23rd International Submarine Symposium

PROGRAM

SEPTEMBER
15-17, 2026

INTERNATIONALES MARITIMES MUSEUM
DNV MARITIME CENTER
HAMBURG, GERMANY

Session	MON Sept 14	TUE Sept 15	WED Sept 16	Session	THUR Sept 17	FRI Sept 18
7:30 to 8:30	ARRIVALS	**REGISTRATION** @ INTL MARITIME MUSEUM on 10TH FLOOR	**REGISTRATION** @ INTL MARITIME MUSEUM on 10TH FLOOR	8:00 to 9:00	**REGISTRATION** @ INTL MARITIME MUSEUM on 10TH FLOOR	
8:30 to 9:00		**SYMPOSIUM OPENING** WSO, William Kohnen Capt Gard Clark (USN Ret) DNV Orientation - P. Schwarmann DNV Hamburg - J. Struwe	Pietro Corsi **RINA,** ITA			
9:00 to 9:30			Curt Cunningham **US NAVY**, USA	9:00 to 9:30	**SOG Opening Remarks** Leighton Rolley	*Open Mtg Session 1* *DNV Marine Center*
9:30 to 10:00		Ionel Darie **DNV**, Germany	Chris Haugen **FORCYS,** USA	9:30 to 10:00	**SOG Working Group** UPDATES	*Open Mtg Session 2* *DNV Marine Center*
10:00 to 10:30		COFFEE BREAK	COFFEE BREAK	10:00 to 10:30	COFFEE BREAK	COFFEE BREAK
10:30 to 11:00		Anthony Tarantino **Woods Hole Ocean. Inst**, USA	Alexander Petri **Polyvantis**, Germany	10:30 to 11:15	Class Societies Panel **ABS / DNV / RINA / Lloyds**	*Open Mtg Session 3* *DNV Marine Center*
11:00 to 11:30		Paul Nelson **DEEP**, UK	Bonnie Blackburn **SouthWest Res. Inst,** USA			*Open Mtg Session 4* *DNV Marine Center*
11:30 to 12:00	TRAVEL to LUBECK Draeger Factory	Dr. Sathia Narayanan **NIOT**, India	Tim MacDonald **Hadal Subsea**, Australia	11:15 to 12:00	Manufacturer's Panel **SEAmagine / Triton** **UboatWorx / Nuytco**	*Open Mtg Session 5* *DNV Marine Center*
12:00 to 12:30		**LUNCH**	**LUNCH**	12:00 to 12:45	Subsea Insurance PANEL **URP Ltd / Deep Blue /** **Subsea Risk**	DEPARTURES
					Free	
1:00 to 1:30	DRAEGER FACTORY TOUR		**GROUP Photo**	1:00 to 2:00	**LUNCH**	
1:30 to 2:00		Leon Adams **SouthWest Electric**, USA	**WSO Flag State Workshop** Gregory Cotten - WSO LCDR Thomas Whalen - USCG Julie Miller - USCG MSC HQ David Edwards - USCG SAR Jeff Bybee - Pelagic Jeff Mahonney - Pelagic			
2:00 to 2:30		Oliver Schirk **Draeger,** Germany		2:00 to 2:30	**KEYNOTE: Daniel Hurd** Atlantis Submarines Intl. Canada	
2:30 to 3:00		Bart Kemper PE **Kemper Engineering,** USA	Roy Thomas **ABS,** USA	2:30 to 3:00	Science Operators PANEL **Rev Ocean / WHOI /** **PISCES / IFREMER**	
3:00 to 3:30		COFFEE BREAK	COFFEE BREAK	3:00 to 3:30	COFFEE BREAK	
3:30 to 4:00		Charles Kohnen **SEAmagine Hydrospace Corp**, USA	J. Svendsen / M. Tofterå **NTNU University**, Norway	3:30 to 4:00	Breakout Discussion	
4:00 to 4:30	RETURN TRAVEL to HAMBURG	Jeff Heaton **Nuytco Research**, Canada	Kwonil Kim, Sejun Jin **STEP INSTITUTE**, South Korea	4:00 to 4:30	CONCLUSION SOG 26	
4:30 to 5:00		Maarten van der Meijs **UBoatWorx,** Netherlands	Changjoo Shin **KIOST Institute**, South Korea	4:30 to 4:45	Principles of SOG/ Future of SOG	
				4:45 to 5:00	**CLOSING WORDS** L Rolley / J Struwe / W Kohnen	
5:00 to 5:30		Stefan Hinz **Engr Bureau Hinz,** Switzerland	Dominic Geysen **SailXplorer**, Spain Brian Goldthorpe **Sub Racing,** UK	5:00 to 5:30		
5:30 to 6:00			***WSO Program SUM-UP***			
6:00 - 6:30	**NEARBY DNV &** **MUSEUM** **MEET at a PUB** General Informal Gathering	**DNV** **Cocktail Reception** **Maritime Museum 10th Floor** **6:00 - 8:00 PM**				
6:30 to 8:30			**WSO RECEPTION** **on Boat in Hamburg Harbor** **6:30 - 8:30 PM**			

Welcome to the 23rd International Submarine Symposium

We are delighted to welcome you to the 23rd International Submarine Symposium, proudly hosted by DNV in Hamburg, in partnership with the MTS Submarine Committee, World Submarine Organization (WSO), and Submersible Operators Group (SOG).

This year, we bring together submarine professionals from around the world—manufacturers, designers, operators, pilots, service providers, classification societies, and regulators—united by a commitment to advancing technology, strengthening standards, and maintaining the highest levels of safety in subsea exploration. We are especially proud to see WSO, MTS, and SOG come together, advancing our long-term vision of gathering the international submarine community once each year, in one special location.

A special focus will again be the WSO Flag State Round Table, bringing maritime authorities from the United States, Canada, UK, Germany, France, Italy, Spain, and others around a common table. The goal is to advance a more harmonized international identification and regulatory framework, facilitating the safe and efficient operation of submarines across jurisdictional waters worldwide. Everyone is invited to participate in this important discussion.

Our sincere thanks go to our speakers, to DNV for generously hosting us, and to our sponsors whose support allows the Symposium to remain free to attend, providing greater access for young professionals and the next generation of our industry.

Finally, please join us Tuesday night at the Maritime Museum for the DNV cocktail reception and Wednesday evening for our Hamburg Harbor boat reception—an opportunity to relax, reconnect, and make new friends. Welcome to Hamburg. We look forward to another remarkable week of knowledge, collaboration, and discovery!

Sincerely,

World Submarine Organization

William Kohnen	*CAPT Gard Clark (USN Ret)*	*Gregory B. Cotten PhD*
WSO, Exec Director	*WSO, Deputy Exec Director*	*WSO, Secretary*

Welcome Message from Jonathan Struwe, DNV

On behalf of DNV, it is my great pleasure to welcome you to Hamburg and to the 23rd International Submarine Symposium.

Having attended the International Submarine Symposium for more than ten years, I am impressed by the breadth of experience represented and, particularly, by the open exchange of knowledge between designers, manufacturers, operators, pilots, classification societies, and regulators. It is a unique forum for our industry, and I am very pleased that DNV has the opportunity to host this year's gathering here in Hamburg.

Hamburg is a city shaped by maritime trade, engineering, and international exchange, making it a fitting setting for this year’s meeting. At DNV, we have a long history in underwater technology and in the classification of manned submersibles. Today, we continue to support the development of increasingly advanced manned underwater systems, working with industry to ensure that safety standards, assurance practices, and regulatory frameworks evolve alongside new technologies and innovation.

The opportunities and challenges facing our industry are increasingly international. Bringing together technical experts, operators, regulators, Flag States, and industry leaders provides an important opportunity to exchange experience, discuss practical solutions, and strengthen the shared commitment to safe, reliable, and sustainable underwater operations worldwide.

We are proud to welcome the World Submarine Organization, the MTS Submarine Committee, the Submersible Operators Group, and all participants who have travelled from around the world to be part of this important gathering.

I wish you a productive and enjoyable Symposium, with valuable discussions, new perspectives, and many opportunities to connect with colleagues from across the global manned underwater systems community.

We are delighted to welcome you to DNV, to Hamburg, and to this important gathering of our industry.

Jonathan Struwe
Head of Section
Underwater Technology, DNV Maritime
Hamburg

Welcome to Hamburg – Your Symposium Guide

On behalf of the DNV Underwater Technology team, welcome to Hamburg! We are very pleased to host the WSO and SOG communities and look forward to an enjoyable and productive few days together. A few practical details will help you find your way:

TUESDAY – WSO Symposium

Registration will begin in the morning on the top floor (10th level) of the International Maritime Museum, where the Symposium is being held. Our team and hosts at the Museum will direct you to the top-floor venue. Lunch will be catered on "Deck 10" at the Museum so everyone can stay together and continue the conversations.

- Tuesday evening, please join us for a DNV Cocktail Reception at the Maritime Museum from 6:00–8:00 PM for drinks, light refreshments, and an opportunity to mingle before dinner.

WEDNESDAY – WSO Symposium

If you already have your badge, you may go directly to the Museum. New arrivals will be registered on-site on the 10th floor. Lunch will again be provided at the Museum.

- Wednesday evening, we will move to the water for a 6:30–8:30 PM Hamburg River Elbe tour aboard two boats, with refreshments and snacks. Boarding information will be available at registration.

THURSDAY – SOG Meeting

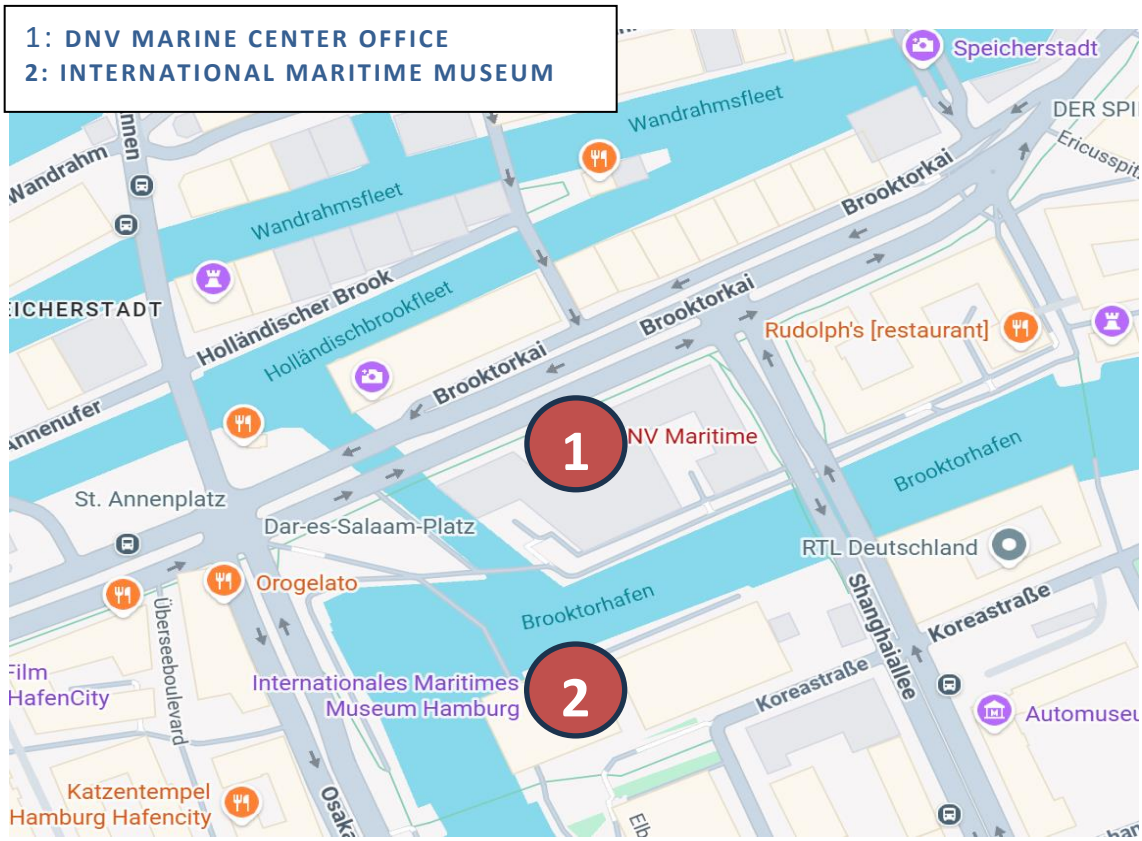
- The SOG program will also take place at the International Maritime Museum and registration will take place on the 10th floor. Existing WSO badges remain valid. Thursday evening is free for your own planning.

Finally, on Friday from 8:30 AM–12:00 PM, DNV will make six private meeting rooms available for companies wishing to meet with customers or partners. Rooms can be reserved through WSO/DNV.

We hope this makes navigating the week easy. When in doubt, come to DNV—we will point you in the right direction!

Philipp Schwarmann
Principal Contracts Manager
Underwater Technology, DNV Maritime
Hamburg

MAP OF THE AREA – HOW TO FIND YOUR WAY



2026 INTERNATIONAL SUBMARINE SYMPOSIUM
at International Maritime Museum- Hamburg

Tuesday, September 15

8:30 – 9:30

SYMPOSIUM OPENING 2026

The opening remarks will provide an overview of the current state of the international submarine industry, highlight the major challenges and opportunities ahead, and establish a constructive tone for the symposium. Particular emphasis will be placed on productive dialogue among delegates, and an outline WSO's priorities and objectives for the coming year.

William Kohnen
WSO, Exec Director

CAPT Gard Clark, USN (Ret)
WSO, Deputy Exec Director

HAMBURG DIRECTIONS & INFORMATION

Philipp will provide an overview of the symposium program, including the schedule, presentation structure, and event locations. He will explain arrangements for sessions at the International Maritime Museum, SOG meetings at the DNV Marine Center, and the planned social events, helping delegates find their way to each activity.

Philipp Schwarmann
Principal Contracts Manager, DNV Maritime

WELCOME MESSAGE FROM HOST

Jonathan Struwe who is hosting the conference, will welcome delegates to Hamburg and the 23rd International Submarine Symposium on behalf of DNV. His remarks will highlight the value of open international exchange, DNV's commitment to advancing safe and sustainable underwater operations, and the importance of collaboration among designers, operators, classification societies, regulators, and Flag States.

Jonathan Struwe
Head of Section
Underwater Technology
DNV Maritime

9:30 – 10:00

From 2D Drawings to Native 3D Models: Towards Model-Based Approval

By: Ionel Darie
Principal Ins. Eng. Underwater Technology
DNV
GERMANY

The field of underwater technology has witnessed a marked shift in its adoption of digital engineering methodologies, with an increasing reliance on native three-dimensional (3D) models. However, the approval and classification processes within this sector continue to rely heavily on conventional two-dimensional (2D) drawings. This discrepancy leads to inefficiencies, interpretation discrepancies, and delays, particularly for complex systems such as manned submersibles, remotely operated vehicles, pressure housing, and subsea mechanical assemblies. This presentation explores the shift from drawing-based approval to 3D-based approval as a pragmatic initial step toward Model-Based Classification (MBC) under DNV-RU-UWT. The approach proposed by DNV considers the 3D CAD model as the primary approval asset, enabling direct verification of rule compliance for geometry, materials, pressure boundaries, capacity strength, interfaces, tolerances, and configuration control within a structured digital environment. By leveraging a unified 3D model as the "single source of truth," stakeholders can perform direct rule checks, design reviews, and lifecycle analyses within a shared digital environment. This approach reduces reliance on two-dimensional documentation, minimizes data duplication, and improves the fidelity of structural assessments. As underwater operations increasingly align with the principles of Industry 4.0, model-based methodologies are expected to play a key role in enabling safer, more cost-effective, and digitally integrated subsea system design and verification.

10:00 – 10:30 COFFEE BREAK

10:30 – 11:00

DSV Alvin Overhaul and 2026 Operations Summary

By: Anthony Tarantino
WHOI - Woods Hole Oceanographic Institution
Alvin Technical Program Manager
USA

The Woods Hole Oceanographic Institution (WHOI) operates the human occupied Deep Submergence Vehicle Alvin as part of the U.S. National Deep Submergence Facility (NDSF). This discussion will provide a brief overview of Alvin's recent operational highlights, and a summary of the recently completed major overhaul. The presentation will also include an update on progress that has been made to improve the program’s distressed submersible emergency response plan. The NDSF is sponsored by the National Science Foundation, the Office of Naval Research, and the National Oceanic and Atmospheric Administration.

11:00 – 11:30

Capability, Competence and Training: A Systematic Approach to the Development of Operational Success

By: Paul Nelson
Director of Training
DEEP Research Labs Ltd.
UK

In safety-critical, highly regulated environments such as submersible operations, the difference between a controlled response and a catastrophic outcome is often defined by the demonstrable competence of the people operating the equipment. This presentation examines how DEEP's training management methodology closes the gap between organizational capability and individual competence. At its core is a systems approach to training that exists to ensure training is safe, requirements-driven, accountable, risk-focused, and consistently capable of withstanding scrutiny. The presentation traces this discipline in practice from Training Needs Analysis through role and task analysis, to defining the knowledge, skills and behaviors required, the conditions under which they must be performed, and the standards against which they are assessed. It follows the creation of DEEP's pioneering Submersible Rescue course as a working example through governance and authorization, staged delivery — including the progression from classroom and simulator to representative operational conditions required for in-vehicle and rescue training — and structured evaluation forming a continuous improvement and audit cycle.
The session demonstrates how systematic rigor, achieved by bringing technical training and subject matter expertise together, translates directly into safer operations in the field, and offers a practical framework for testing whether a training architecture builds real operational capability, or simply issues certificates.

11:30 – 12:00

MATSYA 6000 India's Deep-Water Manned Submersible - An Overview

By: Dr. D. Sathia Narayanan
Project Director MATSYA 6000
NIOT, National Institute of Ocean Technology
INDIA

Considering the significant increase in ocean exploration in the twenty-first century, nations are interested in exploring the ocean's gathering phase. National Institute of Ocean Technology (NIOT), part of the Ministry of Earth Science (MoES), is developing a manned submersible known as the "MATSYA 6000". MATSYA 6000 will allow three people to carry out deep ocean exploration up to a depth of 6000 meters. MATSYA 6000 system can house three personnel inside a 2.1m diameter spherical hull called as personnel sphere (PS). The spherical hull with necessary life support system and control electronics provides a safe envelope for the three personnel.

MATSYA 6000 system has an exo-structure frame to carry all its subsystems including the PS. MATSYA 6000 is designed with an endurance of 12hrs subsea operation in normal conditions

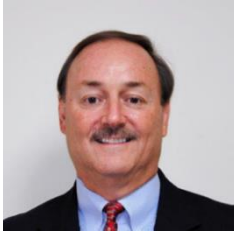
and 96 hours in emergency conditions. Maximum speed of 3 knots in forward direction and 1 knot in all other directions is envisaged for the MATSYA 6000 using thrusters. Ascent and descent motions shall be obtained using energy efficient Ballast system. Ballast system consists of Main Ballast system (MBS), variable Ballast System (VBS) and releasable ballast weights. Apart from ballast system, fixed ballast in the form of syntactic foam makes the MATSYA 6000 system float in sea water. Subsea maneuvering except ascent and descent motions can be achieved by eight electrical thrusters.

Power for operation and control of MATSYA 6000 system comes from 120 - kwh Lithium Polymer batteries assembled in the exo-structure frame and a 5-kwh lead acid battery kept inside the spherical hull. Necessary electrical and electronics components are kept in four 6000m depth rated pressure bottles. Cameras, lights, communication, safety devices and scientific payloads form the rest of the subsystems for the MATSYA 6000 system. MATSYA 6000 is being developed in accordance with DNV certification and classification rules. The purpose of this Presentation is to give a bird's-eye view of the various activities involved in design and development, integration, testing, and harbor trials of MATSYA 6000.

12:00 – 1:30 LUNCH BREAK

1:30 – 2:00

UUV Battery Technology & Endurance



By: Leon Adams
VP Sales & Marketing
Ultralife Corporation- Houston Division
USA

Uncrewed Underwater Vehicles (UUVs) are becoming increasingly central to naval operations, driving demand for systems that travel farther, dive deeper, remain submerged longer, and support more powerful sensors, manipulators, cameras, lights, and motors. These capabilities depend heavily on available subsea power and energy capacity. While tethered systems may use umbilical power, batteries remain the principal energy source for untethered vehicles, with primary lithium and rechargeable lithium-ion technologies increasingly replacing traditional sealed lead-acid batteries. Battery endurance varies significantly with chemistry, system design, size, operating temperature, discharge rate, and pressure-vessel or pressure-tolerant packaging. This presentation summarizes viable battery chemistries for undersea vehicles, sensors, and equipment, and examines trade-offs between high-energy, single-discharge systems for extended missions and rechargeable systems for shorter, repeatable missions. Test results across multiple discharge rates and representative deep-sea and topside temperatures will compare primary lithium and secondary lithium-ion technologies, providing practical data for planning UUV power, payload, mission duration, and endurance.

2:00 – 2:30

Technology for Life In and Around Submarines

By: Oliver Schirk
Business Development Manager
Dräger Safety AG & Co. KGaA
GERMANY

The company Dräger was founded in 1889 in the city of Lübeck, Germany. Today, Dräger offers a full range of products in the fields of Safety and Medical. The Safety products cover detection and protection applications. Detection means detection of toxic substances in the air. This is of course also a topic in submarines. Examples for such substances are toxic gases like carbon dioxide and carbon monoxide but also flammable substances like hydrogen. Another important task is the measurement of oxygen concentrations to identify oxygen-deficiency. Protection in this case means protection against dangerous substances. Examples for protection products include masks and filters, SCBA (self-contained breathing apparatus) and scrubber systems to remove carbon dioxide from the air. Last but not least, protection products also include diving equipment like rebreathers for tactical and MCM (mine counter measures) diving. In many cases, tactical divers are transported to their mission-site by submarine. Dräger medical products include ventilators and narcotic devices which are used for civil and military purposes.

2:30 – 3:00

Leverage Established Submersible ERPs: Using Existing SOPs + USCG & International SAR to Achieve Timely Rescue

By: Bart Kemper
Principal Engineer P.E., CPEng RPEQ
Kemper Engineering Services, LLC
USA

The underwater exploration company OceanGate publicly publicized they were going to innovate “like NASA” by developing a novel carbon fiber composite hull for its third submersible, the TITAN. TITAN’s loss at sea with five people aboard in June 2023. This was the first loss of a non-military submersible in over 50 years and the first to be subject to a Marine Board of Investigation. The joint US Coast Guard/National Transportation Safety Board investigation brought much of the investigation process into the public, including the public hearings in 2024 and the publishing of the separate reports and findings of the USCG and NTSB in 2025. Kemper Engineering Services was the only non-governmental organization that was part of the official investigation. This presentation will be a summary of our findings, to include the details of our failure analysis and our determination of the most likely root cause of the implosion.

3:00 – 3:30 COFFEE BREAK

3:30 – 4:00

SEAmagine Submersible Pilot Training: A Review of 2026 Field Training and the California Training Program

By: Charles Kohnen
Co-Founder & Chairman
SEAmagine Hydrospace Corporation
USA

This presentation provides a review of SEAmagine's submersible pilot training activities during 2026, highlighting both international field training and the Company's structured California Pilot Training Program. It will include examples from pilot training conducted in Palau for operations to depths of 1,000 meters under expedition conditions, as well as examples from SEAmagine's land-based California Pilot Training Program. Video footage from actual training operations will illustrate the various phases of both programs, and the presentation will conclude with an overview of the training structure, competency development process, and lessons learned during 2026.

4:00 – 4:30

The Future of Atmospheric Diving Systems

By: Jeff Heaton
President
Nuytco Research Ltd.
CANADA

Atmospheric Diving Systems (ADS) have evolved over more than three centuries. Their fundamental purpose remains unchanged: to maintain a one-atmosphere environment that protects the diver from ambient seawater pressure and barotrauma, while providing sufficient mobility and dexterity to perform useful work. During the early twentieth century, interest in ocean salvage prompted designs with rudimentary articulated arms and legs. Naval requirements during the two World Wars drove further advances in limb mobility, active ballast control, and life-support systems. A pivotal step occurred in the 1960s, when engineers at Underwater Marine Equipment Ltd. modernized Joseph Salim “Pop” Peress’s 1930s Tritonia suit, which had gained recognition through dives on the wreck of the RMS Lusitania. Lessons from this work led to the celebrated JIM suit. Later developments included Jet JIM, which tested the use of thrusters, and the WASP ADS, widely used in offshore oilfield operations during the 1970s. Phil Nuytten played a central role in the commercialization of modern ADS. After helping introduce ADS technology at Oceaneering International, he founded International Hard Suits to advance the concept. His patented rotary-joint technology dramatically improved mobility and enabled the Newtsuit to perform complex commercial tasks worldwide. Nuytco Research later developed the Exosuit, incorporating more advanced joints, electrical systems, and life-support technology. In 2020, Nuytco Research began developing DSEND for the U.S. Navy, with the goal of creating an ADS maneuverable enough to serve as a direct alternative to a Navy diver. Advanced joint design and human-factors optimization allow the pilot to walk, hop, crawl, climb ladders, kneel, lie down, roll onto their back, and return upright with ease. DSEND achieves a level of natural movement long envisioned by ADS designers and represents the next generation of atmospheric diving capability for naval, commercial, and scientific operations.

4:30 – 5:00

Super Sub: Engineering Innovation and Safety Beneath the Surface

By: Maarten van der Meijs
Director of Engineering & Development
U-Boat Worx
NETHERLANDS

U-Boat Worx's new Super Sub represents a step-change in private submersibles, combining dolphin-inspired hydrodynamics, 100kW of thrust, and speeds of up to 10 knots with a full DNV safety certification. This talk will look under the hood at the engineering innovations that make this possible, from its high-accuracy, front-facing sonar system and advanced DVL system that continuously monitor the seabed and adjust trajectory, to its redundant life-support and control systems designed to the highest standards in the industry.

5:00 – 5:30

Modernization and Classification of the Manned Submersible P-63 in Switzerland

By: Stefan Hinz
Managing Director & Owner
Engineering Bureau Hinz - Underwater Technology LLC
SWITZERLAND

The manned submersible P63, registered in Central Switzerland, is based on a classic design, which was built in the mid 80s and classed by Germanischer Lloyd in 1987. Given the favorable pre-conditions provided by the original classification, the Subspirit AG decided in 2020 to acquire the submersible and to recommission it for commercial trips on Swiss lakes. Initially, the submersible was not in the best condition. A general overhaul was first carried out by the original manufacturer. However, this merely restored the submersible to the condition required for the original 1987 classification. This, however, did not meet the operators' own standards regarding the safety and reliability of the submersible. Working closely together, Subspirit AG and the Engineering Bureau Hinz Underwater Technology GmbH have now implemented various design changes and improvements, resulting in:

1) meeting increased requirements for safety and operational reliability.
2) improving the submersible's performance
3) implementation of significantly higher classification requirements today regarding safety standards, system redundancies and the documentation of their implementation.

Through a joint effort, these challenges were overcome to finally bring the submersible up to the current state of the art, which ultimately enabled it to re-enter class.

6:00 – 8:00

DNV COCKTAIL RECEPTION

HOSTED AT THE INTERNATIONAL MARITIME MUSEUM – 10TH FLOOR

2026 INTERNATIONAL SUBMARINE SYMPOSIUM
at International Maritime Museum- Hamburg

Wednesday, September 16

8:30 – 9:00

From Innovation to Certification: The next generation of midget submarine

By: Pietro Corsi
Naval Ships, Project Manager
RINA Services S.p.A
ITALY

As compact submarines increasingly integrate novel technologies, unconventional architectures and demanding operational concepts, traditional prescriptive certification approaches may not be sufficient to demonstrate safety, reliability and fitness for purpose. In cases where no governmental standards exist, classification societies therefore play a key role in enabling innovation through structured, risk-based and performance-oriented assurance frameworks. The presentation describes RINA's approach to the classification and certification of next-generation compact submarines, using one Midget programme as a representative case study. The methodology integrates safety objectives, technology qualification, risk assessment and design assurance from the earliest design phases through construction, testing and validation.

Particular attention is given to the qualification of novel or insufficiently proven technologies, where compliance with existing rules alone may not provide adequate evidence of performance. Through a staged process combining technology maturity assessment, identification of failure modes and hazards, definition of acceptance criteria and testing activities, the classification society can provide an independent assessment, guideline and best practice for the certification. This approach supports the safe introduction of innovative technologies while creating tangible value for all stakeholders involved. Independent classification and voluntary certification can strengthen customer trust and confidence in the product, support safe underwater operations by minimizing the risk of loss, failure or malfunction, and provide access to specialist technical support throughout the design, construction and operational lifecycle. The value of such certification is particularly significant when it is recognized not only as a means of demonstrating compliance, but as an additional assurance tool for the client, shipyard and designer, providing independent confirmation of safety, reliability and technological maturity. In this context, classification becomes a strategic enabler of innovation, helping stakeholders demonstrate the robustness of novel solutions and increase confidence in their adoption for both defense and commercial underwater applications.

9:00 – 9:30

U.S. Submarine Rescue System Reinstatement of Certification and Commercial Classification

By: Curt Cunningham
Principal Assistant Program Manager - Submarine Escape and Rescue
US NAVY NAVSEA PMS390
USA

Recent recovery and Recertification of the U.S. Submarine Rescue System following a critical incident was executed in exceptional timelines. On May 16, 2025, the system experienced a significant water intrusion casualty, necessitating an immediate suspension of operations and a comprehensive engineering safety review. Through rigorous testing, system recovery, and structural validations, the Submarine Rescue System was successfully recertified on March 23, 2026, restoring vital deep-submergence rescue capability for the U.S. Navy and Global Rescue.

To ensure long-term operational viability, and alignment with global maritime standards, the system is currently undergoing a formal commercial classification process. Governed by the American Bureau of Shipping (ABS), this extensive classification effort mandates stringent structural and operational compliance, with a targeted completion date of 30 September 2027. Ultimately, rapid recertification and subsequent ABS classification highlights the commitment to maintaining a robust, fail-safe submarine rescue asset capable of responding to global maritime emergencies.

9:30 – 10:00

Submarine Rescue Metrics—The Path to Improvement

By: Chris Haugen
Business Development Manager, N. America
FORCYS Inc.
USA

Time to First Rescue (TTFR) is the primary metric establishing performance parameters for submarine rescue systems. Focus on one monolithic metric may not provide sufficient insight into the full rescue process and opportunities to significantly improve both TTFR and survivor outcomes may be missed. Development of new metrics and/or formal definitions of existing metrics germane to the rescue process will provide needed data to guide the highest return on investment decisions. Suggested areas to focus on might include:

- Time-to-Locate
- Time-to-Characterize
- Time-to-Digital Model
- Time to establish communications with survivors
- Docking Success Probability
- First-Dive Success Rate
- Rescues per sortie

Each of these measurements evaluates performance of essential components of the submarine rescue mission.

10:00 – 10:30 COFFEE BREAK

10:30 – 11:00

Next Chapter - PLEXIGLAS(R) for UDDS (Ultradeepdiving Subs)

By: Alexander Petri
Product Manager Cast & Stretched Products
POLYVANTIS GmbH
GERMANY

Humans always strive for more — this is both a strength and a weakness. On one hand, ambition drives progress; on the other, it can push limits to extremes. To achieve more and accomplish great things, it takes a strong team working together.

Over the past year, new boundaries have been broken at POLYVANTIS in the field of PLEXIGLAS® for submarines. A completely new thickness dimension was achieved — in a level of quality that previously seemed unimaginable. Join me in my presentation as we journey from the monomer molecule all the way to the heaviest block in the history of PLEXIGLAS®.

11:00 – 11:30

From Curves to Equations: Parametric Curve Fitting of PVHO Window Short-Term Critical Pressures

By: Bonnie Blackburn
Lead Engineer
SWRI- Southwest Research Institute
USA

Pressure Vessels for Human Occupancy (PVHO) is the standard for the structural design of acrylic viewport windows used on manned submersibles. PVHO publishes Short-Term Critical Pressure (STCP) curves as functions of key window parameters. These curves, based on historical test data, are provided only as graphics, limiting their direct use in modern analytical tools and automated workflows.

As part of ongoing work within the ASME PVHO committee, this presentation describes the development of parametric curve-fit equations for existing PVHO window STCP plots. The goal is to provide consistent mathematical representations that improve standardization, while minimizing fitting error and preserving the design intent of the original plots. The outcome of this work will be a set of curve-fit equations intended to support future editions of ASME PVHO. This talk will show representative examples of fitted curves, highlight inconsistencies and irregularities found in current plots, and discuss limitations on extrapolation.

11:30 –12:00

The World's Deepest Shipwreck in 3D: Photogrammetric Modelling from a Manned Submersible

By: Tim MacDonald
Managing Director
Hadal Subsea Engineering
AUSTRALIA

At 6,895 meters in the Philippine Trench lies USS Samuel B. Roberts, the deepest shipwreck ever discovered. It was found and surveyed not by an AUV or work-class ROV, but by a two-person manned submersible, hand-flown, with the pilot acting as the survey instrument, on exploratory dives that were never planned as a photogrammetry survey mission. This presentation follows the search, discovery and survey of the wreck, and the operational challenges of working at full ocean depth.

Advances in photogrammetry have transformed what can be achieved from ordinary imagery. Footage once captured simply for documentation can now be converted into accurate, measurable three-dimensional models, opening new possibilities for archaeology, marine science and subsea survey without dedicated survey hardware. Using Samuel B. Roberts as a case study, this presentation explores how these emerging tools are changing what many existing submersible programs are already capable of.

12:00 – 1:30

LUNCH BREAK & GROUP PHOTO

GROUP PHOTO FROM TENERIFE - 2025

WSO FLAG STATE MEETING

Wednesday, September 16th, 1:30PM – 2:30PM

1:30 – 2:30

OBJECTIVES

The objective of this year's Flag State Meeting is to advance a practical international framework for the identification, registration, classification, and regulatory oversight of civilian submersibles. This meeting will seek to identify areas of priority, define practical next steps, and support the long-term harmonization of submersible oversight through the IMO, strengthening safety, and public confidence worldwide.

WSO Opening Remarks and Welcome

By: Gregory B. Cotten, PhD, WSO Secretary

Progress and plans in 2026 and review of Reports in last year by US Coast Guard, National Transportation Safety Board USA, and Transport Canada.

Introduction & Trends in Marine Casualties through Time

By: LCDR Thomas F. Whalen, US Coast Guard Investigations

With expertise in international safety treaties, and regulatory oversight, LCDR Whalen will share key lessons from high-profile casualty investigations to address modern challenges in novel vessel oversight.

Introduction to International SAR System

By: David Edwards, US Coast Guard Headquarters

With 23 years of active-duty USCG service Mr. Edwards will address the complex challenges of sub-sea rescue, highlighting the vital need for interconnected government and industry capabilities during deep-sea emergencies.

Introduction & Leverage Industry and International Collaboration

By: Julie Miller, US Coast Guard Headquarters

Ms. Miller will discuss the critical need for international collaboration, emergency planning, and the alignment of company safety management systems with evolving flag state standards.

Lessons in Enhancing ERPs through Dynamic Integration

By: Jeff Bybee & Jeff Mahonney
Pelagic Research Services, USA

Existing regulations and industry guidance for manned submersible operations recognize the need for Emergency Response Plans (ERPs) yet details regarding essential elements required to ensure an effective response to underwater emergencies remains a subject for discernment and discussion.

2:30 – 3:00

Overview of the ABS Underwater Rule Change Proposals

By: Roy Thomas
Sr. Technical Advisor
ABS - American Bureau of Shipping
USA

The American Bureau of Shipping (ABS) Rules for Building and Classing Underwater Vehicles, Systems and Hyperbaric Facilities, commonly known as the "Underwater Rules", are the primary ABS Rules for classification of underwater units. These underwater units include manned submersibles, lock-out submersibles, diving systems, atmospheric diving suits, remotely operated vehicles (ROVs), autonomous underwater vehicles (AUVs), and so forth that are used for commercial, scientific, and government applications.

This industry meeting gives an overview of the annual ABS Underwater Rule change proposals and provides further insight into the rationale and basis for each proposed Rule change. Following this overview, the meeting includes a question-answer session and facilitates an open dialogue with the industry on current technical issues. All active designers, fabricators, owners and operators are invited to attend and provide feedback.

3:00 – 3:30 COFFEE BREAK

3:30 – 4:00

"Are today's competence requirements for submersible pilots sufficient to ensure safe operations?"

By:

Johannes Svendsen
Deck Officer Cadets
NTNU - Norwegian University of Science & Technology
NORWAY

Maria Erstad Tofterå
Deck Officer Cadets
NTNU - Norwegian University of Science & Technology
NORWAY

This study examines whether today's competence requirements for submersible pilots are sufficient to ensure safe operations. A mixed-methods design was applied, combining document analysis of international and national frameworks, semi-structured interviews with active pilots, manufacturers, and industry experts, and a survey distributed through SOG - WhatsApp group. The findings indicate that the industry is in practice remarkably safe - but that this safety is produced by the choices of operators and manufacturers rather than by the regulatory framework itself. MSC/Circ.981 is recommendatory rather than binding, and leaves training and certification to operator discretion. Two thirds of survey respondents

reported operating above the Circular's provisions, and most interviewees considered it overdue for revision. Current requirements permit competent piloting but do not ensure it. A common international baseline for initial training, documented operational experience, recurrent assessment, and competence verification - developed with industry participation and supported by credible consequences - would protect the work responsible operators already do from being undermined by those who do not.

4:00 – 4:30

Building a Safety Governance System for Civil Manned Submersible Development in Korea

By:

Se Jun JIN
Deputy Director
KIOST - Korea Institute of Ocean Science & Technology
KOREA

Kwonil KIM
Research Fellow
STEPI - Science & Technology Policy Institute
KOREA

Korea is now entering a new phase of civil manned submersible development. A national R&D project is underway to develop a 300-meter-class shallow-water underwater mobility platform, creating both technological opportunities and regulatory challenges. Although Korea has experience in naval submarines and unmanned underwater vehicles, civil manned submersible R&D raises distinct legal and safety issues because human occupants are placed directly inside a high-risk underwater system.

This presentation examines the legal and policy questions that arise when a country begins developing civil manned submersibles. It focuses on the Korean case and addresses five issues: the legal classification of manned submersibles under ship safety law; the relationship between ship safety, occupational safety, and laboratory safety regulation; the role of third-party classification and technical standards; the governance of sea trials and emergency response; and the allocation of safety responsibilities and certification costs in multi-institutional public R&D projects.

The presentation argues that Korea should treat civil manned submersible development as a form of extreme R&D. Safety review, classification, emergency planning, training, and documented decision-making should be embedded from the design stage. This approach can help Korea develop not only a new underwater vehicle, but also a responsible and internationally credible governance model for future scientific, industrial, and public uses of manned submersibles.

4:30 – 5:00

A Conceptual Study on Specifications and Safety Systems for Manned Submersibles

By: Changjoo Shin
Principal Research Scientist
KIOST-Korea Institute of Ocean Science & Technology
KOREA

Given the inherent nature of underwater operations, unpredictable and irreversible emergency scenarios can arise at any time. To guarantee passenger survival even under such catastrophic failures, an emergency ejectable system capable of safely returning the occupants to the surface is currently under consideration. Furthermore, research is actively being conducted on a 3D underwater around-view monitoring system to secure omnidirectional visibility and enhance situational awareness around the submersible. This research aims to examine technical key and safety regulations for manned submersibles, establishing a technical baseline for potential future implementations.

5:00 – 5:15

SailXplorer (Designing Sailing Vessels for Explorers)

By: Dominique Geysen
Captain
SailXplorer
SPAIN

In an era where 'all hands-on deck' is the order of the day for the maritime industry to get its act together towards carbon emissions, and the urge to engage in ocean conservation, SailXplorer aims to address both challenges. Beyond design and performance, the project SailXplorer proposes a new way to navigate the future, offering a new generation of operators or yacht owners the opportunity to embark on purposeful global explorations.

The project was born from the collaboration of experienced sailing ship captain and operations manager Dominique Geysen, together with naval architect and two-time Young Designer of the Year Award finalist Andres Otano. The union of two generations and backgrounds resulted in multiple designs that elegantly respond to the robust, bold equipment requirements of today's global exploration missions, delivering purpose-built vessels that set a new benchmark in the field.

5:15 – 5:30

Why Race Your Submarine ?

By: Brian Goldthorpe
Head of Marketing
SubRacing Series
UK

Submarine racing has been taking place for over thirty years, in the USA and Europe, but has been always 'below the radar'. Currently a small number of teams have about 8 months to design build and test their wet submarines, before competing at an event in Washington USA, or Gosport, UK. The bigger challenge is not just the racing but how to enable accelerated learning and 'whole system' view for the students in preparing them for careers in marine engineering and naval architecture. Past alumni have become NASA astronauts and submersible pilots. With improvements in underwater camera technology, augmented reality and safety systems the time is right to bring submarine racing to a wider audience to showcase the only human-powered sport that takes place underwater. We want to use this broader exposure to highlight the positives and opportunities for oceanic employment as well as a start point into these careers.

By developing new classes of racers, holding events in public open water spaces and highlighting the opportunities of marine engineering, conservation and research we want to bring on board a new generation of enthusiastic ocean advocates. Even if they cannot compete themselves, we hope that submarine operators and engineers will support this project, from acting as Subject Matter Experts and Mentors for teams to judging, organizing or supporting the events.

HAMBURG HARBOR
EVENING BOAT RECEPTION
Wednesday, September 16
6:30 – 8:30 PM
Boarding near the DNV Marine Center
Two Boats • One Harbor • One Great Evening
Meet • Mingle • Explore Hamburg
Register at:
https://ISS2026-EveningReception.eventbrite.com

2026 SUBMERSIBLE OPERATORS GROUP MEETING
at DNV Maritime Center- Hamburg

Thursday, September 17

No	Session	Speaker	TITLE	ASBTRACT
1	9:00 to 9:30	**Leighton Rolley** **Submersible Operators Group**	**SOG Opening Remarks**	Overview of SOG activities, direction for next year and growing relationship with WSO and MTS. While all three industry groups come from somewhat different directions, those differences are complementary. SOG especially brings the practical experience of the pilots and operators and together create a much fuller representation of the submarine industry with a strong international forum for addressing the operational, technical and regulatory challenges we all face.
2	9:30 to 10:00	**Leighton Rolley** **Hector Salvador** **Scott Waters** **Submersible Operators Group**	**SOG Working Group Updates**	This session will provide updates from the SOG working groups on objectives, activities, and progress achieved since the 2025 meeting in Tenerife. Working group representatives will summarize efforts to improve operational safety, training, procedures, emergency response, maintenance, certification, and knowledge sharing, while identifying priorities and opportunities for collaboration during the coming year.
	10:00 to 10:30	**COFFEE BREAK**		
4	10:30 to 11:15	**DNV** **ABS** **RINA** **LLOYDS**	**PANEL DISCUSSION** **CLASSIFICATION AGENCIES**	Representatives from DNV, ABS, RINA, and Lloyd's Register will discuss emerging trends in classification rules for manned submersibles and related underwater systems. The panel will examine evolving safety expectations, new technologies, operational experience, and areas where greater international alignment may be beneficial. A Q&A session for attendees follows brief introductions.
4	11:15 to 12:00	**SEAmagine** **TRITON** **UBOAT Worx** **NUYTCO**	**PANEL DISCUSSION** **SUBMERSIBLE MANUFACTURERS**	Representatives from SEAmagine Hydrospace Corporation, Triton Submarines, U-Boat Worx, and Nuytco Research will share the latest developments in submersible design, technology, and market demand. SOG operators will have an opportunity to question manufacturers directly, discuss evolving operational needs, and hear their perspectives on the future direction of the submersible industry.
5	12:00 to 12:45	**URP Ltd** **DEEP BLUE** **SUBSEA RISK**	**PANEL DISCUSSION** **INSURANCE COMPANIES**	Representatives from three insurance companies serving the submarine industry will discuss current underwriting trends, risk assessment, coverage considerations, and the evolving needs of operators and manufacturers. The panel will offer insight into how insurers evaluate submersible operations and provide attendees an opportunity to ask questions about coverage, claims, and insurability.
	1:00 to 2:00	**LUNCH BREAK**		

2:00 – 2:30

KEYNOTE:
Four Decades of Tourist Submarine Operations

By: Daniel Hurd
President
Atlantis Submarines International Inc.
CANADA

For more than 40 years, Atlantis Submarines has helped define the modern passenger submersible industry, completing over 600,000 dives and carrying more than 18.5 million passengers. Drawing on his experience as a pilot, engineer, and company president, Daniel Hurd will reflect on the evolution of tourist submarine operations, safety practices, classification requirements, and regulatory oversight. He will also share lessons learned and his perspective on the challenges and opportunities shaping the industry's future.

6	2:30 to 3:00	**REV OCEAN** **WOODS HOLE INST** **IFREMER** **PISCES VI**	**PANEL DISCUSSION** **SCIENCE OPERATORS**	This panel will explore how crewed submersibles are advancing scientific research and expanding access to the deep ocean. Science operators will discuss recent progress in exploration, observation, sampling, and data collection, together with the operational, technical, financial, and logistical challenges involved in conducting complex underwater missions. The discussion will also examine opportunities for international collaboration among scientists, operators, engineers, vessel teams, and funding organizations.
	3:00 to 3:30	**COFFEE BREAK**		
7	3:30 to 4:00	**Leighton Rolley** **Hector Salvador** **Scott Waters**	**BREAKOUT DISCUSSION**	
8	4:00 to 4:30	**Leighton Rolley** **Hector Salvador** **Scott Waters**	**Principles of SOG/ Future of SOG**	
9	4:30 to 5:00	**Leighton Rolley** **Jonathan Struwe** **William Kohnen**	**CLOSING WORDS** **SOG - WSO - DNV**	

FRIDAY, September 18

DNV MARINE CENTER OPEN MEETING ROOMS

DNV has made available five (5) meeting rooms, at the Maritime Center for Friday morning from 9:00-12:00. These rooms are for delegates to reserve for business meetings after the conference. The rooms all have computer display and hold 6-10 people.

REGISTER AT the ON-SITE WSO DESK with Ms. ANAIS HAMEL to book your room while at the conference.

BIOGRAPHIES – 2026 SPEAKERS

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Leon Adams is a Vice President at Southwest Electronic Energy (SWE). He has 14+ years' experience in Lithium and Lithium Ion battery applications, product definition, applications engineering, technical customer support, and sales. With his focus on Subsea Lithium Ion battery power, Leon has authored various technical papers and articles and presented at Oceans International, Underwater Intervention, MTS Submarine Symposium, Oceans Gulf Coast, and other technical conferences. Prior to SWE, Leon had 28 years experience at Texas Instruments as a Microprocessor Systems Engineer and Product Manager, managing applications, marketing, and business in Digital Signal Processing (DSP) and embedded processing. At TI, Leon authored technical articles on DSP processors, embedded processing solutions, DSP power management, and software development tools. Leon is a member of MTS, SUT, AADE, and IEEE. He has a BS in Engineering Physics from Murray State University and an MBA from the University of Texas-Austin.

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Bonnie Blackburn is a Lead Engineer for the Marine Structures and Engineering team at Southwest Research Institute (SwRI). She is a registered professional engineer with fifteen years' experience working with pressurized equipment in various industries. At SwRI, she engages in engineering design, analysis, and fabrication support for pressure vessels and their associated structures and mechanisms. Ms. Blackburn is newly a member of the ASME PVHO committee, supporting the development of that standard.

BROUGHTON, Keith
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Keith Broughton, a highly experienced underwriter who specializes in underwater systems including autonomous underwater vehicles and seabed-systems. Keith was a Royal Navy officer and mine clearance diver for a decade before entering the insurance sector and is also an accomplished sailor and a qualified marine biologist. Keith speaks about underwriting, the evolution of marine insurance legislation and the value that being an active SUT member has given him throughout his career.

BRYANT, Matthew
President / Founder

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Matt began his insurance career in 1997 with State Farm Insurance Company, underwriting homeowners, personal umbrella, and boat owners' policies. After rising to Vice President of Underwriting for a regional insurer, he transitioned to commercial insurance sales as an agent and risk advisor, then moved into wholesale broking to support retail agents with their marine clients. His family's deep marine background spans three generations, including boat builders, captains, and marine mechanics. Matt’s mother even managed the Exomos submersible manufacturing facility in Stuart, Florida for a year. A natural adventurer, Matt is keenly interested in and passionate about the manned submersible industry. Growing up reading about Alvin and soaking in every chance to get out on the ocean, he married his passion for the ocean with an insurance career that allows him to exercise his creativity and interests to serve those industry niches he finds most interesting. Matt is now owner and founder of Deep Blue Specialty Brokers in Florida, focusing on commercial marine insurance and working closely with both submersible manufacturers and operators. As an independent brokerage, Deep Blue is free to choose the facilities and underwriters best suited to each risk, with no competing corporate constraints limiting the options. Matt leverages strong relationships and specialized knowledge to address complex commercial ocean marine risks for his clients.

BYBEE, Jeff
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Jeff Bybee is the Manager of System 3R for Pelagic Research Services (PRS), where he leads the global Rapid, Ready-state, Response program for crewed submersibles. He joined PRS after a 20-year career in the U.S. Coast Guard, serving in engineering, marine inspection, and senior operational leadership roles. Mr. Bybee's experience spans marine engineering, regulatory compliance, vessel design review, emergency management, and maritime operations. He holds an Unlimited Third Assistant Engineer License and Incident Command System certifications supporting emergency response planning and coordination. He earned degrees from Maine Maritime Academy and the University of Michigan in marine engineering, naval architecture, and industrial and operations engineering.

CLARK, CAPT Gard
Captain, USN (Ret.)

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Captain Clark is a career submariner whose undersea experience includes 31 years in the United States Navy culminating with command of the USS DALLAS (SSN-700), a fast attack nuclear powered submarine specially equipped to carry the Seal Delivery Vehicle (SDV). The SDV is a deployable MUV housed in a Dry Deck Shelter on the deck of the larger submarine and is a "wet submersible" where operators wear scuba gear and are exposed to the ocean environment. While in command, Captain Clark conducted operations with special forces using the SDV during two six-month deployments to the Middle East and Indian Ocean. Following command at sea, Captain Clark served as the Major Program Manager for Naval Sea Systems Command (NAVSEA) PMS-399--Special Operations Forces Undersea Mobility Program Office. There he was responsible for sustainment and development of Dry Navy Submersibles as well as Dry Deck Shelters and other submarine Deep Submergence Systems including maintaining Scope of Certification for manned operations. Following retirement from the Navy in 2012, he joined Teledyne Brown Engineering, Inc. retiring in 2013 as Senior Vice President leading the Energy and Environment Business Unit in Huntsville, AL including responsibility for Teledyne Energy Systems in Hunt Valley, MD. Teledyne Brown Engineering is the designer and manufacturer of the US Navy Shallow Water Combat Submersible which is the follow-on vehicle to the SDV and also manages the Teledyne Slocum Glider in conjunction with Teledyne Marine. Teledyne Energy Systems produces undersea lithium-ion battery systems as well as the Subsea Supercharger® untethered persistent undersea electric generating fuel cell system. As principal of CPMQ Consulting, Captain Clark provides root cause analysis training and management consulting services with special emphasis in nuclear and undersea industries and is Deputy Executive Director of the World Submarine Organization and co-chair of the Marine Technology Society Submarine Committee.

CUNNINGHAM, Curt

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Mr. Curt D. Cunningham serves as the Principal Assistant Program Manager for Submarine Escape and Rescue and Global Submarine Rescue. In this capacity, he directs submarine escape and survivability, in-service rescue systems, and foreign military sales for international rescue seat certifications. Since December 2012, Mr. Cunningham has held pivotal roles across the Submarine Rescue enterprise. Notably, as Assistant Program Manager for Acquisition, he led the successful delivery of the U.S. Navy Submarine Decompression System. Prior to entering civil service, he supported Director Submarine Programs as a defense contractor managing Team Submarine support contracts at Perot Systems and Dell Services. A veteran submariner, Mr. Cunningham served from 1998 to 2008, departing as a Machinist's Mate 1st Class (SS) after tours aboard USS Newport News (SSN-750), USS Hampton (SSN-767), and MARMC. He holds a Bachelor of Science in Interdisciplinary Studies (Psychology/Sociology) and has earned the Navy Meritorious Civilian Service Award (2).

CORSI, Pietro

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Pietro Corsi is a Naval Architect and Marine Engineer, currently Project Manager in Naval Ship Sector at RINA Services S.p.A. In this role, he oversees the classification of naval and governmental vessels, including submarine and underwater domain projects, ensuring compliance with international standards and contractual requirements. Alongside these tasks, he is also involved in developing services and business opportunities, supporting RINA's strategic expansion and reinforcing international partnerships in the naval domain. He graduated in 2019 with top honors in Marine Architecture and Naval Engineering from the University of Genoa, where his studies focused on ship performance, marine systems and sustainable engineering approaches. Corsi is also pursuing a PhD at Klaipeda University, specializing in Autonomous Vessels (MASS), with research centered on regulatory frameworks, safety and innovative solutions for enabling autonomous ship operations. He has developed strong technical and project management skills across different fields, from ship design and operations to advanced maritime technologies. This background enables him to approach complex challenges with both technical rigor and a multidisciplinary perspective. His professional path includes a wide range of experiences in the marine sector, including ABB - Marine & Ports and the shipping company Grandi Navi Veloci (GNV, MSC Group). These opportunities gave him the chance to become familiar with innovative technologies, energy efficiency initiatives and operational management in shipping sector. Beyond engineering, Mr. Corsi is also a pianist, an experience that reflects his non-conventional and creative approach to problem-solving.

COTTEN, Gregory PhD
Technical & Operational Authority

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Dr Gregory B. Cotten graduated from the United States Naval Academy in 1987 with a B.S. in Systems Engineering. He completed 5 strategic deterrent patrols on USS JAMES MADISON (SSBN-627), ultimately as Strategic Weapons Officer. He completed his M.E. and Ph.D. in Chemical Engineering from the University of Idaho in 2000 and then served as Associate Chair and Assistant Professor of the Chemistry Department at USNA; as EXECUTIVE OFFICER, Deep Submergence Unit; DEPUTY COMMANDER for Combat Development, Naval Special Warfare Group 3; and retired in 2014 as DEPUTY COMMANDER for Undersea Rescue at Commander Submarine Squadron 11. Since 2014, he has been involved with global Submarine Escape and Rescue Systems (SERS) at JFD Ltd., in leadership positions for offshore operations, training and competence, and through-life engineering design, maintenance and certification. He is currently the SERS Technical and Operational Authority and holds a Master Mariner's Credential from the United States Coast Guard.

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Naval architect and engineering specialist with over 23 years of experience in structural analysis, classification, rule development, and inspection across the maritime and underwater technology sectors. Currently serving as Principal Approval Engineer and Principal Inspection Engineer at DNV, with responsibility for leading complex projects involving manned submersibles, pressurized systems, and underwater mechanical and fluid systems, supporting both newbuilding and fleet-in-service activities. Professional expertise spans advanced numerical simulation, damage assessment, and technical rule development for ships, offshore structures, and submarine applications. In addition, active contributions have been made to international technical committees, including the ISSC Ultimate Strength Committee, supporting the development and harmonization of industry standards.

EDWARDS, David
International Search and Rescue Expert

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Mr. David Edwards serves as the lead international Search and Rescue (SAR) expert at United States Coast Guard (USCG) Headquarters, a position he has held since 1998. Since 2006, he has also served as the Chair of the International Civil Aviation Organization (ICAO)/International Maritime Organization (IMO) Joint Working Group on Search and Rescue. Bringing a foundational 23 years of active-duty USCG service both at sea and ashore, Mr. Edwards bridges hands-on operational experience with high-level international policy. At this symposium, he will leverage his decades of global coordination expertise to address the complex challenges of sub-sea rescue, highlighting the vital need for interconnected government and industry capabilities during deep-sea emergencies.

ESTAD TOFTERÅ, Maria
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Maria Erstad Tofterå recently graduated with a bachelor’s degree in Nautical Science from the Norwegian University of Science and Technology (NTNU). She took the vocational route into higher education: after completing maritime apprenticeships and earning her Able Seaman certificates, she qualified for university admission without following the traditional academic pathway. Prior to her studies, Maria gained experience as an Able Seaman in the fisheries and aquaculture industries. Throughout her time at NTNU, she has been active in COAST - Centre of Excellence in Maritime Simulator Training and Assessment. This thesis represents her final bachelor's project in partnership with Johannes Svendsen. She has since begun her deck officer cadetship with Sølvtrans, serving on board one of the company’s most advanced wellboats, specializing in live fish treatment and transport operations.

GEYSEN, Dominique
Captain

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Sailing since young age from the guiding hand of his grandfather Dominique has lived his passion for the ocean ever since by relating sailing, diving and whales. As captain he specialized in larger sailing vessels, with as highlights sailing globally with the Canadian school ship for five years, and sailing 70ºN in winter and 80ºN in summer, on a 100-year-old three-mast top-sail schooner. Ashore, he specialized in managing new ship operations. The passion for remote and complex diving operations onboard ships, led him to help yachts with their diving needs (safety, compressors technologies, hyperbaric chambers and submersibles), which gave him the privilege to meet people he had been looking up to for many years.

GILBERT, Antony
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Antony Gilbert is the Sub Operations Manager and Chief Pilot for Wilhelmsen Ship Management, where he set up and now manages the Viking Expedition fleet's four manned submersibles aboard expedition cruise vessels operating worldwide, including in the polar regions. His role with WSM also includes providing consultancy to private clients within the manned submersible sector. Having first gone to sea at 16, Antony has 20 years of maritime experience across expedition ships, superyachts, cruise ships, sailing vessels, tankers and nuclear fuel carriers. He started as an Engineer/ETO Cadet before moving into Deck Officer roles and progressing through the ranks to Chief Officer. After qualifying as a submersible pilot in 2016, his interest in the field grew and eventually led him to move into submersible operations full-time, combining piloting, operational management and pilot training. He is passionate about the future of manned submersibles and the continued development of safe, professional and sustainable operations.

GOLDTHORPE, Brian

Head of Marketing & Director of Development for Canary Islands

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Brian gained a degree in Geography but went into IT in the 70's before moving into a marketing role and held senior positions in both engineering and customer service companies in the UK. He moved to the Canary Islands where he ran a recreational dive center for 20 years before 'retiring' and helping the SubRacing Series organize the first ever head-to-head submarine races in open seas. Drawn in by the intrigue and fun of racing submarines in open water he now leads the developments in the Canaries and is also Head of Marketing.

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Chris Haugen leads FORCYS' business development in North America. He was a career submarine officer in the US Navy, including command of the nuclear-powered ballistic missile submarine, the USS NEBRASKA (SSBN 739)(Gold). FORCYS is an undersea mission company integrating the technologies of their partners for naval and security customers.

HEATON, Jeff

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Jeff Heaton began his career as a commercial diver, working his way through a BSc in Marine Science at UBC. After a decade of diving, he moved on to join Nuytco Research as a technician and submersible pilot and has been with Nuytco for 30 years. When Nuytco debuted the Deep Worker class of submersibles and the Exosuit ADS, Heaton moved into the role of lead pilot and supervisor. As Nuytco's projects expanded, Heaton became Operations Manager and eventually company President, after the passing of his friend and mentor Phil Nuytten. At present, Nuytco is involved

with the sea trials of its next generation ADS for the US Navy. Acronym DSEND (Deep Sea Expeditionary No Decompression), Nuytco's new ADS will bring about a shift in ADS operations. Currently focused on Mobile Diving and Salvage Operations and other Undersea Warfare tasks, the DSEND system will easily be shifted into commercial and scientific diving roles.

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Dr Stephan Hinz, a qualified mechanical engineer who completed his PhD in the field of fiber-reinforced composite technology for aviation application, has worked since 2007 as an approval engineer at Germanischer Lloyd – later DNV – in the field of underwater technology, specializing in manned submersibles. Since 2023, he has been running his own engineering consultancy – now based in Zurich, Switzerland – which specializes in underwater technology. He supports his clients in the design, conversion or new construction of manned submersibles, drawing on his expertise also to facilitate the acquisition of certifications or class from a classification society.

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Daniel Hurd is President of Atlantis Submarines International. The company provides technical support to six commercial passenger submersible operations in the Caribbean and Hawaii. He is a Professional Engineer (Mechanical), registered with Engineers and Geoscientists of British Columbia (EGBC). Daniel joined Atlantis Submarines in Grand Cayman in 2007, where he trained as a submersible pilot and spent the next several years responsible for passenger and crew safety and submersible operation. He joined the engineering group in Vancouver in 2015, and now leads the company's technical support group and serves as its primary liaison with ABS, USCG, and other regulatory authorities on technical and safety matters. He sits on six ASME PVHO committees and the ABS Special Committee on Underwater Systems and Vehicles. Founded in 1983, Atlantis Submarines is the world's first commercial passenger submarine tour company and has carried over 18.5 million passengers and completed more than 600,000 dives.

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Dr. Se Jun Jin, Director of the Future Strategy Research Center at the Korea Institute of Ocean Science & Technology (KIOST), is also a co-author. His biography will be submitted separately at a later stage. He currently serves as the Deputy Director of the Future Strategy Research Center at the Korea Institute of Ocean Science and Technology (KIOST). He earned his Ph.D. in Economics from Seoul National University of Science and Technology, where he majored in Resource Economics, Environmental Economics, and Microeconomics. Dr. Jin conducts research aimed at establishing KIOST's mid-to-long-term strategies and identifying new R&D opportunities. Dr. Jin contributed a paper titled "Measuring the Scientific Benefits from the Deep-sea Human-operated Vehicle Project: A Choice Experiment Study" as the first author to Journal of Ocean and Polar Research in September 2014, focusing on the economic value of deep-sea manned submersibles. Additionally, he is conducting research on regulatory and institutional improvements and utilization methods for the development of manned submersibles. Dr. Jin Se-jun is a co-author of "A Study on Legal Policy Regarding Safety in Research and Development of Submarines," co-authored with Dr. Kim Kwon-il and published in the Journal of Public Law in May 2025.

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William Kohnen is president and Chief Executive Officer of HYDROSPACE Group Inc., a California company expert in manned submersibles, mission critical control systems and pressure vessels for human occupancy. Mr. Kohnen has 30 years of engineering experience in engineering, serving the space, medical and subsea industries with a primary mission to provide complete solutions to all types of high reliability applications. He is executive director of the World Submarine Organization and chairman of the Marine Technology Society (MTS) committee on Submarine Vehicles for the past 21 years. He has published many papers and articles on the state of the submarine industry. Mr. Kohnen is a member of the ASME PVHO Safety Standards Committee, a member of the ABS Special Committee on Rules for Underwater Vehicles, Industry representative for DNV Underwater Technology Rules review, member of the Undersea and Hyperbaric Medical Society (UHMS), and the Aerospace Medical Society. Mr. Kohnen is Co-Founder of SEAmagine Hydrospace Corp, which designs and produces manned submersibles since 1995, with multiple vehicles distributed around the globe. Kohnen was born in Germany. He has a bachelor's and master's degree in electrical engineering at McGill University, in Montreal, Canada.

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Hadal Subsea Engineering is an Australian company specializing in deep-ocean systems, working primarily with philanthropic science groups and superyacht submersible programs, along with supporting commercial and military subsea projects. Hadal led the operations and engineering for Caladan Oceanics' Hadal Exploration System, the deepest diving submersible system in the world. Tim Macdonald is a systems engineer and submersible pilot, and one of only two people in the world to have dived the three deepest ocean trenches, including the Mariana Trench. His operational background specializes in the hadal zone below 6,000 meters, with more than 500 lander deployments and several hundred hours running manned dive operations at full ocean depth. Much of that work has been philanthropically funded, placing scientists on the seafloor at depths no research program could otherwise reach.

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Jeff Mahoney is Director of Business Development for Pelagic Research Services (PRS), a U.S.-based deep-ocean operations company specializing in scientific ROV operations, expedition support, precision subsea tracking and navigation, and emergency response. He served as PRS's primary communications representative during the OceanGate Titan emergency response, from the rapid deployment of the Odysseus 6K ROV system through the international rescue effort and subsequent recovery operations. Alongside PRS CEO Edward Cassano, Mr. Mahoney served as the principal architect of the proprietary System 3R™ (Rapid, Ready-State, Response™) platform, defining its operational software framework, functionality, and feature set while leading its development team through multiple iterations to its current deployment. Drawing on lessons reinforced through real-world emergency response planning and operations, he continues to help guide the platform's evolution for advancing emergency preparedness, critical operational data management, and coordinated response capabilities.

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Ms. Julie Miller serves as the General Engineer on the Offshore Team within the Vessel and Facility Operating Standards Division at United States Coast Guard Headquarters. In this role, she provides technical evaluations and shapes safety standards for complex offshore maritime operations, including deep-sea mining, petroleum, and non-mineral energy installations. As a key interagency liaison, Ms. Miller works closely with federal partners to streamline offshore safety programs, reduce regulatory redundancy, and enhance operational excellence. At this symposium, she will synthesize the panel's themes by discussing the critical need for international collaboration, emergency planning, and the alignment of company safety management systems with evolving flag state standards.

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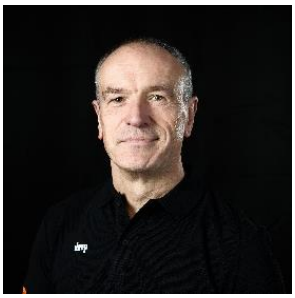

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Paul Nelson is Training Director at DEEP Institute, leading the design, delivery and governance of safety-critical training for DEEP's deep-sea exploration and diving programs. He has thirty years' experience of leading in complex, highly regulated environments. Prior to joining DEEP, he held multiple roles in Babcock International including heading up the Global Skills Academy and leading the provision of skills for the rail, nuclear and automotive sectors. Before that he spent twenty years in the Royal Navy where, alongside appointments in core training management roles, highlights include being part of the design team for the next generation of Frigate, advising the Government of Iraq on Maritime Doctrine, and working in NATO as the UK lead for mission interoperability. Paul’s focus is on operational capability and achieving outcomes with a clear investment in the people component. His experience in strategic roles is complemented by a range of post-graduate studies focusing on leadership in operational contexts.

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I began my career at Evonik as an industrial mechanic, and I quickly realized that I had no strong interest in the field of plastics chemistry alone. By completing both a Bachelor's and a Master's degree in plastics engineering, I continued to accompany the PLEXIGLAS® business through several M&A transitions, leading up to today's POLYVANTIS. Along the way, I had the opportunity to work as an operations assistant in the casting plant and as a market segment manager for blocks. In my current role, I unite products that operate at 12 kilometers above sea level and 11 kilometers below it. My two children show us every day how beautiful the world truly is and what really matters in life. In my private life, I am a youth soccer coach for the U9 team, I enjoy diving, and I am passionate about riding motorcycles. I mainly read non-fiction and have a broad interest in the sciences that shape our world.

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Hector Salvador is the Submersible Supervisor at REV Ocean, where he is responsible for DSV Aurelia, the deepest-diving acrylic submersible currently in operation, and supervises the development of its moonpool launch and recovery system. He began his professional career in the space sector as an aerospace engineer before transitioning to underwater operations in 2012. From 2012 to 2015, he served as Senior Pilot and Field Operations Manager at U-Boat Worx, before joining Triton Submarines as Director of Operations and General Manager of the company's EMEA yard in Barcelona, where he remained until 2024. In addition to his operational work, Héctor is a reservist officer at the Spanish Navy Diving Center (CBA), where he contributes to underwater intervention and submarine rescue exercises. He also organizes educational activities and conferences throughout Spain, using his 2021 descent into the Marianas Trench to inspire the next generation of ocean explorers and advocate for marine conservation.

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Oliver Shirk was born November 21, 1961, and is married with two adult children. After finishing school and Bundeswehr (army): Study of Technical Chemistry in the University of Applied Sciences, Lübeck, Germany. Started 1987 at Dräger Safety as Chemistry Engineer in the development department. Further stations were Product Manager in Detection, Marketing Manager in Mobile gas measurement, Focus group manager Diagnostics, Product Manager Diving, Business Development manager and Marketing Manager in Defence and Security. Oliver holds a CMAS *** diving certificate and also trains users of Dräger diving equipment.

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Philipp Schwarmann has been with DNV for 15 years and has spent the last nine years within the Underwater Technology section. As Deputy Head of Section and Principal Contracts Manager, he is responsible for commercial affairs, export control, and project management setup, supporting projects from initial customer engagement through to completion.

Holding a bachelor’s degree in international business, He brought experience in technical sales, marketing, and project management. Prior to joining DNV, he spent 11 years in the international IT sector, including roles with Hewlett-Packard (HP) focused on system integration and virtual reality software solutions.

He plays a role in the continuous development of DNV's Underwater Technology business, supporting commercial strategy, market development, and customer engagement worldwide. The successful combination of sound engineering know-how with commercial experience and creativity is one of his guiding principles in the daily business of fantastic underwater technology.

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Jonathan Struwe is Head of Section for Underwater Technology at DNV in Hamburg, Germany. The Underwater Technology Section of DNV is primarily involved in manned submersible classification activities of DNV. Currently, he leads several manned submersible new-building classification projects. The technical experts at DNV's Underwater Technology Section are dealing with approval and analysis of a wide range of underwater systems and provide, besides approval according to the DNV Rules for Underwater Technology, technical expertise based on an engineering approach.

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Johannes Svendsen recently graduated with a bachelor's degree in Nautical Science from the Norwegian University of Science and Technology (NTNU). He took the vocational route into higher education: after completing a maritime apprenticeship with the Institute of Marine Research (IMR) and earning his trade certificate as an Able Seaman, he qualified for university admission without following the traditional academic pathway.Prior to his studies, Johannes worked aboard research vessels and high-speed craft. Throughout his time at NTNU, he has been actively involved in COAST – Centre of Excellence in Maritime Simulator Training and Assessment. This thesis was completed in collaboration with Maria Erstad Toftera as the final project for his bachelor's degree. He will return to sea this summer, working towards his Officer of the Watch (OOW) Certificate of Competency.

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Anthony Tarantino is a program manager with a background in electrical engineering and project management. He has over 30 years of professional experience and has been with WHOI since 2000. He is the Deep Submergence Vehicle Alvin Group's Technical Program Manager, an Alvin Pilot, and a relief Expedition Leader. He has managed and supported several deep submergence vehicle projects and programs throughout his career.

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Roy Thomas works as a Senior Technical Advisor with the Government Engineering Services Department of the American Bureau of Shipping (ABS) and is based in Houston, TX. He has worked with ABS for the past 24 years. Mr. Thomas has extensive experience with the certification of underwater vehicles, systems and hyperbaric facilities for commercial and military applications. He has served as the lead design review engineer at ABS on numerous projects involving underwater vehicles, systems and hyperbaric facilities of every possible form and design. Over the years, he has played an active role in updating the ABS Rules for Underwater Vehicles, Systems and Hyperbaric Facilities and has authored new sections on Underwater Habitats, Diving Systems, Lock-Out Submersibles, Ambient-Pressure Submersibles, Atmospheric Diving Suits, AUVs, ROVs, Lithium Batteries, etc. He is actively involved with various industry committees and currently serves as the Chair of the ASME PVHO - Subcommittee on Diving Systems, as well as the Subcommittee on Submersibles. He also currently serves as the Chair of the SNAME T&R Panel OC-6 and is coordinating the efforts to update the SNAME textbook “Submersible Vehicle Systems Design”. Mr. Thomas holds a master’s degree in Ocean and Naval Architectural Engineering from Memorial University of Newfoundland, Canada with a specialization in underwater vehicles and systems. He also holds a bachelor’s degree in marine engineering from Marine Engineering and Research Institute, India.

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Maarten van der Meijs is Director of Engineering & Development at U-Boat Worx, the world's leading manufacturer of private submersibles, based in Breda, The Netherlands. With a background in mechanical engineering, he leads the engineering and development of U-Boat Worx's submersible fleet, including the recently launched Super Sub — currently the fastest private submersible on the market, combining dolphin-inspired hydrodynamics with DNV-certified safety systems. Maarten also holds further business education from Nyenrode Business Universiteit. With hands-on experience across submersible design, launch & recovery operations, and safety-critical systems, he brings a practical, engineering-driven perspective to the evolving world of underwater exploration.

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Scott Waters is the president of Pisces VI Submarine, SL based in the Canary Islands specializing in scientific research and film production. Pisces is capable of diving 2180m with one pilot and two observers and can be easily and inexpensively transported anywhere in the world in a shipping container. Scott started working with human occupied submersibles in 2008 and started the Pisces VI Submarine in 2015 with a wonderful, talented team. Pisces has conducted 5 major missions since starting operations in 2022, with highlights including scientific research in partnership with the Spanish Oceanographic Institution conducting research on the La Palma volcano eruption, locating a sunken refugee boat with unfortunate massive loss of life in Lebanon, discovering 17 new species in partnership with Ocean Census and the Nippon Foundation, and most recently conducting shark research that has led to protection zones for critically endangered sharks.

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Lieutenant Commander (LCDR) Tom Whalen serves as the National Technical Advisor for the U.S. Coast Guard Investigations National Center of Expertise (NCOE), providing expert technical support to marine casualty investigations worldwide. Most notably, LCDR Whalen served as the Lead Investigating Officer for the Commandant-level Marine Board of Investigation into the 2023 implosion of the Titan submersible. Backed by over two decades of Coast Guard service—including supervising regional marine safety detachments and managing compliance for thousands of commercial and foreign vessels—he brings deep expertise in marine forensics, international safety treaties, and regulatory oversight. At this symposium, LCDR Whalen will share key lessons from high-profile casualty investigations to address modern challenges in novel vessel oversight.

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