

**A Briefing Paper on the Destroyers
USS Spruance (DD-963) and USS Dahlgren (DDG-43)
Making Port Calls to Denmark, September 1988**

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Introduction

The two U.S. Navy ships making port calls on 29 September 1988 to Denmark are nuclear-ships.¹ The destroyer Spruance (DD-963) can carry nuclear-armed Tomahawk sea-launched cruise missiles (TLAM/Ns). Nuclear-armed ASROC anti-submarine rockets and Terrier anti-air warfare missiles can be deployed on the guided-missile destroyer Dahlgren (DDG-43).

Below is a brief description of each of these nuclear-weapon systems followed by a report on each ship's nuclear-weapons activities and its notable operations and deployments. Unless otherwise noted, information is drawn from official U.S. Navy histories and fact sheets.

Tomahawk, ASROC, and Terrier Nuclear Weapons

The nuclear-armed Tomahawk (model designation BGM-109A) is a subsonic guided, surface ship or submarine launched, land-attack cruise missile. It carries a W80-0 nuclear warhead with a selectable explosive power of 5-150 kilotons. About 150 warheads were estimated to be in the U.S. stockpile as of the end of 1987.² In the next five years 500 TLAM/Ns will be deployed with the U.S. Navy³ and a total of 758 nuclear versions are to be deployed by the late 1990s.

The Tomahawk land-attack missiles have an inertial and terrain matching guidance system (TERCOM) and an accuracy (circular error of probability) of about 30 meters. The missile is propelled by a solid booster for launch and a small turbofan engine for cruise flight. The TLAM/N's range is 1,350 nautical miles (2,500 kilometers). A total of 4,068 SLCMs of all variants are to be produced, 3,994 for fleet use and 74 for research, development, testing and evaluation.⁴

As of March 1988, over 50 ships and submarines were certified to carry the

¹ As nuclear ships, each must receive regular inspections by the Navy and the Defense Nuclear Agency of the U.S. Department of Defense to certify the ship is prepared to conduct its nuclear weapons missions. These inspections and related preparations are listed when known and are further explained in the glossary.

² Thomas B. Cochran, William M. Arkin, Robert S. Norris, The Bomb Book: The Nuclear Arms Race in Facts and Figures (Natural Resources Defense Council: Washington, D.C., December 1987), p. 32.

³ Dr. Lawrence Woodruff, Statement on Nuclear Force Modernization, before U.S. House of Representative's Armed Services Committee, March 10, 1987, p. 31.

⁴ U.S. House of Representatives, House Appropriations Committee, Hearings on the Fiscal Year 1987 Department of Defense Appropriations, Part 4, p. 167.

TLAM/N.⁵ By the mid- to late-1990s, TLAM/Ns (along with non-nuclear Tomahawk versions) will equip a total of 198 surface ships and submarines, including: the four Iowa (BB-61) class battleships; one Long Beach (CGN-9) and four Virginia (CGN-38) class nuclear-powered cruisers; 22 Ticonderoga (CG-47) class cruisers (hulls CG-52 and later); 31 Spruance (DD-963) class destroyers (including the Spruance itself); 29 Arleigh Burke (DDG-51) class destroyers; and 68 Los Angeles (SSN-688) and 39 Sturgeon (SSN-637) class nuclear-powered submarines.⁶

The ASROC missile is a ship-launched anti-submarine rocket armed with a nuclear depth charge. It is fired from a directable eight-cell launcher (or on some ships from launching rails that also can fire anti-ship or surface-to-air missiles). The 0.9 - 5 nautical mile (1.8 - 9 kilometer) range missile can be armed with a one kiloton W44 nuclear warhead. A conventional version carries the Mk-46 acoustic homing torpedo. It has been operational since 1961, and 575 W44 ASROC warheads were in the U.S. stockpile as of December 1987.⁷ As of December 1987, the ASROC armed 159 U.S. surface ships: 32 cruisers, 62 destroyers, and 65 frigates (including the Dahlgren).

The Terrier, is a ship-launched missile with limited surface-to-surface capability. Several versions have been fielded since it first was deployed in 1956, but the only remaining Terrier missiles in the inventory are 25 nautical mile (47 kilometer) range nuclear-armed versions, which carry a one kiloton W45-0 warhead. There were 285 W45 Terrier warheads in the U.S. stockpile as of December 1987.⁸ When it is time to fire, a target is detected and tracked, the missile readied and the launcher aimed. Once launched the missile rides the targeting beam and uses semi-active terminal radar homing. It is fired from Mk-10 twin rail launchers loaded by an automatic magazine. As of December 1987, 31 cruisers and destroyers can launch the missile, including nine Leahy (CG-16), nine Belknap (CG-26), one Long Beach (CGN-9), one Bainbridge (CGN-25) and one Truxtun (CGN-35) class cruisers, and ten Farragut (DDG-37) class destroyers (including the Dahlgren).

⁵ U.S. House of Representatives, House Appropriations Committee, Hearings on the Fiscal Year 1989, Energy and Water Development Appropriations, Part 6, p. 978.

⁶ U.S. House of Representatives, House Appropriations Committee, Hearings on the Fiscal Year 1987 Department of Defense Appropriations, Part 4, p. 164.

⁷ Bomb Book, op. cit. More ASROC missiles than nuclear ASROC warheads exist since the missile is dual-capable and widely deployed on surface ships, and "extra" missiles are used for training, testing, maintenance, etc.

⁸ Thomas B. Cochran, William M. Arkin, Robert S. Norris, The Bomb Book: The Nuclear Arms Race in Facts and Figures (Natural Resources Defense Council: Washington, D.C., December 1987), p. 32. There are more Terrier missiles than warheads. "Extra" missiles exist for testing, training, maintenance, etc.

Destroyers' Missions and Characteristics

Destroyers are multi-mission ships that can perform anti-air, anti-surface, and anti-submarine warfare, as well as provide support to amphibious operations. They can operate as escort ships in carrier or battleship battlegroups, or independently in escorting convoys of logistic ships. They also can operate together or with cruisers to form their own surface action groups. The Tomahawk cruise missiles being deployed on the Spruance class destroyers will give these destroyers a greatly increased ability to attack targets on land with conventional or nuclear weapons. There are 68 active destroyers in the U.S. Navy, 31 belong to the Spruance (DD-963) class and another 10 belong to the Farragut (DDG-37) class.

The USS Spruance (DD-963)

The Spruance is the lead ship in the Spruance class of destroyers. It was originally outfitted with ASROCs, but in 1986 the ASROC launcher on the forward deck was removed and replaced by a vertical launch system capable of firing Tomahawk missiles.⁹ This was the first retrofit of a VLS into a Spruance class destroyer.

From 1979 to 1985 the ship was regularly inspected and certified to stow and fire nuclear-armed ASROCs. On 27-28 September 1979 the Spruance underwent and successfully completed the first Defense Nuclear Surety Inspection (DNSI) to be held aboard an U.S. Atlantic Fleet Spruance class destroyer. In early November 1982 the ship successfully completed a Navy Technical Proficiency Inspection (NTPI). On 7-9 July 1985 a Nuclear Weapons Assist Team (NWAT) visited the ship to help prepare for an upcoming inspection. And, subsequently on 22-24 July 1985, a NTPI was completed with grade of satisfactory. During 1987, after the installation of the VLS, the Spruance tested out and trained with its new capability. By August 1988, it was certified for Tomahawks.¹⁰

The Spruance is 563 feet long, displaces 7,800 tons and has a crew of over 330. Four gas turbine engines give the ship a top speed of over 32 knots. Major conventional weapons on the ship include Harpoon anti-ship missiles, two five inch

⁹ Vertical launch systems (VLS) are modular units containing rectangular (8x8) arrangements of 64 cells, 61 of which are for missiles and three of which are taken up by a support crane. The top is fitted flush with the deck of a ship, with the rest of the VLS and its missiles extending vertically into ship; Martin Marietta, Co., Vertical Launching System, p. 1. The Navy is outfitting 24 Spruance class destroyers with VLSs. VLSs can also carry and fire non-nuclear Standard SM-2 surface-to-air missiles and will be able to fire non-nuclear vertical launch ASROCs, when this currently under development version of the ASROC becomes available in the 1990s.

¹⁰ U.S. Navy, Cruise Missile Projects Office, August 1988 phone conversation.

guns, torpedoes, and Sea-Sparrow missiles.

The Spruance's History of Operations

The ship was commissioned 20 September 1975 and currently is homeported in Mayport, Florida. It is part of the U.S. Atlantic Fleet and thus makes overseas deployments to the northern Atlantic, middle Atlantic, the Mediterranean Sea, the Persian Gulf and the Indian Ocean. In between these deployments, the Spruance conducts training exercises off the East coast of the United States and in the Caribbean and spends time in port for upkeep and overhauls. The ship on and off loads its weapons at Naval Weapons Station Yorktown, Virginia located near Norfolk, Virginia.

While deployed overseas, the Spruance has conducted several significant operations in support of U.S. foreign policy. The ship has maneuvered near the Soviet Union, shadowed Soviet ships, patrolled off the coast of El Salvador¹¹, taken part in major U.S. and allied exercises and has made numerous overseas port visits. Some of the more significant operations are mentioned here.

While deployed in the Mediterranean, on 4-13 March 1979, the Spruance conducted intensive surveillance of the Soviet guided missile aircraft carriers Minsk and Kiev. In 1980 the ship again conducted surveillance of the Kiev in the Mediterranean, receiving a Meritorious Unit Commendation from the Secretary of the Navy for this operation. Also during 1980 the ship cruised the Black Sea for five days as part of the U.S. Navy's policy of conducting "innocent passage" operations in waters near the Soviet Union.

In early 1984, the ship participated in the Teamwork '84 exercises. During February, over 40 ships from U.S., England, and Canada including the Spruance joined together to conduct an amphibious landing in Norway. After the Teamwork exercises, on 23 March, the ship moved farther north and took part in an Arctic Sharem 55 exercise. This included several exercises above the Arctic circle, encompassing a penetration of the outer edge of the ice pack. In late November 1984, the ship made a second visit to the Black Sea. Accompanied by the guided-missile destroyer the USS Coontz (DDG-40), the Spruance sailed off the coast of Bulgaria and the Soviet Union and undertook various research and development projects during operations.

Finally, over the past 10 years the ship has visited numerous ports in Europe, Africa and the Caribbean including: Liverpool, Portsmouth, and the Isle of Man (1983, the Spruance was the first U.S. naval combatant to visit island) in England; Amsterdam; Rota and Palma de Majorca in Spain; St. Nazzaire, Toulon, and Villefranche in France;

¹¹ From 17 July to early September 1982, the ship conducted special operations off the coast of El Salvador.

Venice, Ancona, Naples, and Taranto in Italy; Ponta Delgrada, Portugal; Split, Yugoslavia; Haifa, Israel; Djibouti; Mobassa, Kenya; Port Sudan; Port Said, Egypt; Raysut, Oman; Manamma, Bahrain; Al Jubayl, Saudi Arabia; Casablanca, Morocco; Dakar, Senegal; Monrovia, Liberia; Liberville, Gabon; Tema, Ghana; Salvador, Brazil; Bridgetown, Barbados; Cartagena, Columbia; Puerto Rico; and Guantanamo Bay, Cuba.

The USS Dahlgren (DDG-43)

The Dahlgren is a Farragut (DDG-37) class guided-missile destroyer. It is able to stow and fire nuclear-armed ASROC anti-submarine warfare rockets and Terrier anti-air warfare missiles.

During the 1980s the ship regularly has been inspected and certified to carry out its nuclear mission. On 13 April 1981 a Nuclear Weapons Assist Team (NWAT) visited the ship to help train for an upcoming inspection. The U.S. Defense Nuclear Agency inspection team arrived on 23-25 April and conducted a Defense Nuclear Surety Inspection (DNSI). The ship's procedures for "maintenance, storage, security and handling of nuclear weapons" were examined by the inspection team. During the DNSI, the U.S. Navy also conducted a complementary Navy Technical Proficiency Inspection (NTPI) to scrutinize procedures not covered by the DNSI. Both inspections were passed successfully. On 21-22 June 1982, the ship underwent and successfully passed another NTPI. On 28 February 1985, a NWAT again visited the ship to prepare for a post-overhaul Nuclear Weapons Acceptance Inspection (Nwai) and on 16-17 March the ship successfully passed the inspection. Most recently the ship successfully passed another NTPI on 26-27 June 1986.

The Dahlgren is 512 feet long, displaces 6000 tons and has a crew of over 380. Four boilers give the ship a top speed of over 30 knots. Major conventional weapons on the ship include Standard anti-air warfare missiles, a five-inch gun, Harpoon anti-ship missiles and torpedoes.

The Dahlgren's History of Operations

The Dahlgren is homeported in Norfolk, Virginia and is part of the U.S. Atlantic Fleet. Ammunition is generally on and off loaded at Naval Weapons Station Yorktown, but occasionally the ship visits Naval Weapons Station, Earle, New Jersey. She was commissioned on 8 April 1961 and over the years has operated in the Atlantic, Pacific and Indian Oceans. During the 1960s, the ship participated in the U.S. naval blockade of Cuba during the Cuban Missile Crisis in 1962 and operated off the coast of Vietnam later in the 1960s.

During the 1980s, the ship's most notable action in support of U.S. foreign policy

occurred in 1983 when the ship was called back from a Mediterranean deployment to take part in the AHUAS TARA II exercises off Honduras in August. After the exercises, the ship conducted operations off Nicaragua in September before returning to its homeport.

Otherwise, in the 1980s, ship made two deployments to the Mediterranean and Indian Ocean one in 1983 and another 1986-87. Ports visited included Rota, Barcelona, and Palma De Majorca in Spain, Benidorm, Toulon, and Cannes in France, Naples, Gaeta, and Augusta Bay, Sicily in Italy, and Tangiers, Morocco, Alexandria, Egypt, and Port Louis, Martius.

Glossary

Defense Nuclear Surety Inspections (DNSI): are conducted by the U.S. Defense Nuclear Agency (DNA) to certify a nuclear-capable unit is prepared to conduct its nuclear mission. A nuclear-capable unit must be inspected and certified once every 18 months by DNA. DNSIs include an examination of a nuclear capable unit's "nuclear weapons technical assembly, maintenance, storage functions, logistic movement, handling, and safety and security directly associated with these functions." [US Defense Nuclear Agency, Technical Manual: Department of Defense Nuclear Weapons Technical Inspection System (DNA TP 25-1/ARMY TM 39-25-1/NAVY SWOP 25-1/Air Force T.O. 11N-25-1), change number 7-3, 28 October 1983, (U), p. 3.]

Nuclear Weapons Certification Inspections: A nuclear-capable ship must be officially inspected and certified before it is allowed to execute its nuclear mission (i.e. stow and deliver nuclear weapons). These nuclear-certification inspections are conducted by the U.S. Defense Nuclear Agency or the U.S. Navy, and determine whether a ship "is capable of performing its assigned nuclear mission" [DNA, TP 25-1, p. 2]. These inspections are routinely given to ships that have ongoing nuclear weapons missions. According to the Department of Defense, nuclear-capable units must be certified at least once every 18 months [DNA, TP 25-1, p. 4]. Naval regulations state that ships and shore activities should be inspected once at least every 12 months, although extensions of up to six months can be authorized [Chief of Naval Operations, Nuclear Weapons Technical Inspections, (OPNAVINST 5040.6E) 17 June 1975 (FOUO), p. 3]. There are two primary types of inspections used by the U.S. Navy to certify nuclear capable ships. The first is a Nuclear Weapons Acceptance Inspection (Nwai) and the second is a Navy Technical Proficiency Inspection (NTPI, often referred to as a Nuclear Weapons Technical or Proficiency Inspection).

Navy Technical Proficiency Inspections (NTPI): are conducted by the U.S. Navy to certify a Navy nuclear-capable unit is prepared to conduct its nuclear mission. NTPIs are conducted after a ship passes its initial Nwai and are "A technical inspection of a nuclear capable certified unit conducted by Navy and/or Marine Corps inspectors to determine their ability to accomplish their technical mission. The scope of the inspection will include examination of technical assembly, maintenance, logistic movement, storage functions, handling and safety, and security directly associated with these functions. In addition, drills will be conducted to determine the unit's ability to respond to a nuclear weapons accident or incident, and to determine whether security forces respond within the required time limit" [OPNAVINST 5040.6E, p. 1].

Nuclear Weapons Acceptance Inspections (Nwai): are conducted by the U.S. Navy to certify a Navy nuclear-capable unit is prepared to conduct its nuclear mission. They are "technical inspections of a prospective Navy or Marine Corps nuclear capable unit, conducted by Navy and/or Marine Corps inspectors, to determine its readiness to

perform technical assembly operations, maintenance, storage functions, logistic movement, handling and safety, and security directly associated with those functions. Drills are conducted to determine the units's ability to respond to a nuclear weapons accident or incident, and to determine whether security forces respond within required time limits. An NWAJ will be conducted prior to assignment of a new weapons capability, and on all afloat units upon completion of shipyard overhauls and prior to receipt of weapons" [OPNAVINST 5040.6E, p. 1].

Author's bio: Joshua Handler was a researcher on the Arms Race and Nuclear Weapons Research Project at the Institute for Policy Studies, Washington, D.C. for three years before joining Greenpeace. He is co-author of Neptune 2 Nuclear Warships and Naval Nuclear Weapons: A Complete Inventory (May 1988), and author of several reports and articles on naval issues. He has an M.A. in international relations from the University of Chicago.