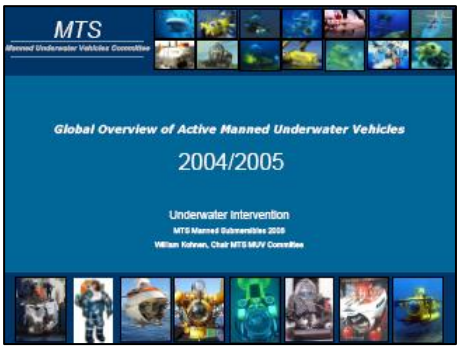
Note: *MTS MUV 2006 Proceedings include a copy of the PowerPoint presentations and associated papers as described below. Listings without the cover page logo do not have any material available for the proceedings.*

SESSION A1 – Manned Submersibles Overview
(Tuesday Jan. 24, 10:00AM - 11:30AM)

1. Global Overview of Manned Submersible Activity in 2005

By: William Kohnen
MTS Manned Underwater Vehicle Committee
Claremont, CA USA
Email: will.kohnen@seamagine.com



An introductory presentation summarizing the activity of manned submersible vehicles during 2005. These include submersibles in research, tourism and commercial applications. The data was compiled as part of an effort to generate the MTS MUV database and information was gathered by industry members, owners, operators and manufacturers. The paper offers a global sense of manned submersible activity around the world.

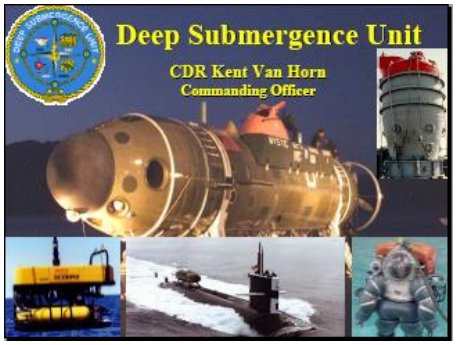
2. NOAA Office of Ocean Exploration Use of Manned Submersibles in Current Year

By: John McDonough/Justin Manley
NOAA Ocean Exploration Office
Silversprings, MD USA
Email: john.mcdonough@noaa.gov

A Review of NOAA's Office of Ocean Exploration Activity in 2004 - 2005 using manned submersibles. Deep submergence expeditions using ALVIN for the Gulf of Alaska Seamount Expedition, Johnson Sea Link for multiple Expeditions from Florida to North Carolina, and PISCES IV & V for Deep Sea Precious Corals observation in the Hawaiian Archipelago.

3. US Navy Deep Submergence Unit Operational Overview for 2005

By: CDR Kent Van Horn, Commanding Officer
US Navy, Deep Submergence Unit
San Diego, California USA
Email: kent.vanhorn@navy.mil

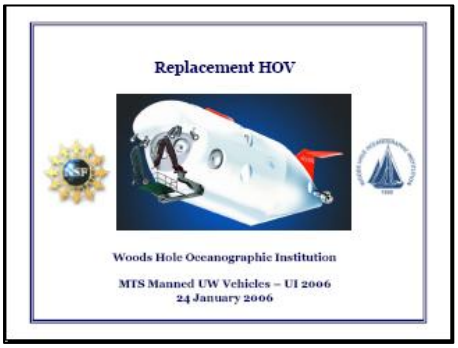


The presentation offers a review of past, current and future activity at the Navy's Deep Submergence Facility in California. Status of DSRV, Rescue Exercises, future trends and the impact of manned submergence technologies to respond to the new demands of Naval capabilities across the globe.

SESSION A2 – Deep Submergence Operations
(Tuesday Jan. 24, 1:30PM - 3:00PM)

4. The US National Deep Submergence Facility Replacement HOV

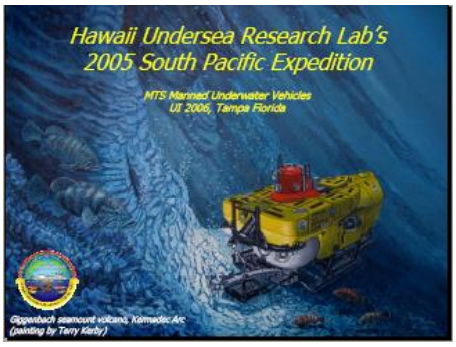
By: Robert Brown
Woods Hole Oceanographic Institution
Woods Hole, MA 02543
Email: rbrown@whoi.edu



The National Deep Submergence Facility, with funding from the National Science Foundation has begun the design process for a replacement HOV for the ALVIN. The new vehicle will dive deeper (6500 meters), have improved observer and pilot viewing, a larger interior volume with improved ergonomics, greater battery capacity and improved endurance, and less reliance on disposable weights and hazardous materials. The presentation will discuss the status of the design and construction of this vehicle.

5. Hawaii Undersea Research Lab, Deep Sea Expeditions in Pacific Rim.

By: John R. Smith, Acting Science Director
Hawaii Undersea Research Laboratory
Email: jrsmith@hawaii.edu
Colin Wollerman, Lead Technician & Pilot in Training
Hawaii Undersea Research Laboratory
Email: wollerma@hawaii.edu
University of Hawaii
Honolulu, HI USA



The Pisces IV and V 2000-meter manned submersibles, an RCV-150 1000-meter ROV, and multibeam equipped former seismic support ship were acquired, adapted, and upgraded to carry out cutting edge scientific missions. These studies range from active submarine volcanoes, delicate precious coral gardens, endangered marine mammal and fisheries management, to engineering surveys and deployment of observatory systems.

6. Cancelled

SESSION A3 – Deep Submergence Operations
(Tuesday Jan. 24, 3:30PM - 5:00PM)

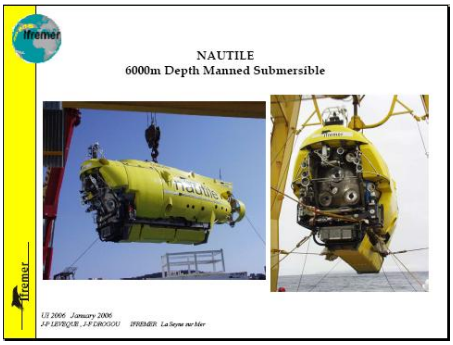
7. Operation of the Manned Deep Submergence Vehicle Shinkai 6500

By: Tetsuya Komuku
Research Support Department
Marine Technology Center, JAMSTEC, Japan
Email: komukut@jamstec.go.jp

Development of the manned deep submersible Shinkai 6500 was completed in November, 1989. Her dive started from June, 1990 in Japan, Micronesia, Polynesia, Melanesia, Mid-Atlantic Ridge, East Pacific Rise and Indian Ocean. In October 2005, the total number of dives reached 907 dives. The paper will present a short history of the Shinkai 6500.

8. Operational Overview of the NAUTILE Deep Submergence Vehicle at IFREMER since 2001

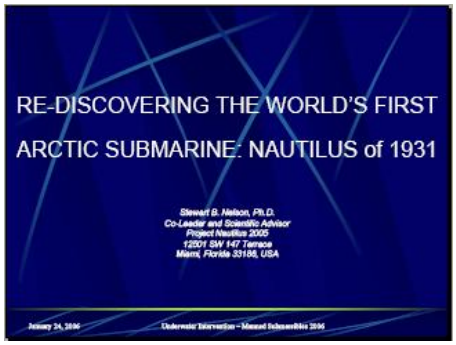
By: Jean Pierre Leveque
IFREMER, Deep Submergence Dept.
La Seyne sur Mer, FRANCE
Email: jplev@ifremer.fr



The NAUTILE submersible is France's national deep submergence vehicle, operated by IFREMER. Overhauled in 2002, the submersible is rated to a maximum depth of 6000 m. The presentation offers a review of operational activities of the NAUTILE during the period 2001 to 2005.

9. Re-Discovering The World's First Arctic Submarine: Nautilus of 1931

By: Stewart B. Nelson, Ph.D.
Scientific Advisor, Project Nautilus 2005
Miami, Florida USA
Email: stewnelson@bellsouth.net



Many considered it foolhardy, others a publicity stunt, but Australian adventurer Sir Hubert Wilkins was determined to be the first to use a submarine to cross the Arctic Ocean by way of the North Pole. The vintage World War I submarine 0-12 was leased and extensively modified for under-ice operation. Christened the Nautilus, it eventually reached the icepack but its deteriorating condition of the submarine (sabotage by some crew members was suspected) forced a return to Bergen, Norway and there the submarine was scuttled in the fjord in 1,138 feet (347 meters) of water in November 1931. In October 2005, the manned submersible JAGO was used to re-discover and document the largely forgotten Nautilus. The Wilkins-Ellsworth Trans Arctic Submarine Expedition of 1931 is worthy of being remembered.

SESSION A4 – Manned Submersibles Operation
(Wednesday Jan. 25, 8:00AM – 9:30AM)

10. Deployment of the U.S. Navy ADS2000 in support of NATO's Submarine Rescue Exercise Sorbet Royal 20052005

By: Tom Bissett, Oceanworks International
Vancouver, BC Canada
Email: TBissett@oceanworks.cc
LCDR Keith Lehnhard, US Navy Deep Submergence Unit
San Diego, California USA
Email: Keith.Lehnhardt@navy.mil

A review of the Submarine rescue Exercise conference held in Italy in 2005. The paper offers a joint presentation with the US Navy Deep Submergence Unit on the operation and deployment of the ADS2000 dive suits, specifically designed for assistance on deep submergence rescue activity.

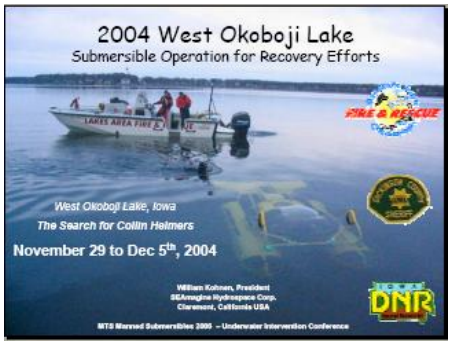
11. Recent Operations with Deepworker 2000 and Dual Deepworker Submersibles

By: Phil Nuytten
Nuytco Research Ltd.Co.
North Vancouver, BC Canada
Email: nrl@direct.ca

DeepWorker 2000 is a single person, 2000 ft rated submersible. The Dual Deepworker is a two-person model rated to the same depth. The paper presents various applications and operations of these manned submersibles in commercial, scientific and military applications during the past season.

12. SEAmobile Submersible Search & Recovery Operations in Cold Water Conditions

By: William Kohnen
SEAmagine Hydrospace Corporation
Claremont, CA USA
Email: will.kohnen@seamagine.com

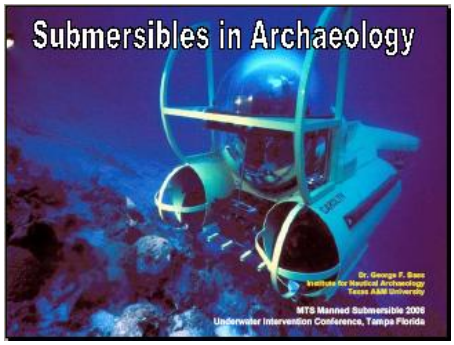


A review of a 5 day search expedition for a drowning victim in Lake Okoboji, in Northern Iowa in early winter. The paper gives an overview of traditional SAR operation deployed by local law enforcement agencies and comparative search effectiveness in terms of coverage and logistics provided by a manned submersible expedition.

SESSION A5 – Manned Submersibles Operation
(Wednesday Jan. 25, 10:00AM –11:30AM)

13. CAROLYN: A Submersible for Nautical Archaeological

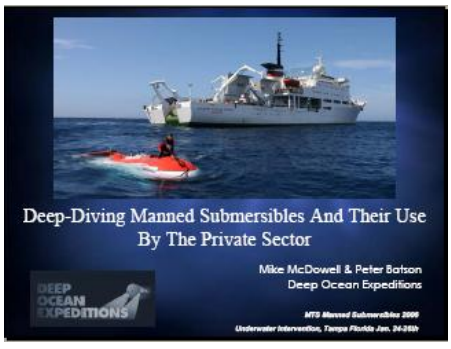
By: Dr. George F. Bass,
Institute of Nautical Archaeology
Texas A&M University
Bodrum, Turkey
Email: gfbass@neo.tamu.edu



The Institute of Nautical Archaeology uses the SEAmobile Carolyn with great success in surveys to locate ancient shipwrecks off the Turkish coast, and for invaluable public relations by allowing non-diving visitors to see underwater archaeological excavations in progress.

14. Manned Submersible-based research and the private sector

By: Michael McDowell, Peter Batson & Carlos De Paco
DeepOcean Quest
San Jose, Costa Rica
Email: peter@deepoceanexpeditions.com



In 2006 DeepOcean Quest will commence operations. It is a privately owned company comprising a modern research ship and two 1,000-meter-rated Deep Rover submersibles equipped for science and filmmaking. DeepOcean Quest will present an overview of its work in 2005 as part of its plan to embrace a new model for conducting deep-sea science.

15. Deep Submergence Pilot Training for TRIUMPH Class Submersibles

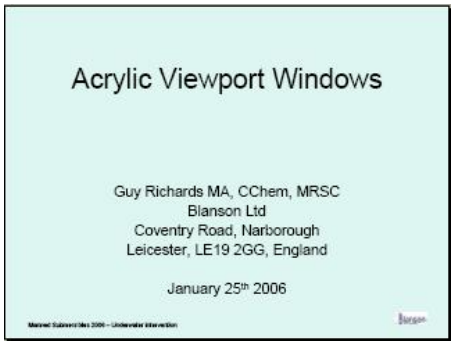
By: Charles Kohnen
SEAmagine Hydrospace Corporation
Claremont, CA USA
Email: charles.kohnen@seamagine.com

A review of SEAmagine's recent completed pilot training program in Costa Rica, certifying a crew of five pilots for the operation of its 455 meters rated deep submersible. Designed to seat a pilot plus two observers, the submersible has logged in excess of 150 training dives. The outline will present the training requirements as well as launch & recovery operations logistics in open ocean conditions.

SESSION A6 – Manned Submersible Regulatory Issues
(Wednesday Jan. 25, 1:30PM –3:00PM)

16. Acrylic Viewport Windows for Manned Submersibles and Pressure Vessels for Human Occupancy

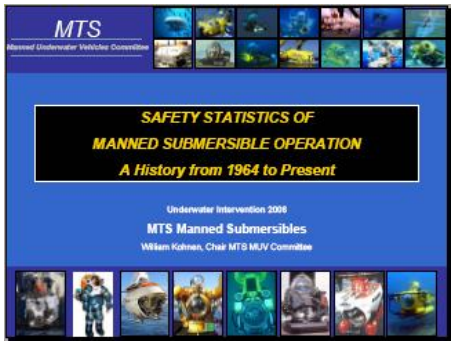
By: Guy Richards
Blason Ltd.
Narborough, England, UK
Email: guy.richards@blanson.com



Acrylic, or polymethyl methacrylate (PMMA), has long been used in the manufacture of pressure vessel windows requiring compressive & impact strength, chemical resistance, UV resistance, and clarity. Acrylic polymer thus occupies a predominant place in the market for clear, robust windows of approved geometries used in submersible applications due to its superior optical qualities and long life of 10 to 20 years. Only glass transmits light as well but has the potential of rapid catastrophic failure upon impact or at high pressures.

17. MTS Overview of Manned Submersible Safety Track Record in past 40 years

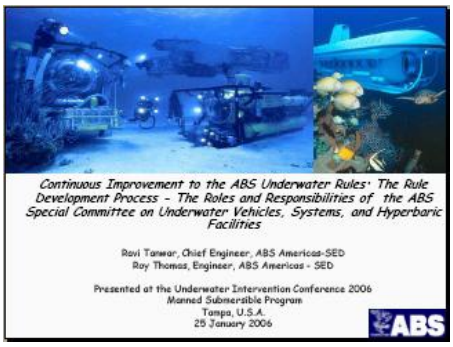
By: William Kohnen, MTS MUV Committee
SEAmagine Hydrospace Corp.
Claremont, CA USA
Email: will.kohnen@seamagine.com



The paper presents a basic overview of the accident and injury data in the operation of manned submersibles over the past 40 years. The information considers commercial and research operation of manned vehicles and provides a comparison to other commercial vehicle industries and their safety records.

18. Rules for Building and Classing Submersible Vehicles

By: Ravi Tanwar
American Bureau of Shipping
Houston, TX USA
Email: rtanwar@eagle.org



The American Bureau of Shipping (ABS), founded in 1862, is one of the world's leading international Classification societies. Most recently, the Bureau published the "Rules for Building and Classing Underwater Vehicles, Systems and Hyperbaric Facilities, 2002". The paper offers an insight into the ABS Rule development process and the procedures followed by the team of industry experts and subject matter experts (Engineers and Surveyors) at the Bureau for continuous improvement of the Rules. The paper also explores the future trends in the industry and explains the mechanisms in place that enable the Bureau to adapt to the latest trends in the industry. The critical roles and responsibilities of the industry experts who are members of the ABS Special Committee on Underwater Systems and Vehicles, is also highlighted.

SESSION A7 – Life Support Systems Panel Discussion
(Wednesday Jan. 25, 3:30PM –5:00PM)

19. Life Support Systems for Atmospheric Pressure Vessel

By: Peter Readey
Steam Machines Inc.
Lebanon, TN, USA
Email: pete_readey@steammachines.com

Engineering derived from other maritime technologies lends itself to modification to meet the needs of the one atmosphere vessel. Many of the problems encountered in ambient pressure, closed circuit diving systems become simplified in a single atmosphere arena. Carbon dioxide removal is one of the most critical areas of design as temperature, depth and an increase in ambient pressure significantly affects the efficiency of the diving scrubber. Utilization of this proven technology has made its way to submarine applications; the result being a highly efficient, cost effective life support system, using a newly modified, granular material, in a canister derived from closed-circuit diving applications.

20. CO2 Air Extension Systems for Submersible Vehicles

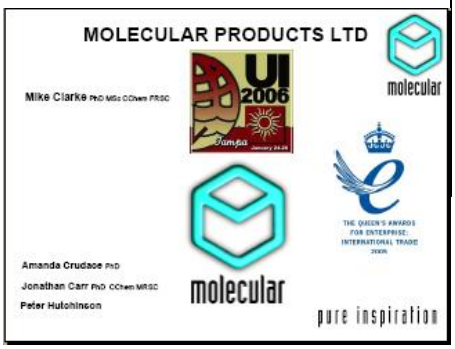
By: Rick Oddo
Micropore Inc.
Newark DE, USA
Email: rick@microporeinc.com

Alkaline absorbents have long been used for carbon dioxide removal in enclosed atmospheres. Calcium hydroxide-based CO2 absorbents have been a primary method for controlling CO2 in diesel submarines, in hyperbaric chambers and also in diver rebreathers. Lithium hydroxide-based CO2 absorbents offer advantages over calcium hydroxide of reduced weight and improved performance at

lower temperatures. Lithium hydroxide is the primary CO2 absorbent on the space shuttle and is the secondary/emergency removal device for US Navy nuclear submarines. Micropore Inc. has patented a new process to totally encapsulate the metal hydroxide absorbents, where in the same finely ground absorbents used in granular products are enmeshed in a polymer substrate, encapsulating the hydroxides but still providing an open and efficient microstructure. Data will be presented which shows enhanced performance characteristics in both lithium and calcium hydroxide-based applications utilizing Micropore's ExtendAir® CO2 absorbent family of products.

21. New Technology for a Self Contained Atmosphere Control Unit

By: Dr Mike J Clarke
Molecular Products Ltd
United Kingdom
E-mail: mc@molprod.com



The provision and maintenance of a breathable atmosphere in a small space can be provided by the use of appropriate chemical oxygen generators and carbon dioxide scrubber technology. This technology is well developed and proven in large submarines for both routine and emergency disabled submarine use. It also has some unique characteristics that make it particularly appropriate for smaller manned submersible vehicles. The combination of chemical oxygen generator technology with chemical carbon dioxide absorber technology, controlled by modern electronics and sensor modules can provide a safe, fully automatic atmosphere control system that can adapt to the local conditions. Such a system used in a manned submersible leaves the crew free to concentrate on the mission without the need for time consuming life support systems monitoring and control operations. It also makes efficient use of the limited space available in such vehicles whilst removing the hazards associated with stored pressure systems. This paper describes some of the technologies available for carbon dioxide control, oxygen provision and ways that these can be used operationally in manned submersibles.