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Navy Shipbuilding: Recent Shipyard Mergers—Background and Issues for Congress

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Summary

In April 2001, General Dynamics (GD) and Newport News Shipbuilding (NNS) announced an agreement under which GD would purchase NNS. The following month, Northrop Grumman (NOC) announced an unsolicited counteroffer to purchase NNS. The Department of Justice (DoJ) and the Department of Defense (DoD) reviewed the two merger proposals and in October 2001 announced that they would oppose the GD merger proposal on the grounds that it would eliminate competition in nuclear submarines and harm competition for emerging technologies for both nuclear submarines and surface ships. DoJ and DoD did not oppose the NOC merger proposal, and in November 2001, NOC assumed control of NNS.

NOC's acquisition of NNS brought to an apparent conclusion a 5-year process of consolidation in the ownership of the 6 private-sector shipyards that build the Navy's major ships. The 6 yards are now owned by two firms – NOC, which owns 3 of the yards, and GD, which owns the other 3.

In theory, the 6 yards might have been consolidated under 3 owners rather than 2. Although the consolidation of the ownership of the 6 yards now appears complete, there may be further mergers and acquisitions involving shipyards that perform work for the Navy. DoD concluded that the consolidation-related savings of the NOC-NNS merger would be comparable to those of a GD-NNS merger. NOC stated that these savings might amount to $1.9 billion to $2.6 billion over the next 10 years.

Critics of the NOC-NNS merger can argue that it might pose competition concerns in areas such as construction of aircraft carriers and large-deck amphibious ships. Supporters of the merger can argue that DoJ and DoD reviewed these issues and did not object to the merger on competition (or other) grounds.

Shipyard mergers are unlikely to lead to significant changes in the total number of blue-collar production workers employed at the yards, but can alter the distribution of the total number of blue-collar workers among the yards. Shipyard mergers may increase the strength of the shipyards and shipbuilding in the competition for limited DoD procurement dollars. The mergers may raise questions concerning the treatment of shipbuilding in industry proposals for large DoD "system-of-systems" acquisition efforts. The mergers may also raise questions concerning the movement of senior officials (particularly those with backgrounds in shipbuilding) between DoD/Navy and industry.

The debate over the merger proposals involving NNS raises a question regarding the adequacy of the "savings-vs.-competition" framework for describing the merger-review process. It also poses a potential question for Congress regarding the executive branch view that DoD (rather than Congress or the taxpayers) is the sole or primary customer for a firm whose products are purchased solely by DoD. Lastly, the NOC-NNS merger raises a potential question regarding the technology-transmission risks of building non-nuclear-powered submarines at NOC's Ingalls shipyard for export to a foreign buyer.

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Introduction

On November 30, 2001, Northrop Grumman Corporation (NOC) assumed control of Newport News Shipbuilding (NNS), bringing to an apparent conclusion a 5-year process of consolidation in the ownership of the six private-sector shipyards that build the Navy's major ships. Following NOC's acquisition of NNS, the six yards are now owned by two firms – NOC, which owns three of the yards, and General Dynamics Corporation (GD), which owns the other three.

The consolidation of these six shipyards under two parent firms raises several issues of potential interest to Congress, including potential savings resulting from consolidation, the potential impact on competition in Navy shipbuilding, the potential impact on shipyard employment levels, and the potential impact on the shipyards and shipbuilding of the political process.

This report supercedes three earlier CRS reports on shipyard mergers – RL30251, which discussed shipyard mergers proposed in 1999;[1] RS20899, which discussed a proposal made by GD in early 2001 to acquire NNS;[2] and RL30969, which discussed both this proposal and a competing proposal made by NOC in early 2001 to acquire NNS.[3] A fourth CRS report, 96-785 F, discussed issues facing these shipyards in 1996, as the merger process was getting under way.[4]

Background

The Navy's Six Major Shipbuilders

1995-2001 Consolidation in Ownership

Six private-sector shipyards build the Navy's major ships. In alphabetical order, these shipyards are:

- Avondale Shipyards of New Orleans, LA;
- Bath Iron Works (BIW) of Bath, ME;
- Electric Boat (EB) Corporation of Groton, CT, and Quonset Point, RI;
- Ingalls Shipbuilding of Pascagoula, MS;
- National Steel and Shipbuilding Co. (NASSCO) of San Diego, CA; and
- Newport News Shipbuilding (NNS) of Newport News, VA.

As summarized in the table below, until September 1995, these six shipyards were owned by six separate organizations. General Dynamics, the owner of EB since 1952,[5] purchased BIW in

[1] CRS Report RL30251, *Navy Major Shipbuilder Ownership Consolidation: Issues for Congress*, by Ronald O'Rourke. Washington, 1999. (May 27, 1999) 28 p.

[2] CRS Report RS20899, *Navy Shipbuilding: General Dynamics' Proposed Acquisition of Newport News – Issues for Congress*, by Ronald O'Rourke. Washington, 2001. (April 26, 2001) 6 p.

[3] CRS Report RL30969, *Navy Shipbuilding: Proposed Mergers Involving Newport News Shipbuilding – Issues for Congress*, by Ronald O'Rourke. Washington, 2001. (May 22, 2001) 38 p.

[4] CRS Report 96-785 F, *Navy Major Shipbuilding Programs and Shipbuilders: Issues and Options for Congress*, by Ronald O'Rourke. Washington, 1996. (September 24, 1996) 126 p.

[5] GD's Web site http://www.gd.com states: "General Dynamics was officially established April 24, 1952, although it has organizational roots dating back to the late 1800s. The company was formed shortly after its predecessor and current operating division, Electric Boat, acquired the aircraft company Canadair Ltd. and began building the first nuclear-powered submarine, USS Nautilus."

September 1995 and then NASSCO in November 1998. Litton Industries, the owner of Ingalls since 1961, purchased Avondale in August 1999. NOC purchased Litton in April 2001, becoming the owner of Ingalls and Avondale, and then purchased NNS in November 2001.

Table 1. Ownership of the Six Navy Major Shipbuilders

Yards	Owners						
	Aug. 1995	Sep. 1995	Dec. 1996	Nov. 1998	Aug. 1999	April 2001	Nov. 2001
BIW	BHC[a]						
EB	GD	GD		GD			
NASSCO	Employee-owned[b]						
Avondale	Employee-owned[c]						
Ingalls	Litton				Litton	NOC	NOC
NNS	Tenneco[d]		Publicly traded[d]				
No. of owners	6	5	5	4	3	3	2

a. BHC refers to Bath Holding Corporation, an owners group led by the investment firm of Gibbons, Goodwin & van Amerongen and backed by the Prudential Insurance Company.

b. NASSCO became employee-owned in 1989.

c. Avondale became employee-owned in 1985.

d. NNS was spun off from Tenneco Corporation and became an independent, publicly traded company in December 1996.

Employment Levels; Types of Ships Recently Built

The table below summarizes the current owners of these yards, the number of people employed by the yards in December 2001, and the types of major Navy ships that the yards have built in recent years.

Table 2. The Six Navy Major Shipbuilders

Yard	Owner	Em-ployees in Decem-ber 2001	Types of Major Navy Ships Built in Recent Years					
			Nuclear-powered		Conventionally Powered			
			Air-craft Car-riers	Sub-mar-ines	Sur-face Com-bat-ants	Amphibious Ships		Auxil-iary & Sealift
						Large Deck (LHA, LHD)	Other (LPD, LSD)	
BIW		6,823			X		X?[a]	
EB	GD	9,239		X				
NASSCO		2,925						X
Avondale		5,388					X	X
Ingalls	NOC	10,120			X	X		
NNS		16,968	X	X				

Yard	Owner	Em-ployees in Decem-ber 2001	Types of Major Navy Ships Built in Recent Years					
			Nuclear-powered		Conventionally Powered			
			Air-craft Car-riers	Sub-mar-ines	Sur-face Com-bat-ants	Amphibious Ships		Auxil-iary & Sealift
						Large Deck (LHA, LHD)	Other (LPD, LSD)	
			Number of owners with recent experience, by ship type					
TOTALS	2 owners	51,463	1	2	2	1	2?*	2

Source: employment figure data provided to CRS, January 24, 2002, by American Shipbuilding Association, which collected the figures from the shipyards.

a. BIW is shown as a builder of LPD/LSD-type amphibious ships because of its membership on an Avondale-led team that won the competition to build the Navy's new San Antonio (LPD-17) class ships. Under the Avondale-BIW teaming arrangement, BIW would build every third LPD-17 and would thus build 4 of an anticipated 12 LPD-17s. In early 2002, however, it was reported that GD, NOC, and the Navy are discussing a plan to shift BIW's 4 LPD-17s back to NOC in return for NOC shifting some of its DDG-51s to BIW. If this plan is implemented, BIW would not build LPD-17s and would no longer qualify as having recent experience building LPD/LSD-type amphibious ships, leaving NOC as the only firm with such experience.

Business Situation

These six yards have only limited amounts of commercial ship construction[6] and overhaul work and consequently are highly dependent on Navy ship construction contracts. The reduction in Navy ship procurement that began in the early 1990s reduced work loads, employment levels, and total profits at several of the yards. Increased business pressures faced by the yards since the early 1990s appear to have been a major factor behind the consolidation in ownership of the yards that has occurred since 1995. The consolidation in ownership among the Navy's major shipbuilders, however, has not led to a major consolidation of facilities – the number of organizations that own the yards has been reduced from six to two, but none of the six yards has been closed or shut down.

Northrop Acquisition of NNS

Competing GD and NOC Merger Proposals

On April 25, 2001, GD and NNS announced an agreement under which GD would purchase NNS for about $2.6 billion, including assumption of about $500 million in NNS debt. On May 8, 2001, NOC announced an unsolicited counteroffer to purchase NNS for the same total cost of $2.6 billion, including assumption of the $500 million in NNS debt. In contrast to the GD proposal, which was an all-cash deal, NOC offered to purchase NNS's outstanding shares using a combination of NOC stock (75%) and cash (25%).

[6] Construction of ocean-going commercial ships in U.S. shipyards fell precipitously following the Reagan Administration's decision in the early 1980s to end the Construction Differential Subsidy (CDS), which subsidized the construction cost of U.S.-built commercial ships to make them more cost-competitive against ships built in foreign yards, and has remained at relatively low levels since.

DoD and DoJ Reviews

The Department of Justice (DoJ) and the Department of Defense (DoD) reviewed the two competing merger proposals for several months. DoJ's review focused on the potential antitrust implications (i.e., the implications for competition) of the proposed mergers. DoD's review focused on both the potential antitrust implications and the potential savings that each merger could realize through the streamlining of merged operations.[7] DoD's review was conducted in accordance with DoD Directive 5000.62 of October 21, 1996 – the directive establishing DoD policy relating to mergers and acquisitions of major DoD suppliers – which states that it is DoD policy to:

> Assess the potential implications for DoD programs resulting from a merger or acquisition involving a major defense supplier. The assessment shall consider the potential loss of competition for DoD contracts and subcontracts, estimated cost savings or cost increases for DoD programs that can be expected to result from the merger or acquisition, and any other factor resulting from the proposed merger or acquisition that may adversely affect the satisfactory completion of a DoD program.[8]

Congressional Interest

The competing merger proposals for NNS, and the DoD and DoJ reviews of the proposals, were closely followed by Members of Congress, particularly those who track issues relating to Navy shipbuilding, the defense industrial base, industry mergers and acquisitions, and government antitrust policy. Some of these Members wrote or signed letters to DoD and DoJ providing their views on the matter while the two departments were conducting their reviews.[9]

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[7] For an overview of basic U.S. antitrust law, see CRS Report RL31026, *General Overview of United States Antitrust Law*, by Janice E. Rubin. Washington, 2001. (June 18, 2001) 7 p. Page 3 of the report discusses the Horizontal Merger Guidelines of DoJ and the Federal Trade Commission (FTC), which were last revised in 1997 and "offer an indication of the ways in which mergers and acquisitions will be analyzed by the Antitrust Division [of DoJ] and the FTC; although they are not binding upon the courts, they are considered to be persuasive." The report notes (footnote 4 on page 3) thatThe 1997 revision dealt only with the Agencies' treatment of the so-called "efficiency defense" often put forth in support of a merger: although "[e]fficiencies generated through a merger can enhance the merged firm's ability and incentive to compete, which may result in lower prices, improved quality, enhanced service, or new products," mergers that are, on balance, anticompetitive will not likely be approved (section 4). Efficiencies "almost never justify a planned merger to monopoly or near-monopoly." 1997 FTC Chairman Robert Pitofsky, quoted at 72 Antitrust & Trade Regulation Report 348 (4-10-97).

The report also notes the "premerger notification" provisions added to U.S. antitrust law by the Hart-Scott-Rodino Antitrust Improvements Act of 1976 (P.L. 95-435), which allow DoJ and the FTC to examine potential mergers and acquisitions before they are implemented. Reviews of proposed defense (and other) mergers are sometimes called Hart-Scott-Rodino (or HSR) reviews.The Horizontal Merger Guidelines are also mentioned in CRS Report RS20241, *Monopoly and Monopolization – Fundamental But Separate Concepts in U.S. Antitrust Law*, by Janice E. Rubin. Washington, 2001. (Updated August 20, 2001) 6 p. The report notes (footnote 15 on page 4) that "a merger that is, on balance, anticompetitive, will not generally be 'saved' by claimed or actual efficiencies, nor likely be approved by reviewing agencies.([section] 4)."

[8] Department of Defense Directive Number 5000.62, October 21, 1996, Subject: Impact of Mergers or Acquisitions of Major DoD Suppliers on DoD Programs, page 2. This directive supercedes a memorandum from the Deputy Secretary of Defense, "Antitrust Aspects of Defense Industry Consolidation," of May 10, 1995. For the entire text of this directive (and other DoD Directives) on the Internet, go to http://www.dtic.mil/whs/directives/ .

[9] For articles discussing some of these letters, see Scarborough, Rowan. Lott Urges Pentagon To Approve Takeover By Northrop. *Washington Times*, May 11, 2001: 1; Capaccio, Tony. Rumsfeld Urged to Take No Position on Newport News Merger Bids. Bloomberg news service story, August 2, 2001; Lerman, David. Battle For NN yard Becoming A Clash Of The D.C. Titans. *Newport News Daily Press*, August 5, 2001: B1; Castelli, Christopher J. Senators Lobby Against General Dynamics-Newport News Merger. *Inside the Navy*, August 6, 2001; Holzer, Robert. Lott Steps Up

DoD and DoJ Decisions

On October 23, 2001, DoJ and DoD issued news releases announcing that they would oppose the GD merger proposal but would not oppose the NOC proposal. The DoD news release stated, in its entirety:

> The Department of Defense has completed its review of the proposals by General Dynamics Corp. and Northrop Grumman Corp. to acquire Newport News Shipbuilding, Inc.
>
> The DoD concluded that the proposal by General Dynamics would eliminate competition for nuclear submarines, resulting in a monopoly. Additionally, the [proposed GD] acquisition would harm competition for surface combatants and for the development of emerging technologies for both nuclear submarines and surface ships.
>
> The department determined that the benefits and savings offered by each transaction were comparable. The Northrop Grumman transaction has the additional benefit of preserving competition. DoD's views have been communicated to the Department of Justice.[10]
>
> "Either transaction would produce savings for the Department that are comparable in both nature and amount," said Glenn Flood, a Pentagon spokesman, in announcing the decision. "A General Dynamics acquisition of Newport News, however, would constitute merger-to-monopoly in nuclear shipbuilding construction."[11]
>
> Another article quoted Flood as follows: "Either transaction would have reduced costs. But in addition to cutting costs, General Dynamics would become a monopoly, hurting competition for not only nuclear submarines but also surface ships. We believe Northrop Grumman will preserve competition in the submarine building business."[12]

The DoJ news release stated, in part:

> The Department of Justice today filed an antitrust lawsuit to block the proposed acquisition of Newport News Shipbuilding Inc. by General Dynamics Corporation. The Department said that if the merger were allowed to proceed, it would eliminate competition for nuclear submarines – a weapon platform of vital importance to the security of the United States – resulting in a monopoly. Additionally, the Department said the proposed acquisition would harm competition for other military ships – conventionally powered surface combatants – and for the development of electric drive, an emerging technology for powering nuclear submarines and surface combatants.

Opposition To General Dynamics' Bid For Shipbuilder. *DefenseNews.com*, August 23, 2001; Gertz, Bill, and Rowan Scarborough. Inside the Ring. *Washington Times*, August 24, 2001: 8; US Senator Queries General Dynamics' Newport Bid. Reuters wire service story, September 18, 2001; Ratnam, Gopal. Senator Questions Claims In General Dynamics' Bid For Shipbuilder. *DefenseNews.com*, September 18, 2001; General Dynamics' Bid For Newport Questioned. *Los Angeles Times*, September 19, 2001; Muradian, Vago. Kohl, DeWine Question GD-NNS On Antitrust, Urge Rumsfeld To Avoid Monopoly. *Defense Daily*, October 1, 2001: 6-8.

[10] DoD News Release No. 536-0 of October 23, 2001, available at http://www.defenselink.mil/news/Oct2001/b10232001_bt536-01.html .

[11] As quoted in Capaccio, Tony. Northrop Wins Pentagon Approval to Buy Newport News. Bloomberg news service, October 23, 2001.

[12] Gilpin, Kenneth N. U.S. Moves to Block General Dynamics Bid. *The New York Times*, October 24, 2001. Another article quoted Flood as saying, "The bottom line is, we think there would be possibility of a monopoly if General Dynamics acquired Newport News. That was the major concern. If Northrop acquires Newport News, it would be a better arrangement." *New London Day*, October 24, 2001.

> The Department of Defense coordinated with the Department of Justice in the investigation that resulted in the lawsuit, and advised the Department that it had significant competitive concerns with the transaction.
>
> "This merger would give General Dynamics a permanent monopoly in nuclear submarines and would substantially lessen competition in surface combatants," said Charles A. James, Assistant Attorney General in charge of the Department's Antitrust Division. "Our armed forces need the most innovative and highest quality products to protect our county. This merger-to-monopoly would reduce innovation and, ultimately, the quality of the products supplied to the military, while raising prices to the U.S. military and to U.S. taxpayers."...
>
> [General Dynamics and Newport News] are the only manufacturers of nuclear submarines and two of only three companies that build large ships of any kind for the U.S. Navy. The companies are also leaders on the only two teams working to develop electric drive technology for nuclear submarines and surface combatants.
>
> "We greatly appreciate the assistance of the Department of Defense in investigating this matter," added James. "Justice and Defense are united in the view that the proposed merger should not go forward, and that competition plays an important role in ensuring that the United States can purchase the best platforms and systems to protect our country."[13]

The text of the DoJ lawsuit is reprinted in this report as Appendix A.[14]

At an October 25, 2001, DoJ briefing on its decision for Senators John Warner and George Allen (with reporters also present), Deputy Assistant Attorney General R. Hewitt Pate said that DoJ's decision to oppose the GD merger proposal "was not a close call" and that "From an antitrust point of view, it doesn't get any worse."[15]

On October 26, 2001, three days after the DoD and DoJ announcements, GD announced that it was terminating its merger agreement with NNS. The announcement signaled that GD would not contest DoJ in court over DoJ's decision on the GD proposal.

Northrop Completes Acquisition

On November 2, 2001, NOC announced that DoJ had closed its investigation of NOC's merger proposal, clearing the way for the merger to proceed.

On November 8, 2001, NOC announced that NOC and NNS had signed a definitive merger agreement. NOC took control of NNS on November 30, 2001, and announced on January 18, 2002, that it had completed acquisition of shares of NNS common stock not previously purchased in its tender offer that expired on November 29, 2001, giving NOC ownership of 100% of NNS.

NOC announced on April 1 that it had completed integrating NNS into NOC in terms of NNS's policies and operating practices, and that it intended to continue operating NNS as a separate division of NOC for about 18 months (i.e., until about October 2003), after which NNS will be integrated into NOC's ship systems division, which includes Avondale and Ingalls.[16]

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[13] DoJ News Release 01-549 of October 23, 2001, available at http://www.usdoj.gov/opa/pr/2001/October01_at_549.htm .

[14] The text is also available in the October 29, 2001, issue of *Inside the Navy*.

[15] Eisman, Dale. General Dynamics' Plan Raised Concern Over Antitrust Law. *Virginian-Pilot*, October 26, 2001. Another article quoted him as saying the case "was not a close call," that "In a merger context, it doesn't get any worse," and that "This was not a close case." Lerman, David. Senior Official Discounts Issue of Direct Competition. *Newport News Daily Press*, October 26, 2001.

[16] Liang, John. Northrop Grumman Completes Newport News Shipbuilding Integration. *InsideDefense.com*, April 1, 2002.

Issues for Congress

Previous Potential for Consolidation to Three Owners

Was consolidation of the 6 shipyards under 2 owners inevitable?

As a result of the post-Cold war downturn in defense procurement that began in the early 1990s, many segments of the defense industry went through a process of mergers and acquisitions that consolidated ownership under two firms or in some cases under a single firm. Production of tactical aircraft, for example, was consolidated under two firms (Boeing and Lockheed Martin), while production of tanks was consolidated under a single firm (GD).

Not all segments of the defense industry, however, have been consolidated under two firms or a single firm. For example, at least three firms are commonly cited as major combat system integrators (Boeing, Lockheed Martin, and Raytheon) and at least three firms are commonly cited as major military radar makers (Lockheed Martin, NOC, and Raytheon).

In the case of the 6 shipyards, a consolidation to three firms rather than two may also have been possible. Following GD's acquisition of BIW in 1995, which created a firm that owned 2 of the 6 yards (EB and BIW), the 4 remaining shipyards might have organized themselves into two additional 2-yard organizations. Avondale, for example, might have merged with Litton/Ingalls (a merger that did occur) while NNS merged with NASSCO (a merger that did not occur). Alternatively, Avondale might have merged with NNS (something the two companies proposed but did not implement) while Litton/Ingalls merged with NASSCO.

The possibility of consolidating the 6 shipyards under 3 firms, however, may have been made less likely by GD's November 1998 acquisition of NASSCO, which created a diversified shipbuilding organization that owned 3 of the 6 yards and accounted for 40% to 45% of the Navy's shipbuilding programs on a dollar basis. This development may have prompted the owners of the 3 remaining yards to question the viability of attempting to continue as smaller and less diversified single-yard firms – something that at least one of these 3 yards would need to attempt, following GD's acquisition of NASSCO, if the 6 yards as a group were to continue being owned by more than 2 firms.

Events following GD's 1998 acquisition of NASSCO appear to reflect the pressure this acquisition created among the 3 remaining yards to seek mergers with other yards: Within 6 months of the GD-NASSCO merger, the 3 remaining yards became involved in 4 merger proposals – NNS-Avondale (proposed in January 1999), GD-NNS (proposed in February 1999), Litton/Ingalls-Avondale (proposed in May 1999 and implemented in August 1999), and Litton-NNS (proposed in May 1999).[17] In light of this potential pressure to consolidate, it may have been unlikely for NNS – the sole remaining single-yard firm as of August 1999 – to remain a single-yard organization indefinitely.

Current Potential for Further Shipyard Mergers

Will there be further mergers and acquisitions involving shipyards that perform work for the Navy?

[17] For discussions of these merger proposals, see CRS Report RL30251, *Navy Major Shipbuilder Ownership Consolidation: Issues for Congress*, by Ronald O'Rourke. Washington, 1999. (May 27, 1999) p. 4-10.

With ownership of the 6 yards consolidated under 2 firms, the process of consolidation in the ownership of these 6 yards now appears complete. Given DoD's and DoJ's rejection of the proposed GD-NNS merger on antitrust grounds, it appears unlikely that the DoD or DoJ would approve a further consolidation in the ownership of all 6 of these yards under a single firm.

This does not, however, mean that there is no potential for further mergers and acquisitions involving shipyards that perform work for the Navy. Various possibilities for further mergers and acquisitions remain:

- **NOC or GD could seek to acquire other shipyards in the United States** that overhaul and repair Navy ships or build smaller ships for the Navy and Coast Guard, so as to gain a greater share of these markets. NNS, for example, acquired Continental Maritime, a San Diego shipyard that overhauls and repairs Navy ships, in December 1997.
- **Shipyards that overhaul and repair Navy ships or build smaller ships for the Navy and Coast Guard could merge among themselves.** For example, Bollinger Shipyards, a Gulf-Coast shipyard organization, in August 2000 acquired five overhaul and repair yards from Friede Goldman Halter, another Gulf-Coast shipyard organization. Bollinger now operates 14 Gulf Coast shipyards. Another example is U.S. Marine Repair (USMR), a shipyard organization owned by the Carlyle Group investment firm.[18] USMR was created by Carlyle's acquisition of Southwest Marine (SWM) in October 1997 and its acquisition of Norshipco in July 1998. (SWM itself was created through a series of shipyard acquisitions in the 1990s.) USMR now operates six shipyards – the SWM yards in San Diego, CA, San Pedro, CA, Ingleside, TX, and Pearl Harbor, HI, Norshipco's yard at Norfolk, VA, and San Francisco Drydock's yard at San Francisco, CA.[19]
- **NOC and GD could seek to acquire foreign shipyards** to gain either a better position in the international market for warships or better access to certain technologies. GD, for example, reportedly is interested in acquiring a 40% interest in the Australian Submarine Corporation of Adelaide, Australia, a firm that was created in 1985 to build Australia's six new Collins-class non-nuclear-powered submarines[20] using a design licensed from Kockums, a Swedish builder of non-nuclear-powered submarines.[21] And in March 2002, it was reported that

[18] The Carlyle Group http://www.carlylegroup.com, established in 1987, describes itself as "a private global investment firm that originates, structures and acts as lead equity investor in management-led buyouts, strategic minority equity investments, equity private placements, consolidations and buildups, and growth capital financings."

[19] Dates on Carlyle's acquisitions of SWM and Norshipco are from the Comment on the News page of http://www.coltoncompany.com an internet site that posts information and news concerning shipyards and shipping. The comment page states that USMR has grown further with "the subsequent addition of Pacific Ship Repair (San Diego CA) in December 1998 and Marisco (Honolulu HI) in June 2001. USMR's internet site http://www.usmarinerepair.com/, however, lists only the six yards discussed above.

[20] Non-nuclear-submarines traditionally have been referred to as diesel-electric submarines, but the term is no longer inclusive of all non-nuclear-powered submarines because of the emergence in recent years of alternatives to the diesel engine, such as fuel cells and Stirling engines, as power sources for non-nuclear-powered submarines. This report uses the term non-nuclear-submarines so as to not exclude submarines powered by such alternative systems.

[21] Ferguson, Gregor. U.S. Submarine Builder Studies Possible Australian Partnership. *DefenseNews.com*, April 10, 2002; Hamilton, Robert A. EB Looking At Sub Builder Down Under. *New London Day*, September 9, 2001; Oz Firm Eyed As Taiwan Sub Source. *Far Eastern Economic Review*, September 6, 2001; Garran, Robert. Navy Ties Up To Uncle Sam. *The Australian*, July 11, 2001.

One Equity Partners (OEP), a business entity owned by Chicago-based Bank One, had purchased a controlling share of the German firm Howaldtswerke-Deutsche Werft (HDW), a leading maker and exporter of non-nuclear-powered submarines. The report speculated that the OEP's purchase might be intended to pave the way for HDW to be acquired by GD or NOC.[22]

- **NOC or GD could decide to sell one or more of its yards** to a third party, such as another major defense firm. In 2001, during the DoD/DoJ review of GD's proposal to acquire NNS, some observers speculated that if the GD-NNS merger proposal were rejected, GD might consider exiting the shipbuilding business by selling its three yards to another firm.
- Finally, it is theoretically possible, if perhaps unlikely, that NOC could at some point in the future seek approval to sell one of its yards to GD, or vice versa, or that NOC and GD could seek approval to swap shipyards.

Consolidation-Related Savings From NOC-NNS Merger

How much consolidation-related savings will result from NOC's acquisition of NNS?

Sources of Savings

Shipyard mergers can lead to consolidation-related savings to the federal government and taxpayers in several areas, including the following:

- **Facilities.** Bringing two or more shipyards under common ownership can provide opportunities for closing or reducing unneeded, redundant, or excess shipyard facilities, and thus for eliminating or reducing the fixed overhead costs associated with maintaining these facilities. Facilities-related fixed overhead costs can include items such as depreciation, insurance, rent, property taxes, utilities, cleaning and waste removal, maintenance and repair, and security costs.
- **Centralized Personnel and Expenditures.** Shipyard mergers can provide opportunities to combine and streamline previously separate headquarters, central administrative, and design and engineering staffs, and to reduce centralized expenditures for items such as computers and data processing (including computer-aided design costs), independent research and development (IRAD),

[22] Mulholland, David, et al. US Bank Takeover Of HDW Raises Technology Issues. *Jane's Defence Weekly*, March 20, 2002. The article stated:Speculation is rampant that the deal is a cover for a US shipyard to acquire HDW's diesel-electric submarine technology. This, US military, US government and US and German industry officials said, would potentially allow a US shipyard to acquire state-of-the-art diesel-electric submarine technology to supply such submarines to international customers, in particular Taiwan....There is also speculation that Northrop Grumman or General Dynamics (GD) may be behind OEP's acquisition. It is the policy of both companies not to comment on mergers and acquisitions. Industry sources in Europe, however, said that General Dynamics has approached Babcock Borsig [one of HDW's previous owners] in the past about buying HDW, but this could not be confirmed. Industry and investment community sources says Bank One is in negotiations with both Northrop Grumman and General Dynamics for HDW and that Northrop is the preferred customer. "This is phase one; the bank transaction is designed to clarify the industrial structure to pave the way for an American partner," an investment community source said. "Negotiations have gone on with both Northrop and GD and Northrop is the front-runner."...HDW currently owns Sweden's Kockums and is in the process of buying Greece's Hellenic Shipyards. HDW is also eyeing a Portuguese shipyard and has industrial partnerships with Spain's Izar and Italy's Fincantieri....HDW has done much research into air-independent propulsion (AIP) that has given its diesel-electric submarines considerable endurance under water, greatly reducing the performance gap between nuclear and non-nuclear submarines, according to experts. HDW's work on fuel-cell technology is particularly attractive because it is efficient and quiet.

corporate allocation costs (i.e., corporate office allocation costs and franchise taxes), and marketing activities.

- **Materials and Components.** Shipyards under common ownership can lower the costs of their purchases of materials and components by combining their purchases into larger bulk orders. Savings in this area can be increased by designing ships of various types with deliberate commonality in materials and components.[23]
- **Best Practices.** Shipyards under common ownership can share their best business practices—their trade secrets—and combine their respective strengths in areas such as strategic business planning, facility management, project management and supervision, in-house design and engineering, worker training and supervision, material and component purchases, subcontractor relationships, and shipyard production processes and techniques.
- **Distribution of Workload.** The managers of a multi-yard organization can shift work from one yard to another, so as to avoid or minimize potentially expensive fluctuations in the workload at individual yards or take advantage of the ability of one yard to perform certain elements of work at lower cost.
- **Availability and Cost of Capital.** Becoming part of a multi-yard shipbuilding organization can give a shipyard improved access to investment capital that can be used to modernize the yard's facilities and thereby make them more efficient. The yard's new owner might have a pool of capital readily available, or the yard, by virtue of becoming part of a larger organization, might now be able to borrow capital at lower interest rates.

Potential Savings

Facilities-related Savings

During the time that its merger proposal was being reviewed by DoD and DoJ, NOC stated that it had no plans to close any of its shipyards following a NOC-NNS merger.[24] This will limit the potential savings that could be realized from reducing facilities. The NOC-NNS merger, moreover, will not create an opportunity for streamlining and consolidation in the area of nuclear-ship construction, as a GD-NNS merger would have. But a NOC-NNS merger might nevertheless lead to some streamlining of tools and facilities, particularly if these tools or facilities perform limited amounts of work and the intermediate products made by these tools or facilities can be easily and economically transported from one yard to another. All three of the yards in question build large surface ships, and two of them – Ingalls and NNS – specialize in the construction of

[23] The formation through mergers of two shipbuilding organizations (GD and NOC) that are each capable of building various kinds of ships may create a potential for reducing future ship-procurement costs by designing ships so that ships in different categories (e.g., surface combatants, amphibious ships, and sealift and auxiliary ships) take greater advantage than at present of commonality in design at the component or system level, and perhaps even to begin to take advantage of commonality in design at the level of entire ship sections (including the basic hull structure). Pursuing commonality at the level of entire hull sections could lead to ship designs that are optimized from the standpoint of total-fleet production and support costs rather than class-specific production and support costs.

[24] Source: Telephone conversation with senior NOC official, May 16, 2001.

large surface ships with complex combat systems.[25] This may create an opportunity to streamline tools and facilities involved in the production of such ships.

NOC has stated that it has now integrated operations at Avondale and Ingalls and in the future will operate them (and a third manufacturing facility at Gulfport, MS) as a single shipbuilding entity (Northrop Grumman Ship Systems). Bids for future work, NOC officials say, will be submitted by this single entity, rather than by Avondale or Ingalls, and decisions about how to divide work between Avondale, Ingalls, and Gulfport will be made on the basis of how that work can be best done collectively by the three sites working together.

Centralized Personnel and Expenditures

Although the NOC-NNS merger will not create an opportunity to streamline the management and supervision of nuclear-ship construction, as a GD-NNS merger would have, it might still generate other savings in the area of centralized personnel and expenditures.

Best Practices

A NOC-NNS merger might present a greater opportunity for sharing of best practices than a GD-NNS merger would have, since NOC and NNS were not previously involved in a major joint-production arrangement and thus did not previously have occasion to share some of their best practices with one another. (GD and NNS, in contrast, have been involved in a joint-production arrangement for building Virginia (SSN-774) class submarines since 1997.)

NOC states that it is beginning to apply at Avondale so-called "lean" production strategies that Northrop and other U.S. aerospace firms adopted from commercial industry and applied to military aircraft manufacturing in the 1990s.[26] NOC officials say that the adoption of lean production techniques at Avondale is beginning to produce significant reductions in the time needed to manufacture certain portions of LPD-17 class amphibious ships being built there.[27]

Potential Total Savings

At the time it announced its merger proposal, and for several weeks thereafter, NOC did not provide any estimate of the total potential consolidation-related savings that would result from a NOC-NNS merger, because, NOC stated, NOC (unlike GD) did not have access to NNS's books[28] and would not gain access until NNS's board of directors approved NOC's bid.[29] Industry analysts, however, reportedly believed that the savings from a NOC-NNS merger would be less than that from a GD-NNS merger because the NOC-NNS merger would not create an opportunity for streamlining facilities and management for nuclear-ship construction.[30]

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[25] A ship's combat system includes its sensors (such as radars), its computers, software, and displays for processing sensor data and displaying it, its weapons launchers, and its weapons.

[26] Lean production strategies, which are the product of intensive studies of manufacturing operations, employ new ways to organize production lines so as to simplify tooling, jigs, and work flows and thereby reduce production times and costs.

[27] Information provided by Avondale official congressional staff and CRS during congressional staff trip to Avondale on February 19, 2002.

[28] GD had access to NNS's books as a result of the definitive merger agreement that the two firms had signed.

[29] Gilpin, Kenneth N. Northrop Grumman Is Long On Defenses Of Its Bid For Newport News. *New York Times*, May 10, 2001.

[30] Squeo, Anne Marie. Northrop's Newport News Bid Will Force Bush Administration To Spell Out Policy. *Wall Street*

Kent Kresa, the chairman and chief executive of NOC, said in May 2001, "My initial view is the savings [from a NOC-NNS merger] would not be as high" as those from a GD-NNS merger.[31] Supporters of the NOC-NNS merger proposal did argue, however, that the savings from a NOC-NNS merger, though perhaps less than those that would be realized from a GD-NNS merger, would still be significant.

In August 2001, NOC altered its position, stating in a document provided to DoD and DoJ that, even though NOC still did not have access to NNS's books, it now estimated that a NOC-NNS merger would produce $1.9 billion to $2.6 billion in consolidation-related savings over the next ten years, or an average of $190 million to $260 million per year.[32]

GD initially estimated that a GD-NNS merger would produce about $2 billion in savings over 10 years.[33] NOC's August 2001 savings estimate of $1.9 billion to $2.6 billion over 10 years for a NOC-NNS merger was thus roughly equal to GD"s estimated savings from a GD-NNS merger.

Following NOC's August 2001 announcement of its savings estimate, it was reported that GD's $2-billion savings estimate was "a figure several officials have described privately as a conservative, low-ball estimate.... Sources familiar with the General Dynamics proposal said the company's $2 billion estimate represents only the minimum savings that a merger would bring. In private briefings to the Pentagon, these sources said, the company has projected the savings could be as high as $3.8 billion."[34] Another report stated that "GD has offered savings of between $2 billion and as much as $3.8 billion over the coming decade, while Northrop Grumman has offered savings between $1.9 billion and $2.4 billion during the same period."[35]

A later report stated that "An internal Pentagon review found a General Dynamics-Newport News combination could save the Navy between $3 billion and $4 billion during the next 10 years,"[36] suggesting that the Pentagon had evaluated the potential savings from a GD-NNS merger to be substantially higher than those from a NOC -NNS merger. This, however, does not appear to be the case: On October 12 – 11 days before DoD and DoJ announced their decisions on the GD-NNS merger, E. C. "Pete" Aldridge, Jr, the Under Secretary of Defense (Acquisition, Technology and Logistics) – the Pentagon's chief acquisition executive, and a key participant in DoD's

Journal, May 10, 2001.

[31] As quoted in Gilpin, Kenneth N. Northrop Grumman Is Long On Defenses Of Its Bid For Newport News. *New York Times*, May 10, 2001.

[32] *The U.S. Government's Decision on the Fate of Newport News: Unprecedented Merger to Monopoly, Cost Savings Without Reduced Competition, or the Status Quo*. Washington, 2001. (Discussion Materials Regarding Alternative Outcomes in the Proposed Acquisitions of Newport News Shipbuilding for the Consideration of the U.S. Department of Defense and U.S. Department of Justice, August 3, 2001. Prepared and Submitted on Behalf of Northrop Grumman Corporation) Tab B, pages 1 and 11. Copies of this 60-page document were distributed not only to DoD and DoJ, but to press reporters and other observers. NOC provided a copy to CRS on August 20, 2001. For a press report mentioning the estimated savings of $1.9 billion to $2.6 billion, see Squeo, Anne Marie. Pentagon Appears To Favor Newport News Acquisition. *Wall Street Journal*, August 29, 2001. Another press report characterized NOC's estimated savings at $2 billion to $2.5 billion over 10 years. (Lerman, David. Bidders Float Similar Savings Figures. *Newport News Daily Press*, August 4, 2001.)

[33] For articles citing GD's $2-billion savings estimate, see Gilpin, Kenneth N. Northrop Grumman Is Long On Defenses Of Its Bid For Newport News. *New York Times*, May 10, 2001; Squeo, Anne Marie. Northrop's Newport News Bid Will Force Bush Administration To Spell Out Policy. *Wall Street Journal*, May 10, 2001.

[34] Lerman, David. Bidders Float Similar Savings Figures. *Newport News Daily Press*, August 4, 2001.

[35] Muradian, Vago. Aldridge To Decide NNS' Fate, Continues TO Assess Based On Four Factors. *Defense Daily*, August 14, 2001: 5.

[36] Squeo, Anne Marie. Pentagon Appears To Favor Newport News Acquisition. *Wall Street Journal*, August 29, 2001.

review of the mergers – stated that the savings from the two merger proposals were not substantially different from one another:

> "Northrop has a fairly wide range of savings. General Dynamics has been a little more specific," he said. Both "are in the ballpark" of what the Pentagon is looking for, Aldridge said. "The numbers are pretty close."[37]

The notion that DoD had concluded that the potential consolidation-related savings from a NOC-NNS merger would be about equal to those from a GD-NNS merger was confirmed in DoD's announcement of its decision on the GD-NNS merger, presented in the background section of this report.

Although DoD evaluated the potential consolidation-related savings from a NOC-NNS merger to be about equal to those from a GD-NNS merger, DoD has not officially stated what those potential savings are in an absolute sense. DoD, in other words, has not said whether its own estimate of the consolidation-related savings over 10 years from the NOC-NNS merger (or a GD-NNS) merger will be about $2 billion or some different figure. In 1999, after DoD rejected an earlier proposal from GD to acquire NNS, it was reported that DoD was able to verify about two-thirds of GD's then-estimated savings of about $2.5 billion over 9 years. The other third, DoD reportedly concluded, was possible but could not be verified.[38]

Competition In Shipbuilding

What are the potential implications of shipyard mergers for competition in the design and construction of Navy ships?

Many policymakers believe that, as a general rule, competition in defense acquisition can generate benefits for the government and taxpayers by restraining costs, improving product quality, encouraging adherence to scheduled delivery dates, and promoting innovation. As discussed in the background section, potential antitrust implications (i.e., implications for competition) are the principal focus in DoJ reviews of proposed mergers, and are a principal assessment criteria set forth in DoD's directive regarding policy for reviewing proposed defense mergers.

Competition Currently Rare in Ship Construction

Although the Navy used competition extensively in ship construction in the 1980s and early 1990s, particularly in the awarding of annual contracts for the construction of surface combatants and nuclear-powered attack submarines, competition is less prominent in Navy ship construction activities today.

The Navy recently conducted a competition to design the new Lewis and Clark (TAKE-1) class Navy auxiliary dry cargo ship (previously known as the ADC[X] class).[39] The Navy also recently

[37] Capaccio, Tony. Pentagon Undecided On Newport News Merger Bids, Aldridge Says. *Bloomberg.com*, October 12, 2001.

[38] CRS Report RL30969, *Navy Shipbuilding: Proposed Mergers Involving Newport News Shipbuilding – Issues for Congress*, by Ronald O'Rourke. Washington, 2001. (May 22, 2001) p. 10 (footnote 12); CRS Report RL30251, *Navy Major Shipbuilder Ownership Consolidation: Issues for Congress*, by Ronald O'Rourke. Washington, 1999. (May 27, 1999) p. 12-13; Lerman, David. Pentagon Sees Some Savings from Shipyard Merger as Realistic. *Newport News Daily Press*, March 16, 1999; Troshinsky, Lisa. Cost-Cutting Deal Sank Merger, Navy Says. *Defense Week*, April 19, 1999: 3.

[39] The Navy on October 18, 2001 announced that it had selected GD/NASSCO as the winner of the competition and

conducted a competition between two industry teams for the right to do preliminary and system design work for the Navy's next-generation destroyer, the DD(X).[40] The Navy in the future intends to conduct competitions to do the detailed design and construction of the first DD(X),[41] to design its next-generation cruiser, the CG(X), and to design a smaller surface combatant called the Littoral Combat Ship (LCS).[42]

For major Navy ship programs now in production, however, there is little active use of competition:

- Nuclear-powered aircraft carriers are a sole-source item—NNS is the only yard currently capable of building large-deck nuclear-powered carriers and has built every carrier procured since FY1958.
- Virginia (SSN-774) class nuclear-powered attack submarines are being jointly produced by EB and NNS under a teaming arrangement worked out by the two shipbuilders and approved by the Administration and Congress in 1997 that divides the value of the work between the two yards on a roughly equal basis.
- Arleigh Burke (DDG-51) class destroyers since FY1994 have been allocated by the Navy to BIW and Ingalls on an essentially equal basis.
- San Antonio (LPD-17) class amphibious ships are being divided up by Avondale and BIW—the two yards on the industry team that won the competition to build the 12-ship class—on a 2-ships-for-1 basis, respectively.[43]
- Wasp (LHD-1) class large-deck amphibious assault ships are effectively a sole-source item—Ingalls has produced all of those procured to date and would be the presumptive builder of any additional such ships that are procured.
- Sealift ships are being built in equal numbers by NASSCO and Avondale as a result of decisions by the Navy to exercise options to construction contracts for these ships that the Navy awarded to the two firms in 1993.

The current limited active use of competition in Navy ship construction appears to be largely a consequence of two key factors – the relatively low rate of Navy ship procurement since FY1993, and an apparent unwillingness of policymakers to take steps that might force any of the six shipyards out of the Navy shipbuilding business.[44] Together, these two conditions make it difficult for the Navy to create uncertainty about its shipbuilding contract-award decisions—a key requirement for generating effective competition in ship construction.

awarded the firm a contract to design the TAKE-1 and to build the first two ships in the class, with options to build another 10 ships in the class. The other competitors were NOC/Avondale and Halter Marine, a Gulf-Coast shipyard owned by Friede Goldman Halter.

[40] On April 29, 2002, the Navy announced that it had selected a team lead by NOC/Ingalls as the winner of the competition.

[41] The first DD(X) is to be procured in FY2005.

[42] For more on the DD(X), CG(X), and LCS, which together form the Navy's future family of surface combatants, see CRS Report RS21059, *Navy DD(X) Future Surface Combatant Program: Background and Issues for Congress*, by Ronald O'Rourke. Washington, 2002. (Updated periodically) 6 p.

[43] GD and NOC reportedly are discussing a plan to shift BIW's LPD-17s back to NOC in return for NOC shifting some of its DDG-51s to BIW.

[44] For a more detailed discussion, see CRS Report 96-785 F, *Navy Major Shipbuilding Programs and Shipbuilders: Issues and Options for Congress*, by Ronald O'Rourke. Washington, 1996. (September 24, 1996) p. 18-19, 60-64.

Given the limited use of competition in Navy ship-construction activities today, the issue for Congress and the Administration appears to be what effect the NOC-NNS merger and previous mergers involving the six shipyards might have on two potential policy goals:

- preserving competition in ship design and technology development; and
- the potential for resuming competition in Navy ship construction in the future, particularly if the Navy ship procurement rate in future years is increased from current levels.

Competition Implications of NOC-NNS Merger [45]

Potential Factors to Consider

In examining the effect that the recent series of shipyard mergers culminating in the NOC-NNS merger might have on ship design and ship technology development and on the potential for resuming competition in Navy ship construction, policymakers may consider several factors, including the following:

- creation of sole sources,
- resulting market share,
- resulting number of independently owned shipyard in-house design and engineering staffs,
- resulting share of shipyard in-house designers and engineers,
- resulting share of Navy research and development funding provided to shipyards, and
- resulting degree of vertical integration.

Creation of Sole Sources

The existence of at least two independently owned sources for an item is usually a requirement in instances where the government wants to make use of competition in the acquisition of that item. A merger that results in the creation of a sole source for an item can thus reduce, perhaps dramatically, the potential for using competition in the acquisition of that item. In expressing its opposition to GD's 1999 and 2001 proposals to acquire NNS, DoD and (for the 2001 proposal) DoJ noted that such a merger would combine the nation's two submarine-construction shipyards under common ownership.

Creation of a sole source does not eliminate entirely the government's ability to use competition in the acquisition of that item. The government can mandate the use of competition among supplier firms in the acquisition of materials and components that are incorporated into the end item manufactured by the sole source prime contractor. The government can also make it clear to the sole source that its end item (in this case, a particular kind of ship) will compete for scarce defense procurement dollars against other defense end items (such as other types of ships, aircraft, missiles, ground combat systems, space systems, and command and control systems).

In the view of some observers, creation of a sole source, in addition to reducing the potential for using competition in the acquisition of that item, can also weaken or distort competition for other items made by the sole source. Under this argument, the sole source can leverage its monopoly

[45] See Appendix B for a discussion of the potential implications for competition that might have resulted from the GD-NNS merger proposal that was rejected by DoD and DoJ in October 2001.

position on a certain item to negotiate contracts for that item with high profit margins, which can then be used to cross-subsidize bids that the sole source makes for contracts to build other end items where the firm does face competition from other competitors. Several years ago, for example, some supporters of EB – but not GD or EB itself – argued that NNS had in the past used its sole-source status on aircraft carriers to negotiate high profit margins on carrier construction contracts that were then used to cross-subsidize bids it submitted in competition against EB for submarine construction contracts.

The NOC-NNS merger preserved two independently owned sources with recent experience in the design and construction of submarines (GD/EB and NOC/NNS), surface combatants (GD/BIW and NOC/Ingalls), and auxiliary and sealift ships (GD/NASSCO and NOC/Avondale). The NOC-NNS merger also did not affect the situation for LPD/LSD-type amphibious ships, where NOC/Avondale is the one established source and GD/BIW, if it participates in LPD-17 construction, would become a second source.

The NOC-NNS merger, however, combined NNS, the longstanding sole source for large-deck, nuclear-powered aircraft carriers, with NOC's Avondale and Ingalls shipyards, which, as discussed in a 1996 CRS report, are the only two yards other than NNS that could build large-deck, conventionally powered aircraft carriers.[46] It also combined NOC's Ingalls shipyard, the effective sole source for large-deck amphibious assault ships, with NNS, the only other shipyard then outside NOC (i.e., other than Avondale) that, as also discussed in the 1996 CRS report,[47] could build large-deck amphibious assault ships without need for making major capital improvements to the yard. The NOC-NNS merger may thus pose an issue regarding the number of potential future sources for aircraft carriers, the number of potential future sources for large-deck (i.e., LHA/LHD-type) amphibious assault ships, and the potential for sole-source-related cross-subsidization of bids.[48] Each of these areas is discussed below.

Aircraft Carriers . Supporters of the NOC-NNS merger can argue that any loss of potential competition in aircraft carrier construction resulting from the merger is insignificant because carriers have been a sole-source item since FY1958, because carriers in future decades (as in recent decades) will not be procured at a rate sufficient to support meaningful competition between two sources, because the Navy's plans for carrier procurement call for future carriers to be nuclear-powered ships, which Avondale and Ingalls cannot build, and because even if the Navy were to procure conventionally powered carriers, Avondale and Ingalls would not have been competitive in bidding for such ships against NNS because of their lack of recent experience in building such ships and the technical challenges specific to building carriers, such as installing aircraft catapults.

Critics of the NOC-NNS merger can argue that the loss of potential competition in carrier construction is possibly significant because the Navy at some point might decide to shift carrier construction from large-deck, nuclear-powered designs to non-nuclear-powered designs that could be built by Avondale or Ingalls, but not by GD's two surface-ship yards (BIW and NASSCO). The concept of building smaller (and potentially non-nuclear-powered) carriers has been examined by DoD in the past and could be examined again in the future. The NOC-NNS

[46] The potential for Avondale or Ingalls, with capital improvement, to build large-deck conventionally powered carriers, was discussed in CRS Report 96-785 F, *Navy Major Shipbuilding Programs and Shipbuilders: Issues and Options for Congress*, by Ronald O'Rourke. Washington, 1996. (September 24, 1996) p. 21, 23, 29, 61-62.

[47] Ibid, p. 29.

[48] Large-deck amphibious assault ships are flat-top ships, about 40 % as large as the Navy's aircraft carriers, that are used to embark Marine forces and their equipment, including Marine helicopters and AV-8B Harrier vertical/short take off and landing (V/STOL) jet airplanes.

merger, critics can argue, will preclude the Navy from using competition in the construction of such ships.

Large-Deck Amphibious Assault Ships . Supporters of the NOC-NNS merger can argue that any loss of potential competition in the construction of amphibious assault ships is not significant because these ships, like carriers, have effectively been a sole source item for many years, for at least two reasons: First, these ships, like carriers, in future years (as in past years) will not be procured at a rate sufficient to support meaningful competition between two sources. Second, NNS would not have been competitive in bidding for such ships against Ingalls due to NNS's lack of recent experience in building them and the overhead costs associated with maintaining NNS's nuclear shipbuilding capability. These overhead costs would make it difficult for NNS to compete effectively for non-nuclear-powered ships against yards, like Ingalls, that do not have to incorporate the overhead costs of maintaining a nuclear shipbuilding capability into their bids. They can also argue that either of GD's two surface-ship yards – BIW or NASSCO – can be made capable, with capital improvements, of building such ships.

Critics of the NOC-NNS merger can argue that the potential loss of competition in the construction of amphibious assault ships is possibly significant because future plans for the Navy might call for building such ships in greater numbers or to a new and significantly different design for which Ingalls' prior experience in building amphibious assault ships would not be an advantage, and because the amount of capital improvements that would be needed at BIW or NASSCO to make these yards capable of building such ships would dissuade them from competing against Ingalls for such ships, which would have left NNS as the most likely potential competitor. They can argue that, in spite of its nuclear-related overhead costs, NNS has been successful in recent years in competing against non-nuclear yards for non-nuclear work such as the conversion of existing merchant ships into U.S. military sealift ships.

Cross-subsidization of Bids . Critics of the NOC-NNS merger can argue that NOC can use its newly acquired sole-source status on aircraft carriers and its previous effective sole-source status on large-deck amphibious assault ships to leverage construction contracts for aircraft carriers and large-deck amphibious assault ships with high profit margins that can then be used to cross-subsidize bids that NOC makes in competitions against GD for contracts relating to submarines (which NNS could do previously as a single-yard organization), surface combatants (which Ingalls could do previously when it was a single-yard organization), LPD/LSD-type amphibious ships (if GD decides to bid for such work), and auxiliary and sealift ships.

Supporters of the NOC-NNS merger could argue that the government is fully capable of negotiating profit rates and auditing NOC's construction costs so as to ensure that profits on this work are not excessive and that cross-subsidization does not take place.

Market Share

Current and potential market shares are sometimes examined to get a preliminary or general sense of whether a proposed merger might produce a firm so dominant within the market for producing a particular product that competition within that market might be eliminated or substantially reduced: The dominance of the leading firm could discourage other firms from attempting to enter the market for making items made by the leading firm. DoD and DoJ did not, however, specifically refer to market share in objecting to the 1999 merger proposals involving NNS or to the 2001 GD-NNS merger proposal.

The six shipyards together account for about 98% of the dollar value of new-construction Navy shipbuilding work performed in U.S. shipyards, and new-construction Navy shipbuilding work in

turn accounts for an estimated 85% to 90% of the total revenues of these six yards.[49] An examination of the total revenues of these six yards can thus provide an approximation of these yards' market shares for Navy shipbuilding.

Information on total revenues for each of the six yards is incomplete for some years, due in part to merger activity, which interrupted the sequence of corporate annual reports for some years. But data for the years where information is available for all six yards (1991-1995, and 2000) plus data available for some of the yards in 1996-1999 and 2001 suggest that the three yards now owned by GD in recent years have tended to account for roughly 40%-45% of the total revenues of the six yards, while the three yards now owned by NOC in recent years have tended to account for roughly 55%-60% of the total revenues of the six yards. The division for 2000, the most recent year for which revenue data is available for all 6 yards, was 43.2% for the three GD-owned yards and 56.8% for the three NOC-owned yards.[50] The division for 2001 could be very similar.[51]

Supporters of the NOC-NNS merger could argue that such a division of revenues, though not exactly 50-50, is not so lopsided as to pose a concern. They could also argue that share of revenues does not, by itself, mean anything – and that DoD and DoJ tacitly acknowledged this by not mentioning market share in its analysis of the 1999 and 2001 GD-NNS merger proposals. GD, they could argue, already builds surface combatants, auxiliary ships, and sealift ships and thus does not face a choice of whether to enter the market to build ships of this kind. Since it does not face this choice, supporters of the NOC-NNS merger could argue, the question of whether the NOC-NNS entity's market share would discourage GD from entering the market for these ships would be moot.

Critics of the NOC-NNS merger could argue that something like a 40-60 division of revenue could be lopsided enough to pose a concern, since NOC's share under such a division would be half again as large as GD's. They could also argue that market share is a potentially important indicator because it indicates a firm's potential, relative to its competitors, to achieve improved production economies of scale and obtain materials and components from supplier firms at lower costs. A large market share, they could argue, might also make it easier for the firm to secure financing from lending organizations, or enable the firm to secure it on more favorable terms. A firm with a large-enough share of the market, it can be argued, could make it more difficult for the government to achieve meaningful competition because that firm might be able to generate size-related cost advantages that could not be matched by other firms with a smaller share of the market. A firm with a dominant share of the market, it can also be argued, might be better able to attract the best managers and engineers because those individuals might conclude that the firm

[49] Source for figures: Telephone conversation with the American Shipbuilding Association (the trade association that includes these six yards, along with a number of other maritime firms), May 19, 1999.

[50] Data taken from http://www.coltoncompany.com, an internet site that posts information and news concerning shipyards and shipping. The GD/NOC divisions for 1991-1995 were 40.6%/59.4%, 39.9%/60.1%, 46.0%/54.0%, 45.1%/54.9%, and 43.7%/56.3%. The data on revenues for some of the yards that is available for 1996-1999 and for 2001 appears consistent with the data for these yards for 1991-1995 and 2000.

[51] Preliminary data for 2001 suggests that the GD/NOC division could be roughly 44%/56%. This is based in part on a preliminary figure for 2001 revenues for GD's marine systems division of $3.6 billion that was reported by http://www.coltoncompany.com, less about $300 million for AMSEA, a part of GD's marine systems division that is not involved in Navy shipbuilding. (AMSEA's revenues in 1998-2000, according to

http://www.coltoncompany.com, were $349 million, $204 million, and $315 million, suggesting that 2001 revenues might be roughly $300 million.) It is also based on a figure for 2001 revenues for NOC's three shipyards of $4.24 billion, using information provided by NOC to CRS in a telephone conversation on March 27, 2002. NOC stated to CRS that NNS's 2001 revenues were $2.0 billion, and that the combined revenues for Ingalls and Avondale for the latter 9 months of 2001 (i.e., following NOC's purchase of Litton) were $1.682 billion. Annualizing this 9-month figure produces a 12-month estimate of about $2.24 billion.

with the dominant share of the market had better long-term business prospects and could thus offer them better long-term career opportunities. Over time, it could be argued, such an advantage in recruiting the best managers and engineers could add to the competitiveness of the firm with the dominant share of the market, making it more difficult for the government to achieve effective competition.

Critics could also argue that if BIW does not participate in the production of LPD-17 class amphibious ships (a possibility), then GD could face a choice of whether to attempt to enter the market against NOC for production of other amphibious ships, making the question of whether NOC's market share would discourage GD from entering the market for these ships potentially relevant.

Number of Shipyard In-House Design and Engineering Staffs

In addition to building ships, the six shipyards maintain in-house design and engineering staffs that design Navy ships and develop new technologies for Navy ships. Maintaining competition in this area may be of greater importance now than in the past, since the Navy in recent years has shifted more of its ship design and engineering work out of its own public-sector ship-design and engineering organizations, and to the private-sector shipyards.

Since innovations in a given area are sometimes made more likely when separate organizations working in parallel are available to conceive of, and experiment with, new strategies for addressing a common challenge, a reduction in the number of independently owned shipyard in-house shipyard design and engineering staffs might make it more difficult to promote innovation in Navy ship design and technology, particularly for specific ship types or in specific technology areas.

Alternatively, it can be argued that a merger of previously separate in-house design and engineering staffs could, for a time at least, improve innovation in ship design and ship technology development by creating an enlarged engineering staff that encompassed a greater diversity of talents and ideas. New technologies and innovations, it can be argued, can sometimes be spurred when members of previously separate organizations are brought together under common ownership and as a consequence are permitted to share ideas, "bounce" thoughts off one another, "cross-fertilize" their thinking, and combine separately conceived and isolated concepts into a testable new approach. Shipyard mergers, in this view, may create a larger "critical mass" of design and engineering talent for generating innovations. In this sense, depending on how the merged firm manages the flow of promising ideas and concepts between their constituent yards, shipyard mergers might, for a time at least, increase the likelihood for innovations in ship design and ship technology development.

If the Navy perceives that the potential for innovation in ship design and ship technology development has been reduced by the reduction in the number of in-house design and engineering staffs, it could attempt to compensate by placing ship-design and ship technology-development contracts with independently owned naval architectural firms and other entities (such as universities and technology companies) that engage in activities relating to ship design and ship technology development.

The NOC-NNS merger reduced the number of independently owned shipyard in-house design and engineering staffs from three to two, but preserved the two independently owned in-house design and engineering staffs with experience in submarines and nuclear-powered ships.

Supporters of the NOC-NNS merger can argue that two independently owned staffs are sufficient for competition, and that any loss associated with the reduction in the number of staffs would be

offset by the creation of a larger NOC design and engineering staff that will be able to generate significant innovations by combining people and ideas that were previously separate from one another.

Critics of the merger can argue that having three independently owned staffs would have been better for competition than having two because having three permits competition to occur on a program even if one staff decides not to compete. They can also argue that the benefits for generating innovations of combining previously separate people and ideas are likely to be temporary rather than permanent.

Share of Shipyard In-House Designers and Engineers

The division of the shipyards' total number of in-house designer and engineers resulting from shipyard mergers is a potentially important measure because designers and engineers can create new designs and develop new technologies that can be sources of competitive advantage to a shipbuilding organization when the organization incorporates the new designs and technologies into bids for future Navy ship acquisition programs. DoD, in explaining its opposition to the 1999 GD-NNS merger proposal, noted that a combined GD-NNS entity would include more than 75% of the six yards' in-house designers and engineers.[52]

As discussed above, although a concentration of design and engineering talent could suppress innovation, it can also be argued, conversely, that new technologies and innovations can sometimes be spurred, at least for a time, when members of previously separate organizations are brought together under common ownership and as a consequence are permitted to share ideas, bounce thoughts off one another, cross-fertilize their thinking, and combine separately conceived and isolated concepts.

The table below shows the approximate sizes of the in-house design and engineering staffs at the six yards in 2001.

Table 3. Approximate Share of Designers and Engineers

Yard	Designers and Engineers	
	Approximate Number	**Approximate Share**
GD, of which	5,250	44%
(EB)	*(3,400)*	*(28%)*
(BIW)		
(NASSCO)	*(1,850)*	*(15%)*
NOC, of which	6,750	56%
(NNS)	*(4,600)*	*(38%)*
(Ingalls)		
(Avondale)	*(2,150)*	*(18%)*
Total	12,000	100%

Sources: Data provided to CRS by GD on May 17, 2001. Similar figures can be derived from McCarthy, Mike, and John M. Donnelly. Worries About Competition Surround Bids For Newport News. *Defense Week*, May 14, 2001: 1, 13, 15.

[52] Letter from Secretary of Defense to Senator Trent Lott, April 15, 1999.

As can be seen in the table, EB and NNS maintain relatively large in-house design and engineering staffs, BIW and Ingalls maintain smaller but still substantial in-house staffs, and Avondale and NASSCO maintain relatively small in-house staffs. The staffs at EB and NNS are the only two among the six yards that have extensive experience and resources in the design and engineering of submarines and nuclear-powered ships.[53]

As can also be seen in the table, the NOC-NNS merger produced a firm that accounts for about 56% of the six yards' in-house designers and engineers, while GD accounted for the remaining 44%. Excluding the 8,000 nuclear-ship engineers and designers at NNS and GD, NOC-NNS merger produced a firm that accounts for 54% of the in-house designers and engineers in 2001 (2,150 of 4,000), while GD accounted for the remaining 46% (1,850 of 4,000).

Supporters of the NOC-NNS merger could argue that a 56%-44% division of in-house designers and engineers, though not exactly a 50-50 split, is not lopsided enough to pose a concern. They can also argue that GD can supplement its own in-house staff of 5,250 shipyard designers and engineers by drawing on the talents of the designers and engineers that exist in GD's information systems and technology and aerospace divisions. GD's ability to do this, they can argue, has grown in recent years as a result of its recent non-shipbuilding acquisitions, including aircraft-maker Gulfstream, and could grow further in future years if GD acquires additional non-shipbuilding firms, as some observers anticipate.

Supporters can also argue that GD can further supplement its in-house design and engineering staff by contracting with some of the 6,000 private-sector ship designers and engineers that exist in the United States outside the six shipyards. Hiring outside designers and engineers, they can argue, is an established practice for shipyards working on Navy non-nuclear shipbuilding programs.

Supporters could also argue that the total number of designers and engineers is not that important because the potential for innovation in a firm often resides within a small core of very experienced designers. The bulk of the designers and engineers at the firm, they could argue, perform routine design and engineering work. Although the total number of designers and engineers are not evenly divided between GD and NOC, they could argue, both GD and NOC possess capable core groups of very experienced designers and engineers. This point of view, they can argue, is supported by DoD's interest in recent years in small business firms as sources of innovation.

Critics of the NOC-NNS merger can argue that the total number of designers and engineers can indeed be important, because ships are composed of tens of thousands of components and the ship-design process gives individual designers and engineers throughout the firm the opportunity (and responsibility) to seek out improvements for the part of the ship they are working on. Even small improvements and innovations, if applied to a sufficient number of the ship's components, can add up to a significant amount of total-ship innovation, they can argue. A firm with a larger share of designers and engineers, they can argue, will be able to carry out a more thorough investigation of the potential for making numerous small improvements and innovations across the entire ship. This point of view, they can argue, is supported by DoD's reference to the share of designers and engineers in its decision on the 1999 GD-NNS merger proposal.

Critics of the merger can argue that in the 56%-44% division understates the imbalance because NOC can combine the talents of 6,750 in-house shipyard designers with those of the designers and engineers in NOC's large and technically advanced aerospace and electronics divisions. The

[53] In addition to these in-house staffs, the private sector also includes independently owned naval architectural and engineering firms that can be hired by shipyards to supplement their own capabilities.

resulting combination of nuclear and non-nuclear shipbuilding technologies, aerospace technologies (including stealth design and materials technology), and electronics technology, they could argue, could give NOC a technological edge over GD.

Critics of the NOC-NNS merger can also argue that it would be difficult to transfer designers and engineers from GD's information systems and technology and aerospace divisions into shipbuilding programs, since these designers and engineers are fully committed to non-shipbuilding programs and lack experience in shipbuilding design and engineering issues.

Critics of the NOC-NNS merger can also argue that NOC can contract for the services of ship designers and engineers that work outside the six yards just as easily as GD could, and that outside designers and engineers might not be able to achieve as much for GD as NOC's in-house designers and engineers could achieve for NOC, for two reasons. First, NOC's in-house staff works at NOC continuously across a range of projects, rather than intermittently on a project-by-project basis, as would be the case for outside designers and engineers working on contract at GD. Second, NOC's in-house staff could have more complete access to NOC's most proprietary concepts and technologies than contract designers and engineers would have to GD's concepts and technologies.

Share of Navy Research and Development Funding

DoD, in explaining its opposition to the 1999 GD-NNS merger, stated that

> over 95% of the Navy R&D investment would exist in a combined General-Dynamics-Newport News entity. This is because the Navy has historically maintained a large R&D program funded through its nuclear shipyards; i.e., General Dynamic's [sic] Electric Boat Division and Newport News. If General Dynamics and Newport News were to merge, we would see a concentration of that engineering talent – and the technology advantages that may have resulted from Navy-funded research and development investments in both firms over the years.[54]

This concern is similar to the concern regarding the resulting share of the total number of in-house designers and engineers. Rather than focusing on personnel, however, this concern appears to relate to research, development, and design facilities and technology that may have accumulated at EB and NNS over the years.

Although DoD in 1999 stated that more than 95% of the Navy research and development investment that goes to the six shipyards would exist in a combined GD-NNS entity, it did not say how much of this 95% came from GD as opposed to NNS. Since DoD did, however, say that "the Navy has historically maintained a large R&D program funded through its nuclear shipyards; i.e., General Dynamic's [sic] Electric Boat Division and Newport News," it might be reasonable to conclude that a significant share of this 95% came from NNS. If so, then the NOC-NNS merger might have produced a division of the Navy research and development funding directed to the shipyards that would be much closer to a 50-50 split than to a 95-5 split.

Supporters of the NOC-NNS merger could argue that the resulting division of shipyard-directed Navy research and development funding is relatively balanced between NOC and GD.

Critics of the NOC-NNS merger could argue that the resulting division understates the advantages for NOC because NOC will benefit from the very large amount of research and development funding that DoD has directed over the years to aerospace firms like NOC. In the case of NOC, they could argue, this includes a large investment in stealth design techniques, materials,

[54] Letter from Secretary of Defense to Senator Trent Lott, April 15, 1999.

production tooling, and test facilities established for the B-2 bomber, which NOC designed and built.

Vertical Integration

Vertical integration refers to the existence, within a single firm, of operations pertaining to different stages of the production process for a particular item – a process that, in its entirety, begins with raw materials and component manufacturing, continues through assembly of subsystems, systems, and other intermediate components, and finishes with final assembly and total-system integration and testing.[55] The potential concern is that vertically integrated firms can undermine competition in various stages of the production process by relying on their own in-house capabilities for performing work rather than bidding the work out to other firms engaged in that stage of the production process.

NOC is one of DoD's leading radar makers and combat system integrators, and competes against other radar makers and combat system integrators, such as Lockheed and Raytheon. NOC is also a maker of Navy ship propulsion equipment. NOC's April 2001 purchase of Litton's Avondale and Ingalls shipyards thus posed a question of vertical integration, since it combined a maker of military platforms (i.e., surface combatants, amphibious ships, and auxiliary and sealift ships) with a maker of radars, combat systems, and ship propulsion equipment that could go onto those platforms. The NOC-NNS merger extended this question to the two remaining major categories of Navy ships – aircraft carriers and submarines.

Critics could argue that NOC-NNS merger created a firm with an undesirable degree of vertical integration. NOC, opponents could argue, could decide to install its own radars and combat systems on the ships it makes, rather than competing its in-house capabilities in this area against the other radar makers and combat system integrators such as Lockheed and Raytheon. This, opponents could argue, would make it difficult for the Navy to achieve effective competition in the acquisition of ship radars and combat systems. A weakening of competition between system-integration firms, they could argue, would be particularly significant in light of the government's increasing reliance on system-integrator firms as sources of design and technology innovation in Navy shipbuilding.

Supporters of the NOC-NNS merger could argue that it is unlikely that a NOC would exclude Lockheed and Raytheon from NOC shipbuilding projects, because radars and combat systems on ships are different in many ways from radars and combat systems on aircraft, and NOC's experience in radars and combat systems is associated more with aircraft, while Lockheed and Raytheon are the two leading makers of radars and combat systems for Navy ships. Supporters could argue that it would be self-defeating for NOC to exclude both Lockheed and Raytheon from its bid in a competitive ship-acquisition program, since that would leave GD free to include one or even both of these firms in its own bid, making it much more likely that the Navy would judge the GD bid superior in terms of proven experience in shipboard radars and combat systems.

[55] Horizontal integration, in contrast, refers to the existence within a single firm of operations in certain stages of the production process for producing significantly different end products. In a simplified example, a firm that takes raw materials in one end and produces fully complete end items (such as ships) at the other end, performing all the manufacturing, assembly, integration and testing steps in between, is said to exhibit complete vertical integration, while a firm that specializes in certain stages of the production process for significantly different products (such as manufacturing of components for, or final assembly of, ships, aircraft, and land vehicles) is said to exhibit horizontal integration.

Potential for Bundled Competitions

The formation through mergers of two shipbuilding organizations that are each capable of building various kinds of Navy ships may create a potential for the Navy to use bundled competitions to restore the use of competition in the awarding of Navy ship-construction contracts even during times when the procurement rates of individual shipbuilding programs are insufficient to permit meaningful competition on an individual-program basis. Under the concept of bundled competitions, the Navy would group together some or all of the ships procured in a given year or two, compete the bundle between GD and NOC, and award a larger share of the bundle to the winning bidder.

Even during periods of relatively low rates of ship procurement, bundled competitions could permit the government to restore some uncertainty in its contract-award decisions – a key requirement for meaningful competition (i.e., competition that generates bargaining leverage for the government). In particular, bundled competitions could help ensure that GD and NOC make maximum use of cross-yard efficiencies in their shipbuilding operations.[56]

Shipyard Employment

What effect will shipyard mergers have on shipyard employment levels?

Members of Congress are often interested in the effect that defense mergers and acquisitions might have on local or regional employment levels. Shipyard mergers, particularly if they are to produce savings, can lead to reductions in the total number of white-collar workers (i.e., headquarters and central administrative workers, and possibly designers and engineers) employed at the yards being brought under common ownership. As mentioned in the section on potential savings, bringing more than one shipyard under common ownership can provide opportunities to the parent firm to combine and streamline the total number of workers in these areas.

Shipyard mergers are unlikely to lead to significant changes in the total number of blue-collar production workers employed at the yards, since that number is determined primarily by the total amount of production work being done at the yards.

Shipyard mergers, however, can lead to changes in the distribution of work being done at the yards being brought under common ownership, which can in turn alter the distribution of the total number of blue-collar workers among the yards.

The managers of a multi-yard organization can rephase work at certain yards, or shift work from one yard to another, so as to avoid or minimize potentially expensive fluctuations in the workload at individual yards or take advantage of the ability of one yard to perform certain elements of work at lower cost. For shipbuilding organizations with facilities in multiple localities or regions, which both GD and NOC are, such changes in the distribution of blue-collar workers across the yards can lead to local or regional increases or reductions in blue-collar shipbuilding employment.

In discussing the potential local employment impacts of shipyard mergers, the potential employment impact of *not* having participated in a merger arguably should also be considered. It is possible, for example, that not merging might have left a yard in weakened competitive position relative to other yards that did merge. In the long run, this weakened competitive position could have reduced the amount of work awarded to that yard, and thus the number of employees sustained there. A nearer-term reduction in employment that might result from a

[56] For a press article discussing this proposal, see Lerman, David. Plan Could Bring More Shipyard Competing. *Newport News Daily Press*, January 20, 2002: B1.

merger might not be as significant as a longer-term reduction that might have resulted from not merging.

During the time that the NOC-NNS merger proposal was being reviewed by DoD and DoJ, NOC stated that it had no plans to close any facilities following a NOC-NNS merger.[57] NOC has taken steps to integrate operations at Avondale and Ingalls (and a third nearby NOC-owned production facility at Gulfport, MS). This integration gives NOC the ability to distribute available work across these sites in a manner that takes advantages of production facilities and available workers at these facilities. NOC is already doing this for production of components for LPD-17 class ships. The ability to distribute work across these three facilities could help to stabilize employment levels at each facility, reducing the frequency or size of layoffs or new hires. When facilities and available workers at these three sites are not in balance, however, there can be other effects: NOC is currently busing about 150 Ingalls employees to Avondale four days a week. These workers are currently not needed for work at Ingalls but are needed for work at Avondale.

NOC will continue to perform nuclear shipbuilding work at NNS. Upon completion (around October 2003) of the period during which NOC will operate NNS as a separate business division, NOC will integrate NNS into its ship systems division, which now includes Ingalls and Avondale. This could give NOC the option of shifting certain elements of surface-ship construction work between NNS and the two other yards, which could increase or reduce the blue-collar employment level at each of the three yards. Ship sections produced at NNS, for example, could be barged to Avondale or Ingalls (or vice versa) to undergo final assembly along with ship sections produced at the final assembly yard.

The following instances of potential or actual cooperation or work sharing between these three yards can also be noted, though their value in predicting the future distribution of workload at NOC's three yards is open to debate:

- In September 1997, Avondale and Ingalls announced that they had signed an agreement establishing a framework for entering into teaming arrangements to bid for work on future Navy and commercial shipbuilding programs. Under the terms of the agreement, "teaming and specific details of the teaming arrangements (including sharing of work) will be determined on a program by program basis as business opportunities develop." In making the announcement, the two yards announced that they had already entered into teaming arrangements to compete for the Navy's new ADC(X) auxiliary dry cargo ship program (now called the Lewis and Clark, or TAKE-1 class program), a program to build a new fleet of Coast Guard cutters, and a program to build commercial crude oil tankers for major oil companies.[58] (As it turned out, Ingalls did not join the Avondale-led team on the Coast Guard project.[59])

[57] Source: Telephone conversation with a senior NOC official, May 16, 2001.

[58] Avondale & Ingalls Execute Agreement to Pursue Shipbuilding Projects. Business Wire news service, September 4, 1997; Ingalls and Avondale Agree to Team for Future Programs. *Ingalls News*, September 4, 1997; Shipbuilders Announce Pact. Associated Press wire story, September 4, 1997; Ingalls, Avondale Form Shipbuilding Alliance. *Aerospace Daily*, September 5, 1997: 351B; Schweizer, Roman. Ingalls, Avondale Agree to Pursue Commercial, Navy Work Together. *Inside the Navy*, September 8, 1997: 4; Bender, Bryan. Ingalls, Avondale Shipyards Sign Teaming Agreement. *Defense Daily*, September 8, 1997: 392.

[59] This project is the Coast Guard's Integrated Deepwater System program, which is an effort to acquire an integrated system of cutters, aircraft, and command and control systems for the Coast Guard's deepwater operations. See CRS Report 98-830 F, *Coast Guard Integrated Deepwater System: Background and Issues for Congress*, by Ronald O'Rourke. Washington, 1998. (November 8, 2000) 14 p.

- In 1996-1997, NNS and Ingalls teamed together to bid for the contract to design and build a proposed Navy surface combatant (since canceled) called the arsenal ship or maritime fire support demonstrator.[60]
- In 1995, NNS and Ingalls teamed together to bid (unsuccessfully) for the contract to design and build the first three San Antonio (LPD-17) class amphibious ships.[61] Under the teaming arrangement, if NNS and Ingalls won this competition, NNS would have built the aft section of each ship, which would have been transported to Ingalls and joined to the Ingalls-built forward section of each ship.[62]
- In 1992-1993, NNS and Ingalls submitted separate (and unsuccessful) bids for contracts to design and build new-construction sealift ships under a loose teaming arrangement between the two yards. Under the arrangement, if either yard won this competition, that yard would sub-contract some of the work to the other yard. NNS would have built the forward section of each ship, and Ingalls would have built the aft section. The winning yard would receive the section of the ship built by the other yard and then carry out final assembly of the ship.
- In the 1980s, Avondale and Ingalls shared work in the program to modernize and reactivate the Navy's Iowa (BB-61) class battleships.[63]

In theory, NOC at some point in the future might determine that its commitment not to close any shipyards following the NOC-NNS merger (i.e., as a direct consequence of the merger) had been fulfilled, and that NOC was now free to close shipyards for reasons unrelated to the merger. A decision to close a shipyard completely, however, might be very unlikely because it would likely cause a controversy in the community and state affected, and because closing a site would reduce the geographic base of support for NOC's shipbuilding programs. A decision to significantly reduce the amount of production work (and employment levels) at a site while still keeping it open might be more likely.

Shipyards and Shipbuilding in the Political Process

What affect will shipyard mergers have on the shipyards and shipbuilding in the political process?

Navy shipbuilding competes in the DoD and congressional budgeting arenas for limited DoD procurement dollars against other DoD defense procurement priorities, such as space systems, aircraft, missiles, land-warfare systems, and defense communications and electronics. Shipyard

[60] See CRS Report 97-455 F, *Navy/DARPA Arsenal Ship Program: Issues and Options for Congress*, by Ronald O'Rourke. Washington, 1997. (April 18, 1997) p. 31. The arsenal ship program was terminated in October 1997; see CRS Report 97-1044 F, *Navy/DARPA Maritime Fire Support Demonstrator (Arsenal Ship) Program: Issues Arising From Its Termination*, by Ronald O'Rourke. Washington, 1997. (December 10, 1997) 6 p.

[61] The contract to build the first 3 ships in this class was instead awarded to a team led by Avondale that also included BIW, Hughes Aircraft Company of Fullerton, CA, and Intergraph Corporation of Waynesboro, VA. The Ingalls-NNS team also included NASSCO (for pre-construction support and post-construction overhaul work) and Lockheed Martin's Government Electronic Systems Division of Moorestown, NJ.

[62] Ingalls To Team With Other Companies To Bid For New Navy Ship Contract. Associated Press wire story, October 24, 1995; Walsh, Mark. Second Team Will Bid For LPD-17. *Defense Week*, October 30, 1995: 3; Walsh, Edward J. Shipbuilders Plan Computerized Design for New Amphib. *Sea Power*, February 1996.

[63] Ingalls and Avondale noted their sharing of work on this program in announcing their September 1997 agreement on future teaming arrangements.

mergers since 1995, by incorporating shipyards into larger defense firms with business activities in multiple defense sectors, can affect shipbuilding's place in this competition in at least two ways – overall strength of representation and system-of-systems acquisition programs.

Overall Strength of Representation

In the competition for limited defense procurement funds, the six shipyards individually are not the largest competitors. As can be seen in Table 2, the six yards in December 2001 employed a total of 51,463 people, or an average of about than 8,600 people per yard, in most cases at one primary site (two sites in the case of EB). In contrast, Boeing employs more than 180,000 people in its military and civilian business activities in 26 states,[64] while Lockheed Martin employs a total of 125,000 people in its military and civilian business activities at 939 facilities in 457 cities and 45 states.[65]

Shipyard mergers since 1995 have incorporated shipyards into firms that have larger total numbers of employees and greater geographical distribution around the United States. GD currently employs a total of about 52,000 people (including about 19,000 at its three shipyards)[66] at several locations, while NOC currently employs about 100,000 people (including about 32,000 at its three shipyards) in 44 states.[67] Other things held equal, this can strengthen the position of the shipyards relative to other defense contractors in the political process.

Shipyard mergers can also lead to more unified and coordinated lobbying and public-relations efforts among the yards, which can also strengthen the position of the yards in the political process. When the six shipyards were owned by six separate organizations, the lobbying and public-relations efforts of some of the yards might contradict or undercut some efforts of other yards. Now that ownership of the six yards has been consolidated under two firms, this possibility appears to have been reduced. In Congress, shipyard mergers can encourage Members of Congress who represent individual shipyards to find common interests with Members who represent other shipyards owned by the same parent firm.

For advocates of increased spending on Navy shipbuilding, the increased overall strength of representation can be viewed as an advantage. For certain other parties, such as policymakers involved in establishing and executing certain policies and programs relating to Navy shipbuilding, or advocates of increased spending on programs other than Navy shipbuilding, this increased strength might pose complications.

Shipbuilding in System-of-Systems Acquisition Programs

DoD relies primarily on defense firms (rather than on itself) to design and act as system integrators for complex individual weapon systems. [68] As a recent extension of this practice, DoD is now relying on large defense firms to design and act as integrators for large "system-of-systems" acquisition programs that involve complex combinations of various "platforms" (i.e., aircraft, ships, other vehicles), sensors and other C4ISR equipment,[69] and weapons. Examples of

[64] Source for figures: http://www.boeing.com/companyoffices/aboutus/brief.html .

[65] Source for figures: http://www.lockheedmartin.com/about/ataglance.html .

[66] Source for figures: http://www.generaldynamics.com/overview/ .

[67] Source for figures: http://www.northropgrumman.com/news/new_faq_main.html .

[68] System integrators ensure that the many systems, subsystems, and components that together make up a complex weapon system operate together as intended, so that the weapon system as a whole performs effectively and efficiently.

[69] C4ISR stands for command and control, communications, computers, intelligence, surveillance, and reconnaissance.

system-of-system acquisitions include the missile defense program and the Army's Future Combat System (FCS) program.[70]

Relying on large defense firms to design and act as system integrators is now a necessity for DoD, given the limits on DoD's own in-house system design and integration capabilities. It also permits DoD to take full advantage of the skills and creativity in the private sector to solve complex defense problems. Such creativity can be particularly important in system-of-system acquisition efforts, where there can be a wide array of possible solutions.

Relying on large defense firms to act as system integrators, particularly in system-of-systems acquisitions, however, can create a potential for the firms to influence U.S. defense policy by suggesting the preferred technical approach to be taken for solving a certain defense problem, or by concluding that a certain policy problem can (or cannot) be solved through the acquisition of a new weapon system or system or systems.

Having U.S. defense policy influenced by industry conclusions about the preferred general technical approach to be taken or whether a certain problem can be solved through a new weapon acquisition program can be helpful to U.S. policymakers by clarifying the potential feasibility, costs, and risks of adopting certain defense policies. A large defense firm, however, might structure its recommendations or conclusions in these areas in ways that suits its own self interests as a firm that has business activities in some kinds of defense systems but not others, or higher rates of profitability in some defense activities than in others.

The potential issue for Congress, in the wake of shipyard mergers since 1995, is whether shipbuilding in general or certain types of ships will receive appropriate emphasis in the technical approaches proposed by large defense firms in system-of-system acquisition efforts. Will firms that do (or do not) own shipyards, or whose shipbuilding activities are more (or less) profitable than its other business activities, give excessive (or insufficient) emphasis to shipbuilding in general or certain types of ships in its system-of-system proposals?

Movement of Officials Between DoD/Navy and Industry

How might shipyard mergers affect the risks associated with movement of senior-level officials between DoD/Navy and industry?

Movement of senior-level employees between DoD and the defense industry is common and can be beneficial in terms of improving DoD understanding of industry concerns, importing efficient industry business practices into DoD, and improving industry understanding of DoD goals, procedures, and concerns. It also, however, has the potential to create questions regarding potential conflicts of interest for senior DoD officials involved in making decisions about major weapon acquisition programs or regulatory issues that affect the defense industry, particularly if those officials are potential candidates for post-DoD employment with a defense firm.

Shipyard mergers since 1995 have contributed to the general consolidation of defense firms and have reduced in particular the number of major defense firms that might hire a former DoD or Navy official specifically on account of that person's background in Navy shipbuilding programs. Until 1995, for example, a DoD or Navy official with such a background who was anticipating or hoping for a post-DoD/Navy career in the private sector knew there were 6 major naval shipbuilding firms (plus several other major contractors involved in shipbuilding programs)

[70] In addition, the Coast Guard is using industry for a system-of-systems acquisition effort for its Deepwater program for replacing its current deepwater-capable cutters, patrol boats, and aircraft. See CRS Report RS21029, *Coast Guard Deepwater Program: Background and Issues for Congress*, by Ronald O'Rourke, Washington, 2002, (updated periodically) p. 6.

available as potential employers. Now, in contrast, there are only two firms that own shipyards that build major ships for the Navy (GD and NOC) and a smaller number of other major defense contractors involved in shipbuilding programs (e.g., Lockheed Martin and Raytheon).

A potential issue for Congress is whether and how shipyard mergers since 1995, by reducing the number of potential post-DoD/Navy employers for persons with shipbuilding backgrounds, might affect decisions made by current senior DoD and Navy officials with responsibility for Navy shipbuilding programs or regulatory issues affecting the shipyards. With fewer firms available as potential post-DoD/Navy employers, will DoD/Navy officials involved in shipbuilding programs be willing to make decisions that might strongly disappoint one or more of those firms? Potential questions that Congress may consider include the following:

- What are the potential benefits and risks of regular movement of senior-level employees between DoD/Navy and industry? How have these benefits and risks been affected, if at all, by shipyard mergers?
- Are the regulations and procedures now in place to protect against the risks associated with senior-level employee movement between DoD/Navy and industry appropriate in light of the more concentrated defense industry structure created by recent shipyard mergers? What, if anything, should or can be done to reduce the risk that post-DoD/Navy employment considerations might influence the decisions of senior DoD/Navy officials on issues affecting firms involved in shipbuilding programs?

Reviewing Mergers on "Savings vs. Competition"

Is DoD's process for reviewing of proposed defense mergers best summarized as one that weighs the potential savings of mergers against their potential affects on competition?

Discussions of DoD's review of the 2001 NOC-NNS merger proposal and other defense merger proposals sometimes described that process as one that weighed the consolidation-related savings that could result from the proposed merger against the effects the merger might have on competition. The notion of a "savings-vs.-competition" review framework might have arisen from the language of DoD Directive 5000.62, or from the inclinations of some participants in the debates over proposed mergers to focus on one of these factors or the other. Supporters of proposed mergers, for example, often focus on the savings that they say will result, while opponents often focus on the effects on competition.

The savings-vs.-competition framework for summarizing DoD's merger-review process, though concise, may not be the most accurate or useful framework, for two reasons. First, it tends to separate the idea of savings from that of competition and put the two ideas into opposition with one another, even though competition can itself be a powerful source of savings.

Second, savings are only one of several ends that the government seeks to achieve in defense-procurement programs, and competition is only one means of achieving those ends. In addition to cost constraint, the government in defense procurement seeks to achieve product quality, product innovation, and production schedule adherence. And in addition to competition, the government can employ regulation, audits, and incentive payments to achieve these ends. The "savings-vs.-competition" framework can obscure these other ends and means.

For these reasons, DoD's merger-review process might be characterized not simply as one that weighs savings against competition, but rather as one that assesses how proposed mergers might

affect the ability of the government to achieve cost constraint and other desired defense-procurement goals through use of competition or other available means.[71]

DoD As "Sole Customer" In Merger Reviews

Is DoD the sole customer whose interests are affected by defense mergers involving firms whose products are purchased solely by DoD?

DoJ discussions of the process that it followed in reviewing GD's and NOC's 2001 proposals to acquire NNS sometimes noted that DoJ would weigh DoD's views quite heavily, if not defer to DoD's views on the matter, since NNS's primary products – new aircraft carriers and new submarines – are purchased solely by DoD, making DoD the sole customer whose interests were at stake.[72]

From a Congressional standpoint, the notion that DoD was the sole customer with a stake in the issue may be of some interest, because it may not be the only way to view the situation. An alternative view is as follows:

- U.S. taxpayers, not DoD, are the customer, since is their tax dollars that pay for NNS's products, and the products are ultimately used for their benefit;
- DoD is simply an agent acting on behalf of the taxpayers;
- DoD is not the only agent acting on their behalf in this matter – Congress acts on behalf of the taxpayers as well; and
- Congress, and not DoD, arguably is the primary agent acting on behalf of the taxpayers, since it is Congress that (1) is empowered by the Constitution "To provide and maintain a navy,"[73] (2) appropriates the taxpayer funds needed to finance the construction of the ships, (3) oversees DoD – Congress' delegated agent – to ensure that those funds are used efficiently in building the ships, and

[71] See also the discussion in the background section of this report, in a footnote to the sub-section entitled "DoD and DoJ Reviews," of the 1997 revision to the DoJ/FTC Horizontal Merger Guidelines, which, as summarized in CRS Report RS20241, imply that "a merger that is, on balance anticompetitive, will not generally be 'saved' by claimed or actual efficiencies, nor likely be approved by the reviewing agencies ([section] 4)."

[72] One article, for example, paraphrased Deputy Assistant Attorney General R. Hewitt Pate, a senior DoJ official involved in the merger-review process, as noting in an October 25, 2001 DoJ briefing on its decision regarding the GD-NNS merger proposal for Senators John Warner and George Allen (with reporters also present) that a DoJ lawsuit opposing NOC's merger proposal was unlikely, given DoD's decision to not oppose the merger. The article also quoted Hewitt as saying, "We're not going to get very far in a trial if the only customer is not complaining." (Lerman, David. Justice Hints OK For Bid By Northrop. *Newport News Daily Press*, October 26, 2001.) Another article based on this briefing paraphrased Pate as saying that DoJ would have been unlikely to oppose the GD-NNS merger if DoD had supported it. (Eisman, Dale. General Dynamics' Plan Raised Concern Over Antitrust Law. *Norfolk Virginian-Pilot*, October 26, 2001.)An earlier article stated: "While staff attorneys at the Justice Department's antitrust division have raised concerns about the potential loss of competition, people close to the situation say the department would be hard-pressed to block a General Dynamics-Newport News transaction if the Pentagon, as the only buyer of such ships, didn't share its concern." (Squeo, Anne Marie. Pentagon Appears To Favor Newport News Acquisition. *Wall Street Journal*, August 29, 2001.)Another article, however, reported that the process has worked differently in some cases, with DoJ influencing DoD's views prior to DoD announcing its decision. A case in point, the article stated, was the 1998 Lockheed Martin-NOC merger proposal: "In that instance, sources have said, while the DoD had concerns that the combination would have raised competition concerns across a series of markets, the Pentagon was moved to oppose the deal – despite the backing of the individual military services – in large part because senior Justice officials during meetings with their defense counterparts expressed grave reservations about the deal." (Muradian, Vago. Aldridge To Decide NNS' Fate, Continues To Assess Based On Four Factors. *Defense Daily*, August 14, 2001.)

[73] Article I, Section 8.

(4) is held directly accountable by the voters at election time for its appropriation and oversight activities.

The alternative view that Congress, and not DoD, is the primary agent acting on behalf of U.S. taxpayers in the purchase of defense products raises the following potential questions for Congress:

- How, if at all, does the executive branch view of DoD as the sole customer affect views in DoD or elsewhere regarding Congress' role in defense procurement?
- Does DoJ's process for reviewing proposed defense-related mergers and acquisitions adequately take into account Congress' status as an elected agent acting on behalf of taxpayers, particularly in cases involving firms whose products are purchased solely by DoD?
- To what degree should DoJ defer to DoD's views in reviewing proposed defense-related mergers and acquisitions involving firms whose products are purchased solely by DoD?

Building Non-Nuclear Submarines At Ingalls For Export

What effect will the NOC-NNS merger have on potential plans for building non-nuclear-powered submarines in a U.S. yard for export to Taiwan or other countries?

The Bush Administration announced in April 2001 that it had decided to sell eight non-nuclear-powered submarines to Taiwan as part of a package of arms intended to modernize Taiwan's armed forces. Press reports identify NOC's Ingalls shipyard as a leading contender to build the ships.[74]

Prior to the Administration's April 2001 announcement, the U.S. Navy had strongly resisted the idea of building non-nuclear-powered submarines in a U.S. shipyard for export to foreign buyers on the grounds that such a program would create a risk of transmitting (even if only inadvertently) highly sensitive U.S. nuclear submarine design and construction know-how to

[74] Ingalls built nuclear-powered submarines for the Navy until the early 1970s. (The last Ingalls-built nuclear-powered submarine was the Parche [SSN-683], which was commissioned in 1974.) Since the early 1990s, Ingalls has pursued a plan to build two non-nuclear-powered submarines for export to Egypt. In April 1994, the State Department approved an export license application permitting Ingalls and the German submarine building firm HDW (Ingalls' joint venture partner at the time) to develop a technical and price proposal for building two HDW-designed Type 209 submarines for Egypt. The plan appeared to fall through in 1996 when Egypt could not secure enough financing to cover its 30% share of the cost of the submarines, which were to be financed partially by funds from the U.S. Foreign Military Sales (FMS) program. In March 1997, the State Department reportedly approved an export license application to another U.S.-led business consortium seeking to build two submarines for Egypt. The license reportedly was granted to Southwest Marine International Navy Consortium, a 14-company group led by Southwest Marine (SWM) of San Diego, CA. (SWM later that year was acquired by the Carlyle Group to become part of the Carlyle-owned U.S. Marine Repair shipyard organization.) The consortium reportedly proposed build the submarines at Atlantic Dry Dock, of Mobile, AL, using a design developed by the Spanish firm Bazan. (Duffy, Thomas. State Dept. Grants U.S. Group Export License To Build Diesel Subs For Egypt. *Inside the Navy*, March 24, 1997: 1, 11.)

foreign countries.[75] Navy concerns on the issue, however, may have abated or been overruled by the Administration, at least with regard to submarines intended for Taiwan.[76]

Navy leaders argued in the past that the technology-transmission risk would be particularly great if non-nuclear-submarines were built at yards that were also building the Navy's nuclear-powered submarines (EB and NNS). For this reason, supporters of the idea of building non-nuclear-powered submarines in a U.S. yard for export to foreign buyers have focused on the possibility of building them in another yard, particularly Ingalls.

Supporters of the idea of building non-nuclear-powered submarines at Ingalls for export to foreign buyers had argued before 2001 that Ingalls is not involved in the Navy's nuclear-powered shipbuilding program and no longer retains any sensitive U.S. Navy submarine design and construction know-how that could be transmitted to a foreign buyer, but has facilities that are capable of building non-nuclear-powered submarines that are based on foreign (e.g., European) non-nuclear-powered submarine designs incorporating no U.S. submarine design know-how.

The question is how these arguments may have been affected by the NOC-NNS merger. As a result of this merger, NNS and Ingalls now have a common owner, and following the initial period (ending around October 2003) during which NOC will continue to operate NNS as a separate division, NOC will integrate NNS into its ship systems division, which includes Ingalls (and Avondale). In addition, NOC in 2001 argued against the GD-NNS merger proposal in part on the grounds that the merger would deny NOC access to NNS's submarine-related technologies. Some of these technologies, NOC argued, will become more important in the future for surface combatants and NOC therefore needed to have access to them to ensure the competitiveness of its future surface combatant designs against designs developed by GD. One implication of this argument is that NOC may transfer submarine-related technologies from NNS to Ingalls.

Opponents of building non-nuclear-powered submarines at Ingalls for export to foreign buyers could argue that NOC's acquisition of NNS, and particularly NOC's plan to integrate NNS into NOC's ship systems division, reduces the separation of Ingalls from the Navy's nuclear-powered-submarine shipbuilding activities at NNS and thereby increases the risk that a non-nuclear-powered submarine building program at Ingalls could, even if only inadvertently, transmit U.S. submarine design and construction know-how to a foreign buyer.

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[75] The Navy's concerns were detailed in a 1992 report to Congress that was required by Section 1014 of the FY1992 defense authorization act (P.L. 102-190/H.R. 2100). (U.S. Department of the Navy. Secretary of the Navy. *Report to Congress*. Washington, 1992. [Secretary of the Navy, May 1992] 9 p.) Other observers have speculated that the Navy's opposition is additionally, or even primarily, grounded in a fear that the establishment of a non-nuclear-powered submarine building program in a U.S. yard could eventually lead to the Navy being compelled by others to purchase non-nuclear-powered submarines for its own use – something Navy leaders do not desire.

[76] One article, for example, stated the following:Bowing to the Bush administration's desire to help Taiwan and to the political and commercial pressures, the Navy has shifted ground. In public statements, the Navy now says it is willing to countenance the possibility that diesel submarines will be made in this country for export. "While the U.S. Navy does not have a requirement for diesel submarines, we do not object to U.S. industry participation in the diesel submarine market," said Lt. Cmdr. Cate Mueller, a Navy spokeswoman. The change is not just one of public relations. Inside the U.S. government too, the Navy has changed its tune. "The Navy is on board now," asserted one surprised U.S. official a few weeks after Bush's announcement. 'It seems a decision has been made to be supportive.' (Mann, Jim. U.S. Promised Subs To Taiwan It Doesn't Have. *Los Angeles Times*, July 15, 2001: 1.)A more recent press report, however, quotes a "person close to the Pentagon" as stating that Navy officials remain "very, very nervous," about the proposal to build non-nuclear submarines in a U.S. yard for export to Taiwan, on the grounds that it could lead to the Navy being pressed to purchase such submarines for its own use in lieu of nuclear-powered submarines. Gertz, Bill, and Rowan Scarborough. Inside the Ring. *Washington Times*, February 22, 2002: 8. (Item entitled "Taiwan diesel subs") See also Jaffe, Greg, and Anne Marie Squeo. Pentagon Widens Ties To Taiwan In a Move Likely to Tweak China. *Wall Street Journal*, April 10, 2002.

Supporters of building non-nuclear-powered submarines at Ingalls for export to foreign buyers could argue that the technology transmission issue can be addressed by establishing a firewall (i.e., an administrative separation) between Ingalls and NNS on all issues and personnel relating to submarine construction. They can also argue that some press reports since April 2001 suggest that Navy opposition to participation by NNS (or EB) in a program to build non-nuclear-powered submarines may have abated, at least with regard to submarines built for Taiwan.[77]

[77] See, for example, Lerman, David. Offer To Sell Diesel Subs To Taiwan Missing A Manufacturer. *Newport News Daily Press*, February 9, 2002; Fabey, Michael. Northrop To Bid On Subs For Taiwan. *Newport News Daily Press*, January 24, 2002; Woods, Randy. U.S. Navy Pushing Ahead With Plans To Provide Diesel Subs To Taiwan. *Inside the Navy*, December 17, 2001; Lague, David. Coming About. *Far Eastern Economic Review*, December 13, 2001; Koch, Andrew, and Wendell Minnick. USA Seeks Help To Deliver Taiwan Sub Promise. *Jane's Defence Weekly*, November 21, 2001; Oz Firm Eyed As Taiwan Sub Source. *Far Eastern Economic Review*, September 6, 2001.

Appendix A. DoJ Lawsuit on GD-NNS Merger

This appendix reprints the lawsuit filed by the Department of Justice in October 2001 to block GD's proposed acquisition of NNS.

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

UNITED STATES OF AMERICA,
U.S. Department of Justice
Antitrust Division
1401 H Street, N.W., Suite 3000
Washington, D.C. 20530,

Plaintiff,

v.

GENERAL DYNAMICS CORPORATION
3190 Fairview Park Drive
Falls Church, Virginia 22042-4523

and

NEWPORT NEWS SHIPBUILDING INC.
4101 Washington Avenue
Newport News, Virginia 23607-2270

Defendants.

CASE NUMBER 1:01CV02200
JUDGE: Gladys Kessler
DECK TYPE: Antitrust
DATE STAMP: 10/23/2001
Judge _____

VERIFICATION OF COMPLAINT

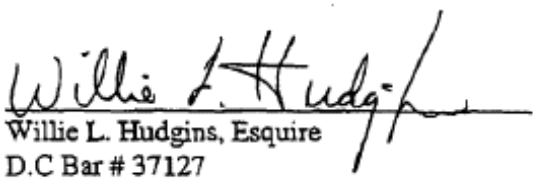
I, Willie L. Hudgins, declare:

1. I am an attorney with the United States Department of Justice, Antitrust Division.

2. The foregoing Complaint for and on behalf of the United States of America was duly prepared under the direction of the Attorney General of the United States. The facts stated therein have been assembled by authorized employees and counsel for the United States of America. The allegations therein are true and correct to the best of my knowledge, information, and belief.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 23, 2001.

Respectfully Submitted,



Willie L. Hudgins, Esquire
D.C Bar # 37127
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(202) 307-0207

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

UNITED STATES OF AMERICA U.S. Department of Justice Antitrust Division 1401 H Street, N.W., Suite 3000 Washington, D.C. 20530, *Plaintiff,* v. GENERAL DYNAMICS CORPORATION 3190 Fairview Park Drive Falls Church, Virginia 22042-4523 and NEWPORT NEWS SHIPBUILDING INC. 4101 Washington Avenue Newport News, Virginia 23607-2270 *Defendants.*	Civil No: Filed:

VERIFIED COMPLAINT

The United States of America, acting under the direction of the Attorney General of the United States, brings this civil action to obtain equitable relief against defendants and alleges as follows:

1. The United States seeks to prevent the proposed acquisition of defendant Newport News Shipbuilding Inc. ("Newport News") by defendant General Dynamics Corporation ("General Dynamics") pursuant to an Agreement and Plan of Merger entered into by the defendants on April 24, 2001 and a cash tender offer announced on April 25, 2001 and extended through October 26, 2001. Newport News and General Dynamics are the only two companies

that design, develop and construct nuclear submarines for the U.S. Navy. The proposed acquisition of Newport News by General Dynamics would create a monopoly in the design, development and construction of nuclear submarines and would eliminate all competition for a weapons system critical to the national defense.

2. In addition, the proposed acquisition would eliminate all competition for the design, development and integration of electric drive, a new technology that the U.S. Navy plans to incorporate into nuclear submarines and surface combatants.

3. Finally, the proposed acquisition would also substantially lessen competition in the design, development and construction of conventionally powered surface combatants. Acoustical technologies such as hydrodynamic flow, propeller design and machinery noise isolation developed by General Dynamics and Newport News for nuclear submarines are now being applied to surface combatants. If General Dynamics obtains a monopoly position in nuclear submarines it would have the incentive to refuse to make available to its surface combatant competitors technology developed at its submarine yards.

I. JURISDICTION AND VENUE

4. This action is filed by the United States under Section 15 of the Clayton Act, as amended, 15 U.S.C. § 25, to prevent and restrain the defendants from violating Section 7 of the Clayton Act, as amended, 15 U.S.C. § 18.

5. General Dynamics and Newport News design, develop and construct nuclear submarines, and they design, develop and integrate electric drive and acoustical technology, for sale to the U.S. Department of Defense ("DoD") or to military prime contractors in the United

States for use in military programs. General Dynamics and Newport News are engaged in interstate commerce and in activities substantially affecting interstate commerce. The Court has subject matter jurisdiction over this action and jurisdiction over the parties pursuant to Sections 12 and 15 of the Clayton Act, 15 U.S.C. §§ 22 and 25, and 28 U.S.C. §§ 1331 and 1337.

6. The defendants transact business and are found within the District of Columbia. Venue is proper in this District under 15 U.S.C. § 22 and 28 U.S.C. § 1391(c).

II. THE DEFENDANTS

7. General Dynamics Corporation, a Delaware corporation headquartered in Fairfax, Virginia, reported net sales of about $ 10.4 billion in 2000, approximately 60 percent or $6.24 billion of which was made to the U.S. Government. General Dynamics is the fifth largest DoD contractor. It develops and produces nuclear submarines, destroyers and auxiliary warships, the M-1 Abrams tank, armored troop carriers, Gulfstream aircraft, electric drive technology, acoustical technology and various surveillance, communications, and intelligence systems. General Dynamics' Marine Group consists primarily of four shipyards: Electric Boat, in Groton, Connecticut and Quonset Point, in North Kingstown, Rhode Island, which design and build nuclear submarines; Bath Iron Works, in Bath, Maine, which designs and builds surface combatants and amphibious assault ships for the U.S. Navy; and the National Steel and Shipbuilding Company ("NASSCO") in San Diego, California, which designs and builds auxiliary ships for the U.S. Navy and commercial ships for private customers, and conducts repair and overhaul services for a variety of U.S. Navy and commercial vessels. In 2000, the Marine Group had net sales of $3.4 billion.

8. Newport News Shipbuilding Inc., is a Delaware corporation headquartered in Newport News, Virginia. In 2000, Newport News reported revenues of about $2.1 billion, $2.0 billion or over 95 percent of which was derived from the U.S. Government. Newport News operates a large main shipyard in Newport News, Virginia, where it produces nuclear submarines and carriers, and a small shipyard in San Diego, California, which does repair work. Newport News is the only company in the United States that designs, develops and constructs nuclear aircraft carriers for the U.S. Navy.

III. TRADE AND COMMERCE

A. RELEVANT PRODUCT MARKETS

1. Nuclear Submarines

9. Nuclear submarines, a vital weapon platform of America's armed forces, are relied upon to provide undersea superiority. Submarines combine competencies of stealth, endurance, agility and firepower. They perform intelligence gathering, surveillance and reconnaissance, launch and recovery of special operations forces, sea control and power projection missions.

10. Nuclear submarines conduct missions that no other weapon platform can undertake. They require no replenishment at sea and operate without the need for a protective escort. They can provide offensive firepower and other support missions for a battle group at minimal risk. Because of their stealth and sustainability, a nuclear submarine can provide intelligence gathering covertly for an extended period of time without revealing its location.

11. There is no suitable substitute for a nuclear submarine. Surface ships and other weapon platforms cannot perform the missions of a nuclear submarine.

12. The design, development, construction and sale of nuclear submarines to the U.S. military is a line of commerce and a relevant product market within the meaning of the Clayton Act.

2. Electric Drive

13. Electric drive technology for submarines and surface combatants is an integrated power system designed so that a single engine or set of engines generate a pool of electricity that can be used both for ship propulsion and to operate the other electrical systems on the ship. The electricity produced by engines or generators is sent by cable to an electrical switchboard where it is divided into two flows – one for propulsion and one for the ship's other electrical needs.

14. Electric drive eliminates the need for a mechanical drive system where power from a gas or steam turbine is transmitted through a rigid shaft and reduction gears to the ship's propeller. Electric drive technology replaces this mechanical system with quieter generators and connects the generators to motors via cables. Motors, instead of the ship's engine, control the speed of the propeller. In addition, since cables are flexible, the motors can be isolated from the hull to minimize noise transmitted into the water. Electric drive technology is quieter and more fuel efficient than mechanical drive systems.

15. The economic and acoustic benefits of electric drive will significantly enhance the capability and lower the operating costs of nuclear submarines and surface combatants. Electric drive is currently planned for insertion on future nuclear submarines no later than 2010

and on surface combatants as early as 2005. Because of its benefits over mechanical drive, the U.S. Navy has invested significant resources to develop this technology as rapidly as possible.

16. The design, development, integration and sale to the U.S. military of electric drive for submarines and surface combatants is a line of commerce and a relevant product market within the meaning of the Clayton Act.

3. Surface Combatants

17. Surface combatants are designed to engage in combat with enemy aircraft, ships or land targets. The *Arleigh Burke* class destroyers and the *Ticonderoga* class cruisers are the main types of surface combatants currently in and being produced for the U.S. Navy fleet. Surface combatants are capable of firing torpedoes for anti-submarine warfare and missiles for anti-surface and anti-air warfare. Destroyers and cruisers usually operate in support of carrier battle groups, surface action groups or amphibious groups.

18. There is no suitable substitute for surface combatants. Other Navy vessels such as submarines or amphibious ships cannot perform the range of missions performed by surface combatants.

19. The design, development, construction and sale of surface combatants to the U.S. military is a line of commerce and a relevant product market within the meaning of the Clayton Act.

B. RELEVANT GEOGRAPHIC MARKET

20. For national security reasons, the DoD only considers domestic producers for nuclear submarines, electric drive and surface combatants. The DoD is unlikely to turn to any

foreign producers in the face of a small but significant price increase by domestic suppliers of nuclear submarines, surface combatants, and electric drive technology.

21. The United States is a relevant geographic market within the meaning of Section 7 of the Clayton Act.

C. ANTICOMPETITIVE EFFECTS AND ENTRY

1. Nuclear Submarines

22. General Dynamics and Newport News design, develop and construct nuclear submarines. Construction of the *Virginia* class submarine is equally shared between General Dynamics and Newport News pursuant to a teaming agreement. General Dynamics produces the pressure hull rings, the engine room and the control room while Newport News produces the stern and bow sections, torpedo room, auxiliary room, machinery room, habitability spaces and the sail. Both firms produce the command and control module. Pursuant to the teaming agreement, General Dynamics is responsible for the test and final assembly of the first and third submarine produced under the program and Newport News is responsible for the test and final assembly of the second and fourth submarine. Each firm builds the power plant portion of the submarine that it is responsible for assembling. After competing against Newport News, General Dynamics won the contract to design the power plant for the *Virginia* class and to become the overall lead design yard. A *Virginia* class submarine costs in excess of $2 billion.

23. Although teamed for construction, General Dynamics and Newport News aggressively compete for design improvements to the *Virginia* class. The *Virginia* class

program is designed to incorporate substantial design changes over the life of the 30-ship program so that subsequent submarines are enhanced to meet future threats.

24. During fiscal year 2000, General Dynamics and Newport News submitted a total of 22 new design improvement proposals for the *Virginia* class: 12 by Newport News and 10 by General Dynamics. Eighteen of the shipyards' design improvement proposals were approved and funded by the U.S. Navy for further development and evaluation. Over the life of the *Virginia* class submarine, a total of 110 design improvements have been submitted by General Dynamics and Newport News as of 2000, of which 62 were submitted by Newport News and 48 by General Dynamics. The U.S. Navy has approved and allocated funding for 67 of these design improvements.

25. General Dynamics and Newport News are the only firms with the capability to design, develop and construct a nuclear submarine. General Dynamics designs and builds nuclear submarines at its Electric Boat facilities in Groton, Connecticut and in North Kingstown, Rhode Island. Newport News designs and builds nuclear submarines at its main shipyard in Newport News, Virginia.

26. General Dynamics and Newport News have a long and rich history as competitors in the design and construction of nuclear submarines. In 1995, General Dynamics was selected over Newport News to build the *Virginia* class after the Navy had awarded contracts for both firms to prepare to start construction. In 1991, General Dynamics won the contract to design the propulsion plant for the *Virginia* class following an eight-month competition with Newport News. In 1982, following a 17-month competition with Newport News, General Dynamics was selected to design the propulsion plant for the *Seawolf*. However,

after a period of competition for the overall ship design, Newport News was selected as the *Seawolf* lead design yard over General Dynamics. General Dynamics and Newport News competed aggressively to construct the first two of the three *Seawolf* submarines. In the early 1960s, Newport News was selected over General Dynamics to design the propulsion plant and become the lead design yard for the *Los Angeles* class submarine. Newport News and General Dynamics were awarded competitive bids to construct the 62 submarines in the *Los Angeles* class: 29 by Newport News and 33 by General Dynamics.

27. The acquisition of Newport News by General Dynamics will create a monopoly in the design, development and construction of nuclear submarines. Successful entry into the design, development and construction of nuclear submarines is virtually impossible. Entry would likely take over a decade and cost billions of dollars. Because of the complexity of nuclear submarines and the safety requirements imposed by having a nuclear reactor close to military personnel, it would take years for a new entrant to win the confidence of the U.S. Navy so that it could design and produce a safe nuclear submarine. Moreover, it is highly unlikely that another firm would obtain the necessary regulatory approvals to enter nuclear submarine construction.

2. Electric Drive

28. Newport News and General Dynamics are the two leading firms developing electric drive for use on submarines and surface combatants. General Dynamics is leading one team developing electric drive for incorporation on the *Virginia* class and is affiliated with a second team developing electric drive technology for the next generation of surface combatants, the DD-21 program. Similarly, Newport News is heading up one team developing electric drive

for the *Virginia* class and is affiliated with a second team developing electric drive for the DD-21 program. On their respective teams for the *Virginia* class and the DD-21, General Dynamics and Newport News are primarily responsible for the design changes necessary to integrate electric drive onto submarines or surface combatants. Newport News and General Dynamics are the only U.S. firms designing technology to integrate electric drive into submarines and surface combatants.

29. If General Dynamics acquires Newport News, it will control the only two teams developing electric drive and the only two firms capable of integrating electric drive onto submarines and surface combatants. The acquisition would deprive the U.S. Navy of the benefits of competition in the design, development and integration of electric drive onto nuclear submarines and surface combatants.

30. Entry into the design, development and integration of electric drive on nuclear submarines and surface combatants is difficult, time consuming and costly. The development of electric drive for nuclear submarines and surface combatants has thus far taken over 10 years and costed approximately $120 million.

3. Surface Combatants

31. General Dynamics' Bath Iron Works and Northrop Grumman Corp.'s ("Northrop Grumman") Ingalls shipyard are the only two shipyards that have built surface combatants for the U.S. Navy during the past 20 years. General Dynamics and Northrop Grumman are competing to build the next generation of surface combatants, the DD-21. In the DD-21 competition, General Dynamics is the lead on one of two teams, designated as the "Blue team" and Northrop Grumman is the lead on the other team, the "Gold team."

32. The DD-21, and future generations of surface combatants, will need to be stealthier than current combat ships because expected future missions will require operation closer to shore. The stealthiness of these ships will depend to a large extent on advanced acoustics technology, machinery noise reduction, propeller design and aerodynamic flow techniques successfully developed in submarine programs. Engineers at General Dynamics and Newport News are involved in developing and integrating these technologies. General Dynamics has access to these technologies through its ownership of Electric Boat. Northrop Grumman does not have similar access, since it does not develop or produce submarines, though it can currently team with an independent Newport News to learn of such technology. With the acquisition of Newport News, both nuclear submarine yards will be under the control of General Dynamics and General Dynamics will have the incentive to keep the technology in-house for its own competitive benefit. Thus, Northrop Grumman may be denied access to technologies developed in nuclear submarine programs which are necessary for it to be a viable competitor for surface combatants. This foreclosure from discriminating technology will make Northrop Grumman a less viable competitor for surface combatants.

33. The acquisition of Newport News by General Dynamics may substantially lessen competition in surface combatants by weakening General Dynamics' only other rival, possibly leading to a monopoly in surface combatants.

34. Entry into the design, development and integration of submarine technology required for surface combatants and into the design, development and construction of surface combatants is extremely difficult, time consuming and costly.

D. HARM TO COMPETITION

35. The DoD has benefited, and likely will benefit in the future, from the ongoing, vigorous competition between General Dynamics and Newport News for the design and construction of nuclear submarines and electric drive technology. Competition will be eliminated in these product markets if General Dynamics acquires Newport News, leading to higher costs, less innovation and higher prices to the DoD.

35. The DoD also relies on ongoing, vigorous competition between General Dynamics and Northrop Grumman in the design and construction of surface combatants. This competition will be substantially lessened if General Dynamics acquires Newport News because of General Dynamics' control of discriminating nuclear submarine technologies necessary for future generations of surface combatants.

V. VIOLATION ALLEGED

36. The effect of General Dynamics' proposed acquisition of Newport News is to lessen competition substantially and tend to create a monopoly in interstate trade and commerce in violation of Section 7 of the Clayton Act.

37. The transaction likely will have the following effects among others:

a. competition in the design, development, construction, and sale of products in each of the relevant markets will be eliminated or substantially lessened;

b. actual and future competition between General Dynamics and Newport News in the design, development, construction, and sale of products in each of the relevant markets will be eliminated;

c. costs and/or prices for products in each relevant product market will likely increase; and

d. innovation in each relevant product market will likely decrease.

VI. REQUESTED RELIEF

Plaintiff requests:

1. That the proposed acquisition by General Dynamics of Newport News be adjudged to violate Section 7 of the Clayton Act, as amended 15 U.S.C. § 18;

2. That the defendants be permanently enjoined and restrained from carrying out the Agreement and Plan of Merger, dated April 24, 2001, or from entering into or carrying out any agreement, understanding or plan, the effect of which would be to combine the business or assets of General Dynamics and Newport News, except for the teaming agreement dated February 25, 1997;

3. That General Dynamics will be permanently enjoined and restrained from acquiring any shares of Newport News pursuant to its proposed tender offer announced on April 25, 2001 and extended to October 26, 2001;

4. That plaintiff be awarded its costs of this action; and

5. That plaintiff have such other relief as the Court may deem just and proper.

Respectfully submitted,

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Appendix B. Competition and GD-NNS Merger

This appendix reprints, with some modifications (e.g., changes to verb tenses), the section of CRS Report RL30969 of May 22, 2001 outlining potential arguments that could be made supporting and opposing GD's proposed acquisition of NNS in terms of its potential effects on competition in Navy ship acquisition. The arguments presented here can be compared with those presented in the Department of Justice's October 2001 court filing reprinted in Appendix A.

Potential Factors to Consider

As mentioned earlier in this report, in examining the effect that shipyard mergers might have on competition in Navy ship acquisition, policymakers may consider several factors, including the following:

- creation of sole sources,
- resulting market share,
- resulting number of independently owned shipyard in-house design and engineering staffs,
- resulting share of shipyard in-house designers and engineers,
- resulting share of Navy research and development funding provided to shipyards, and
- resulting degree of vertical integration.

Creation of Sole Sources

The GD-NNS merger proposal would have transferred the existing sole source for aircraft carriers (NNS) to GD and created a second sole source by bringing the nation's two submarine shipyards under common GD ownership.

Competition in Submarine Construction

Supporters of the GD-NNS merger proposal could argue that competition has not been used in the awarding of contracts to build submarines since the Navy awarded to EB the contract to build SSN-22, the second Seawolf (SSN-21) class submarine, which was procured in FY1991. Since EB had previously been awarded the contract to build the lead ship in the class (SSN-21), many observers believed that EB could use its experience in building SSN-21 and SSN-22 to out-compete NNS for the contract to build the third Seawolf-class submarine (SSN-23) and any subsequent Seawolf-class boats (of which there were none).

Supporters of the GD-NNS merger proposal could argue that this de facto suspension in the use of competition in the awarding of submarine-construction contracts was reinforced by Congress' decision in 1997 to approve a plan proposed by the Navy, EB, and NNS to have EB and NNS build the first 4 Virginia (SSN-774) class submarines under a joint-production arrangement, and further reinforced by Congress' decision in 2000 to extend the joint-production arrangement to the following 5 ships in the program (i.e., through the ninth ship). These decisions to adopt and extend the joint-production arrangement, they could argue, reduced the chances of resuming competition in the awarding of contracts to build submarines at some point in the future, because doing so would require separating the now-entangled submarine construction activities at EB and NNS from one another and possibly reestablishing certain elements of the submarine production lines at one or both yards.

Opponents of the GD-NNS merger proposal could argue that although the joint-production agreement would make it more difficult to resume competition in submarine construction, a GD-NNS merger would further reduce the chances of resuming competition at some point in the future because doing so would likely require GD to sell either EB or NNS to another company – something GD might not be willing to do.

The potential for resuming competition would also depend on future submarine production rates. The current production rate of 1 boat per year is insufficient for achieving meaningful competition between two independently owned submarine builders. Opinions differ on the minimum procurement rate needed to support meaningful competition. In 1996, however, the Navy testified to Congress that a rate of 1.5 boats per year would be sufficient for staging biennial competitions. At this rate, the Navy explained, the Navy every other year could combine two years' worth of procurement (3 boats), allocate one boat to each yard, and have the two yards compete for the third. The Navy in its testimony presented three options for conducting biennial competitions at annual rates of 1.5 or 2 boats per year.[78] A higher procurement rate, such as 3 boats per year, would be needed to support competition on an annual basis.

Supporters of the GD-NNS merger could argue that future submarine procurement rates might not increase significantly from the current rate of 1 boat per year, particularly given the relatively high procurement cost of submarines and competing demands for defense procurement funding. Opponents of the GD-NNS merger proposal could argue that rates of 2 or more boats per year are very possibly, if not likely, in coming years, given the need to maintain the submarine fleet at levels set forth by DoD officials.[79]

Competition in Submarine Design and Technology Development

In 1997, supporters of the joint-production proposal argued that it would be acceptable from a competition standpoint because EB and NNS would continue to compete for secondary Navy contracts for submarine design and submarine technology development work. The use of competition between the two firms, they argued, would thus be preserved in the important area of generating new ideas and technologies for future submarines.

For example, at March 18, 1997 hearing before the Military Procurement subcommittee of the House National Security Committee[80] that focused on the acquisition strategy for the Virginia

[78] U.S. Congress. House. Committee on National Security. Hearings on National Defense Authorization Act For Fiscal Year 1997 – H.R. 3230 and Previously Authorized Programs, 104th Cong., 2nd Sess., March 19, 21, 22, 29, 1996. Washington, U.S. Govt. Print. Off., 1997. [Title I – Procurement, H.N.S.C. No. 104-24] p. 769, 778, 851, 877. (See also p. 890, which refers to the FY1996 DDG-51 class destroyer solicitation, a combined solicitation for the 6 DDG-51s procured in FY1996 and FY1997); U.S. Congress. Senate. Committee on Armed Services. [Hearings on] Department of Defense Authorization for Appropriations For Fiscal Year 1997 and The Future Years Defense Program (S. 1745), 104th Cong., 2nd Sess., Part 2, Seapower, March 19, 21, 26, 27, 28, 1996. Washington, U.S. Govt. Print. Off., 1997. [S. Hrg. 104-532, Pt. 2] p. 130.

[79] Assuming a 33-year life for attack submarines, maintaining the attack submarine force at the planned level of 55 boats over the long run will require a procurement rate of two or more submarines per year starting in the near term and extending for the next 15 or 20 years. For discussions of the rates of submarine procurement needed to support planned submarine force levels, see Statement of Ronald O'Rourke, Specialist in National Defense, Congressional Research Service, Before the House Armed Services Committee, Subcommittee on Military Procurement Hearing on The Navy's Proposed Shipbuilding Program For FY2003, March 20, 2002, pages 27-33; and U.S. Congress. Congressional Budget Office. *Increasing the Mission Capability of the Attack Submarine Force*. Washington, 2002. (A CBO Study, March 2002) 41 p.

[80] The House Armed Services Committee was known as the House National Security Committee during the 104th and 105th Congresses (i.e., 1995-1998).

class (then known as the New Attack Submarine), John Douglass, then-Assistant Secretary of the Navy for Research, Development, and Acquisition – the Navy's acquisition executive – discussed the Navy's plan for inserting new technologies into the Virginia-class design, and stated:

> We use the term "technology opportunities" because we wanted to make sure that our contractors understand this is not a done deal. We want them to compete for these technologies. We want their engineering teams, which are hungry for work, to know that we are going to take the best engineering ideas from either yard and try to inject them into the boats as soon as possible and part of this competition for ideas, competition for technology is based on some of the principles that this committee has put forward.
>
> But this is our commitment, Mr. Chairman,[81] and as long as I am there, I am going to do the very best that I can to get us to stick to it.[82]

The issue came up again later in the hearing in this exchange:

> [Representative Patrick Kennedy:] I want to just ask perhaps one question with respect to how we get R&D into the process, and that is how, Secretary Douglass, do you plan to encourage competition between the yards with respect to new technology and how also can you explain what role Newick [sic][83] will have in that process, as well, and how they would be kept in the loop.
>
> Secretary Douglass: Well, from the – in the first part of your question, how do we plan to get the yards involved and stimulate technology and engineering work. We are making the yards fully aware of how much money we are requesting from the Congress, not only next year but in the out years, and we have asked them to go and look at that budget and give us their proposals for what they think their research and development involvement should be....
>
> Now, within the theme that our [subcommittee] chairman, Congressman [Duncan] Hunter, is going to put on this competition for ideas, the prize is that if we select the technology suggestion of one yard or the other yard, they get to do the engineering work to flesh that idea out and turn it from just an idea into a real piece of equipment or a change to the submarine and then it gets incorporated into that central design and then both builders will build it and incorporate it in the submarines from whatever point that is injected into the production line forward.[84]

Secretary Douglass's written statement for the hearing similarly stated:

> New innovation will not be stifled, but encouraged as more open lines of information exchange are developed between the two shipbuilders, and between the shipbuilder team and government. The teaming arrangement has specific provisions to enhance and upgrade future New Attack Submarines – these efforts may be joint or developed individually by the shipbuilders. Our process is designed to allow industry and the shipbuilders to compete for research and development funds based on innovative ideas for improving [the Virginia-class design's] capability, producibility and affordability.[85]

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[81] The subcommittee chairman was Representative Duncan Hunter.

[82] U.S. Congress. House. Committee on Armed Services. *Hearings on National Defense Authorization Act for Fiscal Year 1998 – H.R. 1119, and Oversight of Previously Authorized Programs.* 105th Cong., 1st Sess., Title I – Procurement. Washington, U.S. Govt. Print. Off., 1998. (H.N.S.C. No. 105-3, Hearings held March 11, 12, and 18, April 8, 10 and 15, 1997.) p. 246-247.

[83] This was a reference to the Naval Undersea Warfare Center, or NUWC, an acronym that is pronounced, and was transcribed here phonetically, as "Newick."

[84] Ibid., p. 298-299.

[85] Ibid., p. 328.

Earlier at the same hearing, another Navy witness – a captain involved in the management of the Virginia-class acquisition program – in explaining the various reasons why the Virginia class would be affordable, talked about how the modular construction process for the Virginia-class design would allow new technologies to be inserted into the design over time:

> Now, one of the things that this [modular construction process] affords us is the opportunity as we go along to adjust the design of these individual modules as the two companies compete for technology insertion, to bring that additional innovation to bear as we complete the construction of the submarine.[86]

Similarly, at an April 8, 1997 hearing before the Seapower subcommittee of the Senate Armed Services Committee on submarine programs, Secretary Douglass, in his opening presentation to the subcommittee, discussed the proposed teaming arrangement for the Virginia class, stated:

> It is also important to remember that if you want to keep your industrial base viable, as you put it, sir, you must do more than just build things. You have to have an engineering force that can look forward into the future and constantly improve the product. This teaming arrangement is going to make that substantially easier to do. In a competitive [construction] environment, it is extremely difficult to get the two competitors to share their best ideas.
>
> Regarding this teaming arrangement, there is evidence that they are already over that hurdle and are sharing their ideas. We have a common technology insertion plan that will come into effect – as I will show you on the next couple of charts – in which we are allowing the shipbuilders to become involved in the future designs of these submarines in a way we have never done before. They sit on a Submarine Technology Oversight Council that Dr. Paul Kaminsky[87] and I co-chair. The presidents of the two shipyards sit with us. There is a very strong and keen competition for ideas about how to improve these submarines. For example, whichever yard brings us the best technology ideas will be the yard to take that idea and get it into the detailed design process. Then they will both build to that new innovative design.[88]

The issue came up again later in the hearing in this exchange:

> [Senator Joseph Lieberman:] But my question is this: Some have raised this question about the teaming concept, which is that we lose all the benefits of competition as a result of the teaming. I wonder if one of you, maybe Secretary Douglass, would answer that or begin to answer that, which is[:] does the teaming agreement eliminate all competition from the submarine construction program?
>
> Mr. Douglass: No sir, it does not eliminate all competition. There is still considerable competition down at the subcontractor level, at the second, third, and fourth tiers of the industrial base in which we have two or more suppliers who have other businesses that they do in addition to supplying us so that we could compete between them.
>
> Also, while you were out, I discussed the competition of ideas that will be in effect in which the engineering teams at both shipyards will be, in a sense, competing against each other to keep themselves in business. We are going to pick from the ideas that come out of those two shipyard engineering teams the very best ones to insert into future boats. So there is a technology competition there, as well.[89]

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[86] Testimony of Captain Burgess. Ibid., p. 244.

[87] Dr. Kaminsky was then the Under Secretary of Defense for Acquisition and Technology – DoD's top acquisition executive.

[88] U.S. Congress. Senate. Committee on Armed Services. [Hearings on] Department of Defense Authorization for Appropriations for Fiscal Year 1998 and the Future Years Defense Program. 105th Cong., 1st Sess., Part 2, Seapower. Washington, U.S. Govt. Print. Off., 1998. (S. Hrg. 105-37, Pt. 2, march 19, April 8, 22, 1997.) p. 166.

[89] Ibid., p. 189-190.

Supporters of the GD-NNS merger proposal could argue that competition in submarine design and technology development could still take place within a combined GD-NNS entity through the creation of two or more industry teams under GD's supervision that are "firewalled" (i.e., administratively separated) from one another and contain team members from other firms. Under this arrangement, the other firms would each belong to one team and not the other. Thus, although GD would have engineers on both teams and would stand to gain whichever team wins the competition, other firms contributing to the teams would stand to gain only if the team to which they contributed engineers wins the competition. The concept is somewhat similar to using competition among suppliers and component manufactures when competition at the level of the final-assembly firm is not possible.

This kind of arrangement, supporters of the GD-NNS merger proposal could argue, was recently used with success in the Navy/Defense Advanced Projects Research Agency (DARPA)-managed submarine payloads project, which was aimed at generating new and innovative ideas for significantly increasing the number and variety of weapons and sensors carried by the Navy's attack submarines. GD participated on both of the industry teams that were organized to compete under Navy/DARPA supervision, but the teams were firewalled and (except for participants from GD and a couple of other firms) consisted of members of firms that provided participants to only one of the two teams.[90] This project, supporters could argue, succeeded in generating ideas that, if developed and implemented, could completely transform the design and capabilities of the Navy's attack submarines.[91]

Opponents of the GD-NNS merger proposal could argue that NNS has done substantial work on submarine design and technology development since 1997 as part of the ongoing effort to improve the Virginia-class design, and that a GD-NNS merger would prevent the Navy from maintaining full competition in this area. They could also argue that using firewalled teams might not be as effective as an arrangement using teams whose members included participants from two separate submarine-building firms, particularly for generating innovations – such as those that might permit submarine missions to be performed by significantly fewer submarines or by platforms other than submarines – that might threaten the value of GD-NNS' status as the sole source for building submarines.

Cross-subsidization of Bids . Opponents of the GD-NNS merger proposal could argue that a GD-NNS entity could use its sole-source status on aircraft carriers and submarines to leverage carrier and submarine construction contracts with high profit margins that could then be used to cross-subsidize bids that GD-NNS would make in competitions against NOC for contracts relating to surface combatants, amphibious ships, and auxiliary and sealift ships.

Supporters of the GD-NNS merger proposal could argue that the government would be fully capable of negotiating profit rates and auditing GD-NNS's construction costs so as to ensure that profits on this work were not excessive and that cross-subsidization would not take place.

[90] The two teams were led by Lockheed and Raytheon.

[91] For a brief mention of the Navy/DARPA submarine payloads project, see Statement of Ronald O'Rourke, Specialist in National Defense, Congressional Research Service, Before the House Armed Services Committee Subcommittee on Military Procurement Hearing on Submarine Force Structure and Modernization, June 27, 2000, p. 20. The second phase of the project, now under Navy (rather than joint Navy/DARPA) supervision, is progress.

Market Share

Using the available figures on shipyard revenues discussed earlier, a combined GD-NNS entity would account for about 70% of the combined revenues of the six major Navy shipbuilders. NOC would have the remaining 30%.[92]

Supporters of the GD-NNS merger proposal could argue that share of revenues does not, by itself, mean anything – and that DoD tacitly acknowledged this by not mentioning market share in its analysis of the 1999 GD-NNS merger proposal. NOC, they could argue, already builds surface combatants, amphibious ships, and auxiliary and sealift ships and thus does face a choice of whether to enter the market to build ships of this kind. Since it does not face this choice, supporters of the GD-NNS merger proposal could argue, the question of whether the GD-NNS entity's market share would discourage NOC from entering the market for these ships would be moot.

Opponents of the GD-NNS merger proposal could argue in turn that market share is a potentially important indicator because it indicates a firm's potential, relative to its competitors, to achieve improved production economies of scale and obtain materials and components from supplier firms at lower costs. A large market share, they could argue, might also make it easier for the firm to secure financing from lending organizations, or enable the firm to secure it on more favorable terms. A firm with a dominant share of the market, they could be argue, could make it more difficult for the government to achieve meaningful competition because that firm might be able to generate size-related cost advantages that could not be matched by other firms with a smaller share of the market. A firm with a dominant share of the market, it could also be argued, might be better able to attract the best managers and engineers because those individuals might conclude that the firm with the dominant share of the market had better long-term business prospects and could thus offer them better long-term career opportunities. Over time, it could be argued, an advantage in recruiting the best managers and engineers could add to the competitiveness of the firm with the dominant share of the market, making it more difficult for the government to achieve effective competition.

Number of Shipyard In-House Design and Engineering Staffs

A GD-NNS merger would have reduced the number of shipyard in-house design and engineering staffs from three to two. Supporters of the GD-NNS merger proposal could argue that two independently owned staffs are sufficient for competition, and that any loss associated the reduction in the number of staffs would be offset by the creation of a larger GD design and engineering staff that would be able to generate significant innovations by combining people and ideas that were previously separate from one another.

Critics of the merger proposal could argue that having three independently owned staffs would have been better for competition than having two because having three permits competition to occur on a program even if one staff decides not to compete. They could also argue that the benefits for generating innovations of combining previously separate people and ideas are likely to be temporary rather than permanent.

[92] As discussed earlier, available data suggests that GD's three yards account for roughly 40%-45% of the total revenues of the six yards. The data also suggest that NNS accounts for 26%-31% of the total revenues, giving a merged GD-NNS entity a combined 66%-76% share, and that Ingalls and Avondale together account for 27%-32% of the total revenues.

Share of Shipyard In-House Designers and Engineers

A GD-NNS merger would produce a firm that, on the basis of the data shown in Table 3, would have more than 80% of the six yards' in-house designers and engineers. NOC would have less than 20%.

Supporters of the GD-NNS merger proposal could argue that the 80% significantly misrepresents the situation because 8,000 of the 9,850 designers and engineers at a combined GD-NNS entity – the 3,400 designers and engineers at EB and the 4,600 designers and engineers at NNS – would have been nuclear-ship designers and engineers dedicated exclusively to nuclear shipbuilding and overhaul programs at EB and NNS. These nuclear-ship designers and engineers, they could argue, would not have been available to work on non-nuclear shipbuilding programs where a combined GD-NNS would face competition from NOC. Any transfers of nuclear-ship designers and engineers from nuclear to non-nuclear shipbuilding programs, they could argue, would have been rare and insignificant occurrences. Subtracting out these 8,000 nuclear-ship designers and engineers, they could argue, would leave GD with 1,850 designers and engineers to work on non-nuclear shipbuilding programs – a figure somewhat smaller than NOC's 2,150 in-house ship designers and engineers.

Supporters of the GD-NNS merger proposal could also argue that NOC could, if it desired, supplement its own in-house staff of 2,150 shipyard designers and engineers by contracting with some of the 6,000 private-sector ship designers and engineers that exist in the United States outside the six shipyards, and by drawing on the talents of the many in-house designers and engineers that exist in the aerospace and electronics divisions of NOC.

Supporters could also argue that the total number of designers and engineers is not that important because the potential for innovation in a firm often resides within a small core of very experienced designers. The bulk of the designers and engineers at the firm, they could argue, perform routine design and engineering work. Although the total number of designers and engineers are not evenly divided between GD and NOC, they could argue, both GD and NOC possess capable core groups of very experienced designers and engineers. This point of view, they can argue, is supported by DoD's interest in recent years in small business firms as sources of innovation.

Opponents of the GD-NNS merger proposal could argue that the total number of designers and engineers can indeed be important, because ships are composed of tens of thousands of components and the ship-design process gives individual designers and engineers throughout the firm the opportunity (and responsibility) to seek out improvements for the part of the ship they are working on. Even small improvements and innovations, if applied to a sufficient number of the ship's components, can add up to a significant amount of total-ship innovation, they could argue. A firm with a larger share of designers and engineers, they could argue, will be able to carry out a more thorough investigation of the potential for making numerous small improvements and innovations across the entire ship. This point of view, they can argue, is supported by DoD's reference to the share of designers and engineers in its decision on the 1999 GD-NNS merger proposal.

Opponents of the GD-NNS merger proposal could argue that designers and engineers involved in nuclear shipbuilding programs at EB and NNS can be – and have been – made available for temporary assignment to non-nuclear shipbuilding programs, where their experience in working on shipbuilding programs and their general design and engineering skills can be of value. Opponents could point to a press report which stated: "GD Electric Boat spokesman Neil Ruenzel said that some of the [EB] engineering staff has worked from time to time on surface combatant

tasks on behalf of GD's Bath Iron Works of Bath, Maine."[93] They could also note that NNS in the 1990s signed contracts to design and build several conventionally powered 46,000-deadweight-ton double-hulled commercial petroleum tankers.[94]

Opponents of the GD-NNS merger proposal could also argue that even if nuclear-ship designers and engineers are not reassigned to non-nuclear shipbuilding programs, some of the technologies they might develop in support of nuclear shipbuilding programs could still be applied to non-nuclear shipbuilding programs to gain a competitive advantage in those programs. The ability to apply technology developed at EB and NNS by nuclear-ship designers and engineers to a non-nuclear-shipbuilding program, they could argue, was recently demonstrated in connection with the Navy's program for developing electric drive/integrated power systems – a technology that can be applied to either nuclear- or non-nuclear-powered ships: When the Navy in the second half of the 1990s began to express a growing interest in the idea of shifting from the use of traditional mechanical-drive systems for its ships to advanced electric-drive/integrated power systems, beginning with the planned DD-21 destroyer (a conventionally powered ship),[95] the only two U.S. firms of any kind that mounted efforts to propose designs for fully integrated electric-drive/integrated power systems (as opposed to specific components of such a system) were GD (including EB) and NNS.[96]

Opponents of the GD-NNS merger proposal could argue that it would be difficult for NOC to transfer designers and engineers from these divisions into shipbuilding programs, since these designers and engineers are fully committed to non-shipbuilding projects and lack experience in shipbuilding-related issues. They could argue that it is inconsistent to maintain that it would be difficult for GD-NNS to temporarily transfer nuclear ship designers and engineers to non-nuclear shipbuilding programs, but that it would not be difficult for NOC to temporarily transfer aerospace designers and engineers to shipbuilding programs.

Opponents of the GD-NNS merger proposal could also argue that a GD-NNS entity could contract for the services of ship designers and engineers that work outside the six yards just as easily as NOC could, and that outside designers and engineers might not be able to achieve as much for NOC as GD-NNS's in-house designers and engineers could achieve for GD-NNS, for two reasons. First, GD-NNS's's in-house staff would work at GD-NNS continuously across a range of projects, rather than intermittently on a project-by-project basis, as would be the case for outside designers and engineers working on contract for NOC. Second, GD-NNS's in-house designers and engineers could have more complete access to GD-NNS's most proprietary concepts and technologies than the contract designers and engineers would have to NOC's concepts and technologies.

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[93] McCarthy, Mike, and John M. Donnelly. Worries About Competition Surround Bids For Newport News. *Defense Week*, May 14, 2001: 1, 13, 15.

[94] The NNS effort to reenter the commercial ship construction market began in 1994 with the signing of contract with a Greek shipowner for the design and construction of two of these "Double Eagle" tankers. This was the first time since 1957 that a foreign buyer had contracted with any U.S. shipyard for the construction of an ocean-going commercial ship. By 1996, NNS had contracts to build up to 14 of the ships for various buyers. In March 1998, however, NNS determined that it would not be able to earn a profit building the ships and announced that it was withdrawing from commercial ship construction. A total of 5 Double Eagle tankers were eventually built, the last being delivered in 1999.

[95] The DD-21 program has now been superceded by the DD(X) program for building a family of next-generation surface combatants, including a destroyer-like ship (DD[X]), a cruiser-like ships (CG[X]), and a smaller Littoral Combat Ship (LCS). These ships, like the DD-21, are to be conventionally powered.

[96] For more on the Navy's electric-drive/integrated power system program, see CRS Report RL30622, *Electric-Drive Propulsion for U.S. Navy Ships: Background and Issues for Congress*, by Ronald O'Rourke. Washington, 2000. (July 31, 2000.) 65 p.

Share of Navy Research and Development Funding

As noted earlier, DoD in 1999 noted, in expressing its opposition to the 1999 GD-NNS merger proposal, that "over 95% of the Navy R&D investment would exist in a combined General-Dynamics-Newport News entity" and that this could result in a concentration of "the technology advantages that may have resulted from Navy-funded research and development investments in both firms over the years."

Supporters of the GD-NNS merger proposal could note that DoD in 1999 did not define in its public statements what it meant when it referred to "Navy R&D investment," or what basis it used to calculate the 95% figure. They could also argue that the 95% figure, if accurate in 1999, could now or in the future be lower as the Navy shifts significant R&D funds into non-nuclear shipbuilding programs such as the DD-21 (now DD[X]) surface combatant program, and as design activities related to the Virginia-class submarine program begin to wind down now that the Virginia-class design has entered production.

Supporters of the GD-NNS merger proposal could also argue that the Navy research and development funding that goes to the six yards is only a small portion of the total amount of research and development funding that the Navy spends each year. The vast majority of the Navy's annual research and development budget, they could point out, goes to entities other than the six shipyards – such as aerospace firms, electronics firms, laboratories, and universities – for research and development on things other than ships, such as aircraft, missiles, electronics, and basic science and technology, to name just a few.

Opponents of the GD-NNS merger proposal could argue that even if the 95% figure from 1999 is no longer accurate, a combined GD-NNS entity would still account for a very large share of the total amount of the Navy research and development funding that goes to the six shipyards. They could argue that the GD-NNS entity could receive a significant share of DD-21 (now DD[X]) research and development funds. They could also argue that submarine-related research and development funding might increase if the Navy decides to implement submarine-design proposals generated under the Navy/DARPA submarine payloads project, and that research and development funding related to aircraft carriers could increase as the Navy continues to develop its next-generation CVNX aircraft carrier.

Opponents of the GD-NNS merger proposal could also argue that it is of little significance that the Navy research and development funding that goes to the six shipyards accounts for only a small share of the Navy's total research and development budget, because the issue is how Navy funding provided to the yards sustains the activities of designers and engineers at the yards. If most of that funding – whatever share it might constitute of the Navy's total research and development budget – goes to a combined GD-NNS entity, they could argue, then the GD-NNS entity would be better able than NOC to generate new in-house ship design concepts and technologies that could be incorporated into bids the firm submits for future ship acquisition programs.

Vertical Integration

Supporters of the GD-NNS merger proposal could argue that it did not raise any significant issues concerning vertical integration, since both GD and NNS are involved in the same stages of the shipbuilding process – ship design and engineering, as well as construction, final assembly, integration, and testing of ships at the shipyard level. A GD-NNS merger, they could argue, would not combine a shipyard with either a major supplier of basic shipbuilding materials and

components or a major supplier of ship combat system equipment. A combined GD-NNS entity would continue to get these items from other firms.

Opponents of the GD-NNS merger proposal could argue that although GD is not currently a major provider of shipbuilding materials or a major combat system supplier for Navy ships, GD does make a few Navy ship components (such as part of a fire control radar installed on Aegis ships) and includes, in addition to its marine systems (i.e., shipbuilding) division, an armaments division that makes guns and ammunition, an information systems and technology division that makes communications equipment, and an aerospace division (Gulfstream) that makes corporate jets. Opponents could argue that, in the future GD might seek to expand its role as a supplier of components for Navy ships.

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