Future Fleet Architectures: Budgetary, Technological and Defense Industrial Restraints on Future Naval Strategy

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On the campaign trail Donald Trump proudly proclaimed that he would build a 350-ship navy. Naval enthusiasts cheered loudly while skeptics wondered where the nation would find the resources to build the largest Fleet since the Reagan buildup in the late 1980s. Existing plans proposed only to increase the size of the fleet from the current figure, 272, to 308 ships over the next thirty years.[1]

Even before candidate Trump shined the spotlight on the Navy, the service was, of course, planning. The Navy had released its latest vision statement, *A Design for Maritime Superiority*, in January 2016.[2] It resoundingly defended the idea that the United States is a maritime nation and a premier naval power, specifically naming China and Russia as potential aggressors on the high seas. It did not specify a target number of ships or other aspects of a future fleet. But conceptually it did justify the sort of growth proposed by Trump. Moreover, senior naval leaders, including Vice Chief of Naval Operations Admiral Bill Moran were straightforward about the Navy's needs, "One thing is clear, we will not be able to keep up this pace [of operations and deployments] forever unless something changes. Arguably, this involves a larger and more capable fleet, resourced to be ready and manned to win whenever the nation calls us into action."[3]

During the last year of the Obama administration some members of Congress worried that sequestration and the Budget Control Act of 2011, had weakened naval readiness and discouraged many, including defense hawks, from contemplating the possibility that the Nation's Navy was insufficient to meet maritime challenges posed by a resurgent Russian Navy and the China's increasingly large and sophisticated PLA(N). Encouraged by naval enthusiasts (navalists) like Representative Randy Forbes (R-FLA), then chair of Seapower and Power Projection Subcommittee of the House Armed Services Committee, added language to the 2016 National Defense Authorization Act that mandated studies involving three alternative future fleet architectures.[4] The Navy proposed its own alternative, while the Center for Strategic and Budgetary Assessment and the MITRE Corp contributed independent studies.[5] Interestingly, none of the three alternatives, propose anything like a 350-ship fleet by 2030.[6] Rather they focus on new warfighting concepts (e.g., distributed maritime operations), types of platforms including unmanned systems and a revived arsenal ship (now the "magazine" ship), new technologies (line of sight communications using the Tern UAV), and various ways to maximize both the Navy's forward presence (more forward basing) and its ability to defeat all potential foes. Capacity and fleet size are obviously not the same thing, despite the pundits' focus on numbers of ships.

This essay will consider whether costs, technological and defense industrial factors will constrain the ability of the Trump build a 350-ship navy or some variant based on the Future Fleet Architecture alternatives produced by the U.S. Navy, CSBA and the MITRE Corp.

Budgetary, Technological and Defense Industrial Constraints

Before navalists assume that President Trump or the Navy will be able to deliver on campaign promises or the USN's fondest hopes for a transformed naval force, it is important to look carefully some of the most significant obstacles to implementing alternative visions for a larger, more capable Fleet.

S&T and RDT&E.

Each of the alternative architectures features several or more innovative platforms and systems that are either entirely notional or whose components will require substantial investments to bring them to fruition in the 2030-time frame. While these investments are smaller than acquisition and O&M costs addressed below, they are likely to be significant in view of the desired pace of change, the range of technologies and engineering challenges to be met, and the relative size of government and military S&T budgets. A full assessment of each architectures relative cost should examine these costs carefully. After all, if Congress does not provide sufficient S&T or RDT&E budgets, the risks to the USN's future fleet will be high. Many necessary innovations are not even fully discussed by the three alternatives mandated by the 2016 NDAA. For example, to make distributed operations possible and ensure that all the platforms and systems implied by the alternative architectures work as promised, will require vastly improved battle management systems. Yet, experts agree that while relatively modest battle management innovations are in already in development a much broader and resource intensive effort will be required. In effect, the USN will ask for an architecture, which cannot be achieved without sustained investments in science, technology and engineering research.

Acquisition.

As a recent Congressional Budget Office (CBO) report analyzes in detail alternatives that rely on large increases in the number of platforms deployed over time will require significant and sustained increases in the top-end USN procurement budget.[7] Moreover, nuclear modernization as currently envisioned (in terms of numbers and types of platforms and weapons (such as the SSBNX) will require and increasingly large share of USN procurement accounts unless Congress provides relief by creating a national, non-service budget for new nuclear systems.[8] To implement any of the FFAs may require significantly more procurement funds than are currently available.

This observation may understate the nature of the funding problems the USN is likely to encounter regardless of which of the existing FFA or some hybrid variant is chosen. The reason is the new presidential administration, some members of Congress and some camps within the USN recommend that the future fleet reach 350 or 355 platforms. The CBO suggests that a fleet of this size will require procurement budgets 60 percent higher than historical funding pinnacles. Aside from whether this level of funding is affordable for the American taxpayer, short of an enormous increase in overall defense spending, such a large procurement budget would almost assuredly result in reallocations amongst USN accounts or even more likely, the procurement accounts of the other Services.

O&M and Sustainability.

As the CNO and other military leaders have noted, sequestration and the Budget Control Act of 2011 (BCA) have reduced fleet readiness and led to deferred maintenance that may eventually

reduce the service life of various naval platforms. Virtually all naval analysts recommend that the Fleet needs its full pre-BCA, budgetary authority restored-- just to restore fleet readiness over the coming years. But this raises another important issue. If the FFA required larger numbers of platforms and greater numbers of sailors, there must be consequent increases in the USN readiness budget. Otherwise, the USN risks a hollowed out future force (with insufficient munitions in its magazine and shorter platform lives due to the cumulative effects of deferred maintenance) regardless of which independent architecture or hybrid variant is chosen. Moreover, larger numbers of platforms will increase political and budgetary pressure on the Navy, especially if the global security environment requires a high operating tempo in the maritime domain. In brief, will future congressional leaders be willing to maintain the O&M required to operate a substantially larger Fleet? The dangerous analogue here is to the fate of the so-called 600-ship Navy of the late-1980s.

Personnel.

Larger numbers of platforms, even if unmanned, generally require greater number of sailors to operate and maintain. In general, this remains true even given long-standing efforts to reduce manning (LCS and various unmanned systems) and outsourcing various maintenance functions to civilian personnel including contractors. Although too complex for this short essay, relevant personnel issues include the ability to attract new recruits, the ability to retain highly skilled sailors and officers, the need to educate and train navy personnel in ways that differ from historical norms, and, finally, subsidiary issues like health care costs, retirement policies, and the full range of challenges in caring for navy families, especially given expected deployment lengths and more forward basing of ships, naval air, and shore support systems.

Technological Feasibility

Each of the three independent Future Fleet Architectures, any blended version or yet created alternative will rely on new technologies. In the face of uncertainties about how quickly these new capabilities will mature (even given reasonable large S&T and RDT&E budgets) and how successfully they can be should base its next Fleet Design on a careful analysis of the risk and rewards associated with the three Future Fleet Architectures.

Risk.

There are well-understood techniques for managing technical risk both within the DoD community and the commercial sector.[9] Again, this issue is far too complex for a short essay so I will not examine risk directly with one exception—a simple observation. The wild card in naval procurement is that program advocates, vendors and members of Congress often have incentives (financial and political) to downplay risk. Thus, several suspect acquisition practices have been developed over the past two decades (i.e., spiral development).[10] Further, procurement techniques have been used to acquire platforms before mission packages have been developed much less tested (i.e., LCS). It is incumbent on the USN to make realistic, not optimistic assumptions—otherwise, especially, if fiscal constraints or technical difficulties arise with a specific platform or system, the future warfighter will be left to fight with a less capable force.

Reward

It does not appear that any of the existing FFA rely on, or propose, specific "war-winning" technologies or weapon systems. In these architectures, there are no equivalents to Jackie Fischer's dreadnought class of battleship or Mitchell or Douhet's extravagant claims for strategic bombers.

FFA authors are quite modest about what they hope to achieve with their visions. In terms of technologies, for the most part each works a within the baselines laws of physics, economics and law. This is significant because the American way of war is largely predicated on a system-of-systems approach that is predicated less on individual weapons or platforms than on the integration of many individual capabilities within the battlespace, the region, and, indeed, the entire world.[11] It would be surprising if the three author organizations came up with a weapons system or even idea that was so powerful or unusual in its capabilities as to change the world as we know it.

On the other hand, each FFA proposes a variety of often incremental technologies that offer, when aggregated, major rewards to the service and nation that manages to deploy them in sufficient numbers. Hence the rewards for assuming technological risk, as above, are great. Traditional economists are quite leery of "picking winners;"[12] rather they believe that market competition will sort out the successful from the unsuccessful. Unfortunately, for the USN, there is not market but rather the unforgiving "audit of war."

Defense Industrial Issues

It appears to date that the naval industrial base is both ready and willing to support whichever future fleet architecture is chosen by the Navy. Indeed, if op-eds and paid analysts are to be believed, they are ready and willing to support the maximalist fleet architectures proposed by analysts outside the government or uttered by the President (e.g., 350 ships). As far as the analysis goes, this is largely true. It is obviously the case that shipbuilders, aircraft manufacturers, and the providers of the vast range of equipment, hardware and software required to outfit a future fleet architecture will, for the right price, do what is required.[13]

As a practical matter, there are several seldom acknowledged constraints on the ability of the naval Defense Industrial Base (DiB) to perform as advertised. First is the question of timing. Given the long period of yard consolidation, the one or perhaps two active American aircraft manufacturers, the existing number of shipyards, slips, and so forth place an upper limit on production, at least in the short term. In the long term, with enough money, the private firms and even the government can acquire the factories, machine tools and so forth necessary to increase the numbers of platforms coming of the lines. It should be mentioned, however, that the number of yards and the availability of production facilities may not even be the long pole in the tent. As many experts have warned over the past two decades, we have a limited pool of experienced and highly trained workers (e.g. welders) available, especially to build the most technologically sophisticated platforms desired by several of the FFAs. Industrial technology (like for example, robotic welding machines) offers a partial way out of the difficulty, especially once production rates rise high enough to achieve economies of scale, but again this will still increase the cost per unit and per program of the equipment and platforms purchased

The second DiB question is, of course cost. To varied degrees, each of the FFA makes efforts to reduce costs—the means vary from advocating for shifting the composition of the fleet (e.g. from smaller numbers of higher technology systems to larger number of lower technology and, it is hoped lower costs systems) to introducing larger number of unmanned systems on the (often) discredited theories that fewer sailors in the cockpit will save on personnel costs and, even, introduce the possibility that such platforms are expendable. Many of these assertions have yet to be proven, have been disproven by evidence dating back decades, or lead to unintended consequences (e.g., taking the man out of the cockpit sometimes leaders to higher accident rates, at least initially and/or the tooth-to-tail ration shifts—i.e. there is no one in the cockpit but the logistical chain

required to maintain and operate an unmanned system may be greater and perhaps even more expensive)

Finally, DiB experts are familiar with and often joke about Augustine's laws (Number 16 is that "In the year 2054, the entire defense budget will purchase just one tactical aircraft. This aircraft will have to be shared by the Air Force and Navy 3½ days each per week except for leap year, when it will be made available to the Marines for the extra day"). Joking aside the cost growth for individual naval systems is very real and any FFA should include cost as a criterion and consider how each alternative deals with DiB realities. Congress, the Obama administration and presumably the Trump administration have worked long and hard on acquisition reform; if past is prelude, they will continue to work on it without notable success.

Conclusion

An obvious but nagging question remains: what is the new fleet, whether 350-ships or some smaller number, complete with the full range of high technology capabilities for? What great global threats or causes will justify spending a large portion of the $54 billion dollar increase in defense spending on new ships, naval aircraft, unmanned systems and all the sundry systems needed to operate a vastly expanded Navy? The question nags especially because buying more ships and naval systems clearly will entail trade-offs. The President's budget proposes to offset new defense spending with similar cuts in non-defense, discretionary spending including foreign aid and the Environmental Protection Agency budget.[14]

The answers to the query remain unknown and are likely to remain mysterious for some time to come. The Trump administration has not yet filled many of the key leadership positions in the Navy and the Department of Defense that would help transform the President's campaign promises into action.

In the end, then what is missing from the President's vision of a 350-ship navy is an underlying strategy – one that links what is proverbially called the "ways, means and ends." Working outward, the national security community, the nation, and indeed America's allies and adversaries need to understand the logic underlying any historic naval buildup. A clear statement regarding of the primary the threats facing the US, the types of adversaries it will face, and the nature of future conflict would help explain why the American taxpayer is investing so much national treasure in the military service.

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[1] FY 2017 U.S. Navy 30-Year Shipbuilding Plan (May 9, 2016). Https://news.usni.org/2016/05/09/document-fy-2017-u-s-navy-30-year-shipbuilding-plan

[2] http://www.navy.mil/cno/docs/cno_stg.pdf

[3] Megan Eckstein, "Admirals: Navy Needs a Bigger Fleet, And Now May Be the Best Time to Plan for It," *USNI News* (October 27, 2016). Https://news.usni.org/2016/10/27/admirals-navy-needs-a-bigger-fleet-and-now-may-be-the-best-time-to-plan-for-it#more-22264.

[4] https://news.usni.org/2017/02/14/trio-of-studies-look-to-the-u-s-navy-fleet-of-2030

[5] Bryan Clark, Peter Haynes, Jesse Sloman, Timothy Walton, *Restoring American Seapower: A New Fleet Architecture for the United States Navy* Center for Strategic and Budgetary Assessments (February 9,

2017). http://csbaonline.org/research/publications/restoring-american-seapower-a-new-fleet-architecture-for-the-united-states-.

[6] Early reports misinterpreted Future Fleet Architecture proposed by the MITRE Corp. by suggesting it advocated more than 400 surface and subsurface vessels.

[7] Congressional Budget Office, *An Analysis of the Navy's Fiscal Year 2017 Shipbuilding Plan* (February 21, 201). https://www.cbo.gov/publication/52324.

[8] Congressional Budget Office, *Projected Costs of U.S. Nuclear Forces, 2017 to 2026* (February 14, 2017). https://www.cbo.gov/publication/52401

[9] Jacques S. Gansler, *Democracy's Arsenal: Creating a Twenty-First-Century Defense Industry* (MIT University Press 2011), see especially chapter 6.

[10] Jacques S. Gansler and William Lucyshyn, *Cost as a Military Requirement* Center for Public Policy and Private Enterprise, School of Public Affairs, University of Maryland (Revised January 2013)

[11] William A. Owens, *Lifting the Fog of War* (Johns Hopkins University Press (October 19, 2001), pp. 78-79 and 98-103. For an earlier argument, see William A. Owens, "The Emerging U.S. System-of-Systems," *Strategic Forum* no. 63, (February 1996)

[12] Joseph E. Stiglitz Senior Vice President and Chief Economist the World Bank, "Public Policy for a Knowledge Economy," Department for Trade and Industry and Center for Economic Policy Research London, U.K. January 27, 1999.

[13] Peter Dombrowski and Eugene Gholz, *Buying Military Transformation: Technological Innovation and the Defense Industry* (Columbia University Press 2006).

[14] https://www.nytimes.com/aponline/2017/02/28/us/politics/ap-us-trump-diplomatic-cutbacks.html?_r=0