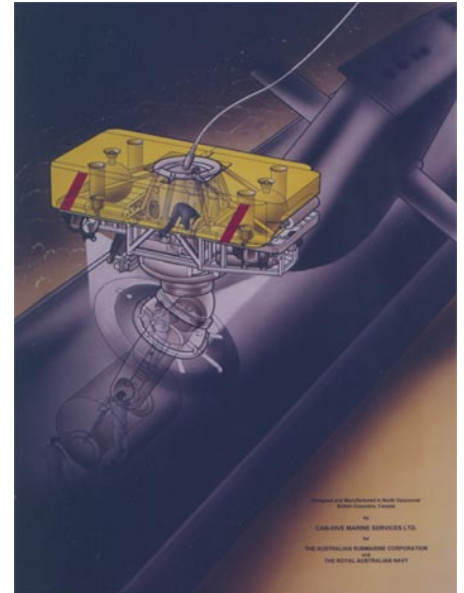




Personal Pressure Suit

The 'Remora' is a rescue/intervention system based on a concept patented by Dr. Phil Nuytten. The prototype was built by Can-Dive Marine Services Ltd., Hard Suits International Inc. and International Submarine Engineering Ltd. for the Australian Submarine Corporation and the Royal Australian Navy. 'Remora' completed sea trials, including mate-up in deep water and was delivered in 1996.

Following the specific work on the Remora (or more properly, the 'Articulating Pressure Conduit'), Nuytten spent considerable time reviewing the history of submarine sinkings, crew rescue, crew escape, current worldwide assistance capabilities, and depth capabilities. He concluded that the Remora/Deep Submergence Rescue Vehicle (DSRV) style of outside intervention and rescue was not optimal, and the self-rescue was the only reasonable approach, for a number of reasons. After in-house study, Nuytco Research entered into a formal contract with Canada's Department of National Defense (DND) and the Defense and Civil Institute of Environmental Medicine (DCIEM) for the purpose of determining the feasibility of a one-atmosphere self-rescue system.



This system is known as the '**Personnel Pressure Suit**' (PPS) and comprises an escape suit that can be tolerate to full outside pressure to the collapse depth of the submarine, as well as full internal pressure in the even that unit must be used to escape from an already-pressurized, disabled submarine (DISSUB). The study was successfully completed in 2000. Subsequently, an external/internal pressure joint was developed as well as an ultra-light-weight, small volume PPS hull. The Exosuit torso was used for preliminary evaluation, but the final individual package could be as small as a sixteen by twenty-four inch cylinder.

The concept is an order of magnitude less expensive than intervention-style rescue systems and would give small submarine groups the same rescue capabilities as the larger military powers. There is no situation where the availability of an individual self-rescue system would preclude outside rescue or intervention if circumstances favour that method and the physical assets are available. The capital costs of equipping a 50 person crew with **PPS** systems is far less than even the proportioned cost of maintaining a DSRV or Remora-style capability. Virtually all DISSUBs begin to take on internal pressure as a consequence of being disabled. As a result, crew are at risk of some degree of tissue saturation.

By moving the base of rescue from the surface to the DISSUB itself, the difficulty and time-consuming operations of locating the DISSUB and placing the rescue assets in secure position above it are eliminated. Since the rescue vessel is not required to carry DSRV style hardware nor the associated handling system, it becomes a means of recovering and transporting crew of the DISSUB and virtually any vessel of opportunity will serve. A most effective combination is the use of the **PPS** (in articulated or capsule form) to provide for DISSUB escape and internal/external pressure protection and the subsequent recovery of surfaced crew by means of large, long-range amphibious aircraft such as the U.S. Navy's Lockheed Martin C-130 on floats or the Russian Anatonov Series.

Interested parties are encouraged to contact Nuytco if they wish to receive more detailed information. Please note that signing a non-disclosure agreement is a requirement.

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