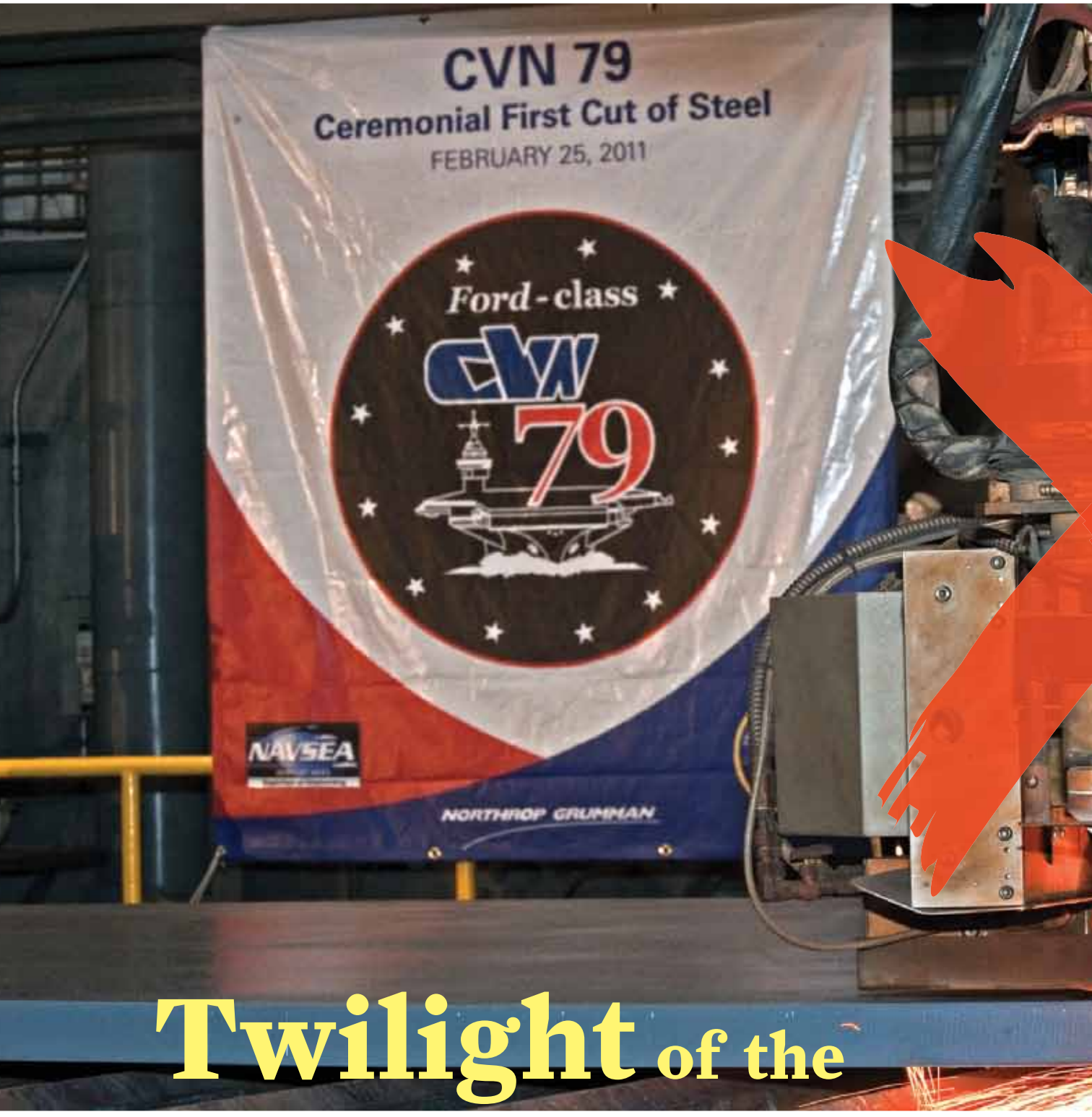

Twilight of the $UPERfluous Carrier

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With smaller and lighter unmanned aircraft coming into the mix, the United States can also deploy smaller and lighter—and less expensive—ships to carry them.

We can't know for sure in what ways future adversaries will challenge our Fleet, but we can assess with some certainty how technology is affecting their principal capabilities. Judging from the evidence at hand, future Fleet actions will place a premium on early sensing, precision targeting, and long-range ballistic- and cruise-missile munitions. Increasingly sophisticated over-the-horizon and space-based sensors, in particular, will focus on signature control and signature deception. Thus, we must ask ourselves how best to win this battle of signatures and long-range strike.

In the current Fleet, submarines are the gold standard for signature control. But unless they receive intelligence, surveillance, and reconnaissance (ISR) from other sources, they have limited sensing ranges. While surface combatants have longer-range sensing capabilities in multiple domains, they pay for it with a significantly higher signature. This balance between signature and sensing will, in large measure, dictate the future Fleet's architecture.

So will the future be one of submarines belching massive salvos of missiles, or large arrays of land- and air-launched hypersonic, conventional projectiles crossing a maritime no-man's-land to directly strike strategic centers of gravity? Given very clear technology trends toward precision long-range strike and increasingly sophisticated anti-access and area-denial capabilities, high-signature, limited-range combatants like the current aircraft carrier will not meet the requirements of tomorrow's Fleet. In short, the march of technology is bringing the supercarrier era to an end, just as the new long-range strike capabilities of carrier aviation brought on the demise of the battleship era in the 1940s.

The Carrier Dilemma

Factors both internal and external are hastening the carrier's curtain call. Competitors abroad have focused their attention on the United States' ability to go anywhere on the global maritime commons and strike targets ashore with pinpoint accuracy. That focus has resulted in the development of a series of sensors and weapons that combine range and strike profiles to deny carrier strike groups the access necessary to launch squadrons of aircraft against shore installations.

One issue of concern is the highly experimental and expensive move toward high-sortie-generation technology like the electromagnetic aircraft launch system (EMALS), which flies in the face of transition to precision-strike systems that promise one-target:one-weapon ratios. In addition, a series of poor acquisition decisions, beginning with the mismanagement and ultimate cancellation of the

J. WHALEN

Sparks fly during the first cut of steel for the next supercarrier in the *Gerald R. Ford* class, CVN-79, on 25 February at the Northrop Grumman Shipbuilding Sector in Newport News, Virginia. Not so fast, the authors say, figuratively unleashing sparks of their own: "The *Gerald R. Ford* is just the first of her class. She should also be the last."

A-12 Avenger as the replacement aircraft for the A-6 Intruder deep-strike aircraft, have exacerbated the challenge to carrier efficacy. The resulting reduction in the combat-effective range of the carrier air wing from 1,050 to 500 nautical miles forces the carrier to operate closer to enemy shores even as anti-access systems would logically force the carrier farther seaward.

Accompanying this range deficiency has been the dramatic increase in the cost of the carrier and her air wing. The price tag for the USS *Nimitz* (CVN-68) was $950 million, or 4.5 percent of the Navy's $21 billion budget in 1976. The USS *Gerald R. Ford* (CVN-78), lead ship of a new class of supercarriers, is estimated by the Congressional Budget Office to cost $12.5 billion. Add to that the Navy's own estimate of a 60 percent chance the ship will exceed the original cost projection and the number of technologies still under development. This brings the estimate to around $13.5 billion, or 8.7 percent of a $156 billion budget—all this while the ship is still plagued with technical risk factors like EMALS and the multi-function radar. The U.S. National Command Authority would need to be facing a gravely extreme scenario to commit this sort of strategic asset, with a crew of 5,000 men and women. The *Gerald R. Ford* is just the first of her class. She should also be the last.

The authors trace "the challenge to carrier efficacy" back to the would-be follow-on program to the A-6 Intruder, the woefully mismanaged A-12 Avenger—depicted here in an artist's rendering. Then-Secretary of Defense Dick Cheney canceled the A-12 in the early 1990s, which reduced the range of the carrier air wing, forcing carriers "to operate closer to enemy shores."

Future Challenges, Future Missions

Before suggesting an alternative to the current Fleet architecture, we must further explore the coming threat environment. And from that assessment, we should define future missions. As has been discussed recently in these pages, the naval services are at a strategic inflection point with regard to Fleet design unlike anything they have faced in 70 years. That the December 1941 attack on Pearl Harbor had a catalytic effect on hastening the ascendancy of the carrier over the battleship is well recognized. But it is also essential to point out that the enemy always has a vote, and geography and geopolitics matter.

It was not simply that aviation technologies had matured to a point where they became sufficiently reliable and effective in the 1940s to doom the battleship; it was also key that the Japanese presented the United States with roughly equal demand for naval sea-control and power-projection forces. In response, the aircraft carrier performed very well in both mission areas. So it is the mission as much as the march of technology that dictates the development of an effective Fleet architecture.

Since World War II, we have experienced varying levels of demand for sea control and power projection. The Soviet Union certainly challenged us strongly in sea control with submarines and long-range bombers. That approach was both logical and expected for a continental power confronting a maritime power. Since 1989, sea control has been largely uncontested and assumed, leaving power projection as the mission emphasis. Now, with the reappearance of a former great power, China, on the seas in force, a sea-control challenge emerges for the United States. Unlike the Soviet Union, however, China is responding in a way one would expect a maritime nation to challenge another maritime nation.

The Chinese are emphasizing sea control over power projection. Given this Chinese "vote" and the challenges we continue to face in the Middle East and Northeast Asia, we must rebalance our Fleet to meet new sea-control missions while maintaining reasonable power-projection capabilities for the range of global threats we will encounter. These new challenges mean that the Fleet architecture must evolve rapidly to meet the new mission requirements of our time. We need to recognize this now and avoid a 21st-century Pearl Harbor.

New Paradigm, New Fleet

Change is essential, but Fleets don't just change overnight. As always, the true pacing factors are the financial

U.S. NAVY (J. A. NUZZO)

The Navy and Spatial Integrated Systems, Inc. conduct harbor-patrol scenario trials with the fully autonomous unmanned surface vehicle off Fort Monroe near Hampton, Virginia, in 2009. Such systems would be part of what the authors call "a new paradigm for Fleet design," incorporating unmanned submarines, aircraft, and surface vessels.

and industrial capacities of a nation. Current anti-access systems suggest that the future Fleet will be dominated by submarines. But the relative lack of maturity in implementing those technologies into a comprehensive battle network means that we have time to make deliberate and strategic course corrections to a lower signature and a longer-range striking Fleet. That would feature not only subs, but also unmanned systems in the air, on the surface, and below the waves, thus establishing a new paradigm for Fleet design.

In such a new strategic environment, unmanned systems diminish the utility of the supercarrier, because her sea-control and power-projection missions can be performed more efficiently and effectively by other means. When the carrier superseded the battleship, the latter still retained great utility for naval surface fire support. Similarly, today's carrier will be replaced by a network of unmanned platforms, while still retaining utility as an as-needed strike platform. Ultimately, the decision to kill the battleships was not because they lacked utility, but because they were too expensive to man and operate. Future budgetary constraints could lead to a similar outcome for the carrier, recognizing that even if we purchased no new supercarriers, we would still have operational carriers in the Fleet for more than 50 years.

In the meantime, the *America*-class big-deck amphibious ship has the potential to be a new generation of light aircraft carrier. At 45,000 tons' displacement, she will slide into the water larger than her World War II predecessors, and larger even than the modern French aircraft carrier *Charles de Gaulle*. Designed without an amphibious well-deck, she will put to sea with a Marine Air Combat Element and key elements of a Marine Expeditionary Unit.

However, to view this purely as an amphibious-assault ship would be to miss her potential as a strike platform.

U.S. NAVY, COURTESY OF NORTHROP GRUMMAN

An X-47B Unmanned Combat Air System Demonstrator completes its first flight at Edwards Air Force Base, California, on 4 February 2011. The Unmanned Combat Air System Carrier Demonstration program will test the capability of such aircraft in performing carrier launches and recoveries. These could become the preferred aircraft to operate from the decks of the imminent *America*-class amphibious ships.

COURTESY OF LOCKHEED MARTIN

Marine Corps Lieutenant Colonel Matt "Opie" Taylor sits in the cockpit of a Navy F-35 test aircraft during approach to the TC-7 catapult at Naval Air Station Patuxent River, Maryland, on 22 March 2011. The F-35C carrier variant, at $120 million each, is projected to be one to three years behind schedule and could cost a total of $80–100 billion over the life of the program. Canceling it in favor of extending F/A-18E/F production could save, the authors say, $60–110 million per aircraft.

Stripped of her rotorcraft, the *America* class could comfortably hold two squadrons of F-35B short take-off vertical-landing (STOVL) stealth fighter/attack aircraft. Such an arrangement would allow the naval services to dramatically increase presence and strike potential throughout the maritime domain. In addition, if the requirements were instituted in the near term, the new unmanned carrier-launched airborne-surveillance and strike (UCLASS) aircraft could be designed to operate from *America*-class decks with greater potential utility and distribution than what could be expected when operating from super carriers.

Room for Two Carrier Types

Using the *America* class as a light aircraft carrier would provide significant flexibility to the Fleet. For the immediate future, the remaining supercarrier inventory could support a surge capability, when required, while the light carriers could provide greater engagement capability forward (light forward-surge heavy). Since three light carriers can be purchased for the cost of a single supercarrier, and since the smaller aviation component represents a more appropriate capacity for engagement missions, light carriers promise increased presence capacity with vastly lower operating costs.

Discussions of operating costs within naval aviation quickly give way to questions regarding costs of major programs over the lifetime of the platforms. The advent of the UCLASS can provide the United States with additional fiscal flexibility as well as strategic advantage. Presently, the Department of Defense remains stuck in the beginning stages of testing and fielding the F-35 Joint Strike Fighter. This platform will be a critical component of the nation's future force structure in the Air Force, Marine Corps, and Navy.

The F-35A will be a conventional takeoff-and-landing platform and will replace much of the U.S. Air Force's F-15 and F-16 inventory. Marine AV-8B Harriers will turn over their deck spots to the F-35B STOVL version, while U.S. Navy F/A-18 C/D Hornets will give way to the F-35C carrier variant. These aircraft could exceed $120 million each and are currently projected to be one to three years behind schedule because of design and test issues. Clearly, in light of the declining utility of the supercarrier, additional options are needed.

Presently, the Navy plans to purchase 480 F-35Cs over the life of the program at an estimated cost of $80–100 billion. A suggested alternative investment strategy would be to cancel the F-35C program and extend the F/A-18 E/F production line, with its current unit cost of $55 million each, yielding a net savings of $60–110 million per unit. Those aircraft could service the remaining super carriers, while the savings could be invested in accelerating the development and transition to the UCLASS. F-35B production, despite the unit cost, should proceed as scheduled because no other suitable alternative exists to replace the rapidly aging Harriers. Otherwise, transitioning the *America*-class carriers to unmanned aircraft is the more appealing alternative.

Beneath the Surface

Cruise-missile-equipped fast-attack submarines and large-salvo guided-missile submarines would become the natural complements to the UCLASS. Launched from stealthy platforms lying hidden beneath the waves, cruise and conventionally armed ballistic missiles would

speed toward critical command, control, communications, and computer ISR nodes ahead of manned and unmanned strike aircraft, crippling an enemy's ability to defend itself. Such platforms would also have a deterrent effect, promising quick-reaction strikes from unknown and unidentifiable locations should competitors choose to attack American national interests anywhere on the planet.

However, as clearly shown by other nations throughout the Asia-Pacific region, the United States cannot place all of its emphasis on submarines to perform day-to-day presence missions. To be an effective agent of American influence, a platform must be seen, and the nation must be perceived to be taking the risks that go along with presence operations just like any other nation. In other words, the United States requires an effective surface fleet—but not the one currently planned.

Ironically, one of the most maligned and dismissed components of the current Fleet already has the fundamental attributes needed to meet tomorrow's challenges. Amphibious ships are the prototypes for future surface combatants. Their design essentials make them perfect carriers of unmanned systems. Amphibious ships by design provide strong interfaces to the air, surface, and subsurface domains.

The new combatants would actually be "carriers," but rather than carrying aircraft, they would carry an array of unmanned systems. A balanced Fleet would have a mix of small, medium, and large unmanned carrier combatants to cover the range of Fleet functions. One near-term option would be to truncate production of the Littoral Combat Ship (LCS) and replace both the LCS and the Dock Landing Ship (LSD) with a common hull displacing around 10,000 tons.

COURTESY OF NORTHROP GRUMMAN

The key to this proposed new composition of the Fleet lies in the much-anticipated *America*-class amphibious assault ship. The authors take the ships' amphibious function a step further by proposing that they be used as "light aircraft carriers." In tandem with the existing supercarrier inventory, 60 of the *America*-class amphibs "would provide significant strategic flexibility," essentially playing the role of the Fleet's "utility infielder."

America the Beautiful

That small amphib would have a flight deck capable of handling all naval rotorcraft and a well-deck that could accommodate current ship-to-shore connectors, as well as future unmanned surface and subsurface vehicles. Building 60 of these combatants would provide significant strategic flexibility to the Fleet, allowing ships performing LCS missions to be easily sortied as amphibs in support of a large amphibious mission, should the need arise. Those ships would be the utility infielders of the Fleet, providing a tremendous platform for engagement missions and humanitarian-assistance/disaster-relief response at one end and amphibious operations and sea control at the other.

This sort of mission flexibility should be considered a key design attribute for any future combatant. In addition, numbers count in two important ways. First, more ships allow the Fleet to operate forward in more places. Second, more numerous, smaller vessels provide a resilient and survivable high-low mix. Technology makes this disproportionate ratio of small to large combatants possible.

In past gun and aircraft eras, there was a linear relationship between size and reach. Now, in the missile era, a small combatant can reach as far as a larger one. Because the most critical naval competition will be the battle of signatures, a small signature-controlled combatant with long-range precision strike will be a decisive component of any Fleet.

If this combatant has the ability to deploy her own surface pickets and antisubmarine and mine-countermeasures unmanned systems, a resilient Fleet architecture emerges where these multi-mission self-protected elements can combine into larger federations of networked platforms to create the battle Fleet of the future. Given the strong capabilities of each component, there is no single point of failure, and the system would attrite gracefully in contrast to the catastrophic failure the loss of a supercarrier would entail with today's Fleet.

The course of technological development renders a Fleet incorporating the design principles discussed here inevitable. However, with emerging-threat and economic challenges, it is essential we as a nation recognize the need for a new Fleet design sooner rather than later. We can raise an Army in years, but building a Navy takes decades.

U.S. NAVY (J. M. KING)

An F/A-18F Super Hornet lands on the USS *Enterprise* (CVN-65) during cyclic flight operations in the Arabian Sea on 21 March 2011. The authors see a place in the Fleet for both the existing supercarriers, which will still deploy Super Hornets, and the "light aircraft carriers." Not only would the new Fleet design provide more strategic flexibility, it would also save significant taxpayer dollars.

The Future Fleet

As always, the future is behind an opaque veil we cannot see clearly beyond, so we will never be able to prepare with complete assurance for what awaits us. However, we can take stock of our historical interests and the present strategic environment and then decide where we need to invest and build on our existing national-security foundation. When considering future Fleet composition, it is critical to explore with clarity the Fleet's peacetime and wartime roles. In wartime, the Fleet must be capable of consolidating its power in a coherent fashion to control the seas and project power ashore against enemy centers of gravity. In peacetime, it must be able to disperse globally to operate as a deterrent and engagement force.

Continuing to invest in platforms such as the supercarrier—which are expensive to build, cost-prohibitive to operate, and increasingly vulnerable in anti-access/area denied environments—is to repeat the mistakes of the battleship admirals who failed to recognize air power's potential in the 1930s.

No less authority than Pacific Commander Admiral Robert Willard has stated that China's DF-21D antiship ballistic missile has reached initial operational capability. We must recognize the new environments in which we will be operating, as well as the profound impact unmanned systems will have on future operations, and adjust our Fleet accordingly if we are to avoid a Pearl Harbor of our own making. We must reallocate science-and-technology, research-and-development, and acquisition resources toward this new Fleet paradigm.

It is neither necessary nor advisable to suddenly suspend supercarrier operations. Those already in commission and the *Gerald R. Ford* now under construction will last for decades. And extending the F/A-18 Super Hornet line will maintain that aircraft's viability and provide the bridge to an unmanned future. In the meantime, we should be moving to light carriers of the 45,000-ton range that can accommodate the STOVL variant of the F-35 as well as the new UCLASS unmanned attack vehicle. We should also be developing a new generation of combatants with flight decks and well-decks that can carry platforms for deployment into subsurface, surface, and aerial environments. All of this will provide regional combatant commanders with the ability to respond to a rapidly evolving security environment.

Moving away from highly expensive and vulnerable supercarriers toward smaller, light carriers would bring the additional benefit of increasing our nation's engagement potential. This type of force structure would allow the United States to increase its forward presence, upholding its interests with a light engagement force while maintaining, at least for the next 50 years, a heavy surge force of supercarriers. Geopolitics and technology are rapidly evolving the future security environment, and we must make decisions today to adapt the Fleet away from its current course to a new design for a new era.

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