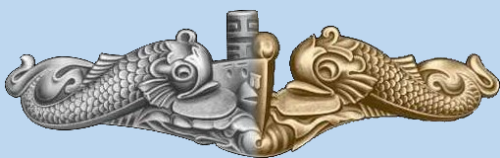


Steel Valley Dolphins

Monthly Newsletter



USS Barb SS-220



The USSVI Requin Base supports the National Creed

“To perpetuate the memory of our shipmates who gave their lives in the pursuit of duties while serving their country. That their dedication, deeds, and supreme sacrifice be a constant source of motivation toward greater accomplishments. Pledge loyalty and patriotism to the United States of America and its Constitution.”

Table of Contents

<u>Meeting Information</u>	2
<u>Officers (National & Local)</u>	3
<u>Boats Lost</u>	4
<u>Submarines Commissioned this Month</u>	5
<u>Binnacle List, Eternal Patrol</u>	7
<u>Birthdays, Anniversaries</u>	7
<u>Commander’s Corner</u>	8
<u>Meeting Minutes</u>	9
<u>Month in Review</u>	11
<u>PCU Idaho SSN-799 / Shipwright Shop</u>	12
<u>Say What ???</u>	14
<u>Chaplain’s Column, Store Keepers Report</u>	14
<u>Upcoming Events, Membership, Eagle Scouts</u>	15
<u>Featured Boat</u>	16
<u>This month in US submarine history</u>	17
Articles of Interest	
<u>Submarine Torpedoes of the USA</u>	19
<u>MK 45 Torpedo</u>	32
<u>UUM-44 SUBROC</u>	33
<u>Otto fuel II</u>	34
<u>Sponsors</u>	35

Meeting Information

Meetings are held on the second Saturday of the month, normally at the Baden PA American Legion. Quarterly meetings are held around our membership area.

Our next meeting will be

August 12, 2023 @ 1230 hours

At Monroeville American Legion Post 820

Base Location



American Legion Post 641
271 State St
Baden PA 15005

From the Editor

Please send ideas for articles or copies of articles, with full credit information to me for consideration of submission in the SVD.

We are a SUBMARINE group. As such, the articles should be SUBMARINE or NAVY related.

Lou Hamill - itgeek8088@gmail.com

MAKE A DIFFERENCE, ATTEND A MEETING!

Our Website

For additional information about what is happening at **YOUR** base, go to

<https://www.requinbase.org/>



USSVI National Officers

Office	Officer	Phone	eMail
National Commander	William Andrea		wcandrea@bellsouth.net
Senior Vice Commander	Jon Jaques	615-893-7800	jjaques@bellsouth.net
Junior Vice Commander	Steven Bell	704-824-3510	usnret82@carolina.rr.com
Secretary	Raymond Wewers	479-967-5541	raywewers@gmail.com
Treasurer	Paul Hiser	910-691-5650	paulhiser664@gmail.com
Past Commander	Wayne Standerfer	972-298-8139	lwaynes@charter.net
Chaplain	James Sandman	615-975-4792	Jsandman85@gmail.com
Region Director Northeast	Leslie Altschuler	917-748-2275	CdrNJNorthBase@hotmail.com
District Commander EN3	Thomas Denton	301-845-0049	gcmfish@verizon.net
National Office		360-337-2978	office@ussvi.org



USS Requin Base Officers

Office	Officer	Phone	eMail
Base Commander	Hubert C. Dietrich	412-486-2635	hueyfromglenshaw@aol.com
1st Vice Commander	Joe Campisi	412-322-3201	jcampisi654@comcast.net
2nd Vice Commander	Chuck "Bat" Masterson	724-869-1938	mastersoncf@aol.com
Secretary	Jeff Simon	920-217-8633	jeffsimon@zoominternet.net
Treasurer	Lee M. Bookwalter	412-795-8337	booky143@verizon.net
Storekeeper	Frank Nicotra	412-835-6540	nicotrafrank@gmail.com
Chaplain	Eric Bookmiller	724-485-2341	ebookmiller@comcast.net
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Asst. Holland Club	Dick Geyer	724-822-0401	dgdiving@gmail.com
Technology Chair	Lou Hamill	412-445-3998	itgeek8088@gmail.com
Eagle Scout Chair	John Held	724-331-2479	petecompost@aol.com
Awards Chair	Dick Geyer	724-822-0401	dgdiving@gmail.com
Master at Arms			
Public Affairs Chair	Ed Derr	724-854-0781	rredde@gmail.com



Tolling of the Boats for July

USS S-28 (SS-133)

Lost on July 4, 1944 with the loss of 49 crew members. She was conducting training exercises off Hawaii with the US Coast Guard Cutter Reliance. After S-28 dove for a practice torpedo approach, Reliance lost contact. No distress signal or explosion was heard. Two days later, an oil slick was found near where S-28. The exact cause of her loss remains a mystery.

USS Robalo (SS-273)

Lost on July 26, 1944 with the loss of 81 crew members while on her 3rd war patrol. She struck a mine about 2 miles off the coast of Palawan. Four men survived and swam ashore, then were imprisoned by the Japanese. Unfortunately, they were put on a Japanese destroyer and lost when that destroyer was sunk.

USS Grunion (SS-216)

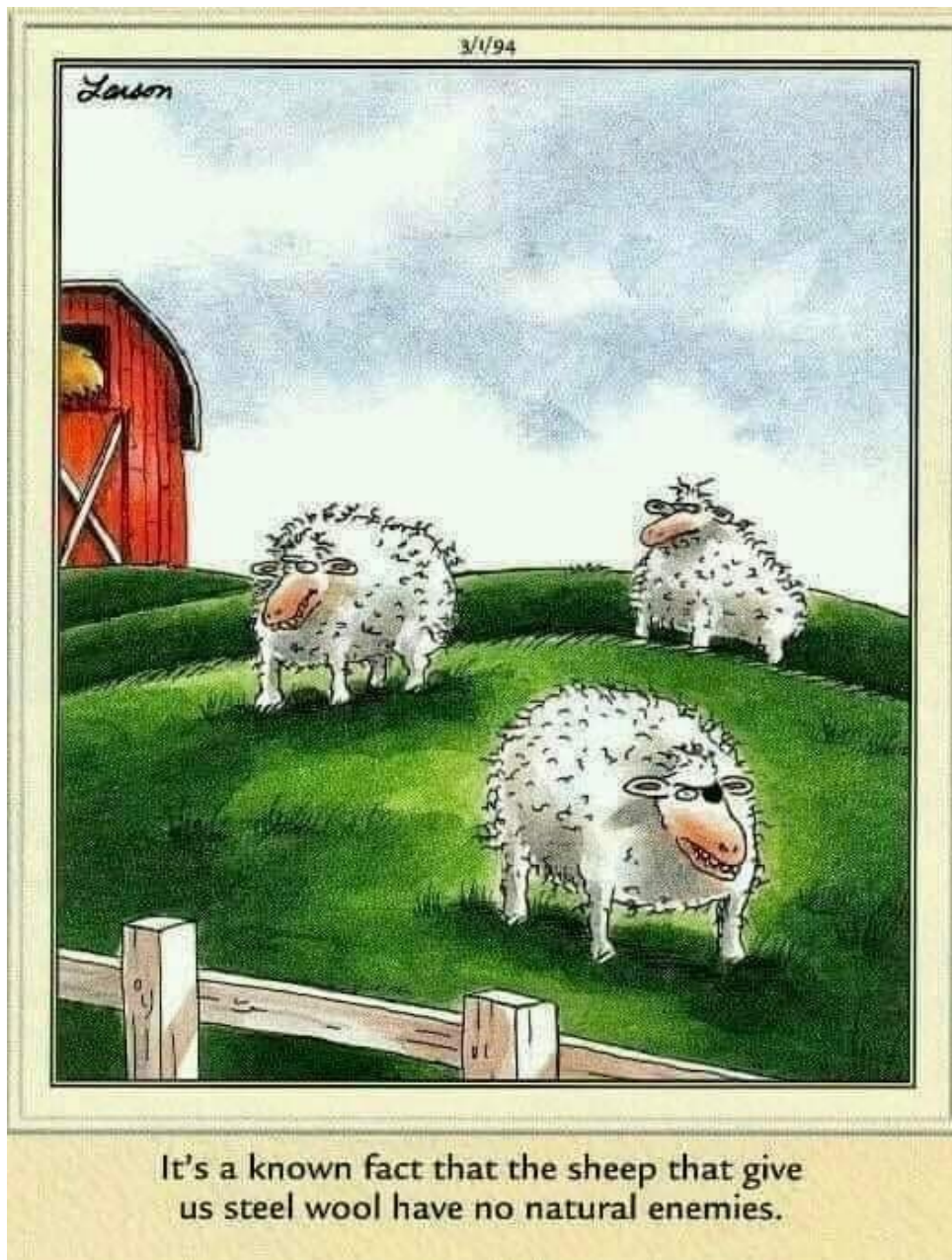
Lost on July 30, 1942 with the loss of 70 crew members while on her first war patrol near Kiska Harbor. She radioed that she sank two sub-chasers and damaged a third, but was never heard from again. Grunion's mangled remains were found in the Bering Sea in 2006 off the Aleutian Island of Kiska.



Submarines commissioned during the month of

Seawolf SSN-21	7/19/1997	Wikipedia	NavSource	
N-6 SS-58	7/9/1918	Wikipedia	NavSource	
O-7 SS-68	7/4/1918	Wikipedia	NavSource	
O-8 SS-69	7/11/1918	Wikipedia	NavSource	
O-9 SS-70	7/27/1918	Wikipedia	NavSource	Eternal Patrol
R-8 SS-85	7/21/1919	Wikipedia	NavSource	
R-9 SS-86	7/30/1919	Wikipedia	NavSource	
R-15 SS-92	7/27/1918	Wikipedia	NavSource	
S-7 SS-112	7/1/1920	Wikipedia	NavSource	
S-13 SS-118	7/14/1923	Wikipedia	NavSource	
S-25 SS-130	7/9/1923	Wikipedia	NavSource	
S-34 SS-139	7/12/1922	Wikipedia	NavSource	
S-37 SS-142	7/16/1923	Wikipedia	NavSource	
Nautilus SS-168	7/1/1930	Wikipedia	NavSource	
Spearfish SS-190	7/19/1939	Wikipedia	NavSource	
Swordfish SS-193	7/22/1939	Wikipedia	NavSource	Eternal Patrol
Tautog SS-199	7/3/1940	Wikipedia	NavSource	
Barb SS-220	7/8/1942	Wikipedia	NavSource	
Blackfish SS-221	7/22/1942	Wikipedia	NavSource	
Cero SS-225	7/4/1943	Wikipedia	NavSource	
Dace SS-247	7/23/1943	Wikipedia	NavSource	
Raton SS-270	7/13/1943	Wikipedia	NavSource	
Ray SS-271	7/27/1943	Wikipedia	NavSource	
Runner SS-275	7/30/1942	Wikipedia	NavSource	Eternal Patrol
Sunfish SS-281	7/15/1942	Wikipedia	NavSource	
Apogon SS-308	7/16/1943	Wikipedia	NavSource	
Aspro SS-309	7/31/1943	Wikipedia	NavSource	
Blackfin SS-322	7/4/1944	Wikipedia	NavSource	
Caiman SS-323	7/17/1944	Wikipedia	NavSource	
Halfbeak SS-352	7/22/1946	Wikipedia	NavSource	
Jallao SS-368	7/8/1944	Wikipedia	NavSource	
Kete SS-369	7/31/1944	Wikipedia	NavSource	Eternal Patrol
Sea Owl SS-405	7/17/1944	Wikipedia	NavSource	
Sea Poacher SS-406	7/31/1944	Wikipedia	NavSource	
Odax SS-484	7/11/1945	Wikipedia	NavSource	
Bonefish SS-582	7/9/1959	Wikipedia	NavSource	
Scorpion SSN-589	7/29/1960	Wikipedia	NavSource	Eternal Patrol
Flasher SSN-613	7/22/1966	Wikipedia	NavSource	
Andrew Jackson SSBN-619	7/3/1963	Wikipedia	NavSource	
James Madison SSBN-627	7/28/1964	Wikipedia	NavSource	
Ulysses S. Grant SSBN-631	7/17/1964	Wikipedia	NavSource	

Narwhal SSN-671	7/12/1969	Wikipedia	NavSource
Groton SSN-694	7/8/1978	Wikipedia	NavSource
Dallas SSN-700	7/18/1981	Wikipedia	NavSource
Baltimore SSN-704	7/24/1982	Wikipedia	NavSource
Hyman G. Rickover SSN-709	7/21/1984	Wikipedia	NavSource
Honolulu SSN-718	7/6/1985	Wikipedia	NavSource
Providence SSN-719	7/27/1985	Wikipedia	NavSource
Oklahoma City SSN-723	7/9/1988	Wikipedia	NavSource
Helena SSN-725	7/11/1987	Wikipedia	NavSource
Kentucky SSBN-737	7/13/1991	Wikipedia	NavSource
Nebraska SSBN-739	7/10/1993	Wikipedia	NavSource
Rhode Island SSBN-740	7/9/1994	Wikipedia	NavSource
Maine SSBN-741	7/29/1995	Wikipedia	NavSource
Wyoming SSBN-742	7/13/1996	Wikipedia	NavSource
Columbus SSN-762	7/24/1993	Wikipedia	NavSource
Missouri SSN-780	7/31/2010	Wikipedia	NavSource



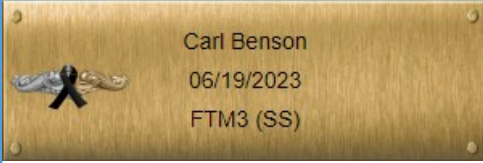


Binnacle List

Eternal Patrol

In Remembrance

Huey Dietrich
 Gerry Gaylor
 Rick Elster
 James Kontier
 George Brown
 Chad Underkoffler



Edward J. Covey	CAPT	7/3/2017
Herbert Hollingsworth	EM1(SS)	7/5/2022
Robert D. Armstrong	TMSN(SS)	7/8/2014
Ronald H. Shook	STC(SS)	7/12/2017
John G. Grienenberger	LT	7/13/2014
William A. Hawk	TM2 (SS)	7/18/2021
Fred Voskuhl	EM3 (SS)	7/23/2020
Stephen A. Kossler	EN2(SS)	7/27/2015
Joseph T. Brenkus	EN3(SS)	7/29/2015

Birthdays

Member

Spouse

Anniversaries

Donald Bright	8/1	Jean Moore	8/2	Christine & Frank Certich	8/1
Ralph Stroede	8/7	Gwen Bushko	8/4	Nicole LaPietra & James Cowher	8/2
Willard Ashmore	8/11	Karen McGee	8/10	Brenda & Mark Winters	8/2
Fred Hayes	8/16	Susan Sutherin	8/12	Agnes & Thomas Strang	8/3
Sarah Bahr	8/18	Linda Allen	8/14	Kyle & Martin Abel	8/4
Martin Abel	8/21	Edith Coats Phelps	8/16	Sondra & James Schwarz	8/7
Arthur Davis	8/22	Carmella Markel	8/27	Ashlee & Michael Amenti	8/10
James Schwarz	8/26	Frances Osborne	8/28	Susan & Gary Ireland	8/10
Dennis Cantwell	8/29	Diane Gervais	8/28	Cindy & George Brown	8/12
Mark Winters	8/31	Elaine Plunkett	8/29	Pamela & Ronald Lucas	8/15
				Emma & Andrew Wolbrueck	8/17
				Laura & Michael Cherock	8/21
				Elizabeth & John Bistolas	8/23
				Erin & Aaron Houpt	8/23
				Connie & Keith Small	8/31





What a great meeting we had with over 50 members and guests in attendance. Our base roster stands at 198! We have two new members in attendance – Don Wood and Frank Certich. Also in attendance was James Murphy, who will be number three when he sends in his application!

These three members will bring our base total to 201 members. We will continue looking for new members to make our base a good solid organization as proud brothers of the phin! As in past years, we roughly lost eight to ten members, who sail on eternal patrol and/or leave for other reasons!

Shipmate Duffy was a plank owner, on the Requin. We will have his crucifix and ashes placed onboard the Requin! His son is from New Hampshire and will be in attendance. We will notify the members when the plans are complete.

HERE IS A LIST OF FUTURE BASE ACTIVITIES:

July 29 – COD picnic – Cleveland Ohio – contact Lou Hamill

Aug 12 – District Meeting – Keystone Base – Harrisburg, Pa

Aug 12 – Base Meeting – American Legion 820 Monroeville, Pa

Oct 13 – Navy League Ball – Edgewood Country Club, Churchill, Pa

In conclusion – Both me and my 1st mate Edie, want to thank everyone for your kindness and thoughtfulness by sending “get well cards”, telephone calls and personal inquiries. The good LORD was with me and I said THANK YOU to him, after the scare of my life! I hope to get back on duty very soon, even if its part – time.

I HAVE A GREAT SUPPORT CREW!!! THANKS TO ALL.....





Meeting Minutes

July 8, 2023
American Legion Post 641, Baden PA

Base Commander Huey Dietrich called the meeting to order.

Attendees: Willard Ashmore, Clair & Nancy Bouts, Eric Bookmiller, Lee & Patsy Bookwalter, Ron Campbell, Joe Campisi, Joe Capito, Frank Certich, Ed Deer, Huey & Edie Dietrich, Sandy Ellis, Dick & Beverly Geyer, Bob & Lynn Gourley, Bill & Donna Greenlee, Lou Hamill, John Held, Steve Kerch, Jean Lemieux, Bill & Sandy Lindsey, Pete & Nancy Loskosh, Mike Markel, Bat Masterson, Vince Metz, Bob & Jude Meyers, James Murphy, Frank Nicotra, Mike Pellegrino, Chuck Shrump, Brian Siege, Jeff & Eileen Simon, Keith Small, Jack Sutherin, Charlie Warren, Ron & Cindy Weaver, Don Wood.

Base Commander Huey Dietrich gave the quote of the day: "Easy street is a blind alley."

Requin History: July 13, 1945 USS Requin joined the Pacific Fleet in the Panama Canal Zone. July 31, 1945 USS Requin arrived in Pearl Harbor Hawaii.

Base Commander Huey Dietrich: Let us at this time, with a moment of silent prayer, remember our Shipmates who made the supreme sacrifice that we may gather here in Peace. We dedicate this meeting to our Shipmates on Eternal Patrol, to perpetuate their memories in our lives and to honor our Shipmates on active duty in the service of the first line of defense of our Nation.

Boats Lost:

USS S 28 (SS 133) July 4, 1944
USS ROBALO (SS 273) July 26, 1944
USS GRUNION (SS 216) July 30, 1942

Chaplain Eric Bookmiller gave the Invocation.

Secretary Jeff Simon lead the base in the Pledge Of Allegiance
Members introduced themselves and the boats they qualified on.

Other Reports:

Binnacle List: Brown, Dietrich, Kontier, Elster, Underkoffler
Eternal Patrol: Carl Benson, Bob Schmidt
Base membership stands at 198

Secretary Jeff Simon reported that Minutes of the previous base meeting were published in the SVD. With no objections, the minutes were approved as published.

Treasurer Lee Bookwalter gave a full accounting of base assets, expenditures, and deposits. With no objections, the report was approved.

Report on available small stores.

Report on Eagle Scouts presentations was given.

Old Business:

Pictures are available from Requin birthday at Science Center on May 28th.
Report on July 4th parade in Canonsburg PA.
Report on Mush Morton Ceremony.
Report on Memorial Day weekend activities.

New Business:

Members wishing to attend the Cod Base picnic in Cleveland on July 29th should contact Lou Hamill to reserve a seat.

District meeting will be held on August 12th at Keystone Base in Harrisburg PA.

Navy League Ball will be held on October 13th at Edgewood Country Club in Churchill PA.

Good Of The Order

Next meeting will be held at American Legion Post 820, Monroeville PA.

Mark Duffy, who is on eternal patrol, was a plank owner of the USS Requin. His ashes contained in a small crucifix will be placed aboard the USS Requin. The Base plans to attend any ceremony.

Chaplain Eric Bookmiller gave the Benediction and blessing of today's meal.

Adjournment: The meeting was adjourned.

Next meeting: American Legion Post 820, Monroeville PA at 1230 hours on August 12, 2023





Month in Review



Mush Morton Award Presentation
06/23/2023

Is Lawton reminiscing of his days as he is making this presentation?

He sure does look happy.



Independence Day Parade in Canonsburg PA

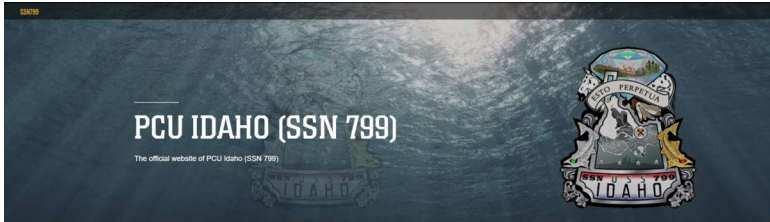


PCU Idaho SSN - 799

SSN 799
USS IDAHO
 COMMISSIONING COMMITTEE
<https://ussidahocommittee.org/>



<https://www.facebook.com/SSN799>

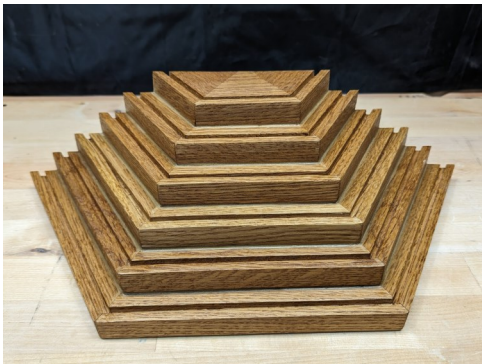


<https://www.sublant.usff.navy.mil/SSN799/>



Shipwright Shop

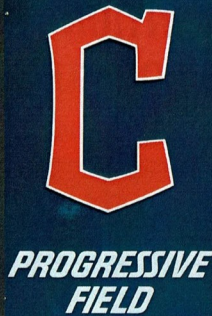
Here is the link to the customer photos. <https://requinbase.org/customer-photos/>



If you would like to order any item contact [Huey Dietrich](#) or
Place your order or purchase these and other items at a base meeting or online at

<https://requinbase.org/shop/>





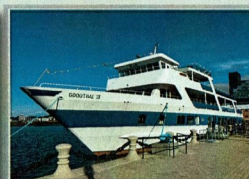
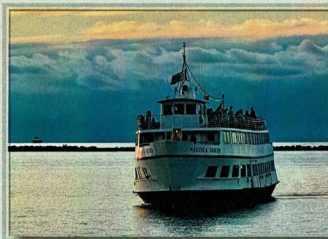
SAVE THE DATE USSVI 2024 CONVENTION CLEVELAND, OHIO USSVI COD BASE SPONSOR

DATE AUGUST 20-24 / 2024

EMBASSY SUITES ROCKSIDE

USSVI ANNUAL CONVENTION 2024 CLEVELAND, OHIO HOME OF THE USS COD SUBMARINE MEMORIAL

- SHUTTLE SERVICE TO EVENTS
- LAKE & RIVER CRUISES
- HELICOPTER TOURS
- JACK CASINO
- CLEVELAND FLATS
- ROCK & ROLL HALL OF FAME
- PLAYHOUSE SQUARE
- CLEVELAND MUSEUM OF ART
- SCIENCE CENTER
- CLEVELAND ZOO
- CLEVELAND AQUARIUM
- WOMENS AIR & SPACE MUSEUM
- CLEVELAND GUARDIANS
- FOOTBALL HALL OF FAME
- BREWERY TOURS
- INDOOR & OUTDOOR GOLF



REUNION DATES

8/17-8/19 & 8/25-8/27

CONTACT JOE MARANELLI 440-205-6089 M-F

The perfect place for a convention

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Come meet fellow submariners SAVE THE DATE AUGUST 20-24 2024 WWW.THISISCLEVELAND.COM



Say What???

Torpedo juice: an American slang for an alcoholic beverage, first mixed in World War II, made from pineapple juice and the 180-proof grain alcohol fuel used in United States Navy torpedo motors. Various poisonous additives were mixed into the fuel alcohol by Navy authorities to render the alcohol undrinkable, and various methods were employed by the U.S. sailors to separate the alcohol from the poison. Aside from the expected alcohol intoxication and subsequent hangover, the effects of drinking torpedo juice sometimes included mild or severe reactions to the poison.

The standard recipe for torpedo juice is two parts ethyl alcohol and three parts pineapple juice.



Chaplain's Column

Greetings to all my fellow Requin Base shipmates, spouses, and associate members.

As always, I would like to ask everyone to keep those on the binnacle list in our thoughts and prayers this month.

Remember we are only as good as the information we get. If we don't know of a member passing, we cannot provide the appropriate honors for a fallen shipmate. If you know anyone who is sick or goes on eternal patrol, please give me a call at 724-485-2341 or email at ebookmiller@comcast.net. If you call and I don't answer, please leave a message. This is a land line phone so do not text this number.

If you wish to be placed on the binnacle list but do not want to disclose the specifics, I will maintain your confidentiality.

Eric Bookmiller



Store Keepers Report

Please visit our online store at <https://requinbase.org/shop/>

You can have your items shipped to you at home via USPS [for a small fee], or pick them up at the next USSVI meeting.





Upcoming Events

Meeting

August 12, 2023
1230 hours

American Legion Post 820
4339 Old William Penn Hwy
Monroeville, PA 15146

Base activities

July 29 – COD picnic – Cleveland Ohio – contact Lou Hamill
Aug 12 – District Meeting – Keystone Base – Harrisburg, Pa
Aug 12 – Base Meeting – American Legion 820 Monroeville, Pa



Membership

Primary Members	171	Holland Club	88	USSVI Life Members	76
Secondary Members	13	WWII	2	Base Life Members	59
Associate Members	16	Eternal Patrol	78	Joined Last Year	7
Total Members	200			Joined This Year	9



New Members

Frank Certich qualified on the USS ANDREW JACKSON SSBN619 -Blue Crew, as a MT. He left the navy in 1983 as a MT1 (SS). Frank lives in Baden, Pa., with his first mate Christine.

Please e-mail Frank and welcome him aboard – fcertich@gmail.com

Don Wood qualified on the USS POGY SSN647 as a MM. He left the navy as a MM1(SS). Don lives in Salem, Ohio with his first mate Kathy.

Please e-mail Don and welcome him aboard – glastron@z00mineternet.net



Eagle Scouts

Please direct all Eagle Court of Honor requests to <https://requinbase.org/eagle-coh>





History

United States



Name	USS <i>Barb</i>
Namesake	<u>Barbus</u>
Builder	<u>General Dynamics Electric Boat, Groton, Connecticut</u>
Laid down	7 June 1941
Launched	2 April 1942
Sponsored by	Mrs. <u>Charles A. Dunn</u>
Commissioned	8 July 1942
Decommissioned	12 February 1947
Identification	SS-220
Recommissioned	3 December 1951
Decommissioned	5 February 1954
Recommissioned	3 August 1954
Decommissioned	13 December 1954
Stricken	15 October 1972
Fate	Transferred to <u>Italy</u> on 13 December 1954

Italy



Name	<i>Enrico Tazzoli</i>
Acquired	13 December 1954
Identification	S 511
Fate	Sold for scrap in 1972



General characteristics

Class and type	<u>Gato-class diesel-electric submarine</u>
Displacement	1,525 long tons (1,549 t) surfaced, 2,424 long tons (2,463 t) submerged
Length	311 ft 9 in (95.02 m)
Beam	27 ft 3 in (8.31 m)
Draft	17 ft (5.2 m) maximum
Propulsion	4 × <u>General Motors Model 16-248 V16 Diesel engines</u> driving <u>electric generators</u> 2 × 126-cell <u>Sargo batteries</u> 4 × high-speed <u>General Electric electric motors</u> with <u>reduction gears</u> two propellers 5,400 shp (4.0 MW) surfaced 2,740 shp (2.0 MW) submerged
Speed	21 kn (39 km/h) surfaced, 9 kn (17 km/h) submerged
Range	11,000 nmi (20,000 km) surfaced @ 10 kn (19 km/h)
Endurance	48 hours @ 2 kn (3.7 km/h) submerged, 75 days on patrol
Test depth	300 ft (91 m)
Complement	6 officers, 54 enlisted
Armament	10 × 21-inch (533 mm) <u>torpedo tubes</u> 6 forward, 4 aft 24 torpedoes 1 × 3-inch (76 mm) / 50 <u>caliber deck gun</u> <u>Bofors 40 mm</u> and <u>Oerlikon 20 mm cannon</u>



07/02/1945

USS Barb (SS 220) bombards Japanese installations on Kaihyo Island, Japan in the first successful use of rockets against shore positions.

07/05/1942

USS Growler (SS 215) torpedoes and sinks the Japanese destroyer, Arare, in the Salmon Lagoon, off Kiska. In the attack, USS Growler damages destroyers Kasumi and Shiranui.

07/06/1944

USS Paddle (SS 263) attacks a Japanese convoy northwest of Halmahera and sinks destroyer Hokaze off Sangi Island. Also on this date, USS Sealion (SS 315) attacks a Japanese convoy in the East China Sea and sinks merchant passenger cargo ship Setsuzan Maru off Ningpo, China while USS Tang (SS 306) sinks Japanese freighter Dori Maru in Chosen Bay.

07/09/1960

USS Thresher (SSN 593) is launched at Portsmouth, N.H.

07/09/1994

USS Rhode Island (SSBN 740) is commissioned at Groton, Conn. The Ohio-class ballistic-missile submarine.

07/10/1945

USS Runner (SS 476) sinks the Japanese minesweeper (No.27) off Tado Saki, Honshu.

07/10/1993

USS Nebraska (SSBN 739) is commissioned at New London, Conn., the 14th Ohio-class submarine.

07/11/1944

USS Sealion (SS 315), in the Yellow Sea off the west coast of Korea, near Shosei Jima, sinks two Japanese freighters.

07/11/1987

USS Helena (SSN 725) is commissioned at Groton, Conn. The Los Angeles-class nuclear attack submarine is the fourth named for the capitol of Montana.

07/13/1991

USS Kentucky (SSBN 737) is commissioned at Groton, Conn., the third Navy vessel to be named after the Bluegrass state. The thoroughbred of the Fleet is an Ohio-class ballistic missile submarine.

07/15/1942

USS Grunion (SS 216) sinks the Japanese submarine chasers (25 and 26) off Kiska, Aleutian Islands.

07/17/1944

USS Gabilan (SS 252) sinks Japanese minesweeper (W 25) northwest of Zenizu, Japan.

07/18/1981

USS Dallas (SSN 700) is commissioned at Groton, Conn., her first homeport. The Los Angeles-class nuclear-powered attack submarine is the first to be built with an all-digital fire control and sonar system.

07/19/1997

USS Seawolf (SSN 21) is commissioned at Electric Boat Shipyard in Groton, Conn.

07/20/1945

USS Threadfin (SS 410) sinks the Japanese minesweeper (W 39) northwest of Mokpo, Korea.

07/20/1960

In the first launch of the Polaris missile, USS George Washington (SSBN 598) successfully fires two operational Polaris missiles while submerged off Florida.

07/24/1942

USS Narwhal (SS 167) sinks Japanese guardboat No.83 Shinsei Maru, at Utsutsu Bay, Hokkaido. USS Narwhal also sinks freighters Nissho Maru off Etorofu Maru, Kuril Island, and Kofuji Maru off Oito.

07/24/1993

USS Columbus (SSN 762) is commissioned onboard Submarine Base New London, Groton, Conn. The Los Angeles-class nuclear-powered attack submarine is the fifth ship to be named Columbus for the Navy.

07/27/1943

USS Scamp (SS 277) torpedoes and sinks the Japanese submarine (I 168), which had sunk USS Yorktown (CV 5) and USS Hammann (DD 412) at the Battle of Midway, south-south-west of Truk. USS Scamp also damages the Japanese oiler, Kazahaya.

07/27/1985

USS Providence (SSN 719) is commissioned at Groton, Conn., the fifth ship in the Navy to be named after the Rhode Island city.

07/28/1926

USS S-1 surfaces and launches a Cox-Klemin (XS 2) seaplane flown by Lt. D.C. Allen. The submarine recovers the aircraft and submerges, successfully completing an airplane transport on board a submarine.

07/29/1944

USS Balao (SS 285) shells and sinks Japanese sampan (No.7) Nissho Maru about 100 miles off Palau. USS Drum (SS 228) sinks Asahi Maru with gunfire in the same general area, and takes survivors prisoner. Also on this date, USS Perch (SS 313) sinks Japanese guardboat Kannon Maru I-Go in the Philippine Sea, east of Dinagat Island.

07/29/1995

USS Maine (SSBN 741) is commissioned at Portsmouth Naval Shipyard, Kittery, Maine. The Ohio-class nuclear-powered ballistic-missile submarine is the third Navy vessel to be named after the state.

07/31/2010

USS Missouri (SSN 780) is commissioned at Groton, Conn., her homeport. The seventh Virginia-class attack submarine is the fourth Navy vessel to honor the state of Missouri.





Submarine Torpedoes of the United States of America

http://www.navweaps.com/Weapons/WTUS_Main.php

Nomenclature

The USN originally procured torpedoes by contracting with private manufacturers. Each vendor was assigned their own Mark number series and was given a designation in metric or in metric and english dimensions specifying how large was the torpedo in both diameter and length and the manufacturing name. For example, the first Bliss-manufactured torpedoes based upon the Whitehead torpedo patents were designated as the **Whitehead 3.55m x 45cm Mark I**. The first Bliss-Leavitt torpedoes manufactured to their own design were designated as **Bliss-Leavitt 5m x 21-inch Mark I**.

In 1913, the practice of assigning a series of marks to each manufacturer was changed to a single series of marks covering all manufacturers and older torpedoes were redesignated. Surviving 45 cm torpedoes were designated as Types A through C while the 21-inch torpedoes were designated as Mark I through Mark 4. Details may be found in the [Pre-World War II USA torpedo datapage](#). From that time onwards, the Mark number alone, or in a few cases the Mark and Mod numbers, uniquely identifies each torpedo.

USA torpedoes since that time are simply designated with "Mark" followed by a Numeral and a "Mod" followed by a number representing the change made since the basic design. For example, the Designation "Mark 12 Mod 2" means that the torpedo is the twelfth torpedo designed by the USN and that it has undergone two design revisions since the first model.

In 1922, all torpedoes prior to the Mark 7 were declared obsolete and removed from service. As of that point, only the Mark 7 (17.7") and Marks 8, 9 and 10 (all 21") remained in service.

All USN 18 inch torpedoes are actually 17.7 inches (45.0 cm) in diameter.

During World War I production was at the Alexandria Torpedo Station at Alexandria, Virginia. This station was closed shortly after the war ended. Production prior to World War II was at the Naval Torpedo Station at Newport, Rhode Island. Efforts to reopen the Alexandria Station prior to World War II were frustrated for political reasons for 11 years before it was finally reopened in July 1941. In addition to these two, Bliss and the Pontiac Division of General Motors made torpedoes during World War II and Westinghouse developed the Mark 18 Electrical Torpedo. After World War II, Honeywell and later General Dynamics were the primary manufacturers while General Electric made some of the acoustic ASW torpedoes.

Engines

1885 to 1905

The first USN torpedo was the Howell which used a flywheel for power. Although modestly successful, the Whitehead type using compressed air was adopted as it was suitable to improvements to increase range and warhead size.

World War I and World War II

Unlike other nations, the United States abandoned the Whitehead compressed air torpedoes in favor of turbine propulsion as early as November 1907. Wet-heater propulsion systems were introduced to USN torpedoes during the 1920s and became the primary motive power for the next two decades.

For example, the Mark 13 airborne torpedo of the 1930s-1940s was an alcohol-fuelled freshwater wet-heater using a two-stage impulse type turbine with contra-rotating rotors, no stator and three nozzles. More

energetic fuel systems including ones using pure oxygen and hydrogen peroxide ("Navol") instead of air were tested in the 1930s but these developments were dropped due to technical difficulties.

Newport Station worked intermittently on electric torpedoes between the wars, but it was not until a captured German G7e was supplied by the British in 1941 that interest was aroused enough to place a development contract. These torpedoes were very popular with the US Submarine force as they were essentially wakeless. However, post-war analysis showed that Japanese merchantmen rarely noticed a wake and the rather slow speed of the Mark 18 resulted in the standard wet-heater torpedoes having a 17% better hit rate against merchant ships and 250% better against escort ships.

Experiments with Navol were revived during World War II with about 1,000 torpedoes being completed too late to see service.

Post war torpedoes have been mainly electrics and otto-fueled pistons.

Production during World War I

Between 01 January 1917 and 30 November 1918, a total of 5,910 Mark 7 and Mark 8 torpedoes were ordered with 1,982 being actually delivered during this time period. However, the massive numbers of "flush-decker" destroyers completed during and after the war resulted in a total production of about 3,000 Mark 8 torpedoes.

Production during World War II

Mark 13	Aircraft	17,000
Mark 14	Submarine	13,000
Mark 15	Surface	9,700
Mark 16	Hydrogen peroxide	1,000
Mark 18	Electric	9,600
Mark 23	Mark 14 variant	9,600
Total		59,900

The numbers above are rounded off and include all torpedoes produced during the 1930s.

The United States manufactured a total of 57,653 torpedoes between 1 January 1939 and 1 June 1946. Newport built 18,751, Alexandria built 9,920, Westinghouse 8,250, Forest Park 8,391, St. Louis 6,257, Keyport 795, and Pontiac and International Harvester built 5,289.

Warhead Explosives

The earliest weapons used wet gun-cotton. Just prior to World War I, this was replaced with TNT. Torpex (TPX) was introduced in the Fall of 1942. In the late 1940s Torpex was replaced by HBX, then H-6 in the 1960s and by PBX in the 1970s.

Approximately 1.9 lbs. (0.9 kg) of wet gun-cotton is equivalent to 1.0 lbs. (0.45 kg) of TNT.

Torpex is a mixture of 37-41% TNT, 41-45% RDX (cyclonite, cyclomethylene trinitramine) and 18% aluminum. HBX and H-6 are also TNT based with additives to increase their explosive power or increase their stability.

Torpex is attractive because of the increased explosive energy and higher detonation velocity of RDX as compared to TNT and the prolongation of the pressure wave by the aluminum. On a weight basis, Torpex is conservatively estimated to be about 50% more effective than TNT as an underwater explosive against ships. However, Torpex is more sensitive than TNT and RDX is expensive and difficult to make safely.

Warhead Pistols

The failure of the US Magnetic Pistol and backup striker gear is well known. Much of this was due to peacetime economies, but excessive secrecy and far too little communications between the Naval Torpedo Station and the Fleet were also to blame, as well as the reluctance of the Bureau of Ordnance to accept good evidence of defects.

The result was that it was not officially announced until August 1942 that the standard submarine torpedo Mark 14 ran 10 feet (3 m) below its depth setting and not until June 1943 that the magnetic pistol was ordered to be disabled. However, long before this time, many submarine commanders were putting to sea per orders with activated pistols only to deactivate them once out of sight of land. The contact exploder faults were finally rectified in September 1943 but magnetic exploders were distrusted as late as thirty years after the war ended.

Whitehead 18" (45 cm) Mark 3 or Type A

3.55 m x 45 cm Whitehead

Ship Class Used On	Surface Ships and Submarines
Date Of Design	about 1898
Date In Service	about 1900
Weight	845 lbs. (383 kg)
Overall Length	140 in (3.556 m)
Explosive Charge	118 lbs. (53.5 kg) wet gun-cotton
Range / Speed	800 yards (730 m) / 27.5 knots
Power	Air-flask (cold running) compressed air powered, three cylinder, radial Brotherhood pattern engines.
Guidance	Mark 1 Mod 1 gyro

This was the first US torpedo to be equipped with a gyro which greatly improved accuracy, otherwise it was a minor improvement of the Whitehead Mark 2.

The A through D class submarines originally fired this torpedo, but the C and D classes were modified around 1912 to use any of the longer, more powerful 204 inch (5.2 m) torpedoes.

Bliss-Leavitt 18" (45 cm) Mark 4

Ship Class Used On	Submarines
Date Of Design	about 1910
Date In Service	about 1912
Weight	1,547 lbs. (702 kg)
Overall Length	197 in (5.004 m)
Explosive Charge	Mod 0: 200 lbs. (91 kg) wet gun-cotton Mod 1: 199 lbs. (90 kg) wet gun-cotton
Range / Speed	Mod 0: 2,000 yards (1,830 m) / 30 knots Mod 1: 3,000 yards (2,740 m) / 29 knots
Power	Turbine engine, alcohol fired dry heaters
Guidance	Mod 0: Mark 4 Mod 3 gyro Mod 1: Mark 2 Mod 2 gyro

First USA torpedo designed specifically for submarines. Twenty-one inch (53.3 cm) torpedoes were too heavy and too bulky for the submarines of the time. For that reason, this torpedo was designed as a scaled down version of the Bliss-Leavitt Mark 3. Designated as Torpedo Mark 4 in 1913. Used by C and D class submarines.

Bliss-Leavitt 18" (45 cm) Mark 6

Ship Class Used On	Destroyers, Cruisers and E through H class submarines
Date Of Design	about 1908
Date In Service	about 1911
Weight	1,800 lbs. (616 kg)
Overall Length	204 in (5.182 m)
Explosive Charge	200 lbs. (90 kg) wet gun-cotton
Range / Speed	2,000 yards (1,830 m) / 35 knots
Power	Turbine engine, alcohol fired dry heaters
Guidance	Mark 6 gyro

The Bliss-Leavitt Mark 6 introduced a new turbine configuration in which the wheels were horizontal. This configuration has been the most common choice for USN torpedo turbine systems ever since. 100 were ordered in 1909.

Bliss-Leavitt 18" (45 cm) Mark 7

'Ship Class Used On	"K," "O" and "R" Class Submarines
Date Of Design	1910
Date In Service	1912
Weight	Mod 0 (submarines): 1,588 lbs. (720 kg)
Overall Length	204 in (5.182 m)
Explosive Charge	Mod 0: 205 lbs. (93 kg) TNT
Range / Speed	Mod 0: 4,000 yards (3,650 m) / 32 knots
Power	Wet-Heater
Guidance	Mark 7 gyro

First wet-heater (water spray into combustion chamber) torpedo in the US Navy. 240 ordered in 1912. Still being used by old submarines during World War II. Some Mark 7 torpedoes were modified for use by aircraft (see below).

Bliss-Leavitt 18" (45 cm) Mark 7 Type D (Short Torpedo)

Ship Class Used On	Submarines Aircraft
Date Of Design	About 1916
Date In Service	1917
Weight	7D: 1,036 lbs. (470 kg)
Overall Length	120 in (3.048 m)
Explosive Charge	7D: 200 lbs. (90 kg) TNT
Range / Speed	7D: 2,000 yards (1,800 m) / 35 knots
Power	Wet-heater

Smaller version of the Mark 7 developed to fit the shorter torpedo tubes on old submarines. Never deployed for that purpose, but used during early aircraft tests. After a series of drops with dummy torpedoes, a live Type D was successfully launched from an R-6L Navy floatplane on 14 July 1919. 43 more Type D torpedoes were launched from planes during the next 12 months.

Bliss-Leavitt 21" (53.3 cm) Mark 9

Ship Class Used On	Mod 1: World War I-era Battleships Mod 1B: Submarines
Date Of Design	About 1912
Date In Service	1915
Weight	Mod 1: 2,059 lbs. (934 kg) Mod 1B: 2,377 lbs. (1,078 kg)
Overall Length	196 in (5.004 m)
Explosive Charge	Mod 1: 210 lbs. (95 kg) TNT Mod 1B: 395 lbs. (179 kg) Torpex
Range / Speed	Mod 1: 9,000 yards (8,230 m) / 27 knots Mod 1B: 5,500 yards (5,030 m) / 34.5 knots
Power	Wet-heater
Guidance	Mark 8 Mod 1 gyro

A short torpedo developed for the submerged tubes on battleships. Originally known as the Bliss-Leavitt Mark 3 Mod 1. Used by "R" and "S" class submarines in World War II. Last torpedo built by

21" (53.3 cm) Mark 10

Ship Class Used On	World War I-era Submarines
Date Of Design	About 1917
Date In Service	About 1918
Weight	Mod 0: 2,050 lbs. (930 kg) Mod 3: 2,215 lbs. (1,005 kg)
Overall Length	183 in (4.953 m)
Explosive Charge	Mod 0: 400 lbs. (181 kg) TNT Mod 3: 497 lbs. (225 kg) TNT or 485 lbs. (220 kg) Torpex
Range / Speed	Mod 0: 5,000 yards (4,570 m) / 30 knots Mod 3: 3,500 yards (3,200 m) / 36 knots
Power	Wet-heater
Guidance	Mark 13 Mod 1 gyro

Last torpedo designed by Bliss and manufactured by the Naval Torpedo Station at Newport. Still used by "S" class submarines during World War II.

21" (53.3 cm) Mark 14

Ship Class Used On	Submarines
Date Of Design	1930
Date In Service	1931
Weight	Mod 0: 3,000 lbs. (1,361 kg) Mod 3: 3,061 lbs. (1,388 kg)
Overall Length	20 ft 6 in (6.248 m)
Explosive Charge	Mod 0: 507 lbs. (230 kg) TNT Mod 3: 668 lbs. (303 kg) TPX
Range / Speed	All Mods: 4,500 yards (4,100 m) / 46 knots Mod 0: 9,000 yards (8,200 m) / 31 knots Mod 3: 9,000 yards (8,200 m) / 30.5 knots
Power	Wet-heater steam turbine
Guidance	Mark 12 Mod 3 gyro

Developed as a replacement for the [Mark 10](#), this was the standard submarine torpedo of the World War II period. Modified versions stayed in US service until the 1970s. The 31 knot setting was rarely used during the war.

21" (53.3 cm) Mark 16

Ship Class Used On	Submarines
Date Of Design	1944
Date In Service	1945
Weight	Mod 0: 3,895 lbs. (1,766 kg) Mod 1: 3,922 lbs. (1,799 kg)
Overall Length	20 ft 6 in (6.248 m)
Explosive Charge	Mod 0: 1,260 lbs. (572 kg) TPX Mod 1: 960 lbs. (435 kg) HBX
Range / Speed	Mod 0: 7,000 yards (6,400 m) / 46 knots Mod 1: 11,500 yards (10,500 m) / 46 knots
Power	Hydrogen Peroxide (Navol) turbine
Guidance	Mark 12 Mod 3 gyro

A high-performance but high-cost torpedo. Not used during the war but it remained in service until the mid-1970s. 1,700 produced.

21" (53.3 cm) Mark 18

Ship Class Used On	Submarines
Date Of Design	1943
Date In Service	1944
Weight	Mod 0: 3,041 lbs. (1,379 kg) Mod 2: 3,061 lbs. (1,388 kg)
Overall Length	20 ft 6 in (6.225 m)
Explosive Charge	Mod 0: 600 lbs. (272 kg) TPX Mod 1: 595 lbs. (270 kg) TPX or HBX
Range / Speed	4,000 yards (3,650 m) / 29 knots
Power	Electric Battery
Guidance	Mark 12 Mod 3 gyro

The Westinghouse version of the captured German G7e. Had the advantage of being trackless and only requiring about 70% of the labor needed to build a wet-heater torpedo. However, its poor performance and design flaws led to it being discarded in 1950 in favor of the Mark 14 and Mark 16. Until new guide studs were placed in the tubes, the Mark 18 was susceptible to damage upon launch because it accelerated much faster than did the conventional steam-powered torpedoes. By the end of the war, the Mark 18 made up 65 percent of all torpedoes fired by submarines. 8,500 produced.

21" (53.3 cm) Mark 22

Ship Class Used On	Submarines
Date Of Design	1943
Date In Service	1944
Weight	3,060 lbs. (1,388 kg)
Overall Length	20 ft 6 in (6.225 m)
Explosive Charge	N/A
Range / Speed	4,000 yards (3,650 m) / 29 knots
Power	Electric Battery
Guidance	Passive Acoustic Homing

A Bell/Westinghouse torpedo. Work started in 1944 but abandoned in 1945 in favor of the Mark 35. Two prototypes built.

19" (48.3 cm) Mark 27 (Cutie)

Ship Class Used On	Submarines
Date Of Design	1941
Date In Service	1943
Weight	Mod 0: 720 lbs. (327 kg) Mod 4: 1,175 lbs. (533 kg)
Overall Length	Mod 0: 7 ft 6 in (2.286 m) Mod 4: 10 ft 6.75 in (3.219 m)
Explosive Charge	Mod 0: 95 lbs. (43 kg) TPX or HBX Mod 4: 128 lbs (58 kg) HBX
Range / Speed	Mod 0: 5,000 yards (4,570 m) / 12 knots Mod 4: 6,200 yards / 15.9 knots
Power	Electric Battery
Guidance	Passive Acoustic Homing

A variation of the airborne Mark 24 adapted for submarine use by Bell Laboratory. It was a passive homer intended for self-defense against ASW escorts. Used only against the Japanese. The Mark 27 Mod 4 was a larger version developed by the Ordnance Research Laboratory at Pennsylvania State College that was in service from 1946 to 1960. About 1,100 Mod 0 units were manufactured by Western Electric while about 3,000 Mod 4 were built. Nicknamed "Cutie."

21" (53.3 cm) Mark 28

Ship Class Used On	Submarines
Date Of Design	1943
Date In Service	1945
Weight	2,800 lbs. (1,270 kg)
Overall Length	20 ft 6 in (6.248 m)
Explosive Charge	585 lbs. (265 kg) HBX
Range / Speed	4,000 yards (3,650 m) / 19.6 knots
Power	Electric-Battery, seawater
Guidance	Passive acoustic

A passive homing torpedo developed from the Mark 18 which in turn was developed from captured German G7e torpedoes. The USN considered motor and gear noises to be the most troublesome problem with the homing torpedoes, unlike the Germans, who regarded propeller noises as the worst problem. The Mark 18 was not a quiet design, so the Mark 28 used only one propeller and eliminated the tail gearing. There were four hydrophones on the curved part of the nose. In production from 1944-52 and remained in service until 1960.

21" (53.3 cm) Mark 33

Ship Class Used On	Submarines
Date Of Design	1946
Date In Service	1949
Weight	1,770 lbs. (803 kg)
Overall Length	13 ft 0 in (3.962 m)
Explosive Charge	550 lbs. (249 kg) HBX
Range / Speed	15,000 yards (13,710 m) / 27 knots
Power	Electric-Battery
Guidance	Passive acoustic

A passive homer, originally called the Mark 33 mine. Intended for submarines and aircraft against surface ships or submarines. This was the first USN torpedo to have a cast aluminum alloy body. Thirty models produced and tested starting in 1943, but did not enter service. Some of its features were later used in the Mark 35.

21" (53.3 cm) Mark 35

Ship Class Used On	Submarines and Surface Ships
Date Of Design	1946
Date In Service	1949
Weight	1,770 lbs. (803 kg)
Overall Length	13 ft 5 in (4.089 m)
Explosive Charge	270 lbs. (122.5 kg) HBX
Range / Speed	15,000 yards (13,710 m) / 27 knots
Power	Electric-Battery, seawater
Guidance	Active and passive acoustic, spiral search

A "Universal" torpedo derived from the Marks 24, 32 and 33 with about 400 being produced between 1949 and 1952. In service until 1960 when it was replaced by the Mark 37.

Final settings were provided from a fire control system to the weapon through a 1" (25 mm) diameter umbilical cable which was cut away during weapon expulsion from the tube. It was intended as an ASW weapon, with the secondary objective of anti-surface vessel attack.

Settings included a pre-enable run-out course and distance, search ceiling and floor, and right or left circling search pattern.

21" (53.3 cm) Mark 36

Ship Class Used On	Submarine
Date Of Design	1944
Date In Service	1948
Weight	4,000 lbs. (1,814 kg)
Overall Length	20 ft 6 in (6.248 m)
Explosive Charge	800 lbs. (53 kg) HBX-1
Range / Speed	7,000 yards (3,300 m) / 47 knots
Power	Electric-Battery, seawater
Guidance	Gyro, pattern running

A pattern-running torpedo that did not enter service. Was intended to be superseded by the Mark 42.

21" (53.3 cm) Mark 39

Ship Class Used On	Submarines
Date Of Design	1955
Date In Service	1956
Weight	1,275 lbs. (578 kg)
Overall Length	11 ft 1 in (3.378 m)
Explosive Charge	130 lbs. (59 kg) HBX
Range / Speed	13,000 yards (11,890 m) / 15.5 knots
Power	Electric-Battery
Guidance	Wire / passive acoustic

A modification of the Mark 27 Mod 4, this was the first wire-guided torpedo to enter service in the USN. Modifications included the addition of a wire dispenser, appropriate controls and improved propulsion. The modifications were developed by ORL and Vitro Corporation. One hundred twenty torpedoes were converted by Philco and used, beginning around 1956, for fleet familiarization and evaluation, mainly in the seven SSK conversions of World War II fleet boats. In addition to the torpedo modifications, it was necessary to modify the fire control system to provide appropriate control signals and the torpedo tubes to accommodate the wire. About 3,000 were produced.

In operation the Mark 39 became a "bearing rider", that is, it was manually steered to keep it on the line of bearing from the launching submarine to the target. This form of guidance is not particularly efficient and it has other limitations among which are:

1. Only one wire guided torpedo at a time can be launched and controlled
2. During the run time of the torpedo, the maneuverability of the firing submarine is limited
3. Torpedo noise masks the acoustic signature of the target

The torpedo on the bearing line indicates the direction to the firing submarine

In spite of these limitations, the Mark 39 program clearly demonstrated the improved effectiveness of wire guidance against a maneuvering target.

19" (48.3 cm) Mark 45

Ship Class Used On	Submarines
Date Of Design	1957
Date In Service	1963
Weight	Mod 0: 2,330 lbs. (1,057 kg) Mod 1 and Mod 3: 2,213 lbs. (1,004 kg)
Overall Length	Mod 0: 225 in (5.715 m) Mod 1 and Mod 3: 227 in (5.766 m)
Explosive Charge	Mod 0: Mark 34 Nuclear warhead Mod 1 and Mod 3: Mark 102 Nuclear warhead
Range / Speed	11,000 to 15,000 yards (10,000 to 13,650 m) / 40 knots
Power	Electric-Battery, seawater
Guidance	Gyro / wire

Two solutions to the high speed, deep diving submarine problem were implemented. The first was the nuclear warhead incorporated in the Mark 45 (ASTOR). The torpedo itself was relatively conventional except for the use of a seawater activated battery to power a 160 hp electric motor. Guidance was by a gyro, depth gear and wire combination that used the attacking submarine's sonar to track the target. There was no homing capability. The warhead was detonated only by a signal sent along the wire; there was no contact or influence exploder in the torpedo. The wire guidance and command detonation were not only important in getting the torpedo to the target, they also satisfied the requirement for positive control of the nuclear warhead.

Development of the Mark 45 was completed in FY60, it was approved for service use in FY61 and production deliveries began in FY63. It was withdrawn from service in 1976 when the Mark 48 had demonstrated its capability and the advisability of using tactical nuclear weapons for ASW purposes became questionable. The basic Mark 45 torpedo was modified by Westinghouse to make a conventional torpedo for foreign military sales, the so-called Freedom torpedo. A few demonstration models were built but none were sold.

21" (53.3 cm) Mark 48 and Mark 48 ADCAP

Ship Class Used On	Submarines
Date Of Design	about 1970
Date In Service	Mark 48: 1972 Mark 48 ADCAP: 1988
Weight	Mark 48: 3,434 lbs. (1545.3 kg) Mark 48 ADCAP: 3,695 lbs. (1662.75 kg) Mark 48 Mod 6: 3,520 lbs. (1,597 kg)
Overall Length	19 ft 0 in (5.790 m)
Explosive Charge	650 lbs. (292.5 kg) PBXN-103 This is equivalent to about 1,200 lbs. (544 kg) of TNT
Range / Speed	10,000+ yards (9,000+ m) / 28+ knots (official figures; see text)
Power	Axial flow pump jet propulsor with twin contra-rotating propellers driven by an external swashplate combustion gas piston engine
Guidance	Wire guided, active and passive acoustic

The Mark 48 is designed to combat fast, deep-diving nuclear submarines and high performance surface ships. It is carried by all Navy submarines. The improved version, Mark-48 ADCAP (for ADvanced CAPabil-

ities), is carried by attack submarines and Ohio class (SSBN-726) ballistic missile submarines. The Mark 48 replaced both the Mark 37 and Mark 14 torpedoes. Mark 48 and Mark 48 ADCAP torpedoes can operate with or without wire guidance and can use active and/or passive homing. When launched they execute programmed target search, acquisition and attack procedures. Both can conduct multiple reattacks if they miss the target.

The non-nuclear approach to the high speed, deep diving submarine was a very fast, deep-diving torpedo with a high performance guidance system, that is, a much improved Mark 37 that would take full advantage of post-World War II technology. Consideration of such weapons, both submarine launched and air launched, began in November 1956 as part of the RETORC (Research Torpedo Re-Configuration) program. By 1960 a specific heavy weight torpedo project had emerged and designated first as EX 10 and later as Mark 48. After a bidder qualification exercise and competition between the qualified bidders, a project definition contract was awarded to Westinghouse. A parallel contract was awarded to Clevite for the development of an alternative acoustic system. The Westinghouse contract was subsequently extended to include the development of the turbine powered Mark 48 Mod 0 which had only an ASW capability. Some Mod 0's were produced for evaluation, but by 1967 it had been decided that an anti-surface vessel capability was also needed. Some feeling persists that this was more of a ploy to keep Clevite in the running than a significant operational requirement.

A competition between the Mark 48 Mod 1, which had emerged in rudimentary form from the Clevite contract, and Mark 48 Mod 2, a redesign of the Westinghouse Mod 0 followed. The Westinghouse torpedo used a Sunstrand turbine, as used in the Mod 0, for propulsion, while Clevite used Otto fuel in an external combustion, axial piston engine. One of several selection factors was apparently the better efficiency of the piston engine, especially when running deep, as opposed to the quieter, but less efficient turbine. The acoustic systems were also somewhat different. In 1971, after competitive evaluation, a full scale production contract was awarded to Gould¹⁵ (formerly Clevite). The first Mark 48 Mod 1 torpedoes were delivered to the fleet in 1972, twelve years after the development characteristics had been approved.

Frequently published, but unofficial, data indicate that the Mod 0 was capable of 55 knots for 35,000 yards (32,000 m) and could operate as deep as 2,500 feet (760 m), but not at maximum speed. Its acoustic homing system is reported to have an acquisition range of 4,000 yards (3,640 m), about four times that of the Mark 37. This performance is impressive and generally adequate for dealing with 30+ knot, deep-diving targets.

The combination of substantial on-board capability (HCL) to control search, homing and re-attack maneuvers and wire guidance provides a formidable weapon. The addition of two way communication (TELCOM) in the Mod 3 provided data from the torpedo sonar and actual torpedo operating data (course, speed, depth etc.) to the submarine fire control system, thus substantially enhancing performance. Mod 4 added envelope expansion features, including increased speed and deeper diving, and a fire and forget capability. Existing torpedoes were upgraded by kits and Mod 4s were production torpedoes from 1980 on. Mod 5 was an interim upgrade of existing torpedoes pending the availability of ADCAP. The Mark 48 torpedo had teething problems, but it is a very sophisticated, high performance weapon. Published photographs of the destruction of targets attest to its effectiveness. The main technical criticism of the Mark 48 seems to be that it is very noisy.

Prior to the mid-1960s, Soviet submarines had diving depths of 650 to 1000 feet (200 to 330 m) and submerged speeds under 30 knots. Early Mark 48 capabilities were clearly capable of attacking such targets. The advent of the Soviet ALPHA submarine with its non-magnetic titanium hull, 2,500 foot (760 m) diving depth and submerged speed in excess of 40 knots apparently produced a validated threat against which the Chief of Naval Operations issued a new operational requirement in 1975. Two approaches to satisfying this requirement were initiated. The first was the Mark 48 "envelope expansion program" which exploited the capabilities of the existing torpedo. The second was essentially a new torpedo, ADCAP. The major

changes in ADCAP involved entirely new digital electronics, inertial guidance (replacing the gyro system), a major reduction in volume devoted to electronics, with a corresponding major increase in fuel capacity, a strengthened shell and inclusion of the Mark 48 envelope expansion features. The Mark 48 piston engine was retained, but given a greater fuel flow rate which yielded an estimated 63 knot speed. Much of this change was made possible by the introduction of integrated circuits, including microprocessors, whose small size made it possible to move many of the functions of the control group into the nose. The guidance wire spool was moved to a position aft of the enlarged fuel tank and other layout changes were made. Authorized for full production in 1990 as the Mod 5, the last new ADCAP torpedo was delivered in 1996.

The Mark 48 Mod 6 torpedo had two significant enhancements: Guidance and control (G&C Mod) and in the torpedo propulsion unit (TPU Mod). The G&C Mod improved the acoustic receiver, replaced the guidance-and-control set with updated technology, increased memory, and improved processor throughput. The TPU Mod provided a tactically significant reduction in torpedo radiated-noise signatures, thus addressing one of the largest complaints about earlier versions. The Mod 6 reached Initial Operational Capability (IOC) in 1997. The Mod 6 was also the first torpedo that could utilize the Torpedo Downloader System (TDS). The TDS can provide rapid software updates to embarked weapons, allowing submarines to deploy with the most up-to-date software variant.

The Mark 48 ADCAP underwent a Block IV upgrade which commenced in 1999. The Navy acquired about 1,046 MODs ADCAPS (Mod 6) which replaced an equivalent number of Mod 5 ADCAPS, maintaining the total inventory of ADCAP torpedoes at 1,046.

The Mark 48 Mod 7 Common Broadband Advanced Sonar System (CBASS) torpedo is optimized for both the deep and littoral waters and has advanced counter-countermeasure capabilities. The Mark 48 ADCAP Mod 7 (CBASS) torpedo is the result of a Joint Development Program with the Royal Australian Navy and reached Initial Operational Capability in 2006.

The following description is adapted from "Jane's Background Information: Mk 48 ADCAP" (see link below):

The Mark 48 ADCAP Mod 6 (MODS) features two hardware upgrades: One for guidance and control and the other a propulsion upgrade. The guidance and control upgrade replaced the previous guidance and control unit with more modern technology, improved the acoustic receiver, added additional memory and improved processor throughput to handle the expanded software demands anticipated for near term upgrades. The torpedo propulsion upgrade improved the propulsion unit, details of which are classified. Included in the upgrade is a Common Broadband Advanced Sonar System (CBASS) program, which will develop a fully digital wideband sonar capability to enable the torpedo to operate effectively both in shallow water (<180 m) to counter diesel electric submarines operating in the littoral and deep water environments. For this the torpedo will also feature frequency agility and optimal frequency selection. This capability will allow the Mark 48 ADCAP to identify torpedo countermeasures and discriminate them from the target. Full rate production of this upgrade is scheduled to begin in FY04.

The Stealth Torpedo Enhancement Program (STEP) will be introduced in two phases. Phase 1 will build on the CBASS capability providing guidance upgrades and eliminate sonar footprints, while Phase 2 will see stealthy and higher power density propulsion improvements and an upgraded warhead.

The Mark 48 has been exported to Australia, Canada, Israel, Netherlands and Turkey (in ex-US Navy submarines).

Mark 45 Torpedo

https://en.wikipedia.org/wiki/Mark_45_torpedo

The **Mark 45 anti-submarine torpedo**, a.k.a. **ASTOR**, was a submarine-launched wire-guided nuclear torpedo designed by the United States Navy for use against high-speed, deep-diving, enemy submarines. This was one of several weapons recommended for implementation by Project Nobska, a 1956 summer study on submarine warfare.^[3] The 19-inch (480 mm)-diameter torpedo was fitted with a W34 nuclear warhead. The need to maintain direct control over the warhead meant that a wire connection had to be maintained between the torpedo and submarine until detonation. Wire guidance systems were piggybacked onto this cable, and the torpedo had no homing capability. The design was completed in 1960, and 600 torpedoes were built between 1963 and 1976, when ASTOR was replaced by the Mark 48 torpedo.

Design

This electrically propelled, 19-inch (480 mm)-diameter torpedo was 227 inches (5,800 mm) long and weighed 2,400 pounds (1,100 kg).^{[4][5]} The W34 nuclear warhead used in ASTOR had an explosive yield of 11 kilotons. The requirement for positive control of nuclear warheads meant that ASTOR could only be detonated by a deliberate signal from the firing submarine, which necessitated a wire link. Because of this, the torpedo was only fitted with wire guidance systems (transmitted over the same link), and had no homing capability. The torpedo had a range of 5 to 8 miles (8.0 to 12.9 km).^[5] By replacing the nuclear warhead and removing the wire guidance systems, the torpedo could be re-configured for unguided launch against surface targets.^[4]

History

Production of ASTOR began in 1959 and it entered service soon after. Approximately 600 torpedoes were built by 1976, when the torpedo was replaced by the Mark 48 torpedo. The ASTORs were collected, fitted with conventional warheads and wake homing guidance systems, then sold to foreign navies as the Mark 45 Mod 1 Freedom Torpedo.

Type	<u>Nuclear antisubmarine torpedo</u>
Place of origin	United States
Service history	
In service	1959–1976
Used by	United States Navy
Production history	
Designer	Applied Research Laboratory, <u>University of Washington</u> <u>Westinghouse Electric</u>
Designed	1957 ^[1]
Manufacturer	<u>Westinghouse Electric</u>
Produced	1959 ^[1]
No. built	600
Variants	Mark 45 Mod 1 Mark 45 Mod 2
Specifications	
Mass	2,400 pounds (1,100 kg)
Length	227 inches (580 cm)
Diameter	19 inches (48 cm)
Warhead	<u>W34 nuclear warhead</u>
Blast yield	11 <u>kilotons</u>
Engine	<u>Electric</u> ^[1]
Operational range	5–8 miles (8–13 km)
Maximum speed	40 knots
Guidance system	<u>Gyroscope and wire</u>
Launch platform	<u>Submarines</u>

UUM-44 SUBROC

https://en.wikipedia.org/wiki/UUM-44_SUBROC

The **UUM-44 SUBROC** (SUBmarine ROcket) was a type of submarine-launched rocket deployed by the United States Navy as an anti-submarine weapon. It carried a 250 kiloton thermonuclear warhead configured as a nuclear depth bomb.

Development

SUBROC was one of several weapons recommended for implementation by Project Nobska, a 1956 summer study on submarine warfare. Development began in 1958, with the technical evaluation being completed in 1963. SUBROC reached Initial Operation Capability (IOC) aboard the attack submarine Permit in 1964. When SUBROC reached IOC, the US Navy's admiral in charge of weapons procurement stated that SUBROC was "...a more difficult technical problem than Polaris."

Operation

SUBROC could be launched from a 21-inch submarine torpedo tube. After launch, the solid fuel rocket motor fired and SUBROC rose to the surface. The launch angle then changed and SUBROC flew to its destination following a predetermined ballistic trajectory. At a predetermined time in the trajectory, the reentry vehicle (containing the warhead) separated from the solid fuel motor. The 250 kiloton W55 nuclear depth bomb, dropped into the water and sank rapidly to detonate near its target. A direct hit was not necessary.

The W55 was 35 centimetres (14 in) in diameter, 1 metre (39 in) long, and weighed 213 kilograms (470 lb). Some sources suggest the W55 evolved from the experimental bomb tested in the Hardtack I Olive nuclear test on July 22, 1958, which had a full two-stage yield estimated at 202 kilotons. Researcher Chuck Hansen claims based on his US nuclear program research that the W55 and W58 warheads shared a common primary or fission first stage, and that this design was nicknamed the Kinglet primary by Hansen in 2001.

SUBROC's tactical use was as an urgent-attack long-range weapon for time-urgent submarine targets that could not be attacked with any other weapon without betraying the position of the launching submarine by calling for an air-strike, or where the target was too distant to be attacked quickly with a torpedo launched from the submarine. The tactical rationale for SUBROC was similar to that for ASROC or Ikara. An added advantage was that SUBROC's approach to the target was not detectable by the target in time to take evasive action, although the warhead yield would appear to make evasive maneuvers unrealistic. However, SUBROC was less flexible in its use than Ikara or ASROC: since its only payload was a nuclear warhead, it could not be used to provide stand-off fire in a conventional (i.e., non-nuclear) engagement.

SUBROC production ended in 1968. SUBROC was never used in combat, and all 285 W55 warheads were decommissioned in 1990 following the end of the Cold War. Because the nuclear warhead was an integral part of the weapon, SUBROC could not be exported to other navies, and there is no evidence that any were supplied to other NATO allies under the well-established arrangements for supplying other dual-key nuclear weapons. In 1980 a planned successor, the UUM-125 Sea Lance, was authorized. In 1982 the contract was awarded to Boeing. The system and its W89 warhead were cancelled in 1990 at the end of the Cold War.

Type	Standoff <u>anti-submarine weapon</u>
Place of origin	<u>United States</u>
Service history	
In service	1964–1989
Used by	<u>United States Navy</u>
Production history	
Manufacturer	<u>Goodyear Aerospace</u>
Specifications	
Mass	4,000 lb (1,800 kg)
Length	22 ft (6.7 m)
Diameter	21 in (53 cm)
Warhead	250 kt W55 <u>nuclear depth bomb</u>
Detonation mechanism	Depth Fuze
Engine	Solid rocket booster
Operational range	55 km (34 mi)
Maximum speed	subsonic
Guidance system	<u>Inertial guidance</u> ballistic trajectory
Launch platform	Submarine

Otto fuel II

https://en.wikipedia.org/wiki/Otto_fuel_II

Otto fuel II is a monopropellant used to drive torpedoes and other weapon systems. Otto fuel II was developed by the US Navy in the 1960s for use as fuel in torpedoes. Otto fuel II was invented by Otto Reitlinger in 1963 (although tests with the substance had taken place before, for example in 1960); it is named after Reitlinger and for being the second iteration of the fuel (sometimes it is known simply as **Otto fuel**). The first torpedo to use it was the Mark 48 torpedo in the 1960s.

Properties

Otto fuel II is a distinct-smelling (described by submariners as being similar in smell to wintergreen oil; i.e. sweet, fruity and minty), reddish-orange, oily liquid that is a mixture of three synthetic substances: propylene glycol dinitrate (the major component), 2-nitrodiphenylamine, and dibutyl sebacate. It does not need exposure to any oxidant to ignite and release energy, as its three components will react among themselves whenever vaporised and heated. Needing no oxidants and being a stable substance makes Otto fuel II ideal for use in the constrained environment of a submarine. Although the fuel can be made to explode, this requires such extreme conditions that it can be regarded as practically stable. The vapour pressure of the fuel is low (i.e., it is not volatile), minimizing toxic hazards. Finally, the fuel's energy density far surpasses the capacity of the electric battery used in other torpedoes, maximizing range.

Major ingredients

Named after its inventor, Otto Reitlinger, Otto fuel II consists of the nitrated ester explosive propellant propylene glycol dinitrate (PGDN), to which a desensitizer (dibutyl sebacate) and a stabilizer (2-nitrodiphenylamine) have been added. The chief component, propylene glycol dinitrate, accounts for approximately 76% of the mixture, while dibutyl sebacate and 2-nitrodiphenylamine account for approximately 22.5% and 1.5% (by weight), respectively.

The principal current use of propylene glycol dinitrate is as a propellant in Otto fuel II. Nitrates of polyhydric alcohols such as this have been used in medicine for the treatment of angina pectoris, and as explosives since the mid-nineteenth century.

In addition to its use by the United States Navy as a stabilizer in the manufacture of Otto fuel II, 2-nitrodiphenylamine is employed for similar purposes by the United States Army in the manufacture of double base solid propellants. It also has civilian applications as a solvent dye.

Dibutyl sebacate is a desensitizer in Otto fuel II. However, its major use is as a plasticizer in production of plastics, namely cellulose acetate butyrate, cellulose acetate propionate, polyvinyl butyral, polystyrene, and many synthetic rubbers. It can be used for plastics in use in the food packaging industry. It is also used as a lubricating ingredient in shaving lotions, and a flavoring additive in non-alcoholic beverages, ice cream, ices, candy, and baked goods.

Toxicity

Otto fuel II is a toxic substance found in EPA National Priorities List. Ingestion of contaminated food or direct exposure at worksites can cause headaches, poor eye–hand coordination, eye irritation, congested noses, nausea, dizziness, and difficulty breathing. An MSA Demand Mask is mandatory for cleanup/mitigation efforts.



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