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COVER STORY: ON THE SEA

Running Aground

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The U.S. Navy keeps shrinking. At its height in 1987, the Navy's battle fleet was 568 ships. Today, it is less than half that size, 279.

Because a ship lasts about 30 years before its hull and mechanical systems wear out, sustaining a 300-ship Navy requires building about 10 ships a year. At the peak of the Reagan buildup, in 1986, the Navy built 20. Since 1993, it has never exceeded eight per year. In 2007, cost overruns and cancellations brought the number down to five. The 2009 budget requests seven.

"The Navy has said they need 313 ships," Rep. John Murtha, D-Pa., the top defense appropriator in the House, said in an interview. "We weren't even going to get close to that at what the Bush administration was sending over to us. This year we're going to put 10 ships in again," Murtha vowed. "But I'm saying to the military that our subcommittee is no longer going willing to pay for these mistakes."

All of the armed services have chronic problems with bringing on complex weapons at cost and on schedule. The Navy, however, has the worst reputation. The secretary of the Navy, Donald Winter, wrote last year, "The Navy's shipbuilding program is deeply troubled [and] requires a brutally honest assessment of what we are doing wrong." From 1977 to 2005, the Navy introduced eight major building programs for different classes of surface ships. On seven of the eight, according to the Pentagon's independent Cost Analysis Improvement Group, the ultimate cost of the first ship built -- the "lead ship," whose construction usually reveals the most unexpected problems -- exceeded the Navy's estimate by at least 40 percent. On four of them, the overrun was more than 100 percent.

"We've lost the ability to estimate military ship costs," said Norman Polmar, a noted naval historian. The service's shipbuilding headquarters, the Naval Sea Systems Command, lost more than half of its workforce in the past 10 years, dropping from 5,000 people in 1998 to 2,350 in 2007. As a result, Polmar said, "we gave over to industry the design of surface ships, and once you've done that, you've lost your ability to check on them."

Overruns now threaten two new classes of Navy ships, the DDG-1000 destroyer and the smaller LCS-class, or "Littoral Combat Ship." Already on the DDG-1000, said Rep. Gene Taylor, D-Miss., the chairman of the House Armed Services Subcommittee on Seapower, "we saw incredible cost escalation that resulted in fewer numbers," with the Navy now planning on just seven ships, down from the original 32. Construction is scheduled to start this year. Meanwhile, out of the first four prototype Littoral Combat Ships, the two now being built are behind schedule and the other two were canceled outright, throwing a planned 55-ship program into uncertainty. "It was designed to be a low-cost warship," Taylor said. "They are rapidly approaching twice the price of what we thought. That puts them in jeopardy, and I think the contractors need to know that."

These overruns are particularly serious because neither the DDG-1000 nor the LCS was intended as a costly flagship. Instead, they were to be workhorse "surface combatants" designed to protect aircraft carriers, patrol sea-lanes, and project U.S. influence into areas around the globe where a carrier is not available. These missions require a large number of vessels. The 55 planned Littoral Combat Ships alone would make up more than a sixth of the Navy's hoped-for fleet of 313.

Coastal Complications

The new surface combatants are meant to solve more than just the Navy's numbers problem. They are also designed to shore up the fleet's performance in coastal areas, where shallow waters, small islands, and land masses can conceal an enemy's approach. All of the Navy's combat losses at sea since 1980 have occurred in these so-called "littoral" zones, mostly in the confined waters of the Persian Gulf: the frigate USS Stark was hit by an Iraqi Exocet missile in 1987; the frigate Roberts struck an Iranian mine in 1988; the amphibious landing ship Tripoli and the cruiser Princeton hit mines in the 1991 Persian Gulf War. In October 2000, Qaeda suicide bombers, in a small boat filled with explosives, rammed the destroyer Cole in Yemen's Aden harbor. The blast killed 17 sailors and put the ship out of service for 19 months.

The Cole belongs to the Navy's current mainstay class of surface combatants, with 52 ships in service and 10 more under contract: the Arleigh Burke class, named for a storied Navy admiral and former chief of naval operations, and also known as DDG-51s. The Burkes are built around their specialized, high-powered radar and long-range guided-missile launchers that can detect, track, and destroy targets 200 or more miles away. Where they struggle is at knife-fight ranges in coastal waters.

The DDG-1000 and the Littoral Combat Ship were supposed to be good in those localized fights. The Navy, however, took diametrically opposite but equally controversial approaches in designing the two ships to fight this kind of close-in coastal warfare. They also come out of radically different procurement processes -- both now widely denounced as failures.

"It's on cost and on schedule," said Allison Stiller, the deputy assistant secretary of the Navy for ships, in defense of the DDG-1000. But "DDG-1000" is only the latest designation for a program renamed, restructured, and rescheduled at least three times since its conception in the 1990s. The original, designated "SC-21," was envisaged as a 32-ship class, Stiller said. Later, as DDG-1000, it became a 10-ship class. "Right now the program of record is seven," Stiller acknowledged.

The original SC-21 was a specialized "land attack destroyer" designed to hit targets ashore and to replace aging frigates, such as the ill-fated Stark and Roberts, which displaced about 4,000 tons. But the design bloated into an all-purpose ship displacing 14,000 tons to accommodate 10 cutting-edge technologies -- not all of which, as it turns out, work well together.

Much of the DDG-1000's cost is its "stealth" hull, designed to baffle enemy radar-guided missiles and sound-activated mines. No matter how you design a ship, it's tough to hide a 14,000-ton vessel. But the DDG-1000's designers complicated the problem by giving the ship a high-powered radar system comparable to that on the Arleigh Burkes, but optimized to detect targets over land rather than over open water. Turning the radar on, however, announces the ship's location to the same radar receivers that are supposed to be baffled by its stealth. The ship can sneak close to shore or see far inland, but it can't do both at once.

The DDG-1000 needs to come close to shorelines to use another of its new technologies, an Advanced Gun System able to fire 10 shells a minute up to 80 miles inland. The Marine Corps has said for years that current Navy vessels lack the firepower to support an amphibious landing. But one of the leading critics of the DDG-1000, analyst Robert Work of the Center for Strategic and Budgetary Assessments, argues that it gives marines ashore very little bang for the buck.

"As a former artilleryman, I love the lethality and the range" of the new gun, said Work, a retired Marine Corps colonel, "but we're only going to get 14 of them" -- two each on the seven DDG-1000s -- "for about $17.5 billion" assuming zero cost overruns. Given the military's profusion of armed drones, smart bombs, cruise missiles, and a new GPS-guided shell for the Navy's existing 5-inch cannon that can fire almost 80 percent as far the DDG-1000's guns, Work considers the new destroyer too much cost for too little gain.

Insurgent Ship

While the mainstream Navy slowly added one costly capability after another to the DDG-1000, insurgents at the Naval War College, led by the late Adm. Arthur Cebrowski, brainstormed a stripped-down Streetfighter ship, which could solve the problem of close-in coastal battles with its high speed, low cost, and large numbers. Then-Defense Secretary Donald Rumsfeld and Chief of Naval Operations Vernon Clark not only embraced the concept -- albeit as the larger, more elaborate Littoral Combat Ship -- but also matched the revolutionary design to an innovative acquisition strategy. Two competing versions from General Dynamics and Lockheed Martin were rushed into production at midtier shipyards outside the "Big Six" that had long monopolized Navy shipbuilding. The yards used civilian construction standards -- standards that the Navy realized later were inadequate and that were then changed to toughen the ship, after work was under way.

"They were designing the ship at the same time they were trying to build it," said Congressional Research Service analyst Ron O'Rourke. "In retrospect, it can be pointed to as a case study in the old adage, 'Haste makes waste'." The design changes to a ship already half-built resulted in expensive do-overs of everything from pipe fittings to the thickness of the hull. The cost of the first two prototypes doubled, and Navy Secretary Winter canceled the third and fourth prototype ships outright.

What is the Navy getting for its money? It depends on whom you ask. "These LCS things are preposterous," said Dave Baker, a former Navy intelligence analyst. "The LCS will have the firepower of a small Third World patrol boat costing less than a tenth as much."

One European expert, however, considers the LCS a dramatic step beyond comparably sized NATO ships. Existing frigates are broadly similar to the LCS, said Jason Alderwick of the London-based International Institute for Strategic Studies. "But what they do not have is the LCS's speed, that's for sure," he said. "What's really exciting with LCS is the

move to integrated unmanned surface vessels and unmanned aerial vehicles."

Instead of giving the whole class a standard fit of equipment, each LCS is designed to accept any of three "mission modules" -- for mine-hunting, submarine-hunting, or fighting small boats -- each consisting of a specialized helicopter and an array of flying and submersible drones. "You get something almost like a small aircraft carrier, except with unmanned vehicles," allowing the LCS to scout out dangerous areas without physically entering them, said military analyst and historian Norman Friedman.

Friedman is less impressed by the Littoral Combat Ship's other innovation, its intended speed of more than 40 knots, compared with 30-plus knots for the Arleigh Burkes. In an era of shipboard helicopters and supersonic anti-ship missiles, most modern ships are actually slower than their World War II predecessors that fought with torpedoes and guns. "Speed is very sexy, but it turns out to be very expensive and not very helpful," Friedman said. "It's ruining a very good idea."

The two Littoral Combat Ship prototypes now in production will have to convince the critics, especially in Congress, that their speed and unmanned systems make up for their small size. If the prototypes succeed, Congress will closely examine whether to build the planned 55 ships. Even at the Congressional Budget Office's estimate of $600 million apiece, an LCS would cost half as much as an Arleigh Burke -- and less than a third of the Navy's most optimistic estimate for the DDG-1000.

Murtha and Taylor have talked publicly about cutting the two DDG-1000s currently under contract and restarting production of the Burkes instead. Building more Burkes would be a popular option with Congress, but parts of the necessary supplier base have already begun to shut down, complicating any restart; and even upgraded Burkes would never be optimal for close-in coastal combat. The Littoral Combat Ship, for good or ill, is the only game in town.