Impacts of the Robotics Age on Naval Force Structure Planning

Jeffrey E. Kline, CAPT, USN (ret)

Naval Postgraduate School

This discussion's theme is that our overly platform-focused naval force structure planning and acquisition system is burdened with so many inhibitors to change that we are ill-prepared to capitalize on the missile and robotics age of warfare. Refocusing our efforts to emphasize the "right side" of an offensive kill chain to deliver kinetic and non-kinetic effects will aid in overcoming these challenges and prioritize our efforts towards identifying where cutting edge technologies can best be applied in naval warfare. The dialog addresses traditional foundations for force structure planning, inhibitors to changing force structure, and how focusing on the packages for platform delivery instead of the platforms will allow us to better leverage new technologies.

Ideally, naval force structure grows from national strategy, national treasury, technology advancement, and potential adversary capabilities to build required ships, aircraft and capabilities. National strategy provides the rationale, purpose, and priority of choices to be made in creating a fleet. National treasure provides both the resources and constraints. New technologies provide opportunities for increasing fleet effectiveness, and may also potentially expose vulnerabilities to fleet survival when adversary capabilities are considered. This is a complex problem with only these four factors. In reality, however, U.S. force structure planning is also challenged by other influences, impactful on planning and budgeting for the fleet's composition. These other pressures inhibit capitalization of new technologies and slow reaction in the face of new challenges.

The most powerful inhibitor is inertia caused by an existing fleet being a large national capital investment with long build and life times. Ships and aircraft cost billions to design, build, and maintain. They require a capital-intensive industry requiring heavy equipment, infrastructure, and a skilled workforce, all generations in the making. The consequence is annual programming and budgeting decisions are marginal in nature. It is the nature of a large fleet to evolve slowly, in lieu of revolutionary changes to its composition.

Since our first six frigates were authorized in 1794, national internal political and economic factors have been another major influence on fleet composition. Illustrated well by Ian Toll in his *Six Frigates: The Epic History of the Founding of the U.S. Navy*, the potential windfalls on local economies when selected to provide force structure generate powerful political pressures on force generation decisions and create the desire for stabilization once those selections are made.

Next, over-compartmentalization in fleet planning, budgeting, building, and maintenance, with large and resource-competing bureaucracies executing these functions, creates a lethargic and inefficient environment for change. Multiple oversight agencies, including Congress, make any decision by one program manager susceptible to over-zealous scrutiny which dis-incentivizes innovation. Agility is lost when the number of stakeholders exceeds the point where responsibility and authority cannot be clearly defined.

Finally, the very nature of a fleet's strategic value engenders conservatism in senior naval leadership when faced with options for change. This is not necessarily an unhealthy view as the loss of the fleet can mean the loss of sea lines of communication and therefore a war. None-the-less, over valuing what worked in the last major maritime war, at the expense of not recognizing technology that changes the conveyance of maritime power, can result in a fleet not prepared to combat an enemy that is not so inhibited.

None of these influences on force structure planning can be lightly dismissed. The danger is that collectively they result in harmful escalation of commitment toward obsolete platforms and only marginal changes in force structure in the face of major technological changes. The result today is a brittle U.S. Fleet that is susceptible to capability surprise.

The United States in not unique in facing these challenges. Historically, major changes to naval force structure have resulted from war and/or great technology leaps. Ramming, row and boarding vessels gave way to the naval cannon and sail; sail to steam; rifled gun and armor to aircraft; aircraft to missiles; and now we are on the dawn of a robotics age. Missiles, robots, and artificial intelligence give the advantage to smaller, many, faster, and more lethal offense capabilities. Our challenge is to not allow restraints on the current force structure planning process to cede these advantages to potential adversaries.

Meeting the 2015 maritime strategic capabilities of all domain access, deterrence, sea control and power projection, and maritime security while constrained by the budget and procurement process, and contested by potential adversaries' growing capabilities, will require new thinking in platforms, weapons, and command and control. Advancement into the robotic age allows us to emphasize options to achieve a desired tactical end state which enables our operational and strategic goals. For example, investing in a very "smart" long range autonomous offensive missile that can out-range those of our adversary may permit us to build less-expensive, less well-defended ships from which to launch them thereby making sea control more affordable. Consider a new frigate with helicopter to hunt and armed with long-range missile to kill against today's DDG Flight III without any over-the-horizon missile. Granted, better to have a DDG Flight III armed with the same long-range missile, so long as we can afford sufficient DDGs with these capabilities to meet all of the other strategic capabilities around the world, the most capacity-demanding being maritime security. But our budget constrains us. The message here is not necessarily to favor a frigate over a DDG, but to refocus our investments on less expensive "payloads" delivered, kinetic or cyber, not the more expensive delivery platforms. A stark example is a weapon that has huge maritime influence but no maritime platform, the DF-21.

The views expressed in this paper are those of the author and do not reflect the official policy or position of the Department of the Navy, Department of Defense, or the U.S. Government.

Focusing on offensive payloads also lessens many of the political, economic, and bureaucratic challenges associated with large capital investment platform programs. We are not there yet. In the FY17 DoD President's budget, a bit over 40% of the budget is for aircraft and ships, only 9% for munitions.

This "package focus" first is particularly applicable in the electromagnetic and cyber realm. Inexpensive, deposable UAVs employing radar reflectors or chirp jamming may be better delivery platforms for EM "packages" than an F-18 Growler. In the offense, developing "Left of kill chain" effects against an adversary need not be expensive, but does require synchronization with the movement of actual forces. The desired effects may rely as much on advisory perception as on physical outcomes. The solutions here may be more organizational, training and in the area of concept of employment than force structure additions.

3