will not idle its shipbuilders but will apply the workforce to naval/coast guard construction adding to its capacity in the Western Pacific.
- Our submarines are our winning hand.
- China and Russia will emphasize programs and investments to counter our undersea advantage and will become more proficient in anti-submarine warfare.
- There will not be an appreciable increase in allied naval force structure in the near and mid-term nor will allied seabased logistics be enhanced adding to the demand on U.S. logistic forces.
- Seabased logistics will be imperative given the speed and intensity of war at sea against a peer adversary.
- Reliance on U.S. flagged sealift will not diminish.
- The time to maturity and fielding of new technologies such as artificial intelligence, assured autonomy, hypersonic weapons, and defensive systems against similar adversaries' developments will be overly optimistic.
- Gap filling capability and capacity until the aforementioned technologies are operational such as decoys and relatively inexpensive small UUVs and UAVs to confuse and disrupt will be seen, erroneously, as unnecessary because of the perceived proximate fielding of more exquisite solutions.

It follows from the above assumptions that our naval force structure will remain important to real and perceived, predictable, and sustained military presence. Regional demands will be different but naval presence tailored to regional needs and likely threats will remain in high demand.

Accordingly, a high-low mix strategy for surface combatants should be pursued. The need for high-end surface combatants will be greatest in the Western Pacific with a low to high mix appropriate for the Middle East. The Atlantic will require high-end undersea warfare capability and capacity to monitor and, if necessary, counter Russian submarine operations.

Our submarines are extraordinary assets whether used for intelligence, surveillance and reconnaissance, strike missions, special operations support, or sea control against adversary surface ships or submarines. Using a chess analogy, our nuclear submarines are like an invisible queen on a chess board. They enjoy great flexibility, versatility, and endurance yet their location is unknown complicating an adversary's calculus.

Current numbers of surface combatants and submarines are inadequate. Both shortfalls are very concerning however the known dip in the number of submarines in the coming years is of great concern. Submarine requirements in the Pacific and Atlantic will burden the force and it is likely our submarines will be further taxed in the Arctic in the coming years. The guideline of four ships in our inventory to have one deployed in a particular region should not be discounted nor discarded. To do so invites decreased levels of readiness, inadequate maintenance being performed, and loss of operational proficiency and competence.

Logistics matter greatly. In two decades of war in the Middle East, with the exception of the deadly miles of ground transportation, the flow of supplies in the air and on the sea has been uncontested. Ships operating in support of our ground operations there have enjoyed proximity to secure ports. Nor has there been an appreciable use of expendables such as sonobuoys, decoys, or ordnance. That will not be the case in high tempo operations in the Western Pacific or Atlantic. Moreover, the distances in those areas of operation demand greater attention to seabased logistics force structure.

Sealift to transport expendables, weapons and fuel to areas of operations must figure more prominently in force structure decisions. Readiness of the Ready Reserve Force (RRF) is woefully low. Numbers should be increased and the average age of the RRF ships reduced. While building replacements in U.S. shipyards is a reasonable goal, purchasing newer "used" ships, including foreign built ships, can fill this shortfall faster and likely at less cost. COVID effects on the shipping industry have increased the number of available "used" ships and those opportunities should be pursued promptly.

Maritime domain awareness, networks, and command and control systems are important in monitoring, confronting effectively, and defeating a peer adversary at sea. They must also be robust enough to withstand penetration and disruption techniques. Numbers of sensors, nodes, and pathways must be sized and configured for redundancy and loss. Unmanned systems are ideally suited to fulfilling these needs and can be deployed from distant, safe bases. We have been extraordinarily slow in prototyping, experimenting and accelerating unmanned concepts and systems into the Fleet largely for reasons cost, culture, and process. Every effort must be made to increase their numbers and accelerate deployment and I encourage your Subcommittee and the HASC to authorize greater flexibility and more risk tolerance for unmanned programs.

I am sure in the coming months there will be a renewed debate regarding the U.S. Navy aircraft carrier force that will center on vulnerability and cost. Recent events regarding the COVID outbreak in USS THEODORE ROOSEVELT will flavor those discussions. In contested environments with regional airbases within range of adversary missiles no other military service of any nation has the ability to move as much raw military power into and out of areas of conflict as quickly as the U.S. Navy's aircraft carrier force. The power, versatility, range and power of these moveable, sovereign U.S. airbases evolve as new aircraft, manned and unmanned, are brought into service. Returning to my earlier assumption regarding intolerance for forces ashore, the aircraft carrier remains a unique instrument of presence, response, and power.

Creating the capability and capacity I've addressed requires a vibrant industrial base and a skilled and experienced workforce. That base is inseparable from any discussion of force structure because it is what makes it possible. Our maritime industrial base from craftsman to seafarer is extremely fragile. As a nation we underappreciate the skill, competence, and dedication of those who envision, design, and build the ships and aircraft our sons and daughters take in harm's way. The maritime industrial base's fragility will become more acute if predictable funding is not provided and sustained. Enhancing the base, making it more attractive for young people to pursue, and returning manufacturing of key maritime components to the U.S. will only be possible if it is economically worthwhile and if those who chose to support our maritime needs and interests see a predictable and fulfilling future. That future and a vibrant maritime industrial base requires stability that is best led by this Subcommittee with its exemplary record of bipartisanship.

I understand fully the hard choices to be made as you deliberate on a range of national security matters. I am also aware of the intense pressures on defense and non-defense budgets. The impact of our current COVID circumstances exacerbate those pressures to a degree not seen in decades, indeed lifetimes. The hard choices you will make regarding naval force structure have become much harder but our nation's reliance on credible naval power remains.

Thank you for the opportunity to appear before your Subcommittee and I look forward to your questions.

Admiral Gary Roughead
Retired 11/1/2011

Adm. Roughead is a 1973 graduate of the United States Naval Academy.

Among his six operational commands, Admiral Roughead was the first officer to command both classes of Aegis ships, having commanded USS Barry (DDG 52) and USS Port Royal (CG 73).

As a flag officer, he commanded Cruiser Destroyer Group 2, the George Washington Battle Group; and U.S. 2nd Fleet/NATO Striking Fleet Atlantic and Naval Forces North Fleet East.

Ashore, he served as Commandant, United States Naval Academy, the Department of the Navy's Chief of Legislative Affairs, and as Deputy Commander, U.S. Pacific Command.

At the time he was on active duty, Roughead was one of only two officers to have commanded the fleets in the Pacific and Atlantic, commanding the U.S. Pacific Fleet and Joint Task Force 519, as well as U.S. Fleet Forces Command, where he was responsible for ensuring Navy forces were trained, ready, equipped and prepared to operate around the world, where and when needed.

Roughead's awards include the Defense Distinguished Service Medal, Navy Distinguished Service Medal, Defense Superior Service Medal, Legion of Merit, Meritorious Service Medal, Navy and Marine Corps Commendation Medal, Navy and Marine Corps Achievement Medal, and various unit and service awards.

Roughead became the 29th Chief of Naval Operations Sep. 29, 2007.

Updated: 12 July 2013

**DISCLOSURE FORM FOR WITNESSES
COMMITTEE ON ARMED SERVICES
U.S. HOUSE OF REPRESENTATIVES**

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(5), of the Rules of the U.S. House of Representatives for the 116th 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), or contracts or payments originating with a foreign government, received during the current and two previous calendar years either by the witness or by an entity represented by the witness and related to the subject matter of the hearing. As a matter of committee policy, the House Committee on Armed Services further requires nongovernmental witnesses to disclose whether they are a fiduciary (including, but not limited to, directors, officers, advisors, or resident agents) of any organization or entity that may have an interest in the subject matter of the hearing. Committee policy also requires nongovernmental witnesses to disclose the amount and source of any contracts or grants (including subcontracts and subgrants), or payments originating with any organization or entity, whether public or private, that has a material interest in the subject matter of the hearing, received during the current and two previous calendar years either by the witness or by an entity represented by the witness.

Please note that a copy of these statements, with appropriate redactions to protect the witness's personal privacy (including home address and phone number), will be made publicly available in electronic form not later than one day after the witness's appearance before the committee. Witnesses may list additional grants, contracts, or payments on additional sheets, if necessary. Please complete this form electronically.

Hearing Date: Thursday, June 4, 2020

Hearing Subject:

Future Force Structure Requirements for the United States Navy

Witness name: Gary Roughead

Position/Title: Admiral, U.S. Navy (Retired)

Capacity in which appearing: (check one)

☒ Individual ☐ Representative

If appearing in a representative capacity, name of the organization or entity represented:

Federal Contract or Grant Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) or grants (including subgrants) with the federal government, received during the current and two previous calendar years and related to the subject matter of the hearing, please provide the following information:

2019

Federal grant/ contract	Federal agency	Dollar value	Subject of contract or grant

2018

Federal grant/ contract	Federal agency	Dollar value	Subject of contract or grant

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Federal grant/ contract	Federal agency	Dollar value	Subject of contract or grant

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2019

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Foreign contract/ payment	Foreign government	Dollar value	Subject of contract or payment

2017

Foreign contract/ payment	Foreign government	Dollar value	Subject of contract or payment

Fiduciary Relationships: If you are a fiduciary of any organization or entity that may have an interest in the subject matter of the hearing, please provide the following information:

Organization or entity	Brief description of the fiduciary relationship
Northrop Grumman Corp	Director
Maersk Line, Ltd	Director
Marinette Marine Corp	Director
Johns Hopkins University	Trustee
JHU Applied Physics Lab	Manager

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2019

Contract/grant/ payment	Entity	Dollar value	Subject of contract, grant or payment

2018

Contract/grant/ payment	Entity	Dollar value	Subject of contract, grant or payment

2017

Contract/grant/ payment	Entity	Dollar value	Subject of contract, grant or payment

Hudson Institute

Prepared statement by

Bryan Clark

*Senior Fellow
Hudson Institute*

Before the House Armed Services Subcommittee on Seapower and Projection Forces on
“Future Force Structure Requirements for the United States Navy.”

Chairman Courtney, Ranking Member Wittman, and distinguished members of the committee, I am honored to appear today for this discussion of the U.S. Navy’s future force structure. The fleet is at an important crossroads. Nearly 20 years after the drive for transformation led to costly and problematic programs such as the Littoral Combat Ship (LCS), *Gerald R. Ford*-class aircraft carrier, and *Zumwalt*-class destroyer, the Navy is starting new ships in every vessel category. Smart decisions on the design of these ships, and of the fleet as a whole, will be essential to create a force that affordably supports future defense strategy and avoids mistakes of the past.

The Navy is arguably facing a once-in-a-century combination of challenges and opportunities as it embarks on a new family of ships. Like their predecessors during the years following the First World War, Navy leaders are reconsidering the relevance and survivability of the fleet’s premier capital ship; emerging technologies are enabling new platforms and tactics that could disrupt today’s fleet’s design; rising peer competitors are threatening U.S. allies and the international order; and budget constraints prevent the Navy countering revisionist powers by simply growing the fleet with better versions of today’s ships and aircraft.

And like the interwar period, the Navy will need a new fleet design to sustainably address its challenges and exploit its opportunities. Unfortunately, the Navy’s current plans fail to deliver on these goals. By continuing to emphasize large multimission combatant ships, the force structure reflected in the PB 2020 Shipbuilding Plan and PB 2021 budget includes too few ships to distribute the fleet or create sufficient complexity to slow or confuse an enemy’s attacks. Moreover, the fleet’s weighting toward large manned platforms creates unsustainable operations and support costs the Navy is even now struggling to pay.¹

The Navy needs a theory of victory

Navy force structure requirements rest on an implicit or explicit concept for how the Navy will deter aggressors or win if deterrence is unsuccessful. The last two decades of Navy assessments assembled requirements from the bottom up, building campaign plans to fight in canonical scenarios and determining the forces needed to succeed using modeling and simulation. These

¹ David Larter, “Despite Record Budgets the U.S. Navy is Short Hundreds of Millions for maintenance,” *Defense News*, accessed at <https://www.defensenews.com/naval/2019/08/19/despite-record-budgets-the-us-navy-is-short-hundreds-of-millions-for-maintenance/>.

requirements, combined with the day-to-day naval presence needed by Combatant Commanders, resulted in a force structure requirement.² The bottom-up method of force structure planning, however, tends to rely on attrition-centric tactics that defeat an enemy in detail, rather than reflecting an overarching operational concept for overcoming specific opponents.

The home field advantage enjoyed by potential adversaries like China, Russia, North Korea, or Iran has allowed each to establish a robust network of sensors and weapons designed to raise the bar for U.S. intervention in their region. Under the protective umbrella of these systems, these rivals pursue a wide range of military and paramilitary actions below the threshold of violence that would provide a pretext for large-scale U.S. or allied retaliation. As a result, U.S. commanders are forced to accept significant risk with a proportional response or deploy large, well-defended force packages that could be portrayed as unduly provocative. And if confrontation turns to conflict, adversaries' sensor and weapons networks could rapidly overwhelm the defenses of U.S. and allied naval forces.

Overcoming these threats in the face of technology proliferation and fiscal constraints will require more than simple attrition. New approaches described in DoD's Joint Warfighting Concept and the Navy's concepts for Distributed Maritime Operations and Littoral Operations in a Contested Environment suggest the Navy's theory of victory should instead rest on establishing a decision-making advantage over adversaries.³ This approach, drawn from maneuver warfare, would combine defensive operations to foreclose enemy attack options with a diversity of offensive capabilities and complex force presentations to degrade adversary decisionmaking.⁴

Decision-centric warfare requires new operational concepts

The Navy's fleet design should prioritize a new set of characteristics to implement decision-centric warfare in the emerging strategic and fiscal environment:⁵

- Defensive capacity in each platform or force package to defeat a prompt adversary attack and enable U.S. forces to effectively fire their offensive weapons;
- Offensive weapons capacity distributed across numerous platforms and able to sustain strike and counter-maritime operations;
- Force package diversity at various scales to enable proportional responses to aggression;

² Arthur Barber, III, "Redesign the Fleet," *U.S. Naval Institute Proceedings*, (Annapolis, MD: U.S. Naval Institute, 2019), accessed at <https://www.usni.org/magazines/proceedings/2019/january/redesign-fleet>.

³ Philip Davidson, "Transforming the Joint Force: A Warfighting Concept for Great Power Competition," *PACOM.mil*, March 3, 2020, accessed at <https://www.pacom.mil/Media/Speeches-Testimony/Article/210111S/transforming-the-joint-force-a-warfighting-concept-for-great-power-competition/>.

⁴ For more detail on decision-centric warfare, see Bryan Clark, Dan Patt, and Harrison Schramm, *Mosaic Warfare: Exploiting Artificial Intelligence and Autonomous Systems to Implement Decision-Centric Warfare*, (Washington, DC: CSBA, 2020), accessed at: <https://csbaonline.org/research/publications/mosaic-warfare-exploiting-artificial-intelligence-and-autonomous-systems-to-implement-decision-centric-operations>.

⁵ The rationale and application of these metrics is detailed in Bryan Clark and Timothy A. Walton, *Taking Back the Seas: Transforming the U.S. Surface Fleet for Decision-Centric Warfare*, (Washington, DC: CSBA, 2019), accessed at <https://csbaonline.org/research/publications/taking-back-the-seas-transforming-the-u.s-surface-fleet-for-decision-centric-warfare/publication/1>.

- Complexity of force packages to counter adversary decision-making, based on the number of different ways a force package can deliver a warfighting effect; and
- Sustainable costs for procurement and operations and support.

Improving the Navy's performance in these metrics will require new approaches to important naval missions, as described below. A foundational element of these tactics is the distribution of naval forces as described in concepts for Distributed Maritime Operations and Littoral Operations in Contested Environments.⁶

Air and Missile Defense (AMD): More distributed formations will dilute adversary attack salvos, reducing the number of weapons each ship or force package may face. More disaggregated forces will also lend themselves to air defense tactics that focus on shorter ranges, allowing greater reliance on electronic warfare, directed energy weapons, and smaller surface-to-air interceptors that can be carried in larger numbers. The Navy's current layered air defense approach, including long-range interceptors like the SM-2 and SM-6, will be employed to project larger platforms such as amphibious assault ships and aircraft carriers.

Anti-Submarine Warfare (ASW): Today submarines and surface combatants contribute to ASW but will need to devote more of their effort to strike and air defense in the future fleet. The Navy will therefore need to increase its reliance on unmanned vessels and sensors to conduct ASW sensing, supported by unmanned and manned aircraft to pounce on targets with suppression weapons, rather than large, expensive torpedoes.

Land and Maritime Strike: The limited reach of today's carrier-based tactical aircraft and small number of refueling tankers planned by the Navy will constrain carriers' capacity for offensive operations from ranges where carrier strike group (CSG) defenses can defeat enemy weapons salvos. Although aircraft with standoff missiles can conduct strikes 1000 nm from a carrier without refueling, these weapons are the same price as their surface-launched counterparts and incur the additional cost of the air wing and carrier escorts. Strike operations will therefore increasingly be conducted by surface combatants, complemented by submarines for hypersonic missile attacks or strikes from inside highly-contested areas.

Amphibious Operations: Today's amphibious fleet is designed to support amphibious assaults from short-range, although it has been repurposed for other amphibious operations including disaster response and humanitarian assistance. Large-scale assaults will only grow more challenging in the future, while the need for Marines are increasingly needed to conduct widely-distributed missions ashore as part of the Expeditionary Advance Base Operations (EABO) concept. Despite their relatively small capacity, F-35 detachments or future Marine short-range air defenses can compel opponents to shift tactical aircraft to suppression or escort operations.

⁶ "CNO Visits Navy Warfare Development Command," Navy News Service, April 13, 2017, available at https://www.navy.mil/submit/display.asp?story_id=99893; "Littoral Operations In A Contested Environment," Marine Concepts and Programs, U.S. Marine Corps, available at <https://www.candp.marines.mil/Concepts/Subordinate-Operating-Concepts/Littoral-Operations-in-a-Contested-Environment/>.

Marine anti-ship missile launchers can similarly impact an opponent's maritime freedom of action.

Mining and Mine Clearance: Mining will be an important component of naval maneuver warfare as it inherently imposes dilemmas on an enemy. Mine clearing has been a rising priority for the Navy during the last decade and is a primary mission for the LCS. Although the LCS mine warfare mission package is delayed by performance shortfalls, its emphasis on unmanned systems reflects the future of offensive and defensive mine warfare. The portability and scaling possible with unmanned systems suggest the Navy should decouple mine warfare from the LCS and deploy these packages on a range of vessels to support minelaying and clearing.

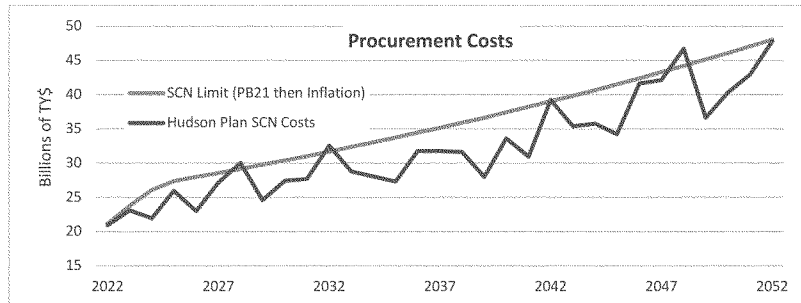
A new fleet design is achievable

The Navy can evolve to improve its distribution, offensive and defensive capacity, complexity, and cost in support of new concepts for maritime maneuver warfare. Hudson Institute developed a plan to implement maritime maneuver warfare that reflects these metrics, these results of which are depicted below for the 2045 timeframe.

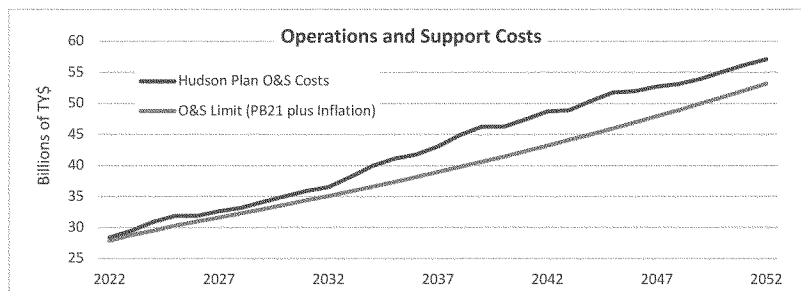
Proposed 2045 Navy Fleet

Nuclear Aircraft Carrier (CVN)	10
Large Surface Combatant - Cruisers (CG) and destroyers (DDG)	77
Small Surface Combatant – Frigates (FFG) and LCS	52
Corvette (DDC)	91
Medium Unmanned Surface Vessel (MUSV)	112
Nuclear Ballistic Missile Submarine (SSBN)	12
Nuclear Attack Submarine (SSN)	61
Nuclear Guided-Missile Submarine (SSGN)	0
Extra-Large Unmanned Undersea Vehicle (XLUUV)	40
Oiler (T-AO/T-AOE)	20
Dry Cargo and Munitions Ship (T-AKE/T-AKM)	19
Future Small Oiler (T-AOL)	20
Amphibious Assault Ship (LHA/LHD)	9
Amphibious Landing Dock (LSD) / Amphibious Transport Dock (LPD)	24
Future Small Amphibious Vessel (LAW)	27
Command and Support Ships	51
Manned vessels	473
Manned vessels and unmanned vessels (XLUUV and MUSV)	625

This architecture is estimated to be achievable within FY 2021's ship construction budget, adjusted for inflation, and the capacity of the shipbuilding industrial base, as shown below.



Notably, the architecture is projected to cost between 3 and 10 percent more to operate and support than is budgeted in FY2021, adjusted for inflation. The challenge of managing sustainment costs suggests the Navy should more explicitly incorporate operations and support expenses into its fleet design analysis.



Details of the shipbuilding plan, posture, and readiness processes for the fleet architecture described above are beyond the scope of this testimony, but major changes for each ship type are addressed below. For each of the force structure evolutions described, the Hudson fleet architecture assumes new platforms are fielded initially in prototype, with serial production starting after 2-3 years of evaluation and concept development

Aircraft carriers: The architecture continues to build *Ford*-class CVNs, but adjusts their construction frequency to 6 years, allowing the number of carriers to gradually lower to 10. This reduces the fleet's overall operations and support costs and reflects the changing role of carriers from the primary strike and air defense platform to one that is complemented by surface combatants in these missions.

Surface combatants: The architecture rebalances U.S. surface forces away from large combatants and toward smaller ships by slightly reducing procurement of new DDGs, retiring aging CGs and DDGs at their end of service life, and building new FFGs. Because the FFG only provides 1/3 of

a DDG's weapons capacity at about 2/3 the cost, the architecture does not substitute FFGs for DDGs and instead assumes they will be used as the lead ship in ASW and escort SAGs. To further distribute the fleet, increase the complexity of force packages, and enable sustainable fires, the architecture also constructs corvettes instead of the Navy's planned large unmanned surface vessel (LUSV). As part of strike-oriented SAGs, corvettes would carry offensive missiles and rotate through remote reload stations to sustain fires. Because they would be manned, however, corvettes could also conduct maritime security and other missions LUSVs would be ill-suited to perform.

Submarines: The architecture continues production of *Virginia*-class SSNs with the Virginia Payload Module. As adversary ASW capabilities improve the additional payload capacity would likely evolve from carrying missiles to deploy undersea vehicles and systems. Due to industrial base limits during construction of the *Columbia*-class SSBN, the SSN fleet does not reach 60 ships until the 2040s. The architecture follows the Navy's plan to build a fleet of 12 *Columbia*-class SSBNs.

Amphibious Vessels: The architecture rebalances today's amphibious fleet to better support the Marine Corps' emerging force design and EABO concept, although both are still under refinement. To provide longer range fires to widely-distributed Marines and support air operations from austere forward bases, LHAs and LHDs are employed primarily as Marine F-35B carriers. The architecture envisions LSDs and LPDs supporting establishment of expeditionary bases and larger amphibious operations such as noncombatant evacuation, humanitarian assistance, and disaster response. To meet the LSD/LPD requirement and sustain the amphibious ship industrial base, the architecture maintains LPD Flt II in production by procuring one every other year until a follow-on ship is developed in the 2040s. For movement of troops and equipment to and between distributed Marine bases, the architecture builds a new light amphibious warship.

Logistics and Support Vessels: The architecture expands logistics forces with new classes of vessels to enable more distributed sustainment concepts and increase the resilience of deployed naval formations. The proposed logistics fleet includes small oilers, large consolidated logistics tankers, dedicated weapon reload ships, additional medical and towing and salvage vessels, and more tenders to support the larger surface fleet and increasing numbers of deployed unmanned vessels. The fleet also provides sufficient funding for a new, flexible approach to strategic sealift.

A closing window of opportunity

Navy leaders need to establish force structure requirements and plans that address the U.S. military's operational challenges by exploiting conceptual and technological opportunities within the Navy's likely procurement and sustainment cost constraints. The past two decades of Navy force designs failed to meet these objectives because of their overly optimistic assumptions regarding budgets and research and development. Going forward the Navy will need to emphasize affordability and executability in its plans to gain the confidence of industry, the Congress, and allies abroad.

There is still time for the Navy to change course and develop a force better suited than today's fleet to long-term competitions with great and regional powers. Although the long-term changes proposed above to Navy fleet architecture would be significant, by acting now Navy leaders could begin an evolutionary approach that brings on new platforms after reasonable concept and design development while continuing production of proven ships to sustain the industrial base and recapitalize some of today's multimission vessels as they retire.

But the window for the Navy to start this evolution is closing. America's adversaries may intensify their efforts against U.S. allies if they perceive U.S. leaders are focused on domestic concerns and unwilling to begin new operations abroad. Fiscal constraints will also begin to foreclose options for the Navy to adopt a new fleet design. As shown above, operations and support costs for the fleet grow faster than inflation even with the proposed Hudson fleet architecture. Every year the Navy delays rebalancing the force to smaller, less-sophisticated, and less manpower-intensive platforms results in higher sustainment costs that will crowd out research and development or procurement of next generation ships, aircraft, and mission systems.

Like their predecessors between the World Wars, today's Navy leaders have an opportunity to establish an enduring advantage against U.S. competitors. Without significant change, however, the fleet could enter a spiral of rising costs, shrinking numbers, and technological irrelevance. The Congress should act to ensure this does not happen.

Bryan Clark
Senior Fellow

Areas of Expertise

- Defense Strategy
- National Security
- International Relations
- Defense Spending
- Military Procurement and Technology

Bryan Clark is a senior fellow at Hudson Institute. He is an expert in naval operations, electronic warfare, autonomous systems, military competitions, and wargaming.

From 2013 to 2019, Mr. Clark was a senior fellow at the Center for Strategic and Budgetary Assessments (CSBA) where he led studies for the DoD Office of Net Assessment, Office of the Secretary of Defense, and Defense Advanced Research Products Agency on new technologies and the future of warfare.

Prior to joining CSBA in 2013, Mr. Clark was special assistant to the Chief of Naval Operations and director of his Commander's Action Group, where he led development of Navy strategy and implemented new initiatives in electromagnetic spectrum operations, undersea warfare, expeditionary operations, and personnel and readiness management.

Mr. Clark served in the Navy headquarters staff from 2004 to 2011, leading studies in the Assessment Division and participating in the 2006 and 2010 Quadrennial Defense Reviews. His areas of emphasis were modeling and simulation, strategic planning, and institutional reform and governance. Prior to retiring from the Navy in 2008, Mr. Clark was an enlisted and officer submariner, serving in afloat and ashore submarine operational and training assignments including tours as chief engineer and operations officer at the Navy's nuclear power training unit.

Mr. Clark is the recipient of the Department of the Navy Superior Service Medal and the Legion of Merit. He received his M.S. in national security studies from the National War College and B.S. in chemistry and philosophy from the University of Idaho.

**DISCLOSURE FORM FOR WITNESSES
COMMITTEE ON ARMED SERVICES
U.S. HOUSE OF REPRESENTATIVES**

INSTRUCTION TO WITNESSES: Rule 11, clause 2(g)(5), of the Rules of the U.S. House of Representatives for the 116th 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), or contracts or payments originating with a foreign government, received during the current and two previous calendar years either by the witness or by an entity represented by the witness and related to the subject matter of the hearing. As a matter of committee policy, the House Committee on Armed Services further requires nongovernmental witnesses to disclose whether they are a fiduciary (including, but not limited to, directors, officers, advisors, or resident agents) of any organization or entity that may have an interest in the subject matter of the hearing. Committee policy also requires nongovernmental witnesses to disclose the amount and source of any contracts or grants (including subcontracts and subgrants), or payments originating with any organization or entity, whether public or private, that has a material interest in the subject matter of the hearing, received during the current and two previous calendar years either by the witness or by an entity represented by the witness.

Please note that a copy of these statements, with appropriate redactions to protect the witness's personal privacy (including home address and phone number), will be made publicly available in electronic form not later than one day after the witness's appearance before the committee. Witnesses may list additional grants, contracts, or payments on additional sheets, if necessary. Please complete this form electronically.

Hearing Date: Thursday, June 4, 2020

Hearing Subject:

Future Force Structure Requirements for the United States Navy

Witness name: Bryan Clark

Position/Title: Senior Fellow

Capacity in which appearing: (check one)



Individual



Representative

If appearing in a representative capacity, name of the organization or entity represented:

Hudson Institute

Federal Contract or Grant Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts) or grants (including subgrants) with the federal government, received during the current and two previous calendar years and related to the subject matter of the hearing, please provide the following information:

2019

Federal grant/ contract	Federal agency	Dollar value	Subject of contract or grant

2018

Federal grant/ contract	Federal agency	Dollar value	Subject of contract or grant

2017

Federal grant/ contract	Federal agency	Dollar value	Subject of contract or grant

Foreign Government Contract or Payment Information: If you or the entity you represent before the Committee on Armed Services has contracts (including subcontracts or subgrants) or payments originating from a foreign government, received during the current and two previous calendar years and related to the subject matter of the hearing, please provide the following information:

2019

Foreign contract/ payment	Foreign government	Dollar value	Subject of contract or payment

2018

Foreign contract/ payment	Foreign government	Dollar value	Subject of contract or payment

2017

Foreign contract/ payment	Foreign government	Dollar value	Subject of contract or payment

Fiduciary Relationships: If you are a fiduciary of any organization or entity that may have an interest in the subject matter of the hearing, please provide the following information:

Organization or entity	Brief description of the fiduciary relationship

Organization or Entity Contract, Grant or Payment Information: If you or the entity you represent before the Committee on Armed Services has contracts or grants (including subcontracts or subgrants) or payments originating from an organization or entity, whether public or private, that has a material interest in the subject matter of the hearing, received during the current and two previous calendar years, please provide the following information:

2019

Contract/grant/ payment	Entity	Dollar value	Subject of contract, grant or payment
Payment	Lockheed Martin Corporation	\$85,000	General Support
Payment	Huntington Ingalls Industries	\$25,000	General Support
Payment	Raytheon Company	\$50,000	General Support

2018

Contract/grant/ payment	Entity	Dollar value	Subject of contract, grant or payment
Payment	Lockheed Martin Corporation	\$60,000	General Support
Payment	Huntington Ingalls Industries	\$25,000	General Support
Payment	Lockheed Martin Corporation	\$30,000	Japan Industrial Security Research

2017

Contract/grant/ payment	Entity	Dollar value	Subject of contract, grant or payment
Payment	Lockheed Martin Corporation	\$60,000	General Support



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TESTIMONY

Statement of

Ronald O'Rourke
Specialist in Naval Affairs

Before

Committee on Armed Services
Subcommittee on Seapower and Projection Forces
U.S. House of Representatives

Hearing on

“Future Force Structure Requirements for the United States Navy”

June 4, 2020

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Introduction

Chairman Courtney, Ranking Member Wittman, distinguished members of the subcommittee, thank you for the opportunity to appear before you today to testify on future force structure requirements for the U.S. Navy. This is a topic I have worked on for Congress throughout my 36 years as a CRS specialist in naval affairs. (My biography is shown in **Appendix A.**)

As requested, this statement addresses the FY2021 Navy 30-year shipbuilding plan and Integrated Naval Force Structure Assessment (INFSA) in connection with Congress's assessment and markup of the Navy's FY2021 budget submission.

This statement draws from some of my CRS reports for Congress, particularly my report on Navy force structure and shipbuilding plans.¹

FY2021 Navy 30-Year Shipbuilding Plan

Statutory Requirement to Submit a 30-Year Plan Each Year

10 U.S.C. §231 states that the Secretary of Defense “shall include” a 30-year Navy shipbuilding plan “with the defense budget materials for a fiscal year.” The requirement for DOD to submit an annual 30-year Navy shipbuilding plan has been in place for most years since the time of DOD's FY2001 budget submission.²

Role of 30-Year Plan in Supporting Congress's Assessment and Markup of Proposed Shipbuilding Budget

The annual 30-year shipbuilding plan is intended to provide Congress with supporting information for assessing and marking up the Navy's proposed shipbuilding program. CRS and CBO testified on the value to Congress of the 30-year shipbuilding plan at a June 1, 2011, hearing before the Oversight and Investigations Subcommittee of the House Armed Services Committee. In its testimony, CRS stated:

The main purpose of the 30-year shipbuilding plan is to support effective congressional oversight of DOD plans for Navy shipbuilding by giving Congress information that is important to performing this oversight function but not available in the five-year data of the Future Years Defense Plan

¹ CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

² The first 30-year shipbuilding plan—the FY2001 30-year plan, which DOD submitted in 2000—was submitted under a one-time-only legislative provision, Section 1013 of the FY2000 National Defense Authorization Act (S. 1059/P.L. 106-65 of October 5, 1999). No provision required DOD to submit a 30-year shipbuilding plan in 2001 or 2002, when Congress considered DOD's proposed FY2002 and FY2003 DOD budgets, respectively. Section 1022 of the FY2003 Bob Stump National Defense Authorization Act (H.R. 4546/P.L. 107-314 of December 2, 2002) created a requirement to submit a 30-year shipbuilding plan each year, in conjunction with each year's defense budget. This provision was codified at 10 U.S.C. §231. The first 30-year plan submitted under this provision was the one submitted in 2003, in conjunction with DOD's proposed FY2004 budget. Section 1023 of the FY2011 Ike Skelton National Defense Authorization Act (H.R. 6523/P.L. 111-383 of January 7, 2011) amended 10 U.S.C. §231 to require DOD to submit a 30-year shipbuilding plan once every four years, in the same year that DOD was required to submit a Quadrennial Defense Review (QDR). Section 1011 of the FY2012 National Defense Authorization Act (H.R. 1540/P.L. 112-81 of December 31, 2011) amended 10 U.S.C. §231 to reinstate the requirement to submit a 30-year shipbuilding plan each year, in conjunction with each year's defense budget.

(FYDP). The 30-year plan supports effective congressional oversight of DOD plans for Navy shipbuilding in at least five ways:

- The 30-year shipbuilding plan enables Congress to assess whether the Navy intends to procure enough ships to achieve and maintain its stated ship force-level goals....
- The 30-year shipbuilding plan helps Congress determine whether there is a fundamental imbalance between Navy program goals and projected Navy resources...
- The 30-year shipbuilding plan helps Congress to assess whether DOD ship procurement plans are likely to be affordable within future defense budgets....
- Supporting information provided in conjunction with the 30-year shipbuilding plan enables Congress to assess whether Navy ship procurement planning is reasonable in terms of assumed service lives for existing ships and estimated procurement costs for new ships....
- The 30-year shipbuilding plan enables Congress to assess the potential industrial-base implications of DOD's intentions for ship procurement.³

In its testimony, CBO similarly stated:

The 30-year ship and aircraft plans benefit Congressional oversight and decisions about funding in at least three different ways:

- Thirty-year plans may reveal cumulative long-term effects of annual appropriation decisions that may not be apparent from a shorter perspective.
- Such plans may also reveal imbalances between long-term objectives for inventories and projected budgetary resources.
- The plans provide information on DoD's assumptions about the service lives of major weapons systems and how those assumptions may affect its inventory goals.⁴

In addition to requiring DOD to submit the 30-year plan with its annual defense budget materials, 10 U.S.C. §231 requires CBO to submit, within 60 days of the submission of the Navy's 30-year shipbuilding plan, a report providing its own independent assessment of the cost and prospective affordability of the plan. CBO's report forms a significant element of the annual discussion of the Navy's shipbuilding program. A delay in the submission of the 30-year shipbuilding plan will likely lead to a delay in the submission of CBO's report.

History of Past Submissions

Since DOD's FY2001 budget submission, there have been three years when DOD was statutorily required to submit a 30-year shipbuilding plan but did not do so. Two of those occasions—relating to DOD's budget submissions for FY2010 and FY2018—occurred during the first years of the Obama and Trump Administrations, respectively. In those two instances, the absence of a 30-year shipbuilding plan was understood to reflect the need for a new administration to spend its first year reviewing and revising the previous administration's defense plans. The other exception occurred with DOD's FY2006 budget

³ Statement of Ronald O'Rourke, Specialist in Naval Affairs, Congressional Research Service, before the House Armed Services Committee Subcommittee on Oversight and Investigations hearing on the Department of Defense's 30-Year Aviation and Shipbuilding Plans, June 1, 2011, pp. 1-2.

⁴ Congressional Budget Office, Statement of Eric J. Labs, Senior Analyst for Naval Forces and Weapons, [on the] The Value of 30-Year Defense Procurement Plans for Congressional Oversight and Decisionmaking before the Subcommittee on Oversight and Investigations, Committee on Armed Services, U.S. House of Representatives, June 1, 2011, p. 1.

submission, when DOD submitted a brief (four-page) interim document that included few details about projected ship procurements over the 30-year period.⁵

Delay in Submission of FY2021 30-Year Plan

To my knowledge, DOD as of the end of May had not submitted the FY2021 30-year shipbuilding plan, and had not provided in public a specific date by which it intends to submit the plan. If DOD does not submit an FY2021 30-year plan, it would be the first time since DOD's FY2006 budget submission that an administration not in its first year in office was required to submit a 30-year shipbuilding plan but did not do so.

Potential Institutional Issue for Congress

The delay in the submission of the FY2021 30-year shipbuilding plan raises a potential institutional issue for Congress regarding executive branch compliance with statutory requirements that are intended to support Congress's role in conducting oversight of executive branch operations. This potential institutional issue is not the only one that Congress may consider in connection with the Navy's FY2021 budget submission—an additional one is posed by the budget submission's treatment of the procurement dates of the aircraft carrier CVN-81 and the amphibious ships LPD-31 and LHA-9 (see **Appendix B**).

Integrated Naval Force Structure Assessment (INFSA)

Current 355-Ship Goal Based on 2016 FSA

The Navy's current 355-ship force-level goal is the result of a Force Structure Assessment (FSA) conducted by the Navy in 2016. An FSA is an analysis in which the Navy solicits inputs from U.S. regional combatant commanders (COCOMs) regarding the types and amounts of Navy capabilities that CCDRs deem necessary for implementing the Navy's portion of the national military strategy and then translates those CCDR inputs into required numbers of ships, using current and projected Navy ship types. The analysis takes into account Navy capabilities for both warfighting and day-to-day forward-deployed presence.⁶ The Navy conducts a new FSA or an update to the existing FSA every few years, as circumstances require, to determine its force-structure goal.

Although the result of an FSA is often reduced for convenience to a single number (e.g., 355 ships), FSAs take into account a number of factors, including types and capabilities of Navy ships, aircraft, unmanned vehicles, and weapons, as well as ship homeporting arrangements and operational cycles. Thus, although

⁵ The interim document for the FY2006 budget stated: "The Final FY 2006 report [on the 30-year shipbuilding plan] will be submitted in Summer 2005 which will allow the report to incorporate the recommendations of the Executive Steering Committee (ESC) on Long Term Shipbuilding established by the Assistant Secretary of the Navy (RD&A) [Research, Development, and Acquisition] and [the] DCNO [Deputy Chief of Naval Operations] ([for] Warfare Requirements & Programs) (N6/7) and benefit from the mature QDR (Quadrennial Defense Review) process." (*An Interim Report to Congress on Annual Long-Range Plan For The Construction Of Naval Vessels For FY2006*, undated, released ca. March 23, 2005, p. 1.) The interim report presented potential Navy force-level goals of 260 and 325 ships, but, as stated by CBO, "The Navy's [interim] report provides few details about how many ships the service would have to buy each year to implement either the 260- or 325-ship plan—and thus how big a budget it would need for ship construction." (Congressional Budget Office, *Resource Implications of the Navy's Interim Report on Shipbuilding*, April 25, 2005, p. 1.) A final report on the FY2006 30-year plan was not released.

⁶ For further discussion, see U.S. Navy, *Executive Summary, 2016 Navy Force Structure Assessment (FSA)*, December 15, 2016, pp. 1-2.

the number of ships called for by an FSA might appear to be a one-dimensional figure, it actually incorporates multiple aspects of Navy capability and capacity.

2016 FSA to Be Succeeded by INFSA

A new FSA—called the Integrated Naval FSA (INFSA), with the term naval referring to both the Navy and Marine Corps (i.e., the two naval services)—is now underway as the successor to the 2016 FSA.⁷ Department of the Navy (DON) officials have stated that they are referring to the new FSA as an integrated naval FSA to emphasize that it will integrate Marine Corps requirements into the FSA process more fully than have previous FSAs. DON officials state that the INFSA will take into account the Trump Administration's December 2017 National Security Strategy (NSS) document and its January 2018 National Defense Strategy (NDS) document, both of which put an emphasis on renewed great power competition with China and Russia.⁸ It will also take into account updated information on Chinese and Russian naval and other military capabilities and recent developments in new technologies, including those related to unmanned vehicles (UVs).⁹

INFSA Could Substantially Alter Navy's Top-Level Ship Force-Level Goal

Statements from Navy officials in February 2020 suggested that the INFSA could result in a new Navy force-level goal for a fleet of about 390 manned ships plus about 45 unmanned or optionally manned ships, for a total of about 435 manned and unmanned or optionally manned ships.¹⁰ Navy officials have provided few additional details in public about the composition of this 390/435-ship force-level goal.

⁷ A September 27, 2019, press report stated that on September 6, 2019, the Chief of Naval Operations and the Commandant of the Marine Corps signed a memorandum stating that the two services will develop a "comprehensive naval force architecture" to inform the new FSA, and that the new FSA will be developed as an integrated naval (i.e., Navy-Marine Corps) FSA (INFSA). (Mallory Shelbourne, "Navy, Marine Corps Conducting Integrated Force-Structure Assessment," *Inside Defense*, September 27, 2019. See also Otto Kreisher, "New Force Structure Assessment Will Address Needs of 'Great Power Competition,' Two Top Requirements Officers Say," *Seapower*, October 22, 2019, and the section under the subheader "Naval Integrated Force Structure Assessment" in Megan Eckstein, "Navy Marines Wargaming New Gear to Support Emerging Warfare Concepts," *USNI News*, October 23, 2019.)

⁸ For additional discussion of the defense implications of great power competition, see CRS Report R43838, *Renewed Great Power Competition: Implications for Defense—Issues for Congress*, by Ronald O'Rourke.

⁹ See, for example, Marcus Weisgerber, "US Navy Re-Evaluating 355-Ship Goal," *Defense One*, February 1, 2019; Paul McLeary, "Navy Rethinks 355-Ship Fleet: CNO Richardson," *Breaking Defense*, February 1, 2019; Mallory Shelbourne, "CNO: Navy Expects New Force-Structure Assessment 'Later This Year,'" *Inside the Navy*, February 4, 2019.

¹⁰ See, for example, Ben Werner, SECNAV Modly Says Nation Needs Larger, Distributed Fleet of 390 Hulls," *USNI News*, February 28, 2020; Mallory Shelbourne, "Modly Sketches Out Potential Navy Force Structure Changes, Anticipates 390-Ship Fleet," *Inside Defense*, February 28, 2020; Rich Abbott, "Modly Reveals Next Force Structure Assessment Details, Working Toward 390-Ship Fleet," *Defense Daily*, February 28, 2020; Patrick Tucker, "Acting Navy Secretary: We Need More than 355 Ships, and That's Not Even Counting Robot Vessels," *Defense One*, February 28, 2020; Connor O'Brien, "Acting Navy Secretary Hints At Larger Fleet Goal," *Politico Pro*, February 28, 2020.

INFSA Could Implement a Once-in-a-Generation Change in Fleet Architecture

Overview of Proposed Change

Statements from DON officials have further suggested that the INFSA could result in a once-in-a-generation change in the Navy's fleet architecture, meaning the mix of ships that make up the Navy and how those ships are combined into formations to perform various missions. More specifically, statements from DON officials suggest that the INFSA could shift the fleet to a more-distributed architecture that includes a reduced proportion of larger ships, an increased proportion of smaller ships, and a newly created category of large unmanned surface vehicles (USVs) and large unmanned underwater vehicles (UUVs). Such a change in fleet architecture could alter, perhaps substantially, the mix of ships to be procured for the Navy and the distribution of Navy shipbuilding work among the nation's shipyards. For additional information on potential changes to various parts of the Navy's force structure under this new fleet architecture, see **Appendix C**.

Operational Rationale for Proposed Change

To improve their ability to perform various missions in coming years, including a potential mission of countering Chinese forces in a possible conflict in the Western Pacific, the Navy and Marine Corps want to implement a new operational concept called Distributed Maritime Operations (DMO).¹¹ DMO calls for U.S. naval forces to operate at sea in a less concentrated, more distributed manner, so as to complicate an adversary's task of detecting, identifying, tracking, and targeting U.S. naval forces, while still being able to bring lethal force to bear against adversary forces.

To implement DMO, the Navy wants to shift to the more-distributed fleet architecture mentioned above. As discussed further in a separate CRS report,¹² Navy and Marine Corps officials argue that a more distributed fleet architecture

- has become necessary due to China's improving anti-ship capabilities;
- is technically feasible due to improvements in networking and unmanned vehicle technologies;
- will be just as lethal, if not more lethal, than today's fleet architecture; and
- will be no more expensive, and perhaps less expensive in some respects, than today's fleet architecture.

Release of INFSA Postponed Repeatedly

Through much of 2019, Navy officials stated that the INFSA was to be completed by the end of 2019. A September 27, 2019, press report stated that an interim version was to be completed by September 2019, in time to inform programmatic decisions on the FY2022 Program Objective Memorandum (POM), meaning the in-house DOD planning document that will guide the development of DOD's FY2022

¹¹ For additional discussion, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke, and CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke.

¹² See CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

budget submission.¹³ A December 6, 2019, memorandum from then-Acting Secretary of the Navy Thomas Modly stated that he expected the final INFSA to be published no later than January 15, 2020.¹⁴ A January 23, 2020, press report quoted Modly as saying that the January 15 date was an internal Navy deadline, and that the Navy expected the INFSA to be released to outside audiences sometime during the spring of 2020.¹⁵

OSD Reviewing INFSA and Conducting Its Own Assessment of Navy Force Structure

More recently, it has been reported that Secretary of Defense Mark Esper and the Cost Assessment and Program Evaluation (CAPE) office within the Office of the Secretary of Defense (OSD) have been reviewing the INFSA and conducting their own analysis of future Navy force structure requirements, and that the INFSA will not be released until OSD completes its review and analysis.¹⁶ OSD's study of future Navy force-level requirements reportedly recommends a fleet with, among other things, 68 or 69 nuclear-powered attack submarines (SSNs), nine aircraft carriers, 80 to 90 large surface combatants (i.e., cruisers and destroyers), 55 to 70 small surface combatants (i.e., frigates and Littoral Combat Ships [LCSs]), 65 unmanned or lightly manned surface vehicles, and 50 extra-large unmanned underwater vehicles (XLUUVs).¹⁷

Lack of Access to INFSA Could Impact Congress's Assessment and Markup of Navy's Proposed FY2021 Budget Submission

In light of the potential scope of changes to the Navy's top-level force-level goal and fleet architecture that could be reflected in the INFSA, not having access to the INFSA could impact Congress's ability to assess and mark up the Navy's FY2021 budget submission. Without access to the INFSA, Congress could be in a position of assessing and marking up requests for procuring types of ships whose total

¹³ Mallory Shelbourne, "Navy, Marine Corps Conducting Integrated Force-Structure Assessment," *Inside Defense*, September 27, 2019. See also Otto Kreisher, "New Force Structure Assessment Will Address Needs of 'Great Power Competition,' Two Top Requirements Officers Say," *Seapower*, October 22, 2019, and the section under the subheader "Naval Integrated Force Structure Assessment" in Megan Eckstein, "Navy Marines Wargaming New Gear to Support Emerging Warfare Concepts," *USNI News*, October 23, 2019.

¹⁴ Memorandum for distribution from Acting Secretary of the Navy Thomas B. Modly, subject "SecNav Vector 1," dated December 6, 2019. See also David B. Larter, "Acting US Navy Secretary: Deliver Me a 355-Ship Fleet by 2030," *Defense News*, December 9, 2019.

¹⁵ Mallory Shelbourne, "Modly: Navy Expects to Release FSA by Spring," *Inside Defense*, January 23, 2020.

¹⁶ See, for example, Sam LaGrone, "SECDEF Esper Holds Back 30-Year Shipbuilding Outlook, New 355-Ship Plan Ahead of HASC Testimony," *USNI News*, February 25, 2020; Paul McLeary, "Esper To Navy: Rethink Your Shipbuilding Plan," *Breaking Defense*, February 25, 2020; Ben Werner, "SECDEF Esper Blames Failures of Optimized Fleet Response Plan for Delay of New 355-Ship Fleet Outlook," *USNI News*, February 26, 2020; Paul McLeary, "EXCLUSIVE: SecDef Esper Seeks Détente With HASC; New Navy Plan This Summer," *Breaking Defense*, February 28, 2020; Paul McLeary, "SecNav Details Gaps Between Navy & Pentagon Shipbuilding Plans," *Breaking Defense*, March 11, 2020; Megan Eckstein, "Modly: Parallel Fleet Studies Could Reshape Future of Aircraft Carriers," *USNI News*, March 12, 2020; David B. Larter, "Defense Department Study Calls for Cutting 2 of the US Navy's Aircraft Carriers," *Defense News*, April 20, 2020; Jack Detsch, "Trump's Navy Pick Would Have Limited Sway on Ship Goal," *Foreign Policy*, May 7, 2020; Paul McLeary, "Navy Scraps Big Carrier Study, Clears Deck For OSD Effort," *Breaking Defense*, May 12, 2020.

¹⁷ David B. Larter, "Defense Department Study Calls for Cutting 2 of the US Navy's Aircraft Carriers," *Defense News*, April 20, 2020; David B. Larter, "To Compete with China, An Internal Pentagon Study Looks to Pour Money into Robot Submarines," *Defense News*, June 1, 2020. For more on the XLUUV program, see CRS Report R45757, *Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress*, by Ronald O'Rourke.

procurement quantities and place in fleet operations are subject to potentially substantial change from what is reflected in the Navy's 355-ship force-level goal and current fleet architecture.

Some General Observations Regarding Future Force Structure Requirements for the U.S. Navy

General observations that can be made at this point regarding future Navy force structure requirements include the following.

355-Ship Force-Level Goal May Be a "Dead Man Walking"

The 355-ship force-level goal at this point may be a "dead man walking," since it might be succeeded in coming months by a new force-level goal that could change both the top-level numerical figure and the types and numbers of ships that add up to that figure. The prospect of the 355-ship force-level goal being succeeded by a new force-level goal is not surprising, since the Navy conducts a new FSA (or updates the most-recent FSA) every few years.¹⁸ As noted earlier, the last FSA was done in 2016, prior to the release of the December 2017 NSS document and the January 2018 NDS document. The amount of change reflected in the Navy's next force-level goal, however, may be greater than average because it may reflect a once-in-a-generation change in fleet architecture.

The current 355-ship goal was made U.S. policy by Section 1025 of the FY2018 National Defense Authorization Act, or NDAA (H.R. 2810/P.L. 115-91 of December 12, 2017).¹⁹ If the 355-ship goal is succeeded by a new and different force-level goal, Congress may consider whether and how to amend Section 1025 of P.L. 115-91.

Future Navy Force Structure Requirements Could Be Affected by Potential Changes in the U.S. Role in the World

As discussed in a CRS report, some observers perceive that after remaining generally stable for a period of more than 70 years (i.e., since the end of World War II in 1945), the U.S. role in the world under the Trump Administration is undergoing a potentially historic change. A change in the U.S. role in the world could significantly affect U.S. policy in several areas, including defense plans and programs.²⁰

¹⁸ See Table B-1 in CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

¹⁹ Section 1025 of P.L. 115-91 states:

SEC. 1025. Policy of the United States on minimum number of battle force ships.

(a) Policy.—It shall be the policy of the United States to have available, as soon as practicable, not fewer than 355 battle force ships, comprised of the optimal mix of platforms, with funding subject to the availability of appropriations or other funds.

(b) Battle force ships defined.—In this section, the term "battle force ship" has the meaning given the term in Secretary of the Navy Instruction 5030.8C.

The term *battle force ships* in the above provision refers to the ships that count toward the quoted size of the Navy in public policy discussions about the Navy. The battle force ships method for counting the number of ships in the Navy was established in 1981 by agreement between the Secretary of the Navy and the Secretary of Defense, and has been modified somewhat over time, in part by Section 1021 of the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015 (H.R. 3979/P.L. 113-291 of December 19, 2014).

²⁰ See CRS Report R44891, *U.S. Role in the World: Background and Issues for Congress*, by Ronald O'Rourke and Michael Moodie

As discussed in the CRS report, a prominent dimension of the debate over the U.S. role in the world is whether the United States should attempt to continue playing the active internationalist role that it has played for the past 70 years, or instead adopt a more-restrained role that reduces U.S. involvement in world affairs. A number of critics of the U.S. role in the world over the past 70 years have offered multiple variations on the idea of a more-restrained U.S. role. Terms such as *offshore balancing*, *offshore control*, *realism*, *strategy of restraint*, or *retrenchment* have been used to describe some of these variations. The terms *offshore balancing* and *offshore control* refer in general to a policy in which the United States in effect stands off the shore of Eurasia and engages in the security affairs of Eurasia less frequently, less directly, or less expansively than the United States has done in recent decades.

As discussed in the CRS report, debate continues on the relative merits of a more-restrained U.S. role in the world compared to the U.S. role of the past 70 years. While a shift to a more-restrained U.S. role might imply a reduction in overall U.S. defense spending and the total required size and capabilities of the U.S. military, it might not necessarily imply a reduction in the Navy's budget and the required size and capabilities of the Navy, because the United States under a more-restrained role might need to rely as much or more than it does now on its ability to use the world's oceans as a buffer for protection from potential security challenges that might arise in Eurasia. A recent policy brief by an organization that advocates a more-restrained U.S. national security strategy, for example, argues that

Reduced DoD budgets can force debate and prioritization among programs and services—between what contributes to U.S. security and what is peripheral or even counterproductive—that large spending authorizations prevent.

Geography makes the U.S. a natural naval power and trading nation. Distance from other major states means the U.S. is perceived as less threatening—unlike China, which borders other Eurasia powers.

The Navy is the key service for projecting U.S. power globally and defending commerce if necessary while avoiding costly occupations. The Navy should command a larger portion of DoD's reduced budget.²¹

Future Navy Force Structure Requirements Could Be Affected by the International Impacts of the COVID-19 Pandemic

As discussed in another CRS report, some observers argue the COVID-19 pandemic could be a world-changing event with potentially profound and long-lasting implications for the international security environment and the U.S. role in the world. Other observers are more skeptical that the COVID-19 pandemic will have such effects.²²

As discussed in the CRS report, observers who argue the COVID-19 pandemic could be world-changing for the international security environment and the U.S. role in the world have focused on several areas of potential change, including world order, international institutions, and global governance; U.S. global leadership and the U.S. role in the world; China's potential role as a global leader; U.S. relations and great power competition with China and Russia; allied defense budgets and U.S. alliances; the definition of, and budgeting for, U.S. national security; and U.S. defense strategy, defense budgets, and military operations.

The CRS report notes, among other things, that:

²¹ Benjamin H. Friedman, *Restraint: A Post-COVID-19 U.S. National Security Strategy*, Defense Priorities, May 2020, p. 3.

²² CRS Report R46336, *COVID-19: Potential Implications for International Security Environment—Overview of Issues and Further Reading for Congress*, by Ronald O'Rourke, Kathleen J. McNinn, and Michael Moodie.

- Some observers have focused on the question of whether the COVID-19 situation will (or should) lead to a revised definition of U.S. national security, particularly one that is less military-centric and more focused on what are sometimes called human-security-oriented challenges or global issues, such as climate change, that are currently more toward the periphery of U.S. national security policy and plans. Such a change in definition could lead to a changed allocation of funding between the Department of Defense (DOD) and other government agencies that perform national-security-related tasks, a realignment of resources within DOD between combat-oriented programs and other programs (such as those related to DOD's mission of providing defense support of civil authorities), and perhaps a changed allocation of funding among the agencies other than DOD that perform national-security-related tasks.
- Some observers have focused on the question of whether the large federal expenditures being made in response to the domestic U.S. economic effects of the COVID-19 pandemic, and the impact these expenditures will have on the federal budget deficit and federal debt, could lead to greater constraints in coming years on U.S. defense spending levels. As a follow-on matter, these observers are additionally focusing on the question of whether responding to such increased constraints will (or should) lead to revisions in U.S. defense strategy, changes in U.S. defense programs, and a reduction or termination of certain overseas U.S. military operations.
- Some observers have focused on the possibility that the costs that U.S. allies are incurring to support their economies during stay-at-home/lockdown periods will lead to offsetting reductions in their defense expenditures. Some observers argue that the NATO allies in Europe in particular may experience contractions in their defense budgets for this reason. More generally, some observers argue that if the COVID-19 pandemic causes a global recession, allied defense budgets could be further reduced.

Developments such as those above could affect future force structure requirements for the Navy in numerous potential ways. At the same time, enduring fundamentals such as the basic features of world geography and the physics of the world's oceans as an operating medium might act as sources of stability in assessments of future Navy force structure requirements, even in the presence of international impacts from the COVID-19 pandemic.

China's Naval Modernization Effort and Future Navy Force Structure Requirements

As discussed in the CRS report on China's naval modernization effort,²³ China's military modernization effort, including its naval modernization effort, has become the top focus of U.S. defense planning and budgeting. China has been steadily modernizing its navy for more than 25 years, since the early to mid-1990s. As a result of this modernization effort, China's navy has become a formidable military force within China's near-seas region, and it is conducting a growing number of operations in more-distant waters, including the broader waters of the Western Pacific, the Indian Ocean, and waters around Europe. China's navy is viewed as posing a major challenge to the U.S. Navy's ability to achieve and maintain wartime control of blue-water ocean areas in the Western Pacific—the first such challenge the U.S. Navy has faced since the end of the Cold War—and forms a key element of a Chinese challenge to the long-standing status of the United States as the leading military power in the Western Pacific.

²³ CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke. This report was first published in November 2005 and has been updated more than 140 times since then.

As discussed in the report, DOD states that China's navy from 2005 to 2019 experienced a net increase of 119 combat ships, of which about 65% (a net increase of 77 ships out of the net total of 119) resulted from increases in missile-armed fast patrol craft starting in 2009 (a net increase of 35 ships) and corvettes starting in 2014 (42 ships). The net 35-ship increase in missile-armed fast patrol craft was due to the construction between 2004 and 2009 of 60 new *Houbei* (Type 022) fast attack craft and the retirement of 25 older fast attack craft that were replaced by Type 022 craft. The 42-ship increase in corvettes is due to China's *Jingdao* (Type 056) corvette program. Prior to the Type 056 program, China's navy had no corvettes. As shown in the CRS report, the number of Type 056 corvettes, which have estimated full load displacements of about 1,500 tons, has grown from zero in 2013 to 42 in 2019—an average addition of seven Type 056 ships per year.²⁴ The Office of Naval Intelligence (ONI) states that as of February 2020, more than 50 Type 056 corvettes had entered service and another 15 were under construction.²⁵ As shown in the CRS report, DOD states that China also experienced double-digit net gains from 2005 to 2019 in destroyers (net gain of 12 ships), frigates (net gain of 11 ships), and amphibious ships (net gain of 17 ships).²⁶ ONI states that "a significant portion of China's Battle Force consists of the large number of new corvettes and guided-missile frigates...."²⁷

As shown in the CRS report, ONI estimates that between 2020 and 2030, China's Navy will increase in size by an additional net total of 65 battle force ships, consisting of net increases of 33 frigates and corvettes, 22 destroyers, cruisers, and aircraft carriers, and 10 nuclear-powered attack and ballistic missile submarines.²⁸

Uncertainty Regarding Details of More-Distributed Fleet Architecture

As noted earlier, Navy officials have stated that the INFSA resulted in a requirement for a fleet of 390/435 ships, with the 435-ship figure including 45 large unmanned vehicles. Navy officials have also stated that the Navy is envisioning procuring a total of 28 to 30 Light Amphibious Warships (LAWs) between FY2023 and FY2026.²⁹ Other than these two data points, however, the Navy has provided little information in public about the total numbers of ships of various types that would make up the INFSA's new fleet architecture. This lack of information about the details of the more-distributed architecture underscores the challenge that the subcommittee faces in assessing the Navy's proposed FY2021 shipbuilding budget in the absence of access to the INFSA.

Analytical Basis for More-Distributed Fleet Architecture

Although Navy officials have spoken in public about shifting to a more-distributed fleet architecture, it is not clear to what extent the Navy has shared with Congress the details of the analytical studies and at-sea exercises and demonstrations that underpin the Navy's judgment that moving to a more-distributed fleet architecture is the best general course of action, and that the Navy's specific preferred version of such an

²⁴ See Table 1 in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke

²⁵ See the section on the Type 56 program in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke

²⁶ See Table 1 in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke

²⁷ See the section on numbers of ships and comparisons to U.S. Navy in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke

²⁸ See Table 2 in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke.

²⁹ For further discussion, see CRS Report R46374, *Navy Light Amphibious Warship (LAW) Program: Background and Issues for Congress*, by Ronald O'Rourke.

architecture is the best possible version. A lack of access to the details of such studies and at-sea exercises and demonstrations could complicate the subcommittee's task of assessing the merits of the Navy's proposed future force structure and supporting shipbuilding plans.

Affordability of Future Navy Force Structure

Overview

The prospective affordability of the Navy's desired force structure and supporting shipbuilding plans has been a principal topic of oversight for the subcommittee for many years. As noted earlier, CBO's annual report on the cost of the Navy's 30-year shipbuilding plan forms a significant element of the annual discussion of the Navy's shipbuilding program. CBO analyses of past Navy 30-year shipbuilding plans have generally estimated the cost of implementing those plans to be higher than what the Navy estimated.³⁰

Press reporting over the last several months suggests that the Navy recently has been struggling to find a way to achieve a fleet of 355 or more ships—a goal that the Trump Administration has recently underscored³¹—within projected future Navy budgets. Navy officials have stated at hearings on the Navy's FY2021 budget submission that achieving and supporting a 355-ship fleet over the next 10 years would require increasing the Navy's budget by a cumulative total of \$120 billion to \$130 billion over the next ten years, or an average of \$12 billion to \$13 billion per year. This figure, Navy officials have stated, includes not only the cost of procuring new ships, but costs associated with crewing, arming, operating, and maintaining a 355-ship fleet.³² It is not clear, however, whether such an increase in the Navy's budget will be forthcoming.

To help generate funding from within the Navy's own budget that can be devoted to achieving a larger fleet size, then-Acting Secretary of the Navy Thomas Modly in February 2020 announced that the Navy would conduct a "Stem to Stern" review of its spending with the aim of identifying \$40 billion over the next five years (i.e., an average of \$8 billion per year) that can be redirected from lower-priority efforts to the goal of achieving and maintaining a larger fleet.³³ It is not clear at this point how successful this effort will be in generating specific, actionable cost reductions (as opposed to generalized or aspirational cost-saving ideas).

Prior to this—in September and October 2019—Navy officials had stated that if Navy budgets in coming years remain at current levels in real (i.e., inflation-adjusted) terms, the Navy would not be able to properly maintain a fleet of more than 302 to 310 ships. A September 16, 2019, press report quoted then-Under Secretary of the Navy Thomas Modly as stating in a speech on that date: "I will tell you it is going

³⁰ For additional discussion, see CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

³¹ See, for example, Anthony Capaccio, "White House Presses Navy to Stick With Trump's 355-Ship Target," *Bloomberg*, December 20, 2019; Hugh Hewitt, "Senator Tom Cotton On NSA O'Brien's '350 Ships Means 350 Ships' Speech At Reagan Defense Forum," *HughHewitt.com*, December 10, 2019; David B. Lister, "Acting US Navy Secretary: Deliver Me a 355-ship Fleet by 2030," *Defense News*, December 9, 2020.

³² See, for example, Ben Werner, "SECNAV Modly: Navy Needs Additional \$120 Billion To Build 355-Ship Fleet By 2030," *USNI News*, February 27, 2020.

³³ See, for example, Megan Eckstein and Ben Werner, "Acting SECNAV Kicks off Navy 'Night Court' Cost Savings Drive with Aim to Save \$40 Billion," *USNI News*, February 18, 2020; Paul McLeary, "Navy Looks to Slash \$40B To Build Bigger Fleet," *Breaking Defense*, February 18, 2020; Justin Katz, "Modly Announces Navy Program Review Seeking \$40B in Savings," *Inside Defense*, February 19, 2020; Ben Werner, "Navy \$40 Billion Savings Effort Linked to Force Structure Assessment," *USNI News*, February 21, 2020; Sam LaGrone, "Navy Mulling Taking Sailors off Forward Deployed Ships as Part of \$40B Savings Drive," *USNI News*, March 11, 2020.

to be very, very difficult for us to get to that number [355 ships] in any reasonable amount of time.” According to the press report, Modly stated: “If you look at our funding in the [Navy] and straight line that on our current budget projections, we can probably get to about 305 to 308 ships and sustain that over time without a significant increase in our budget.” The press report stated that “the under secretary said the service [i.e., the Navy] would likely need \$20 billion to \$30 billion more annually to achieve a 355-ship fleet ‘quickly, and when I say ‘quickly’ I mean within five to 10 years.”³⁴

An October 27, 2019, press report, reporting on remarks made by then-Under Secretary Modly on October 25, stated

The size of the current fleet, the high cost of new ships and the likely lack of growth in future budgets will make it difficult for the Navy to reach the current goal of a 355-ship battle fleet, the Navy’s number two civilian leader [Modly] said....

Modly went through the top 10 issues that keep him up at night, three of which dealt with the problem of buying and sustaining enough ships to get the size fleet the U.S. Navy will need for the possible future conflicts. The effort to get from the current 290-ship force to the 355 goal faces “a math problem,” he said, because future defense budgets are not likely to grow enough to buy all those ships.³⁵

An October 28, 2019, press report stated

The Navy is unlikely to field a 355-ship fleet in the near- or even mid-term future if funding doesn’t change dramatically, the department’s top leadership said during a pair of appearances last week.

The 355-ship Navy is a nice target; however, ship readiness is more critical for the service as it plans how the fleet will look in the future, Vice Chief of Naval Operations Adm. Robert Burke said Friday [October 25] while speaking with reporters at the Military Reporters and Editors conference.

“Will we get to 355-ships?” Burke said. “I think with today’s fiscal situation, where the Navy’s top line is right now, we can keep around 305 to 310 ships whole, properly manned, properly maintained, properly equipped, and properly ready.”...

“If our top line does not go up, if it remains where it is now and is projected to remain in the future defense plans, that’s about where we can get to and do it right, in terms of man those ships and maintain them and have all the ordnance for them and generate readiness,” Burke said. “We would need an increased top line.”³⁶

In January 2020, Admiral Michael Gilday, the Chief of Naval Operations, stated that fully funding the Navy’s program goals, including the attainment of a 355-ship fleet, would require allocating a larger share of DOD’s budget to the Navy.³⁷

Potential Additional Cost of 390/435-Ship Fleet Compared to 355-Ship Fleet

A Navy of 390/435 ships would have about 10%/23% more ships than a 355-ship Navy. The additional cost to expand the Navy from 355 ships to 390/435 ships, however, could be less than 10%/23%, because

³⁴ Justin Katz, “Modly Acknowledges 355 Ships Won’t Happen in ‘Reasonable’ Amount of Time,” *Inside Defense*, September 16, 2019.

³⁵ Otto Kreisher, “Modly Doubts Future Budgets Will Allow for 355-Ship Fleet,” *Seapower*, October 27, 2019.

³⁶ Ben Werner, “Admiral: Navy Can Afford to Field a 310-Ship Fleet, Not 355,” *USNI News*, October 28, 2019. See also Rich Abott, “Navy Says Current Funding Only Supports 310 Ships,” *Defense Daily*, October 28, 2019; Paul McLeary, “Navy May Scrap Goal of 355 Ships: 310 Is Likely,” *Breaking Defense*, October 25, 2019.

³⁷ See, for example, Marcus Weisgerber, “The US Navy Needs More Money, Its Top Admiral Bluntly Argues,” *Defense One*, January 14, 2020; Sam LaGrone, “CNO Gilday Calls for Budget Increase to Reach 355 Ship Fleet; New Battle Force Count Won’t Include Unmanned Ships,” *USNI News*, January 14, 2020; John M. Doyle, “CNO Wants Larger Slice of Defense Budget to Modernize, Meet China Threat,” *Seapower*, January 15, 2020; Rich Abott, “CNO: Ship Count Will Not Include Unmanned; Bigger Topline Needed For Fleet Goal,” *Defense Daily*, January 15, 2020.

the 390/435-ship fleet could have a larger proportion of ships that are smaller and individually less expensive in terms of their procurement costs and operation and support (O&S) costs. The above-mentioned envisioned force of 28 to 30 LAWs would be a case in point, since these ships are to be much smaller and individually much less expensive than the Navy's current amphibious ships. For the 435-ship figure, the 45 large unmanned vehicles would be another case in point.

O&S Costs

Navy officials are concerned that the growing O&S costs of the fleet could in coming years crowd out funding for other Navy program needs, including shipbuilding, and thereby make it harder for the Navy to achieve and maintain a larger fleet in coming years. The Navy highlighted this issue in its FY2020 30-year shipbuilding plan.³⁸

Although Navy officials are concerned about the fleet's rising O&S costs, Navy officials have announced few specific initiatives for making investments that could reduce the fleet's O&S costs over time. One potential option in this regard would be to study options for reducing the annual O&S costs of the Navy's DDG-51 destroyers. The first DDG-51 was procured in FY1985, more than 60 are currently in service, and under the Navy's FY2021 budget submission, a total of 95 are to be procured by about FY2027, which would make the DDG-51s numerically the largest class of ship in the Navy (and one of the largest classes the Navy has procured since World War II). Potential oversight questions for the subcommittee include: To what degree could the annual O&S costs of DDG-51s be reduced by making investments in fuel-saving technologies, components requiring less life-cycle maintenance, or automation technologies for safely reducing crew size without placing increasing burdens on individual sailors? What would be the return on investment (ROI) of such investments, and how might the ROI calculation change depending on how long DDG-51s are kept in service?

Forward-Deployed Presence as a Force-Sizing Factor

Navy force-structure requirements are established through an examination not only of requirements for warfighting, but also of requirements for maintaining day-to-day forward-deployed presence of Navy ships. Forward-deployed presence traditionally has been maintained for purposes such reassuring allies and partners, engaging and exercising with allied and partner-country forces, and deterring potential aggressors, all of which contribute to what is sometimes referred to as shaping of the regional security environment. Forward-deployed presence also enables the Navy to become familiar with local operating conditions, and to conduct intelligence, surveillance, and reconnaissance operations, rapid crisis-response and crisis-containment operations, and timely initial combat operations in larger contingencies.

Requirements for maintaining day-to-day forward deployments of Navy ships are a significant factor in Navy force structure calculations—for some categories of ships, the number required to maintain policymaker-desired levels of day-to-day forward deployments is higher than the number required for warfighting purposes.

The number of ships of a certain kind needed to maintain a given number of those ships forward deployed on a day-to-day basis in overseas operating areas is influenced by homeporting arrangements and ship operational cycles. Measures such as forward homeporting, multiple crewing, and long-duration deployments with crew rotation can substantially reduce the number of ships needed to maintain forward

³⁸ U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, pp. 19-20. See also Paul McLeary, "Navy Wary of Growing Costs While It Ramps Up Ops," *Breaking Defense*, May 15, 2019.

deployments in an overseas operating area, but entail certain costs and risks that can limit their potential for being used. Past CRS and CBO reports have explored these issues.³⁹

Although discussion of employing additional forward homeporting often focuses on potential homeporting locations in the Indo-Pacific region, the option can also be applied in the European theater so as to release of a larger fraction of the U.S. Navy for use in supporting forward presence in the Indo-Pacific. Although it is not commonly remembered today, the Navy's substantial overseas homeporting arrangement in Japan—which includes a carrier strike group, an Amphibious Ready Group (ARG), and mine warship ships—is the result of a Navy initiative in the early 1970s to establish forward homeporting arrangements for Navy ships in both Japan and in Greece (at the port of Piraeus, which is near Athens). The Navy was in the midst of implementing the Greece homeporting initiative—surface combatants for the intended Navy carrier strike group were steaming there—when a 1973 military coup in Greece led to a U.S. decision to cancel the plan. (The homeporting of a carrier strike group in Japan went forward and has been in place since the early 1970s.) If not for the Greek military coup, the homeporting of a Navy carrier strike group in Greece might be as familiar to us today as is the homeporting of a carrier strike group and other Navy ships in Japan.

Potential options for homeporting additional Navy ships in the European theater today would not be limited to Greece—additional potential locations include ports in Italy (where the Navy's 6th Fleet flagship is currently homeported), France, and Spain (where four DDG-51s and an Expeditionary Fast Transport [EPF] ship are currently homeported). Some observers over the years have additionally suggested the port of Haifa, Israel, as a potential U.S. Navy homeporting location. Homeporting additional Navy ships in the European theater could have significant mathematical effects in terms of releasing other Navy ships for duty in the Indo-Pacific region. Navy officials reportedly are interested in the option of homeporting two additional DDG-51s in Spain, which would increase to six the number of DDG-51s homeported there.⁴⁰

Changing Navy Capabilities in the Shorter Term

Given the long construction times of Navy ships, the relatively low annual rates at which new Navy ships are procured and built, and the long expected service lives of Navy ships (which generally range from 25 years to 50 years), making substantial changes in Navy ship force structure is usually viewed as a long-term proposition. Short of carrying out wholesale retirements of existing Navy ships, substantially altering the Navy's force structure can require many years. Using today's expected service lives for Navy ships, two-thirds or more of the Navy's ships of 2030, and one-third or more of the Navy's ships of 2040, are already in operation or under construction.

Some observers who track China's military modernization effort, including its naval modernization effort, are particularly concerned about the time between now and 2030, a period that some of them refer to as the decade of concern.⁴¹ Given the limited amount of change in Navy force structure that might be

³⁹ See archived CRS Report 91-516 F, *Aircraft Carrier Force Levels and Deployment Patterns: Issues and Options*, by Ronald O'Rourke; archived CRS Report 92-803 F, *Naval Forward Deployments and the Size of the Navy*, by Ronald O'Rourke; archived CRS Report RS21338, *Navy Ship Deployments: New Approaches—Background and Issues for Congress*, by Ronald O'Rourke; archived CRS Report R44635, *Navy Force Structure: A Bigger Fleet? Background and Issues for Congress*, by Ronald O'Rourke; Congressional Budget Office, *Options for the Navy's Future Fleet*, May 2006, 85 pp.; Congressional Budget Office, *Crew Rotation in the Navy: The Long-Term Effect on Forward Presence*, October 2007, 18 pp.; Congressional Budget Office, *Preserving the Navy's Forward Presence With a Smaller Fleet*, March 2015, 29 pp.

⁴⁰ See, for example, David B. Larter and Sebastian Sprenger, "Push to Base Six US Navy Destroyers in Spain Could Be Gaining Steam," *Defense News*, March 3, 2020.

⁴¹ See, for example, Jim Fanell, "Now Hear This—The Clock is Ticking in China: The Decade of Concern Has Begun," *U.S. Naval Institute Proceedings*, October 2017; James E. Fanell and Kerry K. Gershaneck, "The Looming 'Short, Sharp War' in the

possible to implement over the next ten years through changes in shipbuilding programs, efforts to address concerns about the Navy's ability to counter China's improving maritime military capabilities over the next 10 years might additionally focus on other types of efforts that can achieve results within a few years, including:

- Improving the readiness of existing ships by bolstering funding for Navy ship overall and repair work, more fully manning Navy ships, and improving the training of shipboard personnel;
- Procuring additional aircraft and missiles and deploying them on existing ships; and
- Upgrading radars and other combat system equipment on existing ships.

Attack Submarines in the Navy's Future Force Structure

Superiority in undersea warfare is considered a crown jewel among U.S. military capabilities, and SSNs are viewed as highly effective platforms for countering China's improving maritime anti-access/area-denial (A2/AD) capabilities. Navy officials have provided no indication that the INFSA will reduce the Navy's current 66-boat force-level goal for SSNs. As noted earlier, OSD's study of Navy force-level requirements reportedly recommends increasing the SSN force-level goal by two or three boats, to a total of 68 or 69 boats.

As discussed in the CRS report on the Virginia-class attack submarine program,⁴² the Navy's force of SSNs is projected to experience a valley or trough from the mid-2020s through the early 2030s, reaching a minimum of 42 boats (i.e., 24 boats, or about 36%, less than the 66-boat force-level goal) in FY2027-FY2028. This projected valley is a consequence of having procured a relatively small number of SSNs during the 1990s, in the early years of the post-Cold War era. Some observers are concerned that this projected valley in SSN force levels could lead to a period of heightened operational strain for the SSN force, and perhaps a period of weakened conventional deterrence against potential adversaries such as China.

The projected SSN valley was first identified by CRS in 1995, in testimony to the House Armed Services Committee, and has been discussed in CRS reports and testimony every year since then. As one measure for mitigating this valley, the Navy is proposing to refuel and extend the service lives of five to seven Los Angeles (SSN-688) class submarines.

Aircraft Carriers in the Navy's Future Force Structure

Aircraft carriers are frequently at the center of discussions of future Navy force structure, including discussions about whether and how to shift the Navy to move toward a more-distributed fleet architecture. Much of the discussion focuses on the procurement cost and prospective wartime survivability and mission utility of carriers.

The operating range of Navy carrier air wings is a key component of the debate over carrier wartime survivability and mission utility, and a number of observers in recent years have proposed making changes to the composition of carrier air wings that are intended to increase their operating range.⁴³

East China Sea over the Senkakus," Project 2049, March 30, 2018, 32 pp.; Gordon G. Chang, "Top General Fears War With China and Russia at the Same Time," *Daily Beast*, October 31, 2018; James E. Fanell, "China's Global Naval Strategy and Expanding Force Structure," James E. Fanell, *Naval War College Review*, Winter 2019: 10-55.

⁴² CRS Report RL32418, *Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

⁴³ See, for example, Bryan Clark et al., *Regaining the High Ground at Sea: Transforming the U.S. Navy's Carrier Air Wing for Great Power Competition*, Center for Strategic and Budgetary Assessments, 2018, 142 pp.

Proposed changes include adding long-range unmanned combat air vehicles (UCAVs) to the air wing. The Navy's new carrier-based MQ-25 Stingray unmanned aerial vehicle (UAV) is intended to extend the operating range of carrier air wings by increasing the air wing's capability to perform in-flight refueling of its combat aircraft.

Statements from Navy officials reported in the press beginning in February 2019 indicate that the Navy is currently considering moving to a new aircraft carrier/naval aviation force architecture that might supplement today's large-deck nuclear-powered aircraft carriers (CVNs) with smaller and perhaps nonnuclear-powered aircraft carriers.⁴⁴ While the idea of procuring smaller and perhaps nonnuclear-powered aircraft carriers has been debated on and off for many years, discussion of the idea among Navy leaders may be more significant now than at any time since the Carter Administration. As noted earlier, OSD's study of future Navy force-level requirements reportedly recommends a fleet with nine aircraft carriers—two less than the current 11-carrier force, and three less than the 12-carrier force called for in the 355-ship plan.

Surface Combatants in the Navy's Future Force Structure

Volatility of Navy Planning for Surface Combatant Procurement and Force Management

Over the last quarter-century, the Navy has experienced considerable churn or volatility in its surface combatant procurement and force-management planning. Developments during this period include, among other things:

- the creation by the Navy, in conjunction with DARPA, of the arsenal ship program in 1996, followed by the cancellation of the program in 1997;⁴⁵
- the Navy's announcement in November 2001 that it was replacing a program for a planned new destroyer called the DD-21 with a new Future Surface Combatant Program aimed at developing and acquiring a family of three new classes of surface combatants, including a destroyer called DD(X) (later renamed DDG-1000), a cruiser called CG(X), and a smaller combatant called the Littoral Combat Ship (LCS);
- the Navy's decision in July 2008, after years of defending the DDG-1000 program, to truncate the DDG-1000 program and resume procurement of DDG-51s—a complete reversal of the Navy's plans for procuring destroyers;
- the termination in the Navy's FY2011 budget submission of CG(X) program;⁴⁶
- multiple changes to the LCS program, including a truncation of the program in December 2015 from a planned procurement total of 52 ships to a smaller number, to be followed by the procurement of new frigates (FFs);
- the subsequent evolution of the FF program into a program for procuring more-capable guided missile frigates (FFGs);

⁴⁴ For additional discussion, see **Appendix C** of this statement and also and CRS Report RS20643, *Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues for Congress*, by Ronald O'Rourke, and CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

⁴⁵ See archived CRS report 97-1004 F, *Navy/DARPA Maritime Fire Support Demonstrator (Arsenal Ship) Program: Issues Arising From Its Termination*, by Ronald O'Rourke. For additional background information on the arsenal ship program, see archived CRS Report 97-4556 F, *Navy/DARPA Arsenal Ship Program: Issues and Options for Congress*, by Ronald O'Rourke.

⁴⁶ See archived CRS report CRS Report RL34179, *Navy CG(X) Cruiser Program: Background for Congress*, by Ronald O'Rourke.

- the initiation of programs for developing and procuring Large USVs (LUSVs) and Medium USVs (MUSVs) that would operate in conjunction with manned Navy surface combatants;
- changes in Navy 30-year shipbuilding plans regarding when procurement of Flight III DDG-51s would end and procurement of a successor design would begin, and whether the successor design would be a Flight IV version of the DDG-51 or a different design; and
- proposed changes in Navy plans for modernizing and extending the service lives of some of its CG-47 cruisers.

Defenders of these developments might argue that they reflect a willingness by the Navy to adapt to a series of significant changes over this time period in strategic, technological, and budgetary circumstances. Skeptics might argue that they reflect an inadequate ability within the Navy to understand its requirements for surface combatants for conducting future missions and to define and justify surface combatant programs for providing capabilities needed for performing those missions.

Options for Augmenting Procurement of Smaller Surface Combatants

The Navy's current plans for procuring smaller surface combatants focus on the FFG(X) frigate program⁴⁷ and the LUSV and MUSV programs.⁴⁸ Compared to larger surface combatants, smaller surface combatants can have shorter construction times and might be suitable for construction in a larger number of U.S. shipyards. For both of these reasons, augmenting plans for procuring smaller surface combatants might offer more potential for changing Navy force structure in the shorter run than augmenting plans for procuring larger surface combatants. Augmenting plans for procuring smaller surface combatants might also be viewed as consistent with moving more quickly to a more-distributed fleet architecture. Potential options for augmenting plans for procuring smaller surface combatants include the following:

- Procuring more than the Navy's currently-planned total of 20 FFG(X)s;
- Building FFG(X)s at two or three shipyards at a combined annual procurement rate of four to six ships per year (rather than building them at a single shipyard at a rate of two ships per year, as the Navy currently plans), particularly if a total of more than 20 FFG(X)s were to be procured;
- Augmenting procurement of FFG(X)s, which will be fairly large (approximately 7,400-ton) frigates, with additional procurement of smaller (roughly 4,000- to 5,500-ton) frigates whose design might be derived from either
 - Huntington Ingalls Industries/Ingalls Shipbuilding's (HII/Ingalls') design for the Coast Guard National Security Cutter (NSC),⁴⁹

⁴⁷ For more on the FFG(X) program, see CRS Report R44972, *Navy Frigate (FFG(X)) Program: Background and Issues for Congress*, by Ronald O'Rourke.

⁴⁸ For more on the LUSV and MUSV programs, see CRS Report R45757, *Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress*, by Ronald O'Rourke.

⁴⁹ HII/Ingalls has previously offered for potential foreign sales at least two designs for a Navy Patrol Frigate derived from the NSC design. See, for example, Calvin Biesecker, "HII Introduces Two NSC Variants For International Patrol Frigate Sales," *Defense Daily*, January 12, 2012; Ingalls Shipbuilding, "Ingalls Shipbuilding Highlighting Patrol Frigate Derivative of National Security Cutter at DIMDEX," Huntington Ingalls Industries, March 26, 2012; Zachary Howitt, "It's Time for a 'Sea-Control Frigate,'" *U.S. Naval Institute Proceedings*, April 2014; Mrityunjay Mazumdar, "Patrol Frigate Concepts from Huntington Ingalls Industries Gain Traction Internationally," *Defense Media Network*, April 24, 2012; "Ingalls Shipbuilding Highlights its Patrol Frigate at Sea-Air-Space 2014," *Navy Recognition*, undated, ca. April 2014; Dave Majumdar, "Huntington Ingalls Has a

- Eastern Shipbuilding's design for the first four Coast Guard Offshore Patrol Cutters (OPCs);
- General Dynamics/Bath Iron Works' design for the original OPC competition,
- Bollinger Shipyards' design for the original OPC competition,
- any new OPC designs that U.S. shipyards may develop for the follow-on competition for OPCs 5 through 15,⁵⁰ or
- a foreign frigate design in this general size range.
- Augmenting procurement of FFG(X)s and perhaps also 4,000- to 5,500-ton frigates with additional procurement of missile-armed corvettes with displacements of perhaps 1,000 tons to 4,000 tons whose design might be developed from scratch or derived from either
 - Fincantieri/Marine Marine's LCS-1 design,
 - Austal USA's LCS-2 design,
 - HII/Ingalls' Sa'ar 5 corvette design (which HII/Ingalls built in the 1990s for Israel's navy), or
 - a foreign corvette design.

In connection with the second option above, it can be noted that the Navy's previous frigates—the Oliver Hazard Perry (FFG-7) class frigates—were built in three U.S. shipyards and procured at annual rates of up to eight ships per year.

Coordination with Coast Guard Shipbuilding

As can be seen from the above list of options, there is currently some potential, at least in theory, for coordinating procurement of smaller Navy surface combatants with procurement of Coast Guard cutters—something that might increase production economies of scale and help optimize the nation's shipbuilding effort at the national level (rather than sub-optimize it at the individual service level).

Such coordination could be viewed as consistent with Navy-Coast Guard policy statements: On at least three occasions in recent years—in 2002, 2006, and 2013—Navy and Coast Guard leaders signed joint National Fleet Policy Statements to provide (as stated in the 2013 edition) “direction and guidance for our Services to achieve commonality and interoperability for 21st century maritime and naval operations.” The document states that “This Policy is particularly important in light of: significantly constrained fiscal resources; the growing costs of acquiring, training, and maintaining technologically advanced forces; and the complexity and lethality of national security threats and challenges confronting the Nation in and from the maritime domain.” It states further that “This Policy enables Navy and Coast Guard forces to effectively and efficiently support each other while identifying specific methods and measurements, avoid redundancies and achieve economies of scale to maximize our Nation's investment of increasingly scarce

New Frigate that Could Give the U.S. Navy Some Impressive Capabilities,” *National Interest*, January 11 2017.

For more on the NSC program, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

⁵⁰ For more on the OPC program, see CRS Report R42567, *Coast Guard Cutter Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

resources.”⁵¹ The 2013 National Fleet Policy Statement was followed in 2015 by a joint Navy-Coast Guard National Fleet Plan for implementing the National Fleet Policy Statement.⁵²

Amphibious Ships in the Navy’s New Force Structure

The Navy’s envisioned program for procuring 28 to 30 new Light Amphibious Warships (LAWs) can be viewed as an initial action to begin shifting the Navy’s amphibious ships to a more-distributed force architecture. A key question is how many LHA/LHD-type large-deck amphibious assault ships and LPD-type amphibious ships would be included under a more-distributed amphibious ship force architecture.

Potential New Ways of Designing and Building Ships

With multiple new kinds of ships—including surface combatants, amphibious ships, logistics ships, and unmanned vehicles—now being designed and procured or potentially available for design and procurement, there might be an opportunity to examine new ways of building ships that might reduce ship design, procurement, and life-cycle O&S costs. U.S. naval architects and engineers are currently focusing on best practices used in South Korea and other Asian shipyards for designing and building warships, because in the view of these naval architects and engineers, “Asian navies are building larger warships that are easier to construct, easier to maintain, and that have greater service [life] allowances for future combat system upgrade. It is also reported that they are also doing this at significantly lower costs than US practice.”⁵³ In addition to adopting such practices, there may be potential for achieving increased production economies of scale in the procurement of U.S. Navy ships by making greater use of:

- cross-class commonalities in hull designs, hull sections, components, materials, and logistics support;
- shared modular production of individual ships, in which certain shipyards produce segments of individual ships that are then transported to a final-assembly yard—an approach that has been used in the Navy’s Virginia-class submarine and DDG-1000 destroyer programs, as well as for some LPD-17 class amphibious ships, and which could permit shipyards to participate in the construction of larger ships that these yards could not fully build by themselves;
- batch building of common hull sections for multiple ships of a given class (as opposed to pure serial building of individual ships);
- bundling shipbuilding programs into packages and competing them periodically, perhaps with Profit Related to Offer (PRO) bidding,⁵⁴ between multi-shipyard teams that might leverage commonality, shared modular production, and batch building; and

⁵¹ *The National Fleet, A Joint United States Navy and United States Coast Guard Policy Statement*, undated but issued in 2013, pp. 1, 3.

⁵² Department of the Navy, Office of the Chief of Naval Operations, and United States Coast Guard, Office of the Commandant, *The National Fleet Plan*, August 2015, 59 pp.

CBO examined the concept of combining Navy and Coast Guard small combatant procurement programs in a 2009 report, using Navy and Coast Guard programs of record of that time. (Congressional Budget Office, *Options for Combining the Navy’s and the Coast Guard’s Small Combatant Programs*, July 2009, 22 pp.) The combinations of Navy and Coast Guard programs suggested above would be somewhat different than those examined by CBO in its 2009 report.

⁵³ Peter E. Jaquith, “Asian vs. U.S. Warship Design, Production Engineering, and Construction Practice,” *Naval Engineers Journal*, December 2019: 55-58. See also Tony Jang, Lois Pena, and Nicholas Abbott, “Realizing Flexible Ships: Lessons from Allies to Improve the U.S. Shipbuilding Affordability, Capacity, and Schedule,” *Naval Engineers Journal*, December 2019: 59-71.

⁵⁴ Under PRO bidding, the bidder that submits the lower bid receives a higher profit margin. The approach is sometimes referred

- multiyear contracting (i.e., multiyear procurement [MYP] and block buy contracting).⁵⁵

Appendix D presents a general summary of lessons learned in Navy shipbuilding, reflecting comments made repeatedly by various sources over the years.

Chairman Courtney, this concludes my statement. Thank you again for the opportunity to testify, and I will be pleased to respond to any questions the subcommittee may have.

to as competition for profit. For more on PRO bidding, see Statement of Ronald O'Rourke, Specialist in Naval Affairs, Congressional Research Service, before the House Armed Services Committee on Case Studies in DOD Acquisition: Finding What Works, June 24, 2014, p. 7.

⁵⁵ For more on MYP and block buy contracting, see CRS Report R41909, *Multiyear Procurement (MYP) and Block Buy Contracting in Defense Acquisition: Background and Issues for Congress*, by Ronald O'Rourke.

Appendix A. Biography—Ronald O'Rourke

Mr. O'Rourke is a Phi Beta Kappa graduate of the Johns Hopkins University, from which he received his B.A. in international studies, and a valedictorian graduate of the University's Paul Nitze School of Advanced International Studies, where he received his M.A. in the same field, with concentrations in international relations theory, international law, and international economics.

Since 1984, Mr. O'Rourke has worked as analyst and specialist in naval affairs for CRS. He has written many CRS reports for Congress on various issues relating to the Navy, the Coast Guard, defense acquisition, China's naval forces and maritime territorial disputes, the Arctic, the international security environment, and the U.S. role in the world. He regularly briefs Members of Congress and Congressional staffers, and has testified before Congressional committees on many occasions.

In 1996, he received a Distinguished Service Award from the Library of Congress for his service to Congress on naval issues.

In 2010, he was honored under the Great Federal Employees Initiative for his work on naval, strategic, and budgetary issues.

In 2012, he received the CRS Director's Award for his outstanding contributions in support of the Congress and the mission of CRS.

In 2017, he received the Superior Public Service Award from the Navy for service in a variety of roles at CRS while providing invaluable analysis of tremendous benefit to the Navy for a period spanning decades.

Mr. O'Rourke is the author of several journal articles on naval issues, and is a past winner of the U.S. Naval Institute's Arleigh Burke essay contest. He has given presentations on naval, Coast Guard, Arctic, and strategy issues to a variety of U.S. and international audiences in government, industry, and academia.

Appendix B. FY2021 Budget's Treatment of CVN-81, LPD-31, and LHA-9 Procurement Dates

Overview

A potentially significant institutional issue for Congress concerns the treatment in the Navy's proposed FY2021 budget of the procurement dates of the aircraft carrier CVN-81 and the amphibious ships LPD-31 and LHA-9.

The Navy's FY2021 budget submission presents the aircraft carrier CVN-81 as a ship that Congress procured in FY2020, rather than a ship that Congress procured (i.e., authorized and provided procurement funding for) in FY2019. The Navy's FY2021 budget submission presents LPD-31, an LPD-17 Flight II amphibious ship, as a ship requested for procurement in FY2021, rather than a ship that Congress procured in FY2020, and the amphibious assault ship LHA-9 as a ship projected for procurement in FY2023, rather than a ship that Congress procured in FY2020.

Potential oversight issues for Congress include the following:

- By presenting CVN-81 as a ship that was procured in FY2020 (instead of a ship that was procured in FY2019), LPD-31 as a ship requested for procurement in FY2021 (instead of a ship that was procured in FY2020), and LHA-9 as a ship projected for procurement in FY2023 (instead of a ship that was procured in FY2020), is DOD, in its FY2021 budget submission, disregarding or mischaracterizing the actions of Congress regarding the procurement dates of these three ships? If so:
 - Is DOD doing this to inflate the apparent number of ships requested for procurement in FY2021 and the apparent number of ships included in the five-year shipbuilding plan?
 - Could this establish a precedent for DOD in the future to ignore or mischaracterize the actions of Congress regarding the procurement or program-initiation dates for other Navy ships, other Navy programs, other DOD programs, or other federal programs? If so, what implications might that have for the preservation of Congress's power of the purse and its status as a branch of government relative to the executive branch?

CVN-81 Aircraft Carrier

The Navy's FY2020 budget submission presented the aircraft carrier CVN-81 as a ship requested for procurement in FY2020, and the Navy's FY2021 budget submission presents CVN-81 as a ship that Congress procured in FY2020. Congressional action on the Navy's FY2019 budget shows CVN-81 as a ship that Congress procured in FY2019:

- Within Section 121 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (H.R. 5515/P.L. 115-232 of August 13, 2018)—the provision that authorized a two-ship block buy contract for CVN-80 and CVN-81—subsection (a)(1) specifically authorizes a contract for the procurement of CVN-81 “beginning with the fiscal year 2019 program year.” The header for subsection (a)(1) is “Procurement Authorized.”
- Consistent with Section 121(a)(1), the funding table for the Navy's shipbuilding account in the conference report (H.Rept. 115-874 of July 25, 2018) on H.R. 5515 shows a quantity of “1” in line 002 of the FY2019 SCN (Shipbuilding and Conversion, Navy)

appropriation account. Line 002 is the line item for procurement (not advance procurement [AP]) funding for the CVN-78 program. A notation in the table for line 002 states that the procurement funding authorized for this line item is for “Authorize CVN81—One ship.”⁵⁶ The funding table does not authorize any funding for line 003 of the FY2019 SCN account—the line item for AP funding for the CVN-78 program. (AP funding is funding for the procurement of a ship to be procured in a future fiscal year.)

- Consistent with the two above points, the paragraph in the FY2019 DOD appropriations act (Division A of H.R. 6157/P.L. 115-245 of September 28, 2018) that makes appropriations for the SCN account makes procurement (not AP) appropriations for the CVN-78 program. This paragraph also states that “the funds made available by this Act for the Carrier Replacement Program (CVN-80) may be available to modify or enter into a new contract for the procurement of a Ford-class aircraft carrier designated CVN-81 pursuant to section 121 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019.”
- Consistent with this bill language, the funding table for the SCN account in the joint explanatory statement for H.R. 6157 shows that this funding was provided for line 2 of the FY2019 SCN account (CVN-78 program procurement funding), not line 3 of the FY2019 SCN account (CVN-78 program AP funding).⁵⁷
- Consistent with all of the above points, the Navy’s FY2020 budget submission shows the \$618 million in FY2019 funding for CVN-81 as full funding (meaning funding for a procured ship), rather than AP funding (meaning funding for a ship to be procured in a future fiscal year).⁵⁸
- The House Armed Services Committee’s report (H.Rept. 116-120 of June 19, 2019) on H.R. 2500, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of no aircraft carrier in FY2020 due to “CVN-81 previously authorized.”⁵⁹
- The Senate Armed Services Committee’s report (S.Rept. 116-48 of June 11, 2019) on S. 1790, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of no aircraft carrier in FY2020 due to “CVN-81 authorized in NDAA [FY]2019.”⁶⁰
- The conference report (H.Rept. 116-333 of December 9, 2019) on S. 1790/P.L. 116-92 of December 20, 2019, the FY2020 National Defense Authorization Act, authorized the procurement of no aircraft carrier in FY2020 due to “CVN-81 previously authorized.”⁶¹
- The House Appropriations Committee’s report (H.Rept. 116-84 of May 23, 2019) on H.R. 2968, the FY2020 DOD Appropriations Act, adjusted the Navy’s FY2020 budget submission to show that no aircraft carrier was being requested for procurement in FY2020.⁶²

⁵⁶ H.Rept. 115-874, p. 1164.

⁵⁷ Joint explanatory statement for H.R. 6157, PDF pages 174 and 176 of 559.

⁵⁸ *Department of Defense, Fiscal Year (FY) 2020 President’s Budget Estimate Submission, Navy, Justification Book Volume 1 of 1, Shipbuilding and Conversion, Navy*, March 2019, p. 15 (PDF page 51 of 356).

⁵⁹ H.Rept. 116-120, p. 378, line 002.

⁶⁰ S.Rept. 116-48, p. 432, line 2.

⁶¹ H.Rept. 116-333, p. 1565, line 002.

⁶² H.Rept. 116-84, p. 173, line 2.

- The Senate Appropriations Committee’s report (S.Rept. 116-103 of September 12, 2019) on S. 2474, the FY2020 DOD Appropriations Act, adjusted the Navy’s FY2020 budget submission to show that no aircraft carrier was being requested for procurement in FY2020.⁶³

LPD-31—an LPD-17 Flight II Amphibious Ship

The Navy’s FY2021 budget submission presents LPD-31, an LPD-17 Flight II amphibious ship, as a ship requested for procurement in FY2021. Congressional action on the Navy’s FY2020 budget shows LPD-31 as a ship that Congress procured in FY2020:

- The House Armed Services Committee’s report (H.Rept. 116-120 of June 19, 2019) on H.R. 2500, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of an LPD-17 Flight II ship in FY2020, showing a quantity increase of one ship above the Navy’s request and recommending procurement (not just AP) funding for the program.⁶⁴
- The Senate Armed Services Committee’s report (S.Rept. 116-48 of June 11, 2019) on S. 1790, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of an LPD-17 Flight II ship in FY2020, showing a quantity increase of one ship above the Navy’s request and recommending procurement (rather than AP) funding for the program.⁶⁵
- The conference report (H.Rept. 116-333 of December 9, 2019) on S. 1790/P.L. 116-92 of December 20, 2019, the FY2020 National Defense Authorization Act, authorized the procurement of an LPD-17 Flight II ship in FY2020, showing a quantity increase of one ship above the Navy’s request and recommending procurement (rather than AP) funding for the program.⁶⁶ Section 129 of S. 1790/P.L. 116-92 authorizes the Navy to enter into a contract, beginning in FY2020, for the procurement of LPD-31, and to use incremental funding to fund the contract.
- The Senate Appropriations Committee’s report (S.Rept. 116-103 of September 12, 2019) on S. 2474, the FY2020 DOD Appropriations Act, recommended funding for the procurement of an LPD-17 Flight II ship in FY2020, showing a quantity increase of one ship above the Navy’s request and recommending procurement (rather than AP) funding for the program.⁶⁷
- The final version of the FY2020 DOD Appropriations Act (Division A of H.R. 1158/P.L. 116-93 of December 20, 2019) provides procurement (not AP) funding for an LPD-17 Flight II ship. The paragraph in this act that appropriates funding for the Navy’s shipbuilding account, including this ship, includes a provision stating “*Provided further*, That an appropriation made under the heading ‘Shipbuilding and Conversion, Navy’ provided for the purpose of ‘Program increase—advance procurement for fiscal year 2020 LPD Flight II and/or multiyear procurement economic order quantity’ shall be considered to be for the purpose of ‘Program increase—advance procurement of LPD-31’.” This provision relates to funding appropriated in the FY2019 DOD Appropriations

⁶³ S.Rept. 116-103, p. 118, line XX.

⁶⁴ H.Rept. 116-120, p. 379, line 012.

⁶⁵ S.Rept. 116-48, p. 433, line 12. See also pp. 23-24 for associated report language.

⁶⁶ H.Rept. 116-333, p. 1566, line 012. See also p. 1144 for associated report language.

⁶⁷ S.Rept. 116-103, p. 118, line 12. See also p. 122 for associated report language.

Act (Division A of H.R. 6157/P.L. 115-245 of September 28, 2018) for the procurement of an LPD-17 Flight II ship in FY2020, as originally characterized in the explanatory statement accompanying that act.⁶⁸

LHA-9 Amphibious Assault Ship

The Navy's FY2021 budget submission presents the amphibious assault ship LHA-9 as a ship projected for procurement in FY2023. Congressional action on the Navy's FY2020 budget shows LHA-9 as a ship that Congress procured in FY2020:

- The Senate Armed Services Committee's report (S.Rept. 116-48 of June 11, 2019) on S. 1790, the FY2020 National Defense Authorization Act, recommended authorizing the procurement of LHA-9 in FY2020, showing a quantity increase of one ship above the Navy's request and recommending procurement (rather than AP) funding for the program.⁶⁹
- The conference report (H.Rept. 116-333 of December 9, 2019) on S. 1790/P.L. 116-92 of December 20, 2019, the FY2020 National Defense Authorization Act, authorized the procurement of LHA-9 in FY2020, showing a quantity increase of one ship above the Navy's request and recommending procurement (rather than AP) funding for the program.⁷⁰ Section 127 of S. 1790/P.L. 116-92 authorizes the Navy to enter into a contract for the procurement of LHA-9 and to use incremental funding provided during the period FY2019-FY2025 to fund the contract.
- The Senate Appropriations Committee's report (S.Rept. 116-103 of September 12, 2019) on S. 2474, the FY2020 DOD Appropriations Act, recommended funding for the procurement of an LHA amphibious assault ship in FY2020, showing a quantity increase of one ship above the Navy's request and recommending procurement (rather than AP) funding for the program.⁷¹
- The final version of the FY2020 DOD Appropriations Act (Division A of H.R. 1158/P.L. 116-93 of December 20, 2019) provides procurement (not AP) funding for an LHA amphibious assault ship. The explanatory statement for Division A of H.R. 1158/P.L. 116-93 states that the funding is for LHA-9.⁷²

⁶⁸ See PDF page 176 of 559, line 12, of the explanatory statement for H.R. 6157/P.L. 115-245.

⁶⁹ S.Rept. 116-48, p. 433, line 15.

⁷⁰ H.Rept. 116-333, p. 1566, line 015.

⁷¹ S.Rept. 116-103, p. 118, line 15.

⁷² Explanatory statement for Division A of H.R. 1158, PDF page 175 of 414, line 15.

Appendix C. Reported Potential Changes in Fleet Architecture Associated with INFSA

This appendix provides additional details on reported potential changes in fleet architecture that could be reflected in the INFSA.

Potential New Surface Combatant Force Architecture

Statements from Navy officials suggest that the INFSA might shift the Navy's surface combatant force to a more distributed architecture that includes a reduced proportion of large surface combatants (i.e., cruisers and destroyers), an increased proportion of small surface combatants (i.e., frigates and LCSs), and a newly created third tier of unmanned surface vehicles (USVs).

Figure 1 provides, for the surface combatant portion of the Navy,⁷³ a conceptual comparison of the current fleet architecture (shown on the left as the "ship centric force") and the new, more distributed architecture (shown on the right as the "distributed/nodal force"). The figure does not depict the entire surface combatant fleet, but rather a representative portion of it.

In the figure, each sphere represents a manned ship or USV. As shown in the color coding, under both the current fleet architecture and the more distributed architecture, the manned ships (i.e., the LCSs and SSCs) are equipped with a combination of sensors (green), command and control (C2) equipment (red), and payloads other than sensors and C2 equipment, meaning principally weapons (blue).

Under the more distributed architecture, the manned ships would be on average smaller (because a greater share of them would be SSCs), and this would be possible because some of the surface combatant force's weapons and sensors would be shifted from the manned ships to USVs, with weapon-equipped Large USVs (LUSVs) acting primarily as adjunct weapon magazines and sensor-equipped Medium USVs (MUSVs) contributing to the fleet's sensor network.

As shown in **Figure 1**, under the Navy's current surface combatant force architecture, there are to be 20 LCSs for every 10 SSCs (i.e., a 2:1 ratio of LCSs to SSCs), with no significant contribution from LUSVs and MUSVs. This is consistent with the Navy's current force-level objective, which calls for achieving a 355-ship fleet that includes 104 LCSs and 52 SSCs (a 2:1 ratio). Under the more distributed architecture, the ratio of LCSs to SSCs would be reversed, with 10 LCSs for every 20 SSCs (a 1:2 ratio), and there would also now be 30 LUSVs and 40 MUSVs.

A January 15, 2019, press report states

The Navy plans to spend this year taking the first few steps into a markedly different future, which, if it comes to pass, will upend how the fleet has fought since the Cold War. And it all starts with something that might seem counterintuitive: It's looking to get smaller.

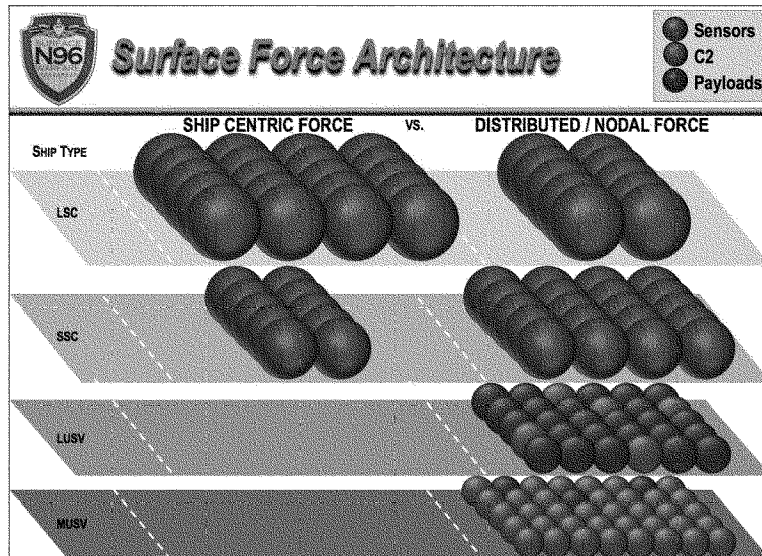
"Today, I have a requirement for 104 large surface combatants in the force structure assessment; [and] I have [a requirement for] 52 small surface combatants," said Surface Warfare Director Rear Adm. Ronald Boxall. "That's a little upside down. Should I push out here and have more small platforms? I think the future fleet architecture study has intimated 'yes,' and our war gaming shows there is value in that."⁷⁴

⁷³ Other major parts of the Navy include submarines, aircraft carriers, amphibious ships, logistics (resupply) ships, and support ships.

⁷⁴ David B. Larter, "US Navy Moves Toward Unleashing Killer Robot Ships on the World's Oceans," *Defense News*, January 15, 2019.

Figure 1. Navy Briefing Slide on Surface Combatant Force Architecture

Each sphere represents a ship or unmanned surface vehicle (USV)



Source: Illustration accompanying Megan Eckstein, "Sea Hunter Unmanned Ship Continues Autonomy Testing as NAVSEA Moves Forward with Draft RFP," *USNI News*, April 29, 2019. The illustration was also included as Slide 2 in a Navy briefing entitled "Designing & Building the Surface Fleet: Unmanned and Small Combatants," by Rear Admiral Casey Moton at a June 20, 2019, conference of the American Society of Naval Engineers (ASNE).

Notes: Each sphere represents a ship or a USV. LSC means large surface combatant (i.e., cruiser or destroyer), and SSC means small surface combatant (i.e., frigate or LCS). As shown in the color coding, the LSCs and SSCs are equipped with a combination of sensors (green), command and control (C2) equipment (red), and payloads other than sensors and C2 equipment, meaning principally weapons (blue). LUSVs and MUSVs, in contrast, are equipped primarily with weapons (blue) or sensors (green).

Another way of summarizing **Figure 1** would be to say that the surface combatant force architecture (reading vertically down the figure) would change from 20+10+0+0 (i.e., a total of 30 surface combatant platforms, all manned, and a platform ratio of 2-1-0-0) for a given portion of the surface combatant force, to 10+20+30+40 (i.e., a total of 100 surface combatant platforms, 70 of which would be LUSVs and MUSVs, and a platform ratio of 1-2-3-4) for a given portion of the surface combatant force. The Navy refers to the more distributed architecture's combination of LSCs, SSCs, LUSVs, and MUSVs as the Future Surface Combatant Force (FSCF).

Figure 1 is conceptual, so the platform ratios for the more distributed architecture should be understood as notional or approximate rather than exact. The point of the figure is not that relative platform numbers

under the more distributed architecture would change to the exact ratios shown in the figure, but that they would evolve over time toward something broadly resembling those ratios.⁷⁵

A January 23, 2020, press report states that

The Navy is expected to finalize next month a major new analysis of its future surface combatant fleet....

The findings are expected to influence force structure decisions in fiscal year 2021 as well as budget and shipbuilding plans beginning in FY-22.

The Future Surface Combatant Force analysis of alternatives [AOA], a 16-month effort, will provide a key input into the Navy's Integrated Force Structure Assessment....

The AOA, according to a senior official, validated a key Navy hypothesis posed in 2018, that a fleet of unmanned surface vessels packed with sensors or loads of missiles give U.S. commanders more options and complicate the calculus for an adversary.⁷⁶

Potential New Amphibious Ship Architecture

Statements from the Commandant of the Marine Corps suggest strongly that the INFSA might change the Navy's amphibious ship force to an architecture based on a new amphibious lift target and a new mix of amphibious ships.

The current 38-ship amphibious ship force-level goal is intended to meet a requirement for having enough amphibious lift to lift the assault echelons of two Marine Expeditionary Brigades (MEBs), a requirement known as the 2.0 MEB lift requirement. The 2.0 MEB lift requirement dates to 2006. The translation of this lift requirement into a Marine Corps-preferred force-level goal of 38 ships dates to 2009, and the Navy's formal incorporation of the 38-ship goal (rather than a more fiscally constrained goal of 33 or 34 ships) into the Navy's overall ship force-structure goal dates to the 2016 FSA.⁷⁷

In July 2019, General David H. Berger, the Commandant of the Marine Corps, released a document entitled *Commandant's Planning Guidance* that states that the Marine Corps wants to, among other things, move away from the 38-ship amphibious ship force-level goal and the 2.0 MEB lift force-planning metric, and shift to a new and different mix of amphibious ships that includes not only the LHA/LHD-type amphibious assault ships and LPD/LPD-type amphibious ships called for in the 2016 FSA, but other kinds of ships as well, including smaller amphibious ships, ships like the Navy's Expeditionary Sea Base (ESB) and Expeditionary Fast Transport (EPF) ships (referred to collectively as E-class ships), ships based on commercial-ship hull designs, and unmanned surface vehicles (USVs).⁷⁸

⁷⁵ For further discussion, see CRS Report RL32109, *Navy DDG-51 and DDG-1000 Destroyer Programs: Background and Issues for Congress*, by Ronald O'Rourke, CRS Report R44972, *Navy Frigate (FFG(X)) Program: Background and Issues for Congress*, by Ronald O'Rourke, and CRS Report R45757, *Navy Large Unmanned Surface and Undersea Vehicles: Background and Issues for Congress*, by Ronald O'Rourke.

⁷⁶ Jason Sherman, "New Future Surface Combatant Fleet Analysis Validates Contribution of Medium, Large USVs to Fight," *Inside Defense*, January 22, 2020.

⁷⁷ For additional discussion of the 2.0 MEB lift goal and earlier amphibious lift goals dating back to 1980, see Appendix A of CRS Report RL34476, *Navy LPD-17 Amphibious Ship Procurement: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

⁷⁸ U.S. Marine Corps, Commandant's Planning Guidance, 38th Commandant of the Marine Corps, undated, released July 2019, pp. 4-5, 10. See also CRS Report R46374, *Navy Light Amphibious Warship (LAW) Program: Background and Issues for Congress*, by Ronald O'Rourke. See also Megan Eckstein, "New Commandant Berger Sheds 38-Amphib Requirement in Quest to Modernize USMC for High-End Fight," *USNI News*, July 18, 2019; Paul McLeary, "Sacred Cows Die As Marine Commandant Changes Course On Amphibs," *Breaking Defense*, July 26, 2019; David Ignatius, "The Marines' New Commandant Has Set the Bar for Real Military Reform," *Washington Post*, August 8, 2019; Megan Eckstein, "Marine Planners

Consistent with the *Commandant's Planning Guidance*, the Navy and Marine Corps now envision procuring a class of 28 to 30 smaller amphibious ships called Light Amphibious Ships (LAWs).⁷⁹

Potential New Aircraft Carrier/Naval Aviation Force Architecture

Statements from Navy officials reported in the press beginning in February 2019 indicate that the Navy is currently considering moving to a new aircraft carrier/naval aviation force architecture that might supplement today's CVNs with smaller and perhaps nonnuclear-powered aircraft carriers.⁸⁰

According to these press reports, one option for a smaller carrier is the so-called Lightning Carrier, a term referring to an LHA-type amphibious assault ship equipped with an air wing consisting largely of F-35B Joint Strike Fighter (JSFs). (The alternate name for the F-35 is the Lightning II. The B variant of the F-35, which is currently being procured for the Marine Corps, is short takeoff, vertical landing [STOVL] variant that can be operated off of ships with flight decks that are shorter than the flight decks of CVNs.) The Navy and Marine Corps have conducted experiments with the Lightning Carrier concept.⁸¹

Another option for a smaller carrier is one whose air wing would consist mostly or entirely of unmanned aerial vehicles (UAVs). The Navy in recent years has periodically studied the potential of UAV carriers.

The current discussion both inside and outside the Navy over the aircraft carrier to be procured after CVN-81 appears to reflect several considerations, including the following:

- concerns over China's improving capabilities for detecting surface ships and attacking them with anti-ship ballistic missiles (ASBMs) and advanced anti-ship cruise missiles (ASCMs);
- the procurement and operating and support (O&S) costs of CVNs and their air wings, particularly in a context of constraints on Navy funding and funding demands from other competing Navy programs; and

Using Commandant's Guidance to Start Crafting Future of the Corps," *USNI News*, September 18, 2019; Shawn Snow, "An Unmanned Ship That Can Travel 500 Nautical Miles Without Resupply—the Corps Is Looking at It," *Marine Corps Times*, September 19, 2019; Megan Eckstein, "Marines, Navy Both Considering Something Like an Offshore Support Vessel to Supplement Amphibs," *USNI News*, September 20, 2019; David Axe, "U.S. Navy and Marine Corps Want Small Ships to Land Troops in a War," *National Interest*, September 21, 2019; Megan Eckstein, "Navy, Marines Rethinking How to Build Future Fleet with Unmanned, Expeditionary Ships," *USNI News*, September 26, 2019; David Barno and Nora Bensahel, "A Striking New Vision for the Marines, and a Wakeup Call for the Other Services," *War on the Rocks*, October 1, 2019; Megan Eckstein, "Berger: Marine 2030 Force Design Is Nearly Complete; Concepts Now Being Modeled, Tested," *USNI News*, October 3, 2019; Patrick Tucker, "The Future of the Marines Is Smaller, More Robotic, More Naval," *Defense One*, October 3, 2019; Otto Kreisher, "'Great Power' Fight Might Require Different Blend of Vessels, But Marines Won't Shun Amphibious Operations, NDIA Speakers Say," *Seapower*, October 24, 2019; Megan Eckstein, "Marines, Navy Considering 'Alternate' Amphibs to Supplement Today's Fleet," *USNI News*, October 26, 2019.

⁷⁹ For further discussion, see CRS Report R46374, *Navy Light Amphibious Warship (LAW) Program: Background and Issues for Congress*, by Ronald O'Rourke.

⁸⁰ See Rich Abott, "Navy Starts Looking At Carriers After CVN-81," *Defense Daily*, February 15, 2019; Richard R. Burges, "Secretary: Navy Discussing Next-Gen Carrier Concepts, Including 'Lightning Carrier,'" *Seapower*, October 24, 2019; Wesley Morgan, "Navy Secretary Accuses Congressional Critics of 'Disinformation' on Ford Carrier," *Politico Pro*, October 23, 2019; Otto Kreisher, "Spencer Lauds Tight Integration of Navy, Marine Forces in 'Great Power Competition,'" *Seapower*, October 27, 2019; Sam LaGrone, "Navy Still Mulling Post-F-35C Aviation Combatant; Could be Mix of Manned, Unmanned Aircraft," *USNI News*, December 5, 2019; Gina Hawkins, "Acting SecNav Hints at Fewer Aircraft Carriers in Next Ship-Count Plan," *Military.com*, January 29, 2020; Sam LaGrone, "Future of U.S. Carrier Fleet Key Issue as New Force Structure Moves Through Pentagon," *USNI News*, January 29, 2020; Rich Abott, "Modly: Future Carrier Force Unclear, All Options On The Table," *Defense Daily*, January 30, 2020.

⁸¹ See, for example, Megan Eckstein, "Marines Test 'Lightning Carrier' Concept, Control 13 F-35Bs from Multiple Amphibs," *USNI News*, October 23, 2019.

- the potential capabilities of smaller carriers operating air wings consisting of unmanned aerial vehicles (UAVs) and/or F-35B Joint Strike Fighters (i.e., the short-takeoff, vertical landing [STOVL] version of the F-35 now being procured for the Marine Corps).

Potential New Combat Logistics Force (CLF) Architecture

The Navy's FY2020 30-year shipbuilding plan suggests that shifting to a more distributed fleet architecture could increase required numbers of Combat Logistics Force (CLF) ships—meaning the oilers, ammunition ships, and dry cargo ships that transport fuel, ammunition, and supplies Navy combat ships that are operating at sea—and augment today's CLF ships with additional “smaller, faster, multi-mission transports.”⁸²

Potential New Undersea Force Architecture

Navy plans indicate that the Navy wants to change the Navy's undersea force to a more distributed architecture that includes, in addition to SSNs and bottom-based sensors, a new element of extra-large unmanned underwater vehicles (XLUUVs), which might be thought of as unmanned submarines.

⁸² U.S. Navy, *Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels for Fiscal Year 2020*, pp. 7, 15, 17, 24. The quoted phrase is from page 24.

Appendix D. A Summary of Some Acquisition Lessons Learned for Navy Shipbuilding

This appendix presents a general summary of lessons learned in Navy shipbuilding, reflecting comments made repeatedly by various sources over the years. These lessons learned include the following:

- **At the outset, get the operational requirements for the program right.** Properly identify the program's operational requirements at the outset. Manage risk by not trying to do too much in terms of the program's operational requirements, and perhaps seek a so-called 70%-to-80% solution (i.e., a design that is intended to provide 70%-80% of desired or ideal capabilities). Achieve a realistic balance up front between operational requirements, risks, and estimated costs.
- **Impose cost discipline up front.** Use realistic price estimates, and consider not only development and procurement costs, but life-cycle operation and support (O&S) costs.
- **Employ competition** where possible in the awarding of design and construction contracts.
- **Use a contract type that is appropriate for the amount of risk involved,** and structure its terms to align incentives with desired outcomes.
- **Minimize design/construction concurrency** by developing the design to a high level of completion before starting construction and by resisting changes in requirements (and consequent design changes) during construction.
- **Properly supervise construction work.** Maintain an adequate number of properly trained Supervisor of Shipbuilding (SUPSHIP) personnel.
- **Provide stability for industry,** in part by using, where possible, multiyear procurement (MYP) or block buy contracting.
- **Maintain a capable government acquisition workforce** that understands what it is buying, as well as the above points.

Identifying these lessons is arguably not the hard part—most if not all these points have been cited for years. The hard part, arguably, is living up to them without letting circumstances lead program-execution efforts away from these guidelines.

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

JUNE 4, 2020

QUESTIONS SUBMITTED BY MR. COURTNEY

Mr. COURTNEY. The Navy's force of SSNs is projected to experience a valley from the mid-2020s through the early 2030s, reaching a minimum of 42 attack boats in FY2027–FY2028. This valley was first identified by CRS in 1995 in testimony before the House Armed Services Committee and has been discussed in multiple, annual CRS reports since then. What strategy or strategies do you feel are best suited to mitigate the SSN valley in the short and long term?

Mr. CLARK. The upcoming valley in nuclear attack submarine (SSN) inventory results in part from DOD's mid-1990s post-Cold War "procurement holiday" when Los Angeles-class submarine production ended and only three Seawolf-class submarines were constructed. Combined with the early retirement of almost half the Los Angeles-class, dramatically reduced submarine construction is now coming home to roost as the last of the Los Angeles-class submarines reach their end of service life during the 2020s.

There is no way to make up for submarines that were not built, but the impact of the coming trough can be mitigated in three main ways, which the Congress should address and support:

- Continue construction of two SSNs per year. Sustained submarine construction is essential to eventually rebuild the U.S. submarine inventory and strengthen the submarine construction and supplier bases.
- Life extension of remaining Los Angeles-class submarines. The U.S. Navy is planning to refuel or extend the hull life of select SSNs. This effort should continue and be expanded if additional ships are able to continue serving.
- Improve integration with allies. The U.S. Navy already closely coordinates SSN deployments with the Royal Navy, whose Astute-class submarines are nearly as capable and quiet as the U.S. Virginia-class. The Navy should more tightly coordinate submarine operations with other allies such as France and Japan to provide more effective submarine presence in key areas like the Mediterranean, North Atlantic, and Western Pacific.
- Encourage allies to grow their submarine forces. Allies would have a difficult time growing their SSN forces due to industrial base and financial constraints, but more conventional submarine (SS) could be maintained in service to mitigate the shortfall in U.S. SSN presence in European and Asian littorals. For example, the Japan Maritime Self Defense Force could retain their Soryu-class SS in service longer than the current 20 years to grow their submarine force from the current 22 to more than 30 at a modest additional cost.
- Adopt new anti-submarine warfare (ASW) concepts that use unmanned systems. One of the largest demands on the U.S. SSN force is ASW operations, both for peacetime surveillance and to defeat enemy submarines in wartime. A combination of unmanned sensors and surface, air, and undersea vehicles would be well-suited to relieve SSNs of much of the ASW mission. These unmanned systems are already fielded or being prototyped today and the sensors and weapons they would deploy would be the same already in use by U.S. or allied navies. This shift to unmanned systems is absolutely necessary to get the most value from the shrinking U.S. SSN force as well as enable affordable and scalable ASW operations in the future.

The U.S. Navy needs to address the coming submarine shortfall through a combination of ship construction and sustainment, alliances, and new operational concepts. All three elements are needed both to address this challenge during the next decade as well as sustaining America's long-term undersea advantage.

Mr. COURTNEY. The Navy's force of SSNs is projected to experience a valley from the mid-2020s through the early 2030s, reaching a minimum of 42 attack boats in FY2027–FY2028. This valley was first identified by CRS in 1995 in testimony before the House Armed Services Committee and has been discussed in multiple, annual CRS reports since then. What strategy or strategies do you feel are best suited to mitigate the SSN valley in the short and long term?

Mr. O'ROURKE. Options for mitigating the SSN valley that the subcommittee may consider include the following, which are not mutually exclusive:

- **Options for increasing the total number of U.S. submarines in service during the valley:**

- **Procure Virginia-class SSNs over the next few years** that are in addition to those the Navy already plans to procure during those years. This option would mitigate the bottom and the back half of the SSN valley and accelerate the valley's end date. This option could begin with procuring an additional Virginia-class boat in FY2021, which would make for a two-boat Virginia-class procurement in FY2021 and a total of 10 Virginia-class boats under the FY1019–FY2023 Virginia-class multiyear procurement (MYP) contract, which includes an option for a tenth boat. The Navy's FY2020 budget submission projected a request for two Virginia-class boats in FY2021 and a total of 11 boats over the period FY2019–FY2023. The procurement of a second Virginia-class boat in FY2021 is the number one item on the Navy's FY2021 unfunded priorities list (UPL).

Navy officials testified this year that their earlier concerns about the ability of the industrial base to execute the construction of an additional Virginia-class boat have been satisfied, and that the only remaining issue regarding the procurement of an additional Virginia-class boat is availability of funds. The Navy estimates in its FY2021 UPL that fully funding the procurement of an additional Virginia-class boat in FY2021 would involve adding about \$2.77 billion to the Navy's shipbuilding budget. In dollar terms, such an addition would fund 51% of the Navy's FY2021 UPL and more than 75% of the net reduction in the Navy's FY2021 shipbuilding funding request relative to what the Navy's FY2020 budget submission had projected would be requested for FY2021. Alternatively, an additional Virginia-class boat could (with congressionally granted authority) be procured in FY2021 with incremental funding, enabling the FY2021 appropriation to be something less than \$2.77 billion.

If Congress were to procure an additional Virginia-class boat as soon as FY2021, Congress would then have the option of exploring the feasibility of adding still more Virginia-class boats to the Navy's planned procurement profile through the mid-2020s. It could also consider making investments in the capacity of the industrial base to support that additional work, so as to further mitigate the back half of the valley and further accelerate the valley's end date. Unlike the options discussed below, procuring additional Virginia-class boats could not only mitigate the SSN valley, but help achieve the Navy's 66-boat SSN force-level goal sooner.

- **Refuel five to seven Los Angeles (SSN-688) class submarines** and extend their service lives by about 10 years through Engineering Refueling Overhauls (EROs). This option, like the one above, would mitigate the back half of the SSN valley and accelerate the valley's end date. It likely would not, however, accelerate the date for achieving the Navy's 66-boat SSN force-level, because even with 10 years of additional service life, these boats would likely age out and be removed from service before the SSN force would begin to approach that goal. These EROs would each cost something more than \$500 million. Initial funding for the first of the EROs was provided in FY2019 and FY2020.
- **Expand and/or accelerate procurement of Extra Large Unmanned Underwater Vehicles (XLUUVs)** as supplements to the SSN force. XLUUVs can be viewed as small, unmanned, non-nuclear-powered submarines. The first five XLUUVs were funded in FY2019. The Navy wants to procure additional XLUUVs at a rate of two per year starting in FY2023. The Navy's FY2021 budget submission does not include funding for the procurement of additional XLUUVs in FY2021 or FY2022.
- **Options for maximizing the material readiness and capability of U.S. SSNs that are in service during the valley:**
 - **Eliminate the SSN maintenance backlog**, so that no SSNs are idled while awaiting the start of their maintenance work.
 - **Provide robust funding for modernizing combat systems and other equipment** on existing SSNs, so as to increase the capability of each in-service SSN.
 - **Provide robust funding for procuring Mk48 torpedoes and other weapons**, so as to reach inventory goals for Mk48 torpedoes sooner and maximize the capability and diversity of weapons available for arming in-service SSNs.
 - **Options for maximizing the fraction of the SSN force that is at sea and on station on a day-to-day basis during the valley:**

- To the extent possible—and without jeopardizing the material readiness of the SSN force—**examine options for shifting SSN maintenance away from the lowest years** of the valley, so as to increase at the margin the number of SSNs available for operation during the valley's lowest years.
- **Temporarily increase average transit speeds and reduce time spent making port calls** for SSNs that are traveling between their home ports and their operating areas, so that a marginally larger percentage of their deployments can be spent on station. Increasing average transit speeds could shorten the service lives of SSNs by using up their nuclear fuel more quickly, unless the period of increased transit speeds is offset by reduced average transit speeds in other years of their lives. The diplomatic impact of reduced port calls made by SSNs could be offset by increasing port calls made by surface ships. The impact on quality of life for submariners of making fewer port calls might be offset by making investments to improve their quality of life in other respects.
- **Shift the homeports of some SSNs** from the continental United States (CONUS) to locations closer to Eurasia during some or all of the valley years, so as to reduce their transit times to and from likely operating areas. In the Pacific, for example, this could involve homeporting one or two additional SSNs at Guam or Pearl Harbor. The homeports of these SSNs could then revert to CONUS locations as the valley ends.
- **Employ dual crewing on some SSNs** during some or all of the valley years, which would increase, perhaps by about 40%, the fraction of time that they can be on deployment. Single-crewing could then be reinstated as the valley ends.
- **Options for increasing allied submarine capacity (numbers) and capability (quality):**
 - **Encourage Japan to increase its non-nuclear-powered attack submarine (SS) force from 22 to 30** during the years of the U.S. SSN valley. In part to support its submarine construction industrial base, Japan builds its SSs at a rate of about one boat per year. The size of Japan's attack submarine force is thus determined by how long each boat is kept in service: Japan had previously planned to maintain a force of 16 SSs, and thus planned to keep each boat in service for 16 years. As part of its most recent defense review, Japan decided to expand its SS force from 16 boats to 22 boats, and thus now plans to keep each boat in service for 22 years. Japan could further expand its SS force from 22 boats to 30 boats by deciding to keep each boat in service for 30 years, which would be consistent with the potential service lives of well-maintained modern SSs, rather than for 22 years. Expanding Japan's SS force from 22 boats to 30 boats consequently would not require Japan to build any boats that Japan does not already plan to build, just as expanding the force from 16 boats to 22 boats did not require Japan to build any boats that Japan did not already plan to build. If Japan were to begin now to implement an expansion of its SS force to 30 boats, the force could increase from 22 boats in about 2021 to 30 boats in about 2029—an increase that would occur at the same general time as the front half of the U.S. SSN valley.

These eight additional Japan SSs would not be as useful to the United States as eight U.S. SSNs, because SSs are not able to perform certain missions that can be performed by SSNs, and because these SSs would be under another country's control. Even so, they could be of value to the United States in terms of helping to maximize combined U.S.-allied undersea warfare capability during the valley years. The eight additional SSs could eventually be removed from service as the U.S. SSN valley ends. Japan sets the planned size of its SS force to meet its own needs. The goal under this option would be to encourage Japan to consider not only its own needs, but the larger context of combined U.S.-Japan naval capability, in setting the size of its submarine force. The potential expansion of Japan's SS force to 30 boats is one of the most significant lower-cost options for bolstering Western naval force structure globally that I have been able to identify.
 - **Work with Australia and regional allies and partners to explore options for forward-homeporting some of Australia's SSs closer to the South China Sea.** This could increase their potential for responding to issues of common U.S.-Australian concern in that area.
 - **Work with Japan and Australia** as needed to ensure that Japan's and Australia's SSs are highly capable in terms of their combat systems and other equipment, armed with adequate numbers of highly capable weapons, oper-

ated by highly proficient crews, and well maintained by their supporting industrial bases.

QUESTIONS SUBMITTED BY MR. GOLDEN

Mr. GOLDEN. ADM Roughead described maintaining the health of the shipbuilding defense industrial base as “one of the most important” issues requiring the subcommittee’s oversight and observed that the “fragility of the base and limited number of shipbuilders and suppliers that we have” will impact on the Navy’s future force structure plans. Admiral Roughead made clear that neither the Navy nor the shipbuilding industry have “the luxury of not having a more integrated approach” towards naval shipbuilding going forward.

Given your particular experience and expertise, I would appreciate your responses to the following questions:

(1) How can the Navy and Congress achieve the anticipated change in naval force structure without repeating the industrial base harms caused by previous “boom and bust” shipbuilding cycles?

(2) What investments in shipbuilder training may be helpful to achieve this transition?

(3) What obstacles do you foresee given shipbuilder demographic challenges, in which there are large numbers of new shipbuilders still learning their trade, large numbers who are senior and nearing retirement, and not enough personnel in the middle of their careers to teach new shipbuilders vital skills?

(4) What legislative or oversight options might the House Armed Services Committee have to encourage the “more integrated approach” between the Navy and the shipbuilding defense industrial base ADM Roughead feels is necessary? Has there been previous Congressional action on this issue?

Mr. O’ROURKE. Regarding question (1), options that Congress may consider include the following, which are not mutually exclusive:

- **Use the 30-year shipbuilding plan** to explore possibilities for shifting projected procurement dates of new ships to years that would not be optimal for replacing aging ships precisely at the ends of their projected service lives, but would nevertheless be beneficial in terms of dampening boom-and-bust cycles for shipyards and associated supplier firms.
- **Use multiyear contracting** (i.e., multiyear procurement [MYP] or block buy contracting) where appropriate to help enhance year-to-year planning stability for shipyards and associated supplier firms while permitting the Navy to reduce unit procurement costs.
- **Use Profit Related to Offer (PRO) bidding** (i.e., competition for profit, as opposed to competition for quantity) where appropriate to help enhance planning stability for shipyards and associated supplier firms while still permitting the Navy to employ competition to restrain prices.
- **Bundle shipbuilding programs together** and compete those bundles periodically between individual shipyards or teams of shipyards, perhaps with PRO bidding, so that reductions in one shipbuilding program can be used to offset increases in another, and then perhaps implement those bundled efforts with multiyear contracting.
- **Build ships with modular and loosely-coupled open-architecture hull designs**, so that these in-production designs can be easily adapted and remain cost effective to build in modified configurations. This approach could help enable ongoing shipbuilding programs to continue—thereby preserving some production stability and production learning curve benefits for shipyards and associated supplier firms—if changes in strategic circumstances require new ships to be built with a changed mix of capabilities.
- **Maintain an awareness of both Navy and Coast Guard shipbuilding programs**, and of how declines in one service’s shipbuilding programs might be offset by increases in the other service’s shipbuilding programs. Maintaining such an awareness might not have been important in earlier years, when the Coast Guard was doing relatively little shipbuilding, but it might be more important to do so now, with the Coast Guard currently executing multiple shipbuilding programs.

Regarding questions (2) and (3), which relate to shipyard workforces and their training, my understanding—based on discussions with shipyard officials in recent years—is that at least some shipyards are contending with (or will soon need to contend with) the retirement of relatively large cohorts of older and highly experienced workers, and consequently now (or soon will) need to replace these retiring workers with relatively large cohorts of newly hired younger workers. This could lead to

shipyard workforces that include relatively large numbers of younger and less-experienced workers (aka *green labor*). The percentage of green labor could be increased further in shipyards that are seeking not only to replace retiring older workers on a one-for-one basis, but to increase total numbers of workers in response to the increased shipbuilding work associated with enlarging the size of the Navy.

My understanding from shipyard officials is that compared to earlier generations of newly hired shipyard workers, today's newly hired shipyard workers can sometimes bring a different set of initial skills into the shipyard. They may have less prior experience using mechanical tools, working in an industrial setting, and working in settings with regular, fixed schedules. On the other hand, they may have more experience than older workers in using digital devices to access and work with information in electronic formats, and they may be more used to shifting from doing one kind of work to another. They might also have different learning styles (i.e., learning by reading, learning by watching, learning by doing, etc.) than earlier generations of workers. Training of shipyard workers, both in shipyard schoolhouses and on the waterfront, may need to adapt to potential differences such as these. Even with such adaptation, some shipyards will continue for a time to have workforces with a relatively large amount of green labor, and productivity models for shipbuilding programs would need to take that into account.

Regarding question (4), Admiral Roughead is not the only observer to recommend an approach to shipbuilding that features a greater degree of integration between the Navy and the industrial base. I have heard other observers make similar statements over the last 10 or 20 years, though what these observers have in mind regarding the specifics of a more-integrated approach can vary from person to person. U.S. naval architects and engineers are currently focusing in part on best practices used in South Korean and other Asian shipyards for designing and building warships, because in the view of these naval architects and engineers, "Asian navies are building larger warships that are easier to construct, easier to maintain, and that have greater service [life] allowances for future combat system upgrade. It is also reported that they are also doing this at significantly lower costs than US practice." The approach that these U.S. naval architects and engineers see being used in South Korean and other Asian shipyards features a higher degree of industry participation in the early stages of naval shipbuilding programs than is typically the case in U.S. Navy shipbuilding programs.¹

One option for Congress would be to review the approach outlined by these naval architects and engineers. Whether this approach would make sense from a congressional perspective is an open question, because it could, for example, substantially alter the point in a shipbuilding program where the Navy would conduct its source selection and award a contract for building the ships. If Congress determines that the option makes sense from a congressional perspective, Congress could then consider legislative options for having the Navy provide its perspective to Congress regarding the potential merits and legislative authorities needed to implement this approach. Offhand I do not remember a prior legislative provision that was focused on the potential merits of a more-integrated approach like the one outlined by these naval architects and engineers.



¹See Peter E. Jaquith, "Asian vs. U.S. Warship Design, Production Engineering, and Construction Practice," *Naval Engineers Journal*, December 2019: 55–58. See also Tony Jang, Lois Pena, and Nicholas Abbott, "Realizing Flexible Ships: Lessons from Allies to Improve the U.S. Shipbuilding Affordability, Capacity, and Schedule," *Naval Engineers Journal*, December 2019: 59–71.