

Bulletin of the Atomic Scientists

U.S. nuclear warheads, 1945–2009

Of 100 types of U.S. warheads developed since 1945, only 15 remain active. New warhead production ceased in 1992, but modified warheads continue to be introduced.

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THE UNITED STATES HAS PRODUCED AN ESTIMATED 66,500 nuclear bombs and warheads of 100 types and modifications for its operational stockpile since 1945. The accompanying table, “U.S. nuclear weapons designs, 1945–2009,” lists all types of U.S. weapons produced, from Little Boy to the W88. The table includes some, but not all, canceled warhead programs.¹ Some 5,200 warheads remain in the Defense Department stockpile, representing eight basic types of warheads and 15 modifications.²

All U.S. warheads were developed at one of two nuclear design laboratories, Los Alamos or Lawrence Livermore national laboratories. Los Alamos has been the predominant design laboratory with 77 types to its credit, while Lawrence Livermore has designed 23 types. Today, Los Alamos maintains 11 types of weapons and Livermore four. All four services have had nuclear weapons: The air force has adopted 52 types, the navy 35 types, the army 26, and the marines 15. Today, the air force has 11 types and the navy 4; the army and marines have none.

The wide variety of warheads and bombs is evident in the profusion of weapon systems developed and adapted to accommodate them, and some warheads and bombs were adopted by more than one service. The earliest bombs weighed approximately 5 tons and could only be carried by large bombers. By the early 1950s, scientists had designed lighter-weight, smaller-diameter bombs that were adapted to dozens of types of air force, navy, and marine aircraft. After thermonuclear bombs entered the stockpile in 1954, the megatonnage of the stockpile rose dramatically, reaching a peak of more than 20,000 megatons (the equivalent of 1,360,000 Hiroshima-sized bombs) in 1960. The yields of individual weapons have varied from 100 tons (0.10 kilotons) to 25 megatons (25,000 kilotons).

Throughout the 1950s and 1960s, the military requested a nu-

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clear weapon for nearly every conceivable mission, including ballistic and cruise missiles, from short- to intercontinental-range, to be launched from both land and at sea. At one point, the air force even proposed launching a ballistic missile from an airplane, but the program—referred to as Skybolt—was cancelled. The air force had two types of air-to-air nuclear-armed missiles (known as the Falcon and Genie) and a high-altitude, surface-to-air, air-defense missile (known as the BOMARC), which was intended to be used to shoot down Soviet bombers. The navy adopted several types of nuclear weapons for anti-submarine warfare and surface ship air-defense missions, and its special forces carried backpack nuclear munitions. The army had a variety of weapons intended to be used on the nuclear battlefield, including several calibers of artillery, ballistic missiles with ranges up to 1,750 miles (2,816 kilometers), air-defense missiles, and landmines. The marines shared some of these systems and had its own types of nuclear bombs.

The U.S. stockpile reached a peak of more than 32,000 warheads in 1967 but decreased by 30 percent during the next 20 years as the number of missions contracted and arms control limitations entered into force. Since the end of the Cold War, the stockpile has been cut by an additional 75 percent to approximately 5,200 warheads.

The Cold War tempo of warhead and bomb proposal, testing, development, production, deployment, and retirement has long ended. The last of more than 1,000 nuclear weapons tests since 1945 was conducted in 1992, and new warhead production ceased in 1992. Yet the military continues to introduce modified versions of warheads, with the B83 mod 1 introduced from 1993 to 1995, the B61 mod 11 introduced from 1997 to 2001, and the W76 mod 1 introduced beginning in 2008. ■

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NOTES

1. Beyond the six cancelled warheads listed, other programs were cancelled: B10, B/W13, B20, B22, B26, B/W29, Mk32, W35, W37, W42, B/W46, W51, W60, W63, W64, W65, W67, W73, W74, W75, W86.

2. For a description of the current U.S. nuclear arsenal, see: Robert S. Norris and Hans M. Kristensen, "Nuclear Notebook: U.S. Nuclear Forces 2009," *Bulletin of the Atomic Scientists*, March/April 2009, vol. 65, no 2, pp. 59–69.

U.S. NUCLEAR WEAPON DESIGNS, 1945-2009

SERVICE DESIGN LAB

DESIGNATOR	DELIVERY SYSTEM	AIR FORCE	NAVY	ARMY	MARINES	LANL	LLNL	OPERATIONAL PERIOD	# BUILT	YIELD	NOTES
MK-1 (Little Boy)	Bomb	X				X		1945-51	5	15 kilotons	Used orally; weighed 9,700 pounds.
Mk-III (Fat Man)	Bomb	X				X		1945-50	120	21 kilotons	Used plutonium; weighed 10,300 pounds.
Mk-IV	Bomb	X				X		1949-53	550	1-31 kilotons	Bomb had 6 yield options, and weighed 10,800 pounds.
B5	Bomb	X	X			X		1952-63	350	6-120 kilotons	Bomb had 6 yield options, and weighed 3,000 pounds.
W5	Matador cruise missile	X				X		1954-69	65	10-47 kilotons	Deployed to West Germany, South Korea, Okinawa, and Taiwan.
W5	Regulus I cruise missile		X			X		1959-64	35	10-47 kilotons	Deployed aboard 5 guided missile submarines, 4 heavy cruisers, and 8 aircraft carriers.
Mk-6/B6	Bomb	X	X			X		1951-61	1,100	8-160 kilotons	Had 5 yield options; weighed about 8,000 pounds.
B7	Bomb	X	X			X		1952-67	470	8-61 kilotons	Had 4 yield options; weighed 1,700 pounds.
B7	BOAR		X			X		1956-63	225	8-61 kilotons	Had 4 yield options; weighed 1,700 pounds.
B7 mod 1	Corporal short-range ballistic missile			X		X		1955-64	300	2-40 kilotons	In addition to U.S. deployments, Britain deployed 100 in West Germany.
B7 mod 2	Honest John short-range artillery rocket			X		X		1954-79	300	1, 20, 40 kilotons	The rocket's range was 3-24 miles.
B7 mod 3	ADM-B			X		X		1957-64	300	Low kilotons	Deployed as landmine.
B8	Bomb		X			X		1951-57	40	20-30 kilotons	A gun-type weapon.
W9	280-millimeter AFAP			X		X		1952-57	80	15 kilotons	A gun-type weapon, weighed 800 pounds.
B11	Bomb	X	X			X		1956-60	40	10-20 kilotons	A gun-type weapon.
B12	Bomb	X	X			X		1954-62	250	12 kilotons	Weighed 1,200 pounds.

U.S. NUCLEAR WEAPON DESIGNS, 1945-2009 (continued)

DESIGN LAB

SERVICE

DESIGNATOR	DELIVERY SYSTEM	AIR FORCE	NAVY	ARMY	MARINES	LANL	LLNL	OPERATIONAL PERIOD	# BUILT	YIELD	NOTES
B14	Bomb	X				X		1954	5	Megaton range	Weighed 29,000 pounds.
B15	Bomb	X	X			X		1955-65	1,200	3.4 megatons	First lightweight thermonuclear bomb.
B17	Bomb	X				X		1954-57	200	13.5 megatons	Weighed 42,000 pounds.
B18	Bomb	X				X		1953-56	90	500 kilotons	Largest uranium fission bomb.
W19	280-millimeter AFAP			X		X		1956-63	80	15-20 kilotons	A gun-type weapon, weighed 600 pounds.
B21	Bomb	X				X		1955-57	275	4-5 megatons	Weighed 17,700 pounds.
W23	16-inch naval gun		X			X		1956-62	50	15-20 kilotons	Deployed on battleships, weighed 1,500 pounds.
B24	Bomb	X				X		1954-57	105	10-15 megatons	Weighed 42,000 pounds.
W25	Genie air-to-air missile	X				X		1957-84	3,150	1, 5 kilotons	Deployed to United States and Canada.
T4	ADM-B			X		X		1957-63	100	Low kilotons	Deployed as landmine.
B27	Bomb		X				X	1958-65	700	2 megatons	First Livermore design to enter stockpile, weighed 3,000 lbs.
W27	Regulus I/II cruise missile		X			X		1958-65	25	2 megatons	Launched from submarines and surface ships.
B28	Bomb	X	X		X	X		1958-91	4,500	70 kilotons-1.45 megatons	5 variants of bomb developed, with 5 yield options.
W28	Hound Dog ASM	X				X		1960-75	650	70 kilotons-1.1 megatons	Deployed on B-52 bomber, weighed 1,700 pounds.
W28	Mace cruise missile	X				X		1959-69	150	70 kilotons-1.1 megatons	Replaced Matador cruise missile.
W30	Talos anti-aircraft missile		X			X		1959-78	300	5 kilotons	Deployed on 7 cruisers.
W30	Tactical ADM			X	X	X		1959-66	300	0.5 kilotons	Deployed as landmine.
W31	Honest John short-range artillery rocket			X		X		1958-89	1,750	1-40 kilotons	Had 5 yield options.
W31	Nike Hercules SAM		X			X		1958-84	3,000	1-40 kilotons	Had 5 yield options.
W31	ADM			X	X	X		1960-65	300	1, 2 kilotons	Deployed as landmine.

U.S. NUCLEAR WEAPON DESIGNS, 1945-2009 (continued)

SERVICE DESIGN LAB

DESIGNATOR	DELIVERY SYSTEM	AIR FORCE	NAVY	ARMY	MARINES	LANL	LLNL	OPERATIONAL PERIOD	# BUILT	YIELD	NOTES
W33	8-inch AFAP		X	X	X	X		1956-92	1,200	5-10 kilotons	A gun-type weapon that used approximately 60 kilograms of highly enriched uranium per shell.
W34	Lulu depth bomb		X			X		1958-71	2,000	10-15 kilotons	Otherwise known as Mk-101.
W34	Hotpoint bomb		X			X		1958-65	600	10-15 kilotons	Otherwise known as Mk-105.
W34	ASTOR		X			X		1963-76	600	10-15 kilotons	2 were aboard the May 1968 Scorpion (SSN 589) Broken Arrow.
B36	Bomb	X	X			X		1956-62	940	6 megatons, 19 megatons	Weighed 17,500 pounds.
W38	Atlas E/F ICBM	X					X	1961-65	110	4.5 megatons	Weighed 3,100 pounds.
W38	Titan I ICBM	X				X		1962-65	70	4.5 megatons	Weighed 3,100 pounds.
B39	Bomb	X				X		1958-66	700	3.8 megatons	Weighed 6,650 pounds.
W39	Snark SSM	X				X		1960-61	30	3.8 megatons	Deployed at Presque Isle, Maine.
W39	Redstone SSM			X		X		1958-64	100	3.8 megatons	Deployed to West Germany, had 200-mile range.
W40	BOMARC SAM	X				X		1959-72	350	10 kilotons	Deployed to United States and Canada.
W40	Lacrosse SSM			X	X	X		1959-64	400	10 kilotons	Deployed to Guam, Okinawa, South Korea, and West Germany.
B41	Bomb	X				X		1960-76	500	25 megatons	A 3-stage weapon, weighed 10,500 pounds.
B43	Bomb	X	X		X	X		1961-91	1,000	70 kilotons-1 megatons	Had 5 yield options, weighed 2,100 pounds.
W44	ASROC		X			X		1961-89	650	5 kilotons	Installed on 262 U.S. Navy ships.
W45	Medium ADM		X	X	X	X		1965-86	350	1-15 kilotons	Weighed 400 pounds.
W45	Little John artillery rocket			X		X		1961-69	500	10 kilotons, 15 kilotons	Deployed to Guam, Hawaii, and Okinawa.
W45	Terrier SAM		X			X		1962-87	750	1 kilotons, 5 kilotons	Installed on 40 U.S. Navy ships.

U.S. NUCLEAR WEAPON DESIGNS, 1945-2009 (continued)

DESIGN LAB

SERVICE

DESIGNATOR	DELIVERY SYSTEM	SERVICE					OPERATIONAL PERIOD	# BUILT	YIELD	NOTES
		AIR FORCE	NAVY	ARMY	MARINES	LANL				
W45	Bullpup B ASM	X					1964-76	100	5-10 kilotons	Briefly deployed to West Germany.
W47	Polaris A1/A2 SLBM		X				1960-75	350	600 kilotons, 1.2 megatons	5 SSBNs were fitted with A1s; later these same subs and 8 more were fitted with A2s.
W48	155-millimeter AFAP	X		X	X		1963-92	1,000	0.1 kilotons	South Pacific, Korea, and West Germany.
W49	Thor IRBM				X		1958-63	75	1.4 megatons	60 weapons deployed to Britain.
W49	Jupiter IRBM			X			1961-63	60	1.4 megatons	30 weapons deployed to Italy, 15 to Turkey.
W49	Atlas D ICBM	X			X		1959-64	40	1.4 megatons	30 deployed to United States.
W50	Pershing I SSM			X			1963-90	350	60, 200, 440 kilotons	Had 3 yield options.
W52	Sergeant SSM			X			1962-78	300	200 kilotons	Deployed to West Germany, Italy, and South Korea.
B53	Bomb	X			X		1962-04	340	9 megatons	Used uranium, weighed 8,900 pounds.
W53	Titan II ICBM	X			X		1962-87	65	9 megatons	54 deployed at peak.
W54	Falcon air-to-air missile	X			X		1961-72	2,000	0.25 kilotons	Only carried by F-102A, deployed to Canada, Alaska, Okinawa, Philippines, Spain, and West Germany.
W54	Davy Crockett munition			X			1961-71	400	0.1, kilotons, 0.2 kilotons	Launched from a recoilless rifle, deployed to Guam, Okinawa, South Korea, and West Germany.
W54	Special ADM		X	X	X		1964-88	360	0.1-1 kilotons	Man-portable.
W55	SUBROC ASM		X				1965-88	350	1-5 kilotons	Launched from submarines.
W56	Minuteman IB/II ICBM	X					1963-91	950	1.2 megatons	Deployed on 650 Minuteman IBs and 450 Minuteman IIs.
B57	Bomb	X	X	X	X		1963-92	3,100	5-20 kilotons	Compatible on 24 aircraft types.
W58	Polaris A-3 SLBM		X				1964-81	1,450	200 kilotons	Deployed on 18 SSBNs and multiple reentry vehicles.

U.S. NUCLEAR WEAPON DESIGNS, 1945-2009 (continued)

DESIGNATOR	SERVICE							DESIGN LAB			OPERATIONAL PERIOD	# BUILT	YIELD	NOTES
	DELIVERY SYSTEM	AIR FORCE	NAVY	ARMY	MARINES	LANL	LLNL							
W59	Minuteman IA ICBM	X				X		X			1962-69	175	1 megaton	150 deployed at Malmstrom Air Force Base.
B61 mod 0	Bomb	X				X					1967-84	500	Sub-kilotons to 360 kilotons	Weighted more than 700 pounds.
B61 mod 1	Bomb	X				X		X			1969-85	700	Sub-kilotons to 360 kilotons	Converted to mod 7.
B61 mod 2	Bomb		X			X		X			1975-90	265	Variable	Upgraded to mod 8; ultimately cancelled.
B61 mod 3	Bomb	X	X			X		X			1979 to date	520	0.3, 1.5, 60, 170 kilotons	Deployed by United States and NATO allies.
B61 mod 4	Bomb	X	X			X		X			1979 to date	680	0.3, 1.5, 10, 45 kilotons	Deployed by United States and NATO allies.
B61 mod 5	Bomb		X			X		X			1977-90	435	Variable	Upgraded to mod 8; ultimately cancelled.
B61 mod 7	Bomb	X				X		X			1985 to date	700	Variable to 360 kilotons	A converted mod 1 with new permissive action links and insensitive high explosives.
B61 mod 10*	Bomb	X				X		X			1990 to date	200	0.3, 5, 10, 80 kilotons	Converted from W85 deployed on Pershing IIs.
B61 mod 11	Earth-penetrating bomb	X				X		X			1997 to date	47	Variable to 360 kilotons	A converted mod 7.
W62	Minuteman III ICBM	X					X	X			1970-2009	1,800	170 kilotons	Deployed on Mk-12 multiple independently targetable reentry vehicles.
W66	Sprint ABM			X		X					1974-76	70	1 kiloton	Enhanced radiation.
W68	Poseidon C-3 SLBM		X				X	X			1970-91	5,250	40-50 kilotons	Deployed on 31 submarines.
W69	SRAM-A	X				X		X			1972-91	1,250	170-200 kilotons	Deployed on B52 bombers and FB-111 fighter-bombers.
W70	Lance SSM		X				X	X			1973-91	1,170	Sub-100 kilotons	308 of the Mod 3, 1-kiloton enhanced radiation versions produced but never deployed.
W71	Spartan ABM		X			X		X			1975	50	5 megatons	Briefly deployed to North Dakota.
W72	Walleys II ASM	X				X		X			1970-80	300	0.6 kilotons	Early air force "smart bomb" deployed to Germany.

U.S. NUCLEAR WEAPON DESIGNS, 1945-2009 (continued)

SERVICE DESIGN LAB

DESIGNATOR	DELIVERY SYSTEM	AIR FORCE	NAVY	ARMY	MARINES	LANL	LLNL	OPERATIONAL PERIOD	# BUILT	YIELD	NOTES
W76	Trident I SLBM	X	X			X		1979 to date	3,200	100 kilotons	Deployed on 14 submarines.
W76 mod 1	Trident II SLBM	X	X			X		2008 to date	0	100 kilotons	A life-extended W76.
W78	Minuteman III ICBM	X				X		1979 to date	1,000	335 kilotons	Deployed on Mk-12A multiple independently targetable reentry vehicles.
W79	8-inch AFAP			X	X		X	1981-91	550	Variable to 1.1 kilotons	Never deployed.
W80 mod 0	SLCM		X			X		1983 to date	350	5-150 kilotons	Can be deployed on attack submarines.
W80 mod 1	ALCM/ACM	X				X		1982 to date	1,850	5-150 kilotons	ACM retired.
W81	Standard-2 SAM		X			X		Cancelled in 1985	0	1 kiloton	Designed to replace Terrier SAMs.
W82	155-millimeter AFAP			X	X		X	Cancelled in 1992	0	1 kiloton	Designed to replace the W48.
B83 mod 0*	Bomb	X				X		1983 to date	300	Variable to 1.2 megatons	Deployed on B-1, B-2, B-52, and FB-111 bombers.
B83 mod 1	Bomb	X				X		1993 to date	325	Variable to 1.2 megatons	Deployed on B-1, B-2, B-52, and FB-111 bombers.
W84	GLCM	X				X		1983-91	400	0.2-150 kilotons	Recently retired.
W85	Pershing II SSM			X		X		1983-91	225	0.3, 5, 10, 80 kilotons	Converted to B61-10.
W87	MX/Peacekeeper ICBM	X				X		1986 to date	560	300 kilotons	Deployed on Mk-21 multiple independently targetable reentry vehicles.
W88	Trident II SLBM		X			X		1990 to date	400	455 kilotons	Deployed on 14 submarines.

U.S. NUCLEAR WEAPON DESIGNS, 1945-2009 (continued)

DESIGNATOR	SERVICE							DESIGN LAB				OPERATIONAL PERIOD	# BUILT	YIELD	NOTES
	DELIVERY SYSTEM	AIR FORCE	NAVY	ARMY	MARINES	LANL	LLNL								
W89	SRAM II	X					X			Cancelled in 1992	0	200 kilotons	Designed to replace the SRAM-A.		
B90	Bomb		X				X			Cancelled in 1991	0	Low kilotons	Designed to replace the B57.		
W91	SRAM-T	X					X			Cancelled in 1991	0	10-100 kilotons	A tactical ASM.		
W92	Follow-on-to-Lance			X			X			Cancelled in 1990	0	Low kilotons	A short-range army missile.		
TOTAL		52	35	26	15	77	23				66,572				

* Warhead type is only in inactive stockpile.

** Totals do not include cancelled warheads.

Highlighted types remain in operational stockpile.

ABM - antiballistic missile; ACM - advanced cruise missile, ADM - atomic demolition munition; AFAP - artillery-fired atomic projectile; ALCM - air-launched cruise missile; ASM - air-to-surface missile; ASROC - Anti-submarine rocket; ASTOR - anti-submarine torpedo; BOAR - bombardment aircraft rocket; GLCM - ground-launched cruise missile; IRBM - intermediate-range ballistic missile; ICBM - intercontinental ballistic missile; SAM - surface-to-air missile; SRAM - short-range attack missile; SSM - surface-to-surface missile; SLBM - submarine-launched ballistic missile; SLCM - submarine-launched cruise missile.

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