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Ronald O'Rourke

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TRANSFORMATION AND THE NAVY'S TOUGH CHOICES AHEAD

What Are the Options for Policy Makers?

Ronald O'Rourke

After a decade of making painful choices and implementing wrenching changes, it now seems that policy makers face another set of potentially far-reaching decisions concerning the future of the Navy. These new decisions, which are driven in large part by a significant apparent mismatch between current programs and potential resources, could significantly affect the structure and capabilities of the Navy over the next twenty years or more. Some of the most significant of the new choices concern the concept of military transformation: What does it mean for the Navy? What might be involved in implementing it?

There are many ways to explore this issue. This article begins by focusing on

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 that university's Nitze School of Advanced International Studies, where he received his M.A. in the same field. Since 1984, he has been a naval analyst for the Congressional Research Service of the Library of Congress. In 1996, he received a Distinguished Service Award from the Library of Congress for his service to Congress on naval issues. 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. This article is adapted from an address delivered to the Current Strategy Forum at the Naval War College in June 2000.

The views expressed in this article are those of the author and not necessarily those of the Congressional Research Service or the Library of Congress.

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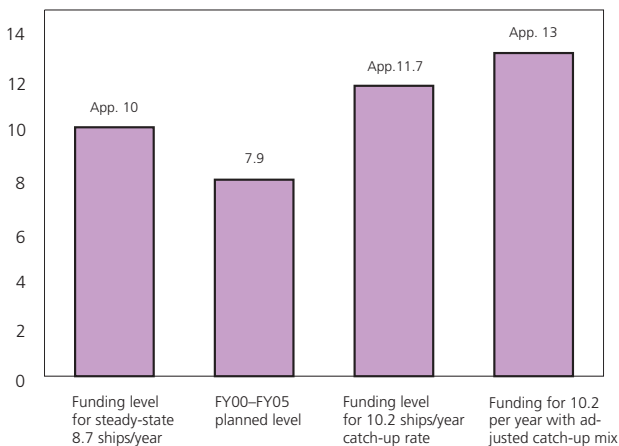
the balance between program goals and potentially available resources. It then presents four general options for future U.S. naval forces that arise from this balance. The discussion concludes by examining possible elements of a strategy for policy makers to implement the fourth and least-defined of these options—the transformation of U.S. naval forces in a manner more rapid and extensive than now planned.

WHERE WE ARE: THE BALANCE BETWEEN PROGRAMS AND RESOURCES

Policy makers cannot develop or assess options for future naval forces until they first assess where the Navy currently stands, and from a programs-versus-resources perspective, the first thing to be said about the current

TABLE 1
ANNUAL FUNDING FOR SHIP PROCUREMENT

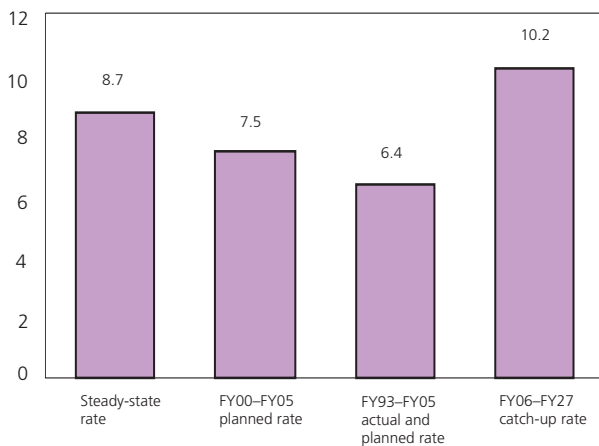
For 310-ship Navy, in bil. of \$FY01



Prepared by Ronald O'Rourke, November 2000

TABLE 2
SHIP PROCUREMENT FOR 310-SHIP NAVY

Average annual number procured



Prepared by Ronald O'Rourke, November 2000

situation is that the Navy's current programs collectively appear to be significantly larger than its budget.

Take, for example, just one portion of that budget—the shipbuilding account, which is intended to support the currently planned fleet of about 310 ships. (This figure includes fifty-five attack submarines, up from fifty in the 1997 Quadrennial Defense Review.) The shipbuilding account currently provides an average of about \$7.9 billion per year for actual procurement of new ships and procures a mix of about 7.5 ships per year (see tables 1 and 2). Increasing the ship-procurement rate to about 8.7 ships per year—the steady-state rate for a 310-ship Navy—and adjusting the mix of ships procured to reflect the planned mix of ships in the 310-ship plan would require the shipbuilding account to be increased by about two billion dollars per year. A bit less than four billion dollars in additional funding per year would be needed to achieve and maintain a procurement rate of 10.2 ships per year, which is what would be needed after fiscal year (FY) 2005 to work off the backlog of deferred

ship procurement that has accumulated relative to the steady-state rate since fiscal 1993. About five billion dollars in additional funds per year might be needed to adjust the mix of these 10.2 ships to compensate for the fact that the ships procured since the early 1990s have included a less-than-proportionate share of submarines, which are more expensive than most other types of ships.¹

That would be two billion to five billion dollars in additional required funding per year—for just one of the Navy's appropriation accounts. Other individual Navy accounts would not require nearly as much additional money to fund fully, but it appears that several program areas could easily absorb increases of from several hundred million dollars to more than a billion dollars a year if the programs in these areas were to be more fully funded.

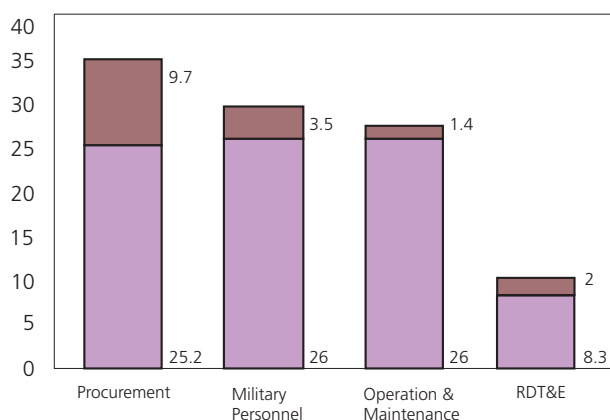
The "Procurement, Marine Corps" account, for example, has a steady-state funding requirement of about \$1.2 billion a year. The FY 2001 budget returns this account to about that level, but because this account was funded at about one-half of that level for several years, the Marine Corps states that it must now increase this account to about \$1.8 billion a year—an additional six hundred million dollars for each of the next several years. Similar things could be said for the Navy's aircraft procurement, weapon procurement, and research and development (R&D) ac-

counts, and the accounts relating to readiness, maintenance of real property, and housing.

When one adds up the increases for all these areas, including shipbuilding, the total funding differential could be ten billion or more dollars per year, depending on how robustly the current programs of the Department of the Navy (DoN) are funded (table 3). A recent Congressional Budget Office report puts the figure at seventeen billion dollars per year.² This considerable difference between what it would take to fund fully the Navy's programs and its current budget "top line" is a central feature of the Navy's current situation.

TABLE 3
ANNUAL DON FUNDING SHORTFALL

Billions of FY 2000 dollars
Average planned funding for FY01–FY05 (bottom) and additional amount needed to reach sustaining level (top)



Prepared by Ronald O'Rourke, November 2000
Data taken from CBO report, *Budgeting for Naval Forces* (October 2000), table 5.

The Center for Strategic and International Studies, in Washington, D.C., last year published an updated analysis of what it calls the “coming train wreck” between defense program goals and available resources.³ The title of this analysis has made the train-wreck metaphor a well-established phrase in debates over future defense spending. This metaphor, however, may not be the best one, because it suggests that the conflict between programs and resources is still ahead, that the services have not yet felt its effects, and that these effects, when they arrive, will come all at once, in a cataclysmic way.

The conflict between program goals and available resources, however, is already with us. It has been growing incrementally for the last several years, and the tensions that have built up over that time have already begun to outstrip the Navy’s strategies to generate internal budget savings, as well as the service’s other temporary coping measures.

As a result of the tension between program goals and available resources, Navy programs have undergone a succession of cutbacks and reductions in recent years. The cumulative effects of these reductions are difficult to discern unless one stands back and assesses them in their entirety—which sometimes can be hard for military officers to do, since their career paths often move them from one job to the next every two or three years. Rather than a train wreck, then, it might be better to think of the effects of the imbalance between goals and resources as akin to gradual oxygen deprivation: it happens slowly, its effects build up over time, and the victim is likely not to be fully aware of what is happening. But in the end, if not alleviated or at least well managed, it can be just as fatal as a train wreck.

A second feature of the Navy’s current situation is that in the midst of this growing tension between programs and resources, there are proposals for increasing the Navy’s force structure from the current 318 or so ships to about 360 ships, so that the fleet can better meet the demands being placed on it, particularly for maintaining desired levels of forward deployments, without placing an undue burden on the Navy’s personnel and equipment. Such an increase in force structure would clearly require substantially more additional funding than would be required to fund fully the current 310-ship program.

A third important feature of the Navy’s current situation is that since the middle of 1999 there has been an increased focus in debates over future U.S. defense spending on the “revolution in military affairs” and on “defense transformation.” The theme of transformation was featured prominently in the Defense Department’s presentations of its proposed defense plan to Congress in early 2000, and in statements on defense policy that year by both sides in the presidential campaign.

WHERE WE MIGHT GO FROM HERE: FOUR GENERAL OPTIONS

Given this situation—the programs/resources imbalance, the proposals for increasing force structure, and increased interest in defense transformation—four general options for future U.S. naval forces can be sketched out:

- The first of these options would stay on today's path: it would maintain today's collection of programs and today's level of resources. It is, in effect, the baseline option.
- The second option would maintain today's programs but seek the additional resources needed to fund them fully—the ten billion (or more) additional dollars per year mentioned earlier.
- The third option is force-structure expansion toward a fleet of something like 360 ships. This option would maintain today's collection of programs in expanded form and would require an even larger amount of money to achieve.
- The fourth option is transformation, which would involve changing the current mix of programs. It could be implemented at various resource levels, but since it is not usually spoken of today in connection with large net increases in total resources, it can be associated here with today's levels of resources or something a bit higher.

First Notional Option—Stay on the Current Path

Choosing the first option would mean continuing the various strategies now being pursued to generate internal budget savings that would in turn be applied to currently underfunded priorities, including modernization. These include familiar measures like regionalization of bases and of maintenance; competitive sourcing and privatization; “smart ship,” “smart work,” and “smart base” initiatives; and also acquisition reform measures, such as multiyear procurement, commercial-off-the-shelf (COTS) procurement, and using cost as an independent variable (CAIV) in the design of new systems.⁴ This approach would also continue to balance, as well as possible, near-term readiness against longer-term modernization. It would seek to protect core procurement programs, the readiness of deployed forces, and selected R&D efforts leading toward a moderate, gradual evolution of the force.

In theory, the internal savings produced by this strategy might be enough to finance an increase in procurement rates approaching steady-state replacement levels. This plan, however, depends on certain key, and rather optimistic, assumptions: that the money-saving strategies will be implemented as planned, that they will generate the projected amounts of savings within a certain amount of time, and that no unexpected needs for increased expenditures will arise—that there will be no more financial shocks to the system.

This strategy appears to be a fragile one in that its success requires all these factors to work out as planners hope. The experience of the last several years, in fact, suggests that there is a good chance that one or more of these assumptions will not pan out. Some strategies for saving money may be only partially implemented; some even of those that are fully implemented may not produce hoped-for results; and unexpected financial demands could well arise.

If matters did not work out as planned, the result would be an intensification of the challenges that the Navy now faces in trying to make ends meet. This strat-

The first thing to be said about the current situation is that the Navy's current programs collectively appear to be significantly larger than its current budget.

egy carries a high risk of producing, over time, a gradual erosion in force structure, an erosion that would begin when today's ships begin to retire in large numbers after 2010 and particularly after 2020. The fleet could

fall below the current level of about 318 ships, and then below three hundred ships, as the consequences of fifteen or twenty years of deferred procurement begin to manifest themselves. This would lead to a corresponding reduction in the number of ships that could be deployed forward at any one time. Similar effects would become manifest in aircraft inventories. In general, there would be pressure on the Navy's ability to maintain required levels of readiness, with the burden for this task falling increasingly on the backs of Navy personnel. Also, there would be limited or spotty modernization; in place of new designs and new production, there would be significant reliance on modified designs, upgrades, and service-life extensions.

With regard to the potential for reduced forward-deployed operations, the nation could respond to such a state of affairs in a number of ways. It could simply accept reduced levels of forward-deployed forces, which could require choosing to maintain higher levels of presence in one region at the expense of presence in another, reducing the number of ships sent to each region, or reducing the fraction of the year that ships are deployed to various regions.

Alternatively, the nation could seek to maintain higher levels of forward-deployed naval forces by increasing the number of ships that are "forward homeported" in overseas operating areas. This would raise all of the traditional issues associated with forward-homeported ships, including the need for host-nation acceptance; the possibility of host-nation restrictions on how the ships are used; the risk of becoming excessively tied politically to one region at the expense of others; the issue of how and where these ships are to be maintained; and the risk—the severity of which would depend on the host nation involved—of being evicted and seeing calculations made on the assumption of forward homeporting upset.

Finally, the nation could respond by seeking greater efforts from allies and friends in support of maintaining regional security. This option, however, would depend not just on the willingness of those allies and friends to take on this responsibility but on their capability to do so as well. For naval forces, capability is a significant consideration, since U.S. naval forces include platforms and systems (and resulting capabilities) that are rare in or absent from the naval forces of U.S. allies and friends, including carrier-based fixed-wing aircraft, nuclear-powered attack submarines, surface combatants with highly capable area-air-defense systems, land-attack cruise missiles, and substantial amphibious assault forces.

Optimistically, this first option would result in a fleet of about the size of today's, with some amount of modernization. Less optimistically, the fleet would have fewer ships than it does today, and the amount of modernization could be meager. Either way, but particularly in the less optimistic scenario, this option raises issues regarding both numerical and qualitative sufficiency for carrying out potential missions fifteen or twenty years from now.

Second Notional Option: Fully Fund the Current Plan

Pursuing the second option—fully funding the currently planned 310-ship force—would involve continuing the same money-saving measures described under the first option while seeking the additional resources needed to fund today's collection of programs more completely. These additional resources could come from an increase in the defense budget top line or an increase in the Navy's share of the top line.

It is not clear whether the next administration will support an increase in the defense budget so large that the Department of the Navy's proportionate share of that increase would amount to ten (or more) billion dollars per year. While both presidential campaigns spoke in favor of maintaining a strong defense, neither committed itself specifically to an increase of this size. Moreover, the new administration will face numerous competing federal budget priorities, such as shoring up Social Security; financing new domestic program initiatives in areas such as education, health care, and the environment; granting tax reduction; and carrying out debt reduction. In light of these competing federal budget priorities, substantial growth in the defense top line, while possible, is by no means certain.

The alternative of increasing the Department of the Navy's share of the Defense Department's top line has been mentioned regularly for many years now. The experience of the past several years, however, suggests that mutually offsetting forces in the Pentagon tend to make such shifts difficult to achieve. All the services will likely ask the new administration for more funding, and all of them

will bring well developed arguments to bear. In practice, each service's efforts have tended to cancel out those of the others.

If the division of the defense budget changes, moreover, it might not be in the Navy's favor. The Army is now pursuing a force transformation, and policy makers on Capitol Hill, at least, have reacted very supportively to this initiative. On this basis, one might argue that the most likely beneficiary of a defense-budget reallocation would be the Army rather than the Department of the Navy.

If the Navy were to obtain enough new money to fund fully today's programs, then compared to the first option, force structure would be more stable, there would be less pressure on readiness, and there would be somewhat more modernization. Current levels of presence could be maintained, and there would be less need for compensatory measures like forward homeporting or increased reliance on allies. Whether this force would be sufficient numerically and qualitatively for tomorrow's forward requirements, however, would still be in question. If the Navy did not succeed in obtaining all the additional needed resources, the outcome would be more like that of the first option, and the adequacy of the force numerically and qualitatively would be more problematic.

Third Notional Option: Expand the Force Structure

The third option of increasing the Navy's force structure toward 360 ships and maintaining today's collection of programs in expanded form would be pursued like the second, except that the amount of additional resources to be sought would be substantially greater. The question of an increased defense top line or an increased Department of the Navy share would arise again, but in more intensified form.

This option offers a fairly wide array of potential outcomes, depending on how much additional funding the Navy secured. If the Navy obtained most or all of what it asks for, the Navy could over time build itself up toward the 360-ship figure. Forward deployments could be expanded from present levels. Numerical sufficiency would be less of an issue, or no problem at all, but qualitative sufficiency might still be an open question, particularly if the new money were devoted primarily to acquisition of current systems rather than development of new ones. If, however, the Department of the Navy did not receive a large increase in resources, the outcome could be more like that of the second option or the first, depending on the amount it did manage to obtain.

Fourth Notional Option: Transformation

The fourth notional option is transformation beyond that which is already reflected in the Department of the Navy's plans. This option would involve altering today's mix of programs and implementing this altered mix at a level of funding about equal to or a bit higher than today's level.

In discussing this fourth option, it should be noted that, in debates over future U.S. defense spending, the term “transformation” is currently being used in two basic ways. The Defense Department and supporters of current defense plans often use transformation to refer to measures to change U.S. military forces that are already incorporated into the current Five-Year Defense Program, and to such long-range Defense Department conceptual documents as *Vision 2020*. This is the kind of transformation to which the Defense Department referred when it presented its proposed fiscal 2001 budget to Congress in early 2000. For naval forces, these measures include, among other things, current plans for implementing network-centric warfare in the fleet. It is an implicit feature of the three general options discussed above.

Those who believe present Defense Department efforts to implement transformation are inadequate use the term transformation in a different way—to refer to measures that would change U.S. military forces more rapidly or extensively than now planned by the department. This is the kind of transformation referred to under the fourth general option discussed here.

Although there has been much discussion of this more ambitious kind of transformation since the early 1990s, and particularly over the last year or two, it is still not clearly defined in terms of program content or cost. In relation to naval forces, it is typically characterized simply by citing specific proposals, such as STREETFIGHTER, the Arsenal Ship, or the conversion of Trident ballistic-missile submarines (SSBNs) to an SSGN configuration, carrying cruise missiles.

In general, however, it might be fair to say that this kind of transformation can be contrasted from the first kind—the kind reflected in the other three options—as involving different platforms and systems, different operational concepts, and a greater emphasis on long-term investments (as opposed to nearer-term programs). Its advocates argue that this kind of transformation is a means to produce, for a given amount of resources, a force more effective against future threats than one that would result from funding and implementing today's collection of programs.

THE FOURTH OPTION: IMPLEMENTING TRANSFORMATION

A major question facing policy makers and others who support or are interested in this kind of transformation is how to make it happen. What measures, in other words, could policy makers consider taking (or encouraging others to take) to implement this second kind of transformation? The following are some candidate measures that might form the core of a strategy for transforming U.S. naval forces.

Signaling. One measure to consider in beginning a transformation process would be to make clear to people both outside and inside the naval community

that transformation has become an important Department of the Navy priority, even the top priority. Signaling to outsiders is important in terms of winning support for any effort, particularly from Congress. The support that the U.S. Army received in congressional markups of the fiscal 2001 defense budget for its own transformation program is a good example. Signaling to members of the naval community would be equally important, because it would alert them to the facts that they may need to alter the focus of their efforts and that the current distribution of resources may change.

RDT&E. A second item would be to expand research, development, testing, and evaluation efforts so as to include a greater emphasis on “clean-sheet” designs and prototyping. This is likely to require a substantial increase in the RDT&E account—even more than what would be needed to fund more fully current research and development programs—particularly for developing new designs and building and testing prototypes. Instead of adding perhaps several hundred million or a billion dollars to the Navy’s RDT&E account (as under the second option discussed earlier), pursuing a transformation strategy might involve adding some multiple of this amount—perhaps two or three times as much.

Experimentation. A third need—one that is often mentioned in connection with transformation—is greater use of experimentation. This could include the establishment of standing experimental forces to supplement the experimentation that can be carried out by general-purpose forces.

* * * * *

These first three items come quickly to mind and are frequently mentioned in discussions of transformation strategies. There are additional measures, however, that can be considered, some of which are less frequently mentioned.

Reassurance. One of these would be to reassure platform communities (that is, the major sectors of the service closely involved with either surface ships, submarines, or aircraft) as well as program managers and contractors that transformation does not represent a mortal threat to their organizational well-being. Institutions, like individuals, tend to prefer stability and continuity over instability and discontinuity. Transformation carries with it the prospect of the latter and thus tends to elicit defensive reactions from people and organizations. The likelihood of swift and vigorous defensive reactions may well have been increased by several years of defense downsizing, which has encouraged institutions and individuals to focus more intensely on self-preservation. Years of program cutbacks and cancellations have encouraged a strong inclination toward “circling the wagons” and defending programs and priorities that have survived earlier reductions.

If transformation is to succeed, incentives would need to be changed so that individuals would know that they can succeed and advance in a transformative environment, and so that businesses would be confident of maintaining their profitability. Program managers' success should not be measured solely by their ability to carry forward procurement programs that were designed years ago if those programs are no longer appropriate, but rather on their ability to recognize where change may be needed and to move quickly to restructure the efforts.

Keeping NCW in Perspective. A fifth potential initiative would be not only to emphasize network-centric warfare but set it in context, in terms of its place in the intended transformation. Much excitement has been generated by network-centric warfare, and for good reason. But in the midst of this enthusiasm, there is a potential for simply equating transformation with network-centric warfare and letting it go at that. That would be a mistake, for although network-centric warfare is essential to transformation, a comprehensive transformation would involve other changes as well.

Right now, the Navy is essentially superimposing network-centric capabilities onto its existing force architecture. This will clearly increase Navy capabilities; but network-centric warfare, which fundamentally alters the relationships between different elements of a force, makes possible wholly new naval force architectures that can differ from today's fleet design. Indeed, exploiting the full potential of network-centric warfare may actually demand a change in the current force architecture. Simply applying it as a veneer over today's force architecture will limit the benefits it produces.

At a time when funds for the development and procurement of new designs are limited, there is a temptation to use network-centric warfare as a rationale for not investing in platforms and systems that could contribute to a new and different force architecture. Misapplying the concept of NCW in this manner would result in missed opportunities. Network-centric warfare will help a great deal, but transformation does not begin and end there.

Force Architectures. The Navy does not show much evidence, at least to outside observers, of having done very much work for years in the area of alternative force architectures. The last completed major effort that was publicized outside the Navy may have been a project conducted by Captain Clark "Corky" Graham at the Naval Surface Warfare Center at Carderock, Maryland, in 1989–92. This architecture focused on a large, modular ship that went by various names, including "carrier dock multimission" and "carrier of large objects," the objects being such things as aircraft, smaller scout/fighter ships, and amphibious forces.⁵

Instead of alternative force architectures, the focus in recent years appears to have been primarily on designing new platforms and systems for the current

fleet concept. But with the Navy becoming ever more networked, and with the capabilities of individual platforms increasingly becoming functions of their

The total funding differential could be ten billion or more dollars per year, depending on how robustly the Navy's current programs are funded.

places in that network, the need for paying more attention to the design of the overall force is becoming increasingly urgent. Just as the designer of a ship should

seek to optimize the total ship (rather than its individual systems or components), the need now appears to be to optimize the architecture of the entire naval force rather than simply the designs of the individual platforms that make it up.

There are several new platform and system concepts now on the table, but their merits and limitations will be less and less easy to identify and evaluate except in the context of a larger force architecture. If the focus remains on designing individual new platforms without parallel work on revised architectures, the result is likely to be a perpetuation of the current architecture, producing only next-generation versions of today's platforms and allowing change only through linear descent—stovepipe evolution, if you will.

It might turn out that a further elaboration of today's force architecture is the right approach to meeting tomorrow's operational needs. But this cannot be known with any confidence if the issue is not explored, and there is little evidence of such exploration in recent years. One hears references to a future "system of systems," but the tendency is to consider this metasystem as a by-product of individual platform and program development—something that will emerge and evolve passively, from the bottom up. Such an approach could overlook many of the opportunities that a more consciously designed "system of systems" could offer for increasing fleet capabilities. To achieve not just any system of systems but the best one will require not just bottom-up evolution but top-down concept generation as well.

One current example of focusing on optimizing the entire force architecture and approaching fleet modernization from the top down is the U.S. Coast Guard's DEEPWATER acquisition project. This project, which aims at replacing a large portion of the Coast Guard's current deep-water-capable assets, is deliberately seeking to avoid a simple one-for-one replacement of cutter classes and aircraft types. Instead, it focuses on identifying the most cost-effective force architecture—that is, the optimum combination of surface platforms, air platforms, C4ISR* systems, and logistics systems—that technology now permits. The

* C4ISR stands for command, control, communications, computers, intelligence, surveillance, and reconnaissance.

program would then procure the elements of this architecture in an integrated fashion.

This is an ambitious project for the Coast Guard, and that service faces several challenges in implementing it successfully. Parts of what the Coast Guard is attempting may not be appropriate or practical for the Navy to consider. Even so, it is worth examining for the lessons it can provide for thinking about future naval force architectures and for achieving them.

What might a transformed naval force architecture include? Elements that are frequently mentioned include a greater reliance on unmanned vehicles (including autonomous vehicles), increased use of distributed sensor networks, and new kinds of ships.

The possibilities for ships are quite diverse. In comparison to current designs, they could have larger and more varied payloads; they could be much more

All the services will likely ask . . . for more funding and . . . bring well developed arguments to bear. In practice, each service's efforts have tended to cancel out those of the others.

modular; they could be significantly smaller, or significantly larger; they could have much higher maximum speeds; and they could take advantage of nontraditional hull forms. They could be hybrid ships, mixing, say, the

functions of an aircraft carrier and surface combatant, or a surface combatant and an amphibious ship. They could be “mother ships,” deploying large numbers of smaller ships and unmanned platforms; they could be mobile offshore bases rather than ships at all. They could be derived from commercial designs. All these things have been proposed at one time or another.

An effective strategy to develop alternative force architectures might have three primary aspects. First, it could involve parallel efforts by multiple groups. Alternative force architectures could take various shapes, and the most promising candidates are likely to be discovered more quickly if a number of groups try independently to find them. These groups could be recruited from a variety of settings—the fleet, the platform communities, government laboratories, industry, universities, and think tanks. Each kind of group would have different strengths and limitations. For example, a group whose members are drawn from one of the Navy's platform communities might create architectures that expanded the capabilities of that platform in ways that other groups might not think of; on the other hand, however, it would understandably be disinclined to propose an architecture that downplayed or eliminated that platform.

Similarly, an industry group might have a better understanding of how to apply cutting-edge technologies, particularly from the commercial arena, to create new force architectures. It might be less bound by force-design traditions than people working within Navy offices, and it would be likely to have a keener

appreciation for producibility considerations. But a group whose members were drawn from the “widget” industry could not be expected to advance an architecture, whatever its merits, that did not require widgets.

A second potential element of an effort to generate alternative naval force architectures would be a greater use of simulation-based design as applied to the entire force rather than individual ships. The nation cannot afford to build new architectures for experimental purposes, and the Navy could sift through the many possibilities more quickly through intensive modeling and assessment.

Lastly, developing new force architectures should not be thought of as a one-time exercise but as a continuing effort, so that it can incorporate new developments and the contributions of new participants.

Operational Concepts. The need for new operational concepts is frequently discussed in connection with transformation. Much of this discussion concerns proposed operational concepts for warfighting and crisis response operations, and this part of the discussion does not need to be further elaborated here. The discussion of new operational concepts, however, arguably should not stop with warfighting and crisis-response operations, because it can also include consideration of new concepts for how to maintain normal forward-deployment and presence operations. A key goal here would be to identify concepts that can reduce the Navy’s current “station-keeping multipliers”—the numbers of ships of given kinds needed to keep one such ship on station in an overseas operating area. These multipliers are considerably higher than people often assume. Although it has often been asserted with conviction over the years, even by admirals, that it takes three Navy ships to keep one on station, the actual station-keeping multipliers for Navy ships are in fact more like five to one, or six to one for ships homeported in the continental United States—the exact numbers depending on the category of ship in question, the specific overseas operating area involved, and (for deployments to the Persian Gulf/Indian Ocean region) whether the ship is homeported on the East or West Coast.⁶

In the post–Cold War era, these station-keeping multipliers have been used extensively to justify Navy force levels. Indeed, for several years now the Navy’s force-structure requirements have been based primarily on the number of ships necessary to maintain established levels of presence overseas, and only secondarily on warfighting needs.

Although these station-keeping multipliers are effective force-level justifiers, they also reflect a high operational-cycle “overhead”—the fact that the Navy must procure a large number of expensive platforms to keep a fraction of them deployed on station at any one time. Reducing the multiplier might permit a smaller number of ships to maintain a given level of presence. Frequently

mentioned strategies for accomplishing this include double-crewing ships and scheduling long-duration deployments coupled with crew rotation, as was envisaged for the Arsenal Ship. Even after taking into account the additional costs of such measures—for additional crews, more shore-based training facilities, and shorter ship-service lives—this approach might produce net savings that could be devoted to research and development or acquisition.

Measures like these to reduce station-keeping multipliers could be applied only insofar as they did not leave the fleet with insufficient forces for warfighting.

Incentives would need to be changed so that individuals would know that they can succeed and advance . . . and so that businesses would be confident of maintaining their profitability.

They also raise serious issues concerning maintenance, training, and crews' sense of "ownership" of the ships they serve on—which can contribute to the efforts they make on behalf of their ships. These issues are

by no means trivial and may prove difficult to resolve. But that should not disqualify them from consideration as potential components of transformation.

The Acquisition System. If much of this is to be accomplished, significant changes might need to be made to the Defense Department acquisition system, particularly in terms of how proposed systems are evaluated and justified. One potential change would be to reduce the emphasis the system puts on replacing specific capabilities that are now being provided by systems approaching retirement age. This approach encourages decisions in favor of replacing older systems with new-generation versions of the same things—a replacement-in-kind strategy that leads to force modernization by linear descent and to a consequent perpetuation of the current force architecture. Instead, the acquisition system could be broadened to accept justification of proposed systems in terms of how they make sense within a future force architecture, irrespective of whether they exactly replace the capabilities of systems being retired, and even if they would result in overlaps of capabilities with other systems that are still years away from retirement.

If transformation is to involve greater use of prototypes, then the acquisition system might need to be changed so that the large up-front design costs associated with developing prototypes can be justified more in terms of their demonstrative (as opposed to purely operational) benefits. In addition, if transformation would mean frequent design changes during production, and frequent modification or restructuring of programs, then the acquisition system would need to be changed so that the assessed cost-effectiveness of proposed systems is not dependent on completing lengthy production runs of stable designs.

Finally, if transformation were to include increased use of experimentation, the acquisition system arguably should be changed to reduce its current emphasis on avoiding test failures at all costs on the grounds that such failures are inherently wasteful. This potential kind of waste should be compared to the more subtle forms of waste that can result when the emphasis on avoiding test failures at all costs slows down the replacement of inappropriate or cost-ineffective systems. Just as the Navy is trying to move away from the “zero-defect” mentality in its personnel policies, so too might it consider, in a transformative era, moving away from an acquisition system with a zero-defects orientation. The Navy (and the Defense Department generally) would need to recognize that if transformation is the goal, an absence of mistakes can be evidence of insufficient effort.

The current acquisition system can be viewed as, among other things, a huge system for avoiding errors and apportioning the blame when something goes wrong. A transformed acquisition system would encourage people to take risks when appropriate and protect them from blame or criticism for errors that result from honest efforts to discover something new.

Agile Manufacturing. Lastly, industry, in coordination with government efforts to change the acquisition system, can assist in the transformation process by altering its business model so that its operations are no longer built so much around the concept of executing long production runs of stable designs. Under this new model, profitability in the future would be derived more principally from research and development work, prototyping, and short production runs or longer runs with frequent changes in design. These activities would need to be viewed by industry as a significant and stable source of profits. The idea of operating profitably on the basis of short production runs of frequently changing designs is established in certain commercial industries that must contend with rapid changes in product technology or with frequent shifts in consumer preferences. The practices adopted by these commercial firms may be able to provide lessons in how to accomplish the same thing in defense production.

Moving toward this new business model, which might be called “agile manufacturing,” would likely involve the adoption of new production capabilities and processes. Defense firms have already made significant strides in adopting new production capabilities and processes in areas such as “lean” manufacturing (which involves, among other things, the avoidance of tools and jigs that are suitable for producing only one kind of item) and “flexible” manufacturing (which includes systems that can produce various components in small quantities in response to user demands for individual spare parts). Agile manufacturing would build on these improvements to put prototyping, limited

production runs, and rapidly changing designs more at the center of a firm's business operations.

These are not the only elements that might be included in a successful transformation strategy, but a strategy that lacked elements like these would be less likely to achieve its goals. Policy makers in the new administration and the 107th Congress may consider what a transformed naval force might look like and whether it would be better than the force that might result from pursuing the three alternative options discussed earlier. Their views on these issues will no doubt vary, but the Navy and the nation will likely benefit from the debate.

NOTES

1. For a discussion, see *Statement of Ronald O'Rourke, Specialist in National Defense, Congressional Research Service, before the Senate Armed Services Committee Subcommittee on Seapower Hearing on Ship Procurement and Research and Development Programs*, 2 March 2000, pp. 3–9.
2. U.S. Congress, *Budgeting for Naval Forces: Structuring Tomorrow's Navy at Today's Funding Level* (Washington, D.C.: Congressional Budget Office, October 2000).
3. Daniel Gouré and Jeffrey M. Ranney, *Averting the Defense Train Wreck in the New Millennium* (Washington, D.C.: Center for Strategic and International Studies, in Cooperation with Management Support Technology, Inc., 2000).
4. In an acquisition program using CAIV, goals are set for procurement or total ownership of the system (or both). Industry is given broad flexibility in making system-design tradeoffs to develop a system that meets the government's minimum-performance specifications and offers the most overall system capability for that cost.
5. For published discussions of this concept, see Anne Rumsey, "Navy Plans Look-a-Likes," *Defense Week*, 13 March 1989, p. 3; Robert Holzer, "Navy Floats Revolutionary Ship Design for Future Fleet," *Defense News*, 14 May 1990, pp. 4, 52; Norman Polmar, "Carrying Large Objects," U.S. Naval Institute *Proceedings*, December 1990, pp. 121–2; Edward J. Walsh, "'Alternative Battle Force' Stresses Commonality, Capability," *Sea Power*, February 1991, pp. 33–5; and Michael L. Bosworth, "Fleet Versatility by Distributed Aviation," U.S. Naval Institute *Proceedings*, January 1992, pp. 99–102. See also the "USN's '2030' Plan for Future Fleet," *Sea Power*, April 1992, pp. 79, 82. At one point in the early 1990s, the Advanced Research Projects Agency (ARPA) explored an alternative fleet architecture that included mobile offshore bases and small modular boats. For a discussion, see "ARPA Envisions Future Battle Fleet," *Navy News & Undersea Technology*, 3 October 1994, pp. 3–5.
6. For a discussion, see U.S. Congress, Library of Congress, *Naval Forward Deployments and the Size of the Navy*, by Ronald O'Rourke, CRS Report for Congress 92-803 F, 13 November 1992 (Washington, D.C.: Congressional Research Service, 1992), pp. 13–23. See also U.S. Congress, Library of Congress, *Naval Force-Structure Planning: Breaking Old Habits of Thought*, by Ronald O'Rourke, CRS Report for Congress 93-332 F, 19 March 1993 (Washington, D.C.: Congressional Research Service, 1993), pp. 2–3.