



DR. CHRISTIAN J. LAMBERTSEN

AQUATIC PIONEER

Dr. Christian J. Lambertsen was a pioneer in underwater operations. While a student at the University of Pennsylvania, he developed a closed-circuit underwater rebreather. A true innovation, it allowed the swimmer to remain underwater for longer periods and prevented detectable bubbles from escaping to the surface.

In 1942, Lambertsen demonstrated the system to representatives of the wartime Office of Strategic Services (OSS), who recognized its combat potential. After graduating in early 1944, Lambertsen was commissioned in the U.S. Army Medical Corps. Once in uniform, he was assigned to the OSS Maritime Unit, where he instructed swimmers in the use of his system, dubbed the Lambertsen Rebreathing Unit (LARU).

After the war, he coined the term Self-Contained Underwater Breathing Apparatus (SCUBA), and worked with the U.S. Army, Navy, Coast Guard, and non-military agencies such as the National Oceanic and Atmospheric Administration

(NOAA) and the National Aeronautics and Space Administration (NASA). His innovations have helped shape U.S. Army underwater operations to this day.

Dr. Lambertsen was a staunch preserver of the history of the OSS MU. This page features materials graciously donated by his family to help foster an understanding of the legacy of Dr. Lambertsen.

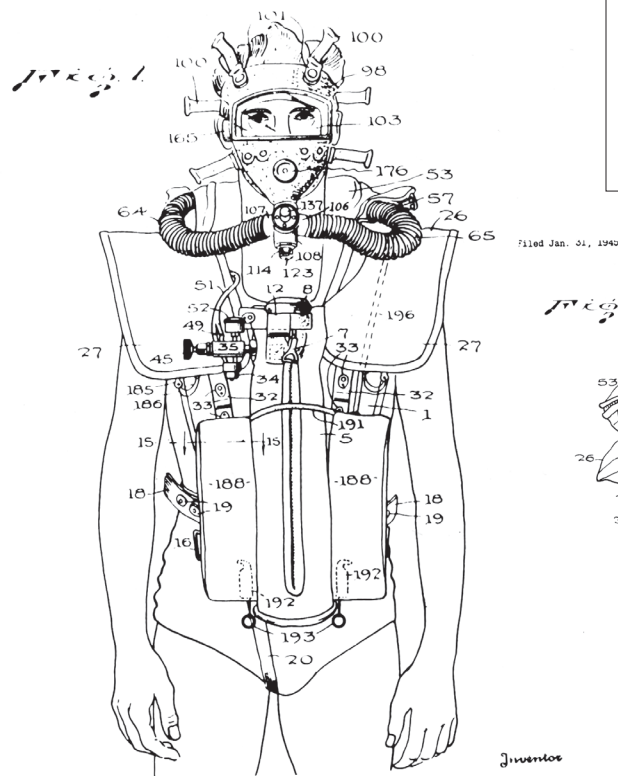


MAJ Christian J. Lambertsen with Special Forces Tab and Combat Diver Badge, 1996.

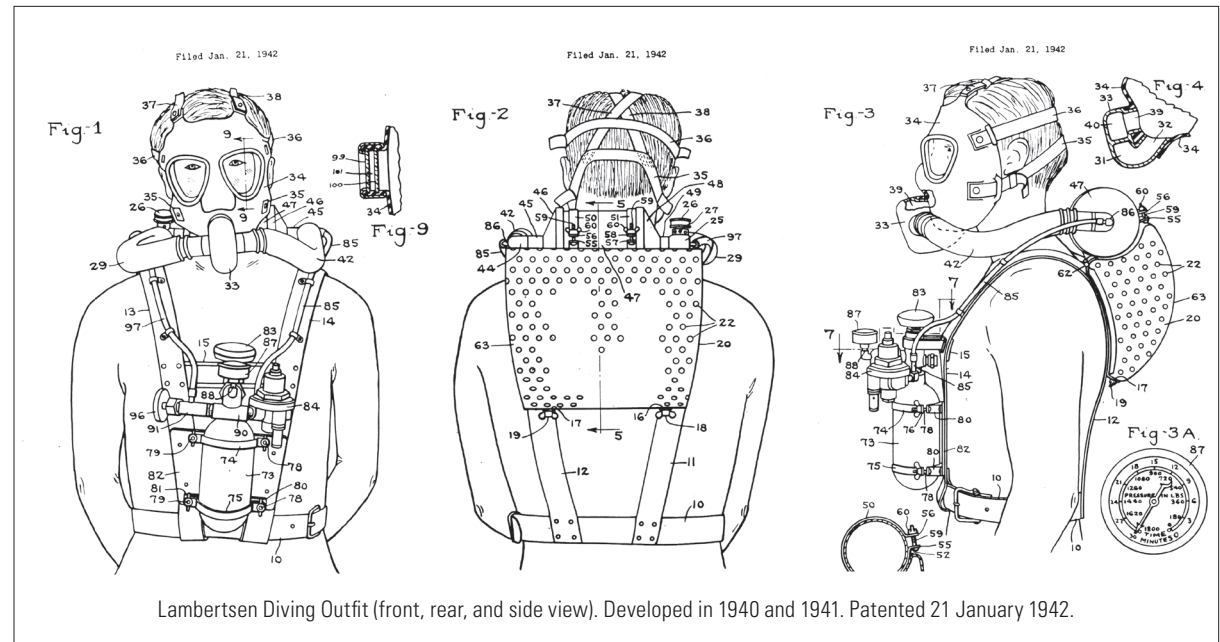
DESIGN

Christian J. Lambertsen is considered the “father” of combat underwater swimmers. He designed a prototype rebreather before the U.S. entered World War II. A student of respiratory physiology at the University of Pennsylvania, he became interested in the effects of gasses on the human body. Experiments brought him to the realization that if carbon dioxide could be scrubbed from a contained circulatory gas system, a person could remain underwater for a much longer time.

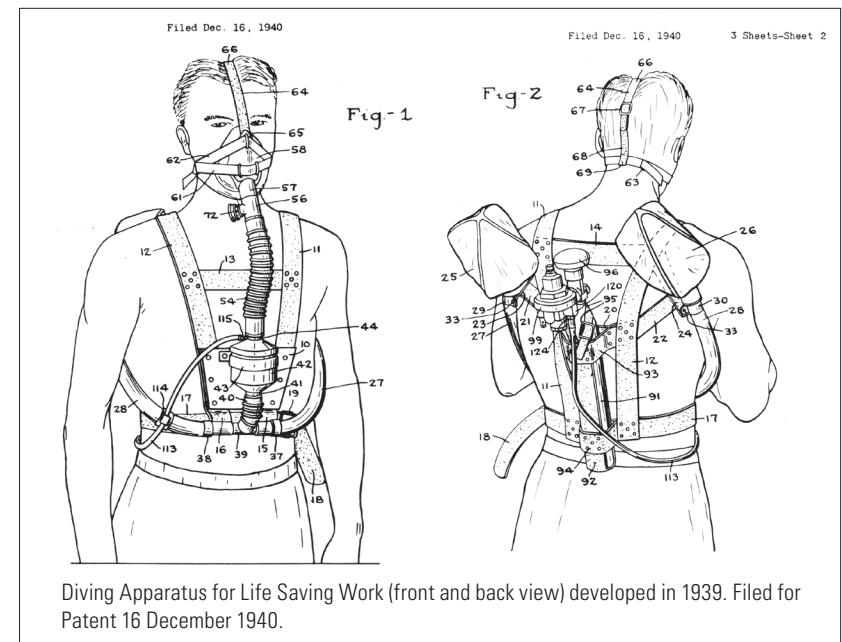
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OSS Developed LARU Model 10 (front and side view). Developed throughout 1943 and 1944. Patented 31 January 1945.



Lambertsen Diving Outfit (front, rear, and side view). Developed in 1940 and 1941. Patented 21 January 1942.



Diving Apparatus for Life Saving Work (front and back view) developed in 1939. Filed for Patent 16 December 1940.

Initially, he worked with the Ohio Chemical Company to develop an underwater rebreather, publishing a paper in 1941 in The Journal of the American Medical Association on the system's use for saving lives. That same year, he demonstrated this system, later named the Lambertsen Amphibious Respiratory Unit (LARU), to the U.S. Navy Experimental Diving Unit. Although impressed, the Navy did not see utility in salvage operations.

In 1942, Lambertsen demonstrated an improved version of the LARU to the Office of Strategic Services (OSS) and British Special Operations Executive (SOE), both of which understood the application of the system to underwater warfare. The OSS unofficially employed Lambertsen while he was a student and worked with him to refine the system.



❶ OSS Developed LARU Mark II. Silver Springs, FL. Sept., 1943.

❷ Diver displaying mouth piece of LARU Mark II.

❸ Lt. Fred Wadley wearing LARU Model 10 (LARU)(out-of-water)-late 1944. Extended swim fins, depth gauge, waterproof watch, m3 Trench Knife, Double-gimbaled Compass Bracket (Army Engineer Compass), OD Longjohns, Speaking Diaphragm.



- ❶ Lt. Fred Wadley wearing LARU Model 10 (LARU)(out-of-water) late 1944. Extended swim fins, depth gauge, waterproof watch, m3 Trench Knife, Double-gimbaled Compass Bracket (Army Engineer Compass), OD Longjohns, Speaking Diaphragm.
- ❷ Front view, LARU Model 10.
- ❸ Side view, LARU Model 10.
- ❹ LARU Mark III, left side. Late Spring 1944.
- ❺ LARU Mark II, behind.



TESTING

Upon graduating with a Doctorate of Medicine in 1943, Lambertsen commissioned into the U.S. Army Medical Corps, and was detailed to the OSS Maritime Unit (MU). Lambertsen continued to develop the LARU, coming up with several variations during the war. In addition, he personally trained two MU swimming groups on the use of the LARU, while at the same time writing and refining the program of instruction.

❶ Swimmer John Booth, USCG, Lt. Jg. Pool 1947. Photo for USN Diving Manual.

❷ Lt. John Booth wearing LARU, showing Lambertsen technique. Self-Contained Breathing Apparatus from which U.S. Self-Contained Diving Evolved. Silver Springs, FL. 1947.

❸ Sleeping Beauty and its pilot making the first successful rendezvous and docking with a submerged and underway submarine. (CL in last moment of landing on underway USS Quillback foredeck St. Thomas, Virgin Islands, Oct. 1948).

❹ Sleeping Beauty approaching landing on USS Quillback, 1948.

❺ Diver exits Sleeping Beauty at bottom.



He also developed additional underwater equipment, including a device that allowed swimmers to communicate with each other at ranges of up to a hundred yards, a compass, and a neutral buoyancy container to help swimmers tow demolitions. This equipment, as well as pushing boundaries for the employment of the LARU through aggressive training, opened new possibilities for the employment of combat divers.

In late 1944, Captain Lambertsen deployed to Burma with a MU swimming group that conducted amphibious reconnaissance missions for the British XV Indian Corps as it secured the Arakan Coast prior to liberating Rangoon from the Japanese. Although they found that the LARU was not suitable in the murky waters of coastal Burma, the MU successfully worked in conjunction with an OSS Operational Group to help secure the coast.



❶ Lambertsen-designed neutral-boyancy container.

❷ GM2C Norm Wicker, USN, and GM2C John Spence, USN on prototype of the silent electric surfboard wearing LARU MK II. Silver Springs, 1943.

❸ Two Sleeping Beauties on the cradles, Feb/March 1945, Galle, Ceylon

❹ Back View of LARU on dock in Cleveland, Ohio

❺ Lambertsen climbing up onto dock after a test of an early rebreather.

❻ Lt. Chris Lambertsen, U.S. Army, MC, Lt. Fred Wadley, U.S. Army, MAJ Al Lichtman, USMC, and Lt. Dennis Roberts, Chief, Maritime Unit, standing in the Norman Scott Natatorium by the pool at Annapolis, Oct/Nov. 1944







DEPLOYMENT

After the war, Major Lambertsen remained in the Army Reserves. He served on national-level underwater warfare boards and continued to train the Coast Guard, Navy, and Army in the use of the LARU and helped them develop underwater search and rescue and warfare techniques.

Additionally, he was the founder and director of the University of Pennsylvania Institute for Environmental Medicine where he continued to develop equipment that would assist underwater warfare.

His research into the effects of gasses on the human body pushed human limits in both deep water and space. Dr. Lambertsen is the namesake for the United States Special Operations Command's Dr. Christian J. Lambertsen Award for Operational Innovation. In 2022, he was posthumously awarded the Special Forces tab for his OSS service.

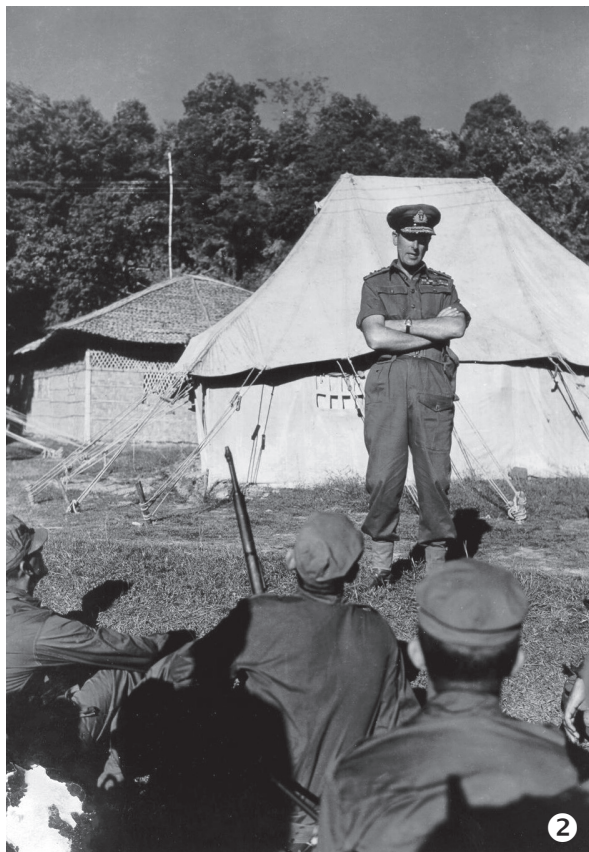


❶ On board USS Burrfish before Gagil Tomil Island Mission, 18 August 1944. Recon Team during pre-mission dinner. (L to R) William E. Moore, Warren R. Christensen, ??, John C. MacMahon (KIA), and Leonard L. Barnhill.

❷ On board USS Burrfish before Gagil Tomil Island Mission, 18 August 1944. Recon Team during pre-mission dinner. (L to R) John E. Ball, John C. MacMahon (KIA), Robert A. Black, Jr. (KIA), Emmet L. Carpenter, Howard 'Red' Carpenter.

- ❶ Underwater Demolition Team beach landing
- ❷ OSS Detachment 404 AFU 06 on inspection
- ❸ S-48, 'ghost fleet' used to test underwater techniques post-WWII
- ❹ Landing ships offload at Ramree Island, 1945.





❶ MU craft P-101 at high speed.

❷ Lord Louis Montbatten Cmdr-in-chief, South East Asia Command, Arrives for Inspection of Detachment 404, Teknoff, India.

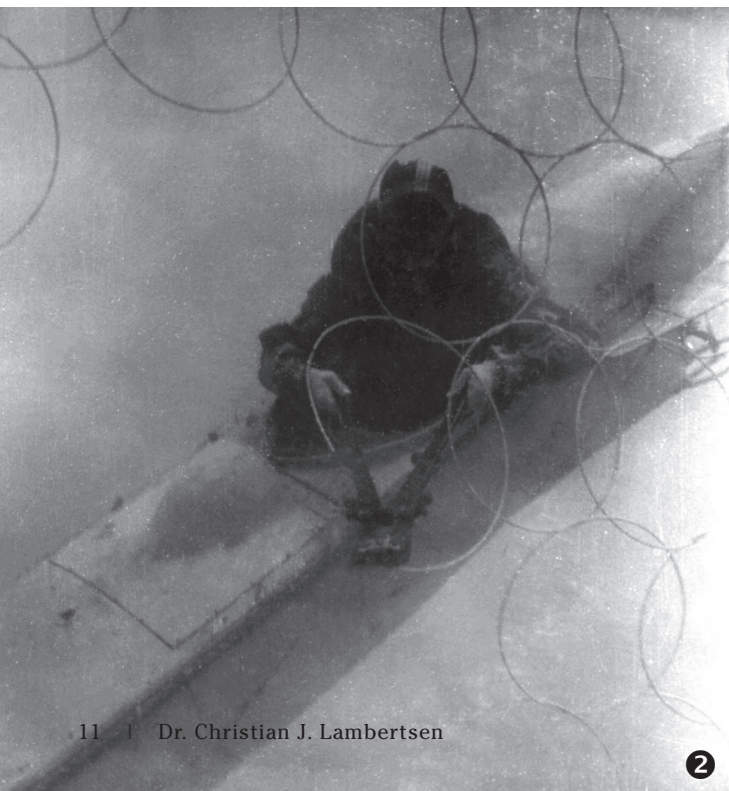
❸ Lord Louis Montbatten visiting Arakan Field Unit of Detachment 404 Office of Strategic Services. Teknoff, India. December 1944.

❹ Two Maritime Unit personnel in kayaks participating in Operation BOSTON.

❺ OSS Operational Group/Maritime Unit Officer Group. Kyaukpyu, Ramree Island, Burma early 1945. Seated: Lt. O'Jibway, Capt. Sam Regan, Capt. George Bright, Major Lloyd Peddicord, (C.O.), Standing: Capt. Chris Lambertsen (MC), Lt. Hugh McDewitt, ??, Lt. John Archbold (USNR), Cmdr. Dereck Lee, Lt. Jogn Babb (USN), ??, Capt. Trois Johnson (MC).



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- 1 Sleeping Beauty through torpede net.
- 2 Close up of cutting anti-submarine net.
- 3 Tweedy at bottom of anti-submarine net.
- 4 OSS OG/MU team receiving a briefing for a mission of the Arakan Coast of Burma.
- 5 SGTs Johnson and McCarron of the Aerial Delivery Equipment Division, US Army Natick Laboratories, checks the oxygen and harness of the HALO (High Altitude Low Opening) parachute assembly. The assembly consists of three major components: the main parachute assembly, the harness assembly, the reserve assembly. The parachute incorporates a 2-stage, free fall parachute system, using a small stabilization parachute for the first stage, which permits the jumper to fall at three-quarters the free fall terminal velocity of the human body, while keeping him in an upright position. The second stage or man-recovery parachute is activated at a predetermined altitude by a pressure-sensing device, 1964.

