ARCHIVED REPORT

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George H.W. Bush

Outlook

- Commissioned January 2009 and home ported at Norfolk
- Shakedown cruise ended in May 2009
- Maiden deployment expected in 2011
- Last ship of Nimitz class CVNs
- Last carrier to enter U.S. Navy service until CVN-78 joins fleet in 2015/2016

Orientation

Description. Nuclear-powered aircraft carrier.

Sponsor

United States Department of Defense
U.S. Navy
Naval Sea Systems Command (NAVSEA)
1333 Isaac Hull Ave, SE
Washington Navy Yard, DC 20376-1080
Tel: + 1 (202) 781-0000

Status. Commissioned, in service.

Total Produced. CVN-77 is a single-ship class.

Pennant List

Number & Name	Shipyard	Launch	Commissioned
CVN-77 *George H.W. Bush*	Northrop Grumman Newport News	10/2006	1/2009

Mission. In peacetime, the mission of U.S. aircraft carriers is to provide a credible, sustainable, independent forward presence and conventional deterrence. In times of crisis, they operate as the cornerstone of joint/allied maritime expeditionary forces. They engage aircraft attacks on enemies, protect friendly forces, and engage in sustained independent operations in war.

Price Range. The price of the CVN-77 was quoted as $5.2 billion in 1997.

Contractors

Prime

Northrop Grumman Corp	http://www.northropgrumman.com, 1840 Century Park E, Los Angeles, CA 90067-2199 United States, Tel: + 1 (310) 553-6262, Fax: + 1 (310) 201-3023, Email: onewebmaster@ngc.com, Prime
Northrop Grumman Shipbuilding	http://www.sb.northropgrumman.com, 4101 Washington Ave, Newport News, VA 23607-2770 United States, Tel: + 1 (757) 380-2000, Email: nnwebmaster@ngc.com, Lead

George H.W. Bush

(Newport News Shipyard)	Contractor

Subcontractor

Bainbridge International	8, Flanders Park, Hedge End, Southampton, SO30 2FZ Hampshire, United Kingdom (Flame Retardant Protection Systems)
Delphi Connection Systems	17150 Von Karman Ave, Irvine, CA 92614-0901 United States, Tel: + 1 (949) 660-5701, Fax: + 1 (949) 660-5825, Email: info@phughes.com (Wiring Assembly)
Dresser-Rand Power	http://www.dresser-rand.com/, 1200 W Sam Houston Parkway N, Houston, TX 77043 United States, Tel: + 1 (713) 467-2221, Fax: + 1 (713) 935-3490 (Turbines)
Duramax Marine LLC	17990 Great Lakes Pkwy, Hiram, OH 44234 United States, Tel: + 1 (440) 834-5400, Fax: + 1 (440) 834-4950 (Shaft Sealing)
Filtronic Components Ltd	Airedale House, Acorn Park, Shipley, BD17 7SW Bradford, United Kingdom (RF Components)
General Atomics	http://www.ga.com/, PO Box 85608, 3550 General Atomics Ct, San Diego, CA 92186-5608 United States, Tel: + 1 (858) 455-3000, Fax: + 1 (858) 455-3621, Email: PR_Info@ga.com (Control System Design)
ITT Defense & Information Services	http://www.defense.itt.com, 1650 Tysons Blvd, Suite 1700, McLean, VA 22102 United States, Tel: + 1 (703) 790-6300, Fax: + 1 (703) 790-6360 (SPS-48E)
Raytheon Co	http://www.raytheon.com, 870 Winter St, Waltham, MA 02451-1449 United States, Tel: + 1 (781) 522-3000, Fax: + 1 (781) 860-2520 (Mk 29 SeaSparrow Launcher)
Raytheon Network Centric Systems, Integrated Communications Systems	http://www.raytheon.com/businesses/rncs/index.html, 1801 Hughes Dr, Fullerton, CA 92834 United States, Tel: + 1 (714) 446-4305, Fax: + 1 (714) 446-4314 (Mk 23 TAS)
Raytheon Space & Airborne Systems	http://www.raytheon.com/businesses/rsas, 2000 E El Segundo Blvd, El Segundo, CA 90245 United States, Tel: + 1 (310) 647-1000, Fax: + 1 (310) 647-0734, Email: SAS_Comms_PA@raytheon.com (Electronic Warfare Active Jammer)
Thordon Bearings	http://www.thordonbearings.com/, 3225 Mainway, Burlington, L7M 1A6 Ontario, Canada, Tel: + 1 (905) 335-1440, Fax: + 1 (905) 335-4033 (Bearings)
Westinghouse Marine Division	401 E Hendy Ave, PO Box 3499, Sunnyvale, CA 94088 United States (A4W Nuclear Reactor)

Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to www.forecastinternational.com (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800.

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

	Metric	**U.S.**
Dimensions		
Length (overall)	332.9 m	1,092 ft
Length (WL)	317 m	1,040 ft
Beam	40.8 m	134 ft
Width at Flight Deck	76.3 m	252 ft
Length of Flight Deck	332.9 m	1,092 ft
Flight Deck (angled)	237.7 m	779.8 ft
Draft	11.3 m	37 ft
Displacement		
Light	78,852 tonnes	77,607 tons
Full Load	105,668 tonnes	104,000 tons

George H.W. Bush

	Metric	U.S.
Performance		
Speed	55 kmph	31 kt
Endurance	(13-year reactor core life)	
Aircraft Elevators	4	
Catapults	4x C-13 Mod 1	
Crew	200 officers, 3,000 enlisted	
Air Wing	366 officers, 2,434 enlisted	
Total Accommodations	6,500 personnel	

	Type	Qty
Armament		
Aircraft		
Heavy Fighter	F/A-18E/F Super-Hornet	12
Multirole	F/A-18A/B/C/D Hornet	36
EW	EF-18G Growler	4
AEW&C	E-2C Hawkeye	4
Utility/Tankers	S-3B Viking	7
ASW Rotary Wing	SH-60F, SH-60R Seahawk	7
Guns	Mk 15 Phalanx CIWS	3
Surface-to-Air Missiles	Mk 29 SeaSparrow	2x 8
	RIM-116 RAM	2x 21
Electronics		
Radar		
3-D Air Search	SPS-48E	1
2-D Air Search	SPS-49(V)5	1
Surface Search	SPS-67(V)1	1
Target Acquisition	Mk 23 TAS	1
Missile Fire Control	Mk 95	3
	Mk 91	3
Navigation	SPS-64(V)9	1
	Furuno 900	1
CCA	SPN-44	1
	SPN-43B	1
Electronic Warfare		
ESM/ECM	SLQ-34(V)4	2
Decoy Launchers	Mk 36 SRBOC	8
Floating Decoy	SLQ-49	N/A
Chaff Buoy	SLQ-39	N/A
Floating Jammer	SSQ-95	N/A
Torpedo Decoy	SLQ-25 NIXIE	2
Sonar	Fathometer	1
Command Control		
Satellite Communications	OE-82	
	SSR-1	
	WSC-3	
	NTDS	
Surface Navigation	GPS, Loran, Omega	
Air Navigation	TACAN, URN-25	
Machinery		
Nuclear Reactors	General Electric A4W/A1G	2x 140,000 shp
Steam Turbines	Westinghouse	4
Propellers	Fixed pitch	4
Ships Services	Emergency diesel generators	4x 2 MW
Distilling Plants	Soloshell	4

N/A = Not available.

George H.W. Bush

Design Features. The USS *George H.W. Bush* is an interim model, making way for the CVN-21 series currently being designed. The CVN-77 is still considered part of the Nimitz class, but it features a number of technological advances. The basic configuration of the class is similar to that of the CVN-68 class, with two elevators before the island, one aft of the island, and one on the port (left) side at the end of the angle deck. Each elevator is 25.91 meters long x 15.85 meters wide (85 x 52 ft). The hangar deck is 208.5 meters (684 ft) long, 32.92 meters (108 ft) wide, and 8.01 meters (26.5 ft) high. There are four Mk 13 Mod 1 steam catapults and four arresting wires. Each ship has enough aviation fuel and ordnance for 13 days of unreplenished air strike operations.

The CVN-77 retains the two pressurized-water A4W/A1G nuclear reactors featured on the Nimitz class. The machinery spaces have been redesigned to reduce crew requirements by up to 50 percent. It should be noted that for many years, the top speeds of the CVNs were classified information, leading to rumors indicating they were capable of unprecedented speeds increasing over the years to 40, 50, and eventually 60 knots. Such figures were never taken seriously, and when the real speeds were disclosed, they turned out to be much more prosaic. The latest carrier to run trials, the CVN-75 USS *Harry S. Truman*, topped out at 30.9 knots. Some of this speed loss was recovered with CVN-76 *Ronald Reagan* by the adoption of a new bulbous bow form, and this feature has been carried over to the CVN-77.

The island of the CVN-77 has also been redesigned. Originally, a radical redesign was proposed in which the shape and form of the island would be changed to incorporate a number of multifunctional phased-array antennas. These would replace the existing mechanically scanned radar arrays and the plethora of communications antennas. Much of this technology was leveraged from the DD-21 program, and the cancellation of that effort means that these design parameters had to be changed.

There was some early speculation that CVN-77 would have two islands rather than the conventional one. However, studies indicated that a two-island design would show relatively insignificant improvement in the carrier's radar cross-section, which was the driving force for plans to split the island in two. Due to the new sensors and the integration that can be carried out on shipboard systems, the work spaces on the new ship can be rearranged so the advantages of two islands versus one would be very limited in proportion to the added investment.

Another option discussed was moving the position of the bridge on the flight deck and possibly lowering its height, while raising the level of the deck itself to improve the maneuvering capabilities within and to rearrange the flight deck design. Other changes more related to the function of the ship include the following:

- Improved integration of information systems and the provision of a fully integrated command system.
- Greater efforts to reduce the radar cross-section and signature.
- Further improvements in magazine protection.
- New power and energy management systems.
- Revised Primary Flight Control stations and other aircraft operating systems.

The CVN-77 features the implementation of some advanced technologies, including the installation of a bulbous bow (first used on CVN-76 USS *Ronald Reagan*), which should boost the ship's hydrodynamic performance. The concept drawings of a future CVN-77 included the following:

- Standardization of and reduction in the number of parts, for better efficiencies and cost.
- New design of the hangar bay, with less clutter.
- Higher degree of commercialization (cost).
- The installation of passive jet blast deflectors on the deck, made from new materials to a new design, improving the ship's launch capability.
- Reduced signature in other design aspects.
- Incorporation of zonal electrical distribution systems.
- Expanded bandwidth.
- Improved aircraft servicing and turnaround rate.
- Reconfigurable spaces (modular construction).
- Reductions in workload.

The manning issue, meanwhile, is becoming increasingly significant on the future carriers. CVN-77 reduces the manpower requirement by about 500.

The air group on these carriers has been systematically reduced over the last decade and now stands at 12 F-18E Super Hornet and 36 F/A-18 Hornet strike aircraft, along with four EA-6B EW aircraft, four E-2C AEW&C aircraft, seven S-3As, and seven SH-60F ASW aircraft. This reduced air group, approximately 60 percent of the carrier's strike aircraft capacity, is causing increasing concern.

Operational Characteristics. The elimination of the DD-21 program (now replaced by DD(X)) has

resulted in a decision to equip the CVN-77 with the same radar systems featured on the newer ships of the Nimitz class. These include the three-dimensional SPS-48E, the SPS-64 navigation radar, the SPS-67 surface search radar, and the SPS-49 two-dimension air search radar. The island is being designed so that a later switch to the new radars can be made without major redesign. The CVN-77 will retain the Aircraft Carrier Anti-Submarine Warfare (CV ASW) module for command, control, and analysis of ASW operations, although the ASW capability of the carriers has been steadily de-emphasized over the years.

These ships have remarkable firefighting capabilities, normally considered equivalent to those of a medium-sized city, although no civilian firefighting department has access to the level of firefighting technology commonplace on these carriers. Standard equipment includes infrared goggles, optimized so that the seat of a fire can be easily identified; handheld sonar; radar scanners to detect obstructions and debris; and equipment for rapidly detecting and removing survivors. Crew training standards in fire containment and elimination are very high on board the carriers.

CVN-77 *George H.W. Bush* departs for sea trials.

Source: Northrop Grumman Newport News

Variants/Upgrades

CVN-21. This class will be an all-new design. The first carrier will be built in the 2008-2013 time frame. It will represent the first major aircraft carrier design change in the U.S. Navy since the 1960s. It is expected to carry the aircraft force very late into the 21st century, considering that nuclear power plants are estimated to undergo their midlife refueling and overhaul at about 30 years of age. Features that may be included in the new carrier include modular construction, electric rail-gun catapults, a redesign island to include multifunctional phased-array radars, enhanced self-defense systems, and a fully integrated command system.

Adm. Jay Johnson, Chief of U.S. Naval Operations, acknowledged in June 1998 that the service would not be able to afford (in terms of time or money) a radically different design for the first ship of the CVN-21 class, which comes on the heels of the CVN-77. The funding necessary for an entirely new clean-sheet design for the CVN-21 class could not possibly be expected to become available over the next several years. Furthermore,

some of the technologies expected to be implemented on the CVN-21 are still in such early stages of development that it would be impossible to introduce them on time for startup of the first ship. Instead, he suggested that the CVN-21 class be introduced at a more affordable pace, incorporating technology enhancements over the period of three hulls. The upcoming CVN-77 could be the first of those three transitional platforms, Johnson estimated. CVN-21 has now become the CVN-78 Gerald R. Ford class and is the subject of a separate report in this tab.

CVN(X). Earlier designation for CVN-21.

Program Review

Background. During the early 1990s, the U.S. Navy completed a study for the carrier of the 21st century that recommended that the Nimitz/Roosevelt design be retained. It also recommended slightly increasing the displacement. There were suggestions that the new carrier should also incorporate the AEGIS radar/weapons and fire control system, fiber-optic data transmission, and an electromagnetic catapult system. All of the systems, with the exception of the catapults, are either in service or under development. However, the inclusion of an AEGIS system on a fleet carrier was immediately and strongly condemned because a carrier's main weapon is its air group, and any equipment that limits the efficiency of that air group is counterproductive. AEGIS would be an extreme example in that it would physically consume space otherwise allocated to aircraft, and its emissions would pose a safety and interference hazard to those aircraft. This design without the AEGIS system became the basis of the CVN-76 USS *Ronald Reagan*.

Birth of CVN-77

With CVN-76 in hand, debate turned to construction of the CVN-77. The Government Accountability Office (GAO) looked into this situation with a study document titled "Navy's Aircraft Carrier Program – Investment Strategy Options." This report attempted to assess the financial and employment impact of a wide variety of aircraft carrier construction programs. While its methodology in a number of areas appeared questionable, it did add some weight to the credibility of commencing a conventionally powered carrier program.

In spite of these considerations, it was finally decided that the CVN-77 would be nuclear-powered and be a slightly modified version of the CVN-76. The CVN-77 is generally characterized as a transitional platform in terms of technology, in which some items of advanced technology that are expected to be implemented in the next-generation carrier, CVN-21, will be injected into the existing design. Models of the new design shown in public were very similar to the CVN-76 up to the flight deck but featured a radically changed island.

Budget discussions for fiscal years 1997 and 1998 included much debate over whether funding for the CVN-77 should be accelerated to maintain the workload at the Newport News Shipyard. Keeping the production facilities in a continued state of readiness is increasingly being used as the key argument in favor of accelerating the schedule, as doing so would result in significant cost savings for the program versus the cost of closing down operations and rehiring and retraining personnel, plus reinvesting in production machinery.

Funding the New Carrier

The U.S. Navy supported speeding up the funding cycle, although its estimates of cost savings come to about $400 million despite the fact that Newport News said earlier the savings could be as much as $600 million if funding were started in 1997 instead of the year 2000. It was also reported by one industry study that the carrier's cost could go up by as much as $300 million if the startup date were delayed beyond 2002 by even one year. Nevertheless, another serious driving factor in this debate was the need to maintain carrier numbers and improve the operational tempo of the carrier fleet as a whole.

Newport News requested inclusion of $345 million in the FY98 budget for CVN-77, followed by $170 million in FY99, $875 million in FY00, $135 million in FY01, and a balance of $3 billion for FY02. The Navy had foreseen funding to begin in FY00, and to conclude two years later with a payment of $4.5 billion. The Navy projected a total of $5.2 billion, whereas the shipbuilder suggested its time schedule would mean the total price would be capped at $4.6 billion. After some political confabulations (including a midnight address to the Conference Committee by Senator John Warner), a "reduced scope smart buy" for the CVN-77 was agreed upon. This moved the construction contract for the CVN-77 a year forward to 2001. This plan envisioned spending $700 million in FY99 for long-lead components and allocating $4.5 billion in FY00 for construction, the majority of which would be spent in FY01.

The FY99 defense budget proposal included $38.5 million for CVN-77 research and development and $124.5 million for CVN-77 advance procurement. In addition, $50 million was requested to accelerate the

development of some technologies destined for CVN(X)-1 but having potential for application to the CVN-77. This was the first indication that using the CVN-77 as a bridge to a new carrier design beginning with CVN-78 would prove more difficult than originally contemplated. This impression was confirmed on June 2, 1998, when Adm. Jay Johnson, Chief of Naval Operations, stated that the single step from CVN-77 to CVN(X) was no longer affordable and that the transition would now take place over three hulls, ending with CVN-79 in 2018.

Not Transitional Anymore

By late 1998, it was becoming apparent that the U.S. Navy was struggling with inadequate research and development funding for the CVN-77. Although construction was apparently adequately financed, the R&D effort needed to fulfill the carrier's role as the first of a transition series was not. This shortfall in R&D funding was unofficially put at $460 million for non-nuclear propulsion-related research alone (presumably, this referred to automating the steam turbines). In addition, a U.S. Navy battle to combine the funding for two new radar systems for the CVN-77 program began in late 1998. The first of these was the multifunctional radar intended to provide horizon-search capability against sea-skimming anti-ship missiles, along with the ability to track and illuminate those missiles for defensive systems. The other radar was the Volume Search Radar, or VSR, that would provide 360-degree 3-D search capability out to approximately 250 nautical miles. In addition to their deployment on CVN-77, the two radars would also form a key part of the electronics fit on the new DD-21 land attack destroyer. The target cost for the combined radar suite was $40 million. A $140 million contract for the development of these radars was awarded to Raytheon in June 1999.

In early 1999, funding shortfalls in the CVN-77 program were highlighted by a Pentagon directive to the U.S. Navy to increase R&D funding for the CVN-77 by $220 million (allowing development of a new integrated island) and for the CVN(X)-1 by $1 billion. In February 1999, Newport News Shipbuilding and U.S. Navy design staff from the Sea Systems and Air Systems Commands met formally to start the CVN-77 design process. This marked the first time that a shipbuilder and the U.S. Navy had worked together on the early stages of a major warship design. As part of this process, Newport News Shipbuilding hosted a conference in March 1999 in preparation for the acquisition of a warfare system for the CVN-77. This was in anticipation of a May 1999 definition of two teams to compete for the contract to develop that system.

Financial Pressures Mount

The annual funding dance over the CVN-77 started in May 1999 when the U.S. Navy asked for an increase of $300 million in the cost cap applied to the CVN-77. This increase would cap the total cost of the ship at $4.9 billion. In May 1999, it was recommended by the Senate Armed Services Committee that $751.5 million be granted for advance procurement of the CVN-77 (matching the president's request) and $146.6 million for CVN-77 advanced research and development (also matching the president's request). These provisions were approved.

Following a competition, in February 2000, a team headed by Lockheed Martin, including Northrop Grumman and Solipsys, was selected to provide combat systems integration services for the CVN-77, a program segment valued at $500 million. This team was later joined by Microsoft. The same month, Dresser-Rand was awarded a $9 million contract to start production of the main propulsion turbines for the CVN-77.

Further financial complexities began to surround the CVN-77 in March 2000 when pressure mounted to increase the number of ships under construction to meet a projected shortfall in U.S. force levels. The Department of the Navy responded to some extent by juggling building schedules a bit, but emphasized how little flexibility actually existed. The FY01 budget request contained $4 billion for the procurement of the CVN-77. At this point, the total cost of the CVN-77 was capped at $4.97 billion.

In February 2001, Newport News was awarded a $3.8 billion contract for final design and construction of the CVN-77. At this time, it was confirmed that the new carrier was scheduled for launch in 2006 and would enter service in 2008.

At this point, construction of the CVN-77 should have been secure. However, following the U.S. presidential elections, the George W. Bush administration called for a thorough review of U.S. defense policy. At an early stage in this review, rumors started to circulate that the U.S. Navy's big carriers were going to be the primary losers and that the service's force level would be severely reduced. The rationale for this belief was reported to be concerns over the carriers' vulnerability to submarine and missile attacks. These reports were strenuously denied, and the U.S. Navy budget plans released in March 2001 placed great emphasis on the need to recapitalize the aircraft carrier fleet.

Another unforeseen consequence of the defense review instituted by the new administration was the decision to cancel the DD-21 Zumwalt class land attack destroyer and replace it with a family of new surface combatants

tentatively designated DD(X). This decision effectively eliminated attempts to leverage the development of the MFR and VSR radars for the CVN-77 and DD-21. Some consideration was given to replacing the VSR with AEGIS and the SPY-1D (or SPY-1F) radars but, in the end, this was not considered to be an appropriate solution. Instead, the CVN-77 would be equipped with the SPS-48 and other legacy radars of the type used on the CVN-76.

Scaling Back Technology

This decision proved to be the start of a scale-down in the new technology status of the CVN-77. Next to go was the extremely advanced combat management system being developed by Lockheed and Solipsys. This was replaced by a development of the Ship Self-Defense System (SSDS), while retaining the more advanced concepts as far-term options. This system, the SSDS Mk 2, would also be backfitted to the nine Nimitz class carriers. Next to go were some of the more advanced design concepts, such as the flight deck "pit stop" for aircraft handling and the highly unconventional arrangements for transferring cargo to the ships.

By September 2001, the CVN-77 was starting to look very similar to the existing CVN-76, the USS *Ronald Reagan*, with the primary change being the rearranged engine rooms to reduce crew requirements by an estimated 550 personnel. Doubts over the value of the CVNs in the modern environment continued to be expressed, with some suggesting that their role could be filled by long-range bombers operating from the U.S. mainland.

Any such arguments were quashed by the terrorist attacks of 9/11. The immediate result was the announcement of the war on terrorism, with the U.S. carriers a key part of this campaign; their performance eliminated any doubts about their future. By April 2002, the question was not whether additional carriers should be built, but how many and how quickly.

In this environment, the emphasis became one of risk reduction in an effort to freeze the design of the CVN-77 and commence construction. In accordance with this focus, the U.S. Navy planned to issue a stop-work order on the new combat system for the carrier on August 2, 2002. However, Lockheed Martin and Northrop Grumman held a joint meeting on August 12, 2002. Partly because of these discussions, conferees allocated $90 million to pay for a common, flexible island that would accommodate both legacy radars and the more advanced systems to be developed later – namely, full-service integrated voice, sensor, and data communications and multimodal workstations. An integrated advanced strike and mission planning capability was also to be included.

The new carrier became a solid entity on December 10, 2002, when it was announced that she would bear the name USS *George H.W. Bush* in honor of the 41st president. The keel of the carrier was laid down on September 6, 2003. The new aircraft carrier was christened on October 7, 2006, and started her sea trials in April 2008, prior to being handed over to the U.S. Navy by the end of the year. She was finally commissioned on January 10, 2009. She then departed for her shakedown trials, which were completed in May 2009. This represented a slight delay due to foreign material being found in her diesel generators.

CVN-77 returned to Northrop Grumman Newport News shipyard on June 18, 2009, for her post shakedown availability. This resolved a number of minor issues that came up during trials and delivery. The opportunity was also taken to make a number of last-minute changes and upgrades. These included the installation of a Rigid Hull Inflatable Boat handling system and a new freshwater purification system. Other changes include compartment reconfigurations, combat system and radar equipment upgrades, along with a number of minor repairs.

Funding

The construction of CVN-77 *George H.W. Bush* was funded in FY01, with additional monies allocated in subsequent budgets on an as-required basis. In FY03, for example, $90 million was allocated for technology improvements.

Contracts/Orders & Options

Contractor	Award ($ millions)	Date/Description
Newport News Shipbuilding	45.3	Sep 10, 1998 – Advanced procurement contract for CVN-77.
Newport News Shipbuilding	59.7	Jan 12, 1999 – Technology insertion for CVN-77.
Newport News Shipbuilding	56	Mar 22, 1999 – Addition to contract of September 10, 1998, for advance procurement work on CVN-77.
Newport News Shipbuilding	81.2	Apr 4, 1999 – Modification to January 12, 1999, contract for CVN-77 technology insertion.
Dresser-Rand	9.0	Feb 2000 – Start of production of four high-pressure and four low-pressure main propulsion turbines for CVN-77.
Newport News Shipbuilding	100	Feb 22, 2000 – Advance planning and procurement services for CVN-77.
Newport News Shipbuilding	3,800	Feb 12, 2001 – Design and construction of CVN-77.
Northrop Grumman Shipbuilding	72.6	Jun 2009 – Post acceptance refit and maintenance.

Timetable

Month	Year	Major Development
	1997	Funding plans for CVN-77 finalized
Sep	1998	Advance procurement, advance construction contracts awarded for CVN-77
Feb	1999	Formal design of CVN-77 initiated
Feb	2000	Lockheed Martin selected to perform CVN-77 warfare systems integration
	2000	Full construction authorization for CVN-77 (est)
Feb	2002	First metal cut on CVN-77
Dec	2002	CVN-77 named *George H.W. Bush*
Sep	2003	Keel laid on CVN-77 *George H.W. Bush*
Oct	2006	CVN-77 *George H.W. Bush* launched
April	2008	CVN-77 *George H.W. Bush* starts sea trials
Jan	2009	CVN-77 *George H.W. Bush* commissioned
May	2009	CVN-77 completed
	2011	Maiden deployment expected

Worldwide Distribution/Inventories

United States. One ship completed.

George H.W. Bush

Forecast Rationale

With the commissioning of the *George H.W Bush* in January 2009, the construction of the Nimitz class aircraft carriers has finally ended. These ships feature a design originally conceived more than 40 years ago, and their continued unmatched capability must rank them as one of the classic warships of all time.

The 10 aircraft carriers of the Nimitz class will provide the backbone of the U.S. fleet for at least another 40 years. They will be continuously upgraded and modernized during this period. New construction for the carrier fleet will be part of the CVN-78 Gerald R. Ford class. The first of that class will commission in 2015 and replace the USS *Enterprise*. Beyond that point, uncertainty over U.S. carrier force levels makes the decommissioning dates of the older Nimitz class unclear. This report will be archived next year.

Ten-Year Outlook

With the commissioning of the USS *George H.W. Bush*, construction of the Nimitz class has ended. Therefore, this report contains no forecast chart.

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