

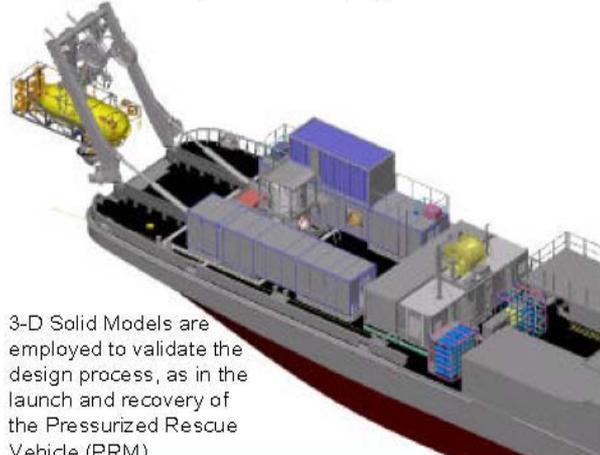
Submarine Rescue Diving & Recompression System (SRDRS)

The world hopes that a Disabled Submarine (DISSUB) message is never received, but if one is, the US Navy will be ready with a rapidly deployed, worldwide-capable system, the Submarine Rescue Diving and Recompression System (SRDRS). This next generation system is being developed through a team-effort with Oceaneering International, Inc. (OII) providing the engineering experience and know-how to get the job done right the first time. OII's engineering team is comprised of expert engineers and designers with hyperbaric chamber, Remotely Operated Vehicle (ROV), launch and recovery, and at-sea experience who know what it takes to successfully accomplish SRDRS' mission.



An artist's concept of SRDRS rescuing submariners from a DISSUB was the genesis for the program.

The SRDRS will replace the current rescue system in 2005. The SRDRS is transportable by road, air, and sea and is not dependent upon dedicated platforms like the present rescue system. This advantage allows the SRDRS to use any Vessel Of Opportunity (VOO) that meets loading/stability requirements. This provides a potential worldwide fleet of over 2000 VOOs as opposed to the eight mother subs and two specialty ships that support the present system.



3-D Solid Models are employed to validate the design process, as in the launch and recovery of the Pressurized Rescue Vehicle (PRM).

OII has designed SRDRS equipment to meet Sea State 5 conditions by making use of engineering tools such as *SLATE* for Systems Engineering, *SolidWorks* (3-D Modeling) for Mechanical Engineers and Designers, *ANSYS* and *COSMOS* for finite element analysis, and *ORCAD* for Electrical Engineers. Additional tools (e.g., *MathCad* and *Working Model*) are available from OII's vast library of engineering resources. These tools have accelerated design and production schedules, allowing us to go from concept to production with "right the first time" designs.



An example of this capability is the Auxiliary Van (AV), a specially designed van that provides the SRDRS with a Breathing Air/Pressurization System, Environmental Control Subsystem, Electric Power System, Command and Control System, Auxiliary Systems, Structures and Mechanisms, and Freshwater Pressurization System. The design was developed with solid modeling and FEA tools (*SolidWorks* and *ANYSYS*) prior to production.

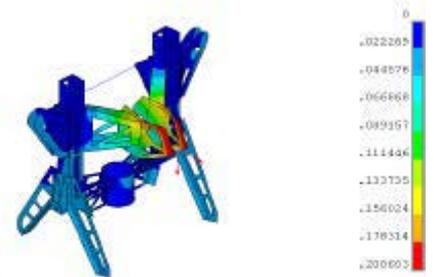
Oceaneering not only designs elements of the SRDRS, but is also tasked by the Navy to provide technical oversight on elements designed by other companies. In this engineering role, OII ensures the Navy will receive equipment that performs as required by the specifications. OII is responsible for ensuring that the Configuration Baseline (CBL) is 100% accurate, critical for a program that is supported by multiple Navy Program offices and multiple worldwide contractors. This is accomplished by use of a secure SRDRS website that provides the CBL in real-time.

OII engineering capabilities and expertise in submarine rescue is further enhanced by the worldwide OII presence and expertise in designing, building, and operating over 125 remotely operated vehicles (ROVs). This worldwide presence and vast experience with designing, building, and operating ROVs and search and recovery operations is the foundation for our SRDRS Program. Our engineering team is experienced in the real-world applications of at-sea operations.

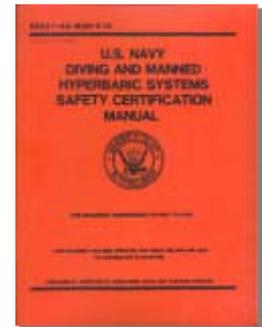
OII's extensive US Navy Scope of Certification (SOC) background is an asset for development of the SRDRS. The Deck Transfer Lock (DTL) design is more than 40% SOC. Bringing these specialized SOC requirements and equipment together using our Systems Integration and Verification expertise enables OII to deliver systems, products, and services with commercial and military applications.

The following table provides an overview of the Submarine Rescue System.

Submarine Decompression System (SDS)	Pressurized Rescue Module System (PRMS)
Submarine Decompression Chambers(2)	Pressurized Rescue Module System (2)
Deck Transfer Lock	Control Van
Auxiliary Van	Umbilical Winch
Generator Van	Launch and Recovery System
Spares Van	Deck Cradle
Pressurized Flexible Manways	PRMS Gas Rack
Modified Transfer Locks and Bases	Simulator
SDS Gas Rack	PRMS Auxiliary Equipment
SDS Auxiliary Equipment	



ANSYS Model of Launch & Recovery System used to ensure system design safety



THE SRS has hundreds of SOC items per US Navy Requirements