22nd International Submarine Symposium

PROGRAM

OCTOBER 7-10, 2025

INSTITUTO ESPAÑOL DE OCEANOGRAFÍA

TENERIFE, CANARY ISLANDS, SPAIN

2025 International Submarine Symposium

4-DAY SCHEDULE

No	Session	OCT. 7 2025	OCT. 8 2025	OCT. 9 2025	OCT. 10 2025
	8:30 to 9:00	*Arrival, Registration & Coffee (15 mins)*	*Arrival & Coffee*	Arrival & Coffee	Arrival & Coffee
1	9:00 to 9:30	***Opening Remarks*** *(15 min + 15 min discussion)*	***Keynote Speaker – TBC*** *(20 mins + 10 min Q&A)*	**Opening Remarks & 2025 Overview** MTS Submarine Chair, USA WSO Exec Director, Intl	**Concepts for New Manned Submersibles** Submergence Group LLC, UK
2	9:30 to 10:00	**A Review of Year 2 of SOG**	**Fatigue and Its Impact on Safe Submersible Operations** Open Mic Discussion (60 mins)	**ALVIN Operations in 2025 and Emergency Planning** Woods Hole Oceanographic Inst, USA	**DNV Classification Rules for Underwater Habitats** DNV, Germany
	10:00 to 10:30	**Environmental Management** Intro - Why This Matters to Us All		COFFEE BREAK	COFFEE BREAK
3	10:30 to 11:00	COFFEE BREAK	COFFEE BREAK	**MATSYA 6000 India's Deep-Water Manned Submersible- An Overview** Natl Institute Ocean Technology, INDIA	**Improving Submarine Rescue with Autonomous Systems** FORCYS, UK / USA
4	11:00 to 11:30	***Environmental Management*** *Group Breakout Discussion (45 mins)* *Topic Feedback (30 mins)* *Next Steps (15 mins)*	**The Future of the SOG Open Mic Discussion** Agreement of Next Steps (75 mins)	**SHINKAI 6500 operations in 2025 and Emergency Planning** JAMSTEC, JAPAN	**Rapid Ready-State Response: System 3R for Manned Submersibles** Pelagic Research Services, USA
5	11:30 to 12:00			**Diving the Last Frontier; Submersible Operations in remote Locations** EYOS Expeditions Ltd, UK	**Leverage Established Submersible ERPs to Achieve Timely Rescue** Show Me Quality, USA
	12:00 to 12:30		**Closing Remarks - Leighton** (15 mins)	**LUNCH**	**LUNCH**
	12:30 to 1:00	**LUNCH**	**LUNCH**		
	1:00 to 1:30				
6	1:30 to 2:00	**Operational Guidelines WG (60 mins)** Review and Group Feedback Discussion, Next steps (what, when, who)	**WSO FLAG STATE MEETING** **Maritime Authorities** *& Industry Members* *INVITED SPEAKERS and Open to Observers*	**U.S. Submarine Rescue System Capability Gaps for Modernization** US NAVY, NAVSEA PMS390, USA	**Overview of the ABS Underwater Rule Change Proposals** American Bureau Shipping, USA
7	2:00 to 2:30			**DRASS Submarine Rescue Sys & RINA modular certification** RINA / DRASS, ITALY	**The pathology of OceanGate and its legacy for uncertified MUV'S** STANLEY Submarines, HONDURAS
8	2:30 to 3:00	**Pilot Logbooks WG (30 mins)** Next steps (what, when, who)		**DSAR6 Hull Replacement Programme 2024-2025** JFD Global, UK / USA	**Investigating hypercapnia onboard OceanGate's TITAN submersible** Kemper Engineering Services, LLC, USA
	3:00 to 3:30	COFFEE BREAK		COFFEE BREAK	COFFEE BREAK
9	3:30 to 4:00	**Keynote Speaker – TBC** (20 mins + 10 min Q&A)	COFFEE BREAK	**Manned Submersible Insurance - Securing Industry Feedback** Deep Blue Specialty Brokers, LLC	**Explorations in Inconel 625 Cladding for Seal Surfaces** Southwest Research Inst, USA
10	4:00 to 4:30	**Annual Exercise WG (60 mins)** Review and Group Feedback Discussion, Next steps (what, when, who)	**MTS Submarine Committee & World Submarine Org** Annual Member Meeting OPEN MEETING	**Bridging Submersible Platforms: Training Submersible Pilots** SEAmagine Hydrospace Corp, USA	**Lessons Learned, Arronax Ver 2 Propulsion Control System** M.W. Zintel Consulting, USA
11	4:30 to 5:00			**Submarine Training Academy and updates from Pisces VI** PISCES VI Submarines SL, SPAIN	**Lithium batteries, a key technology for improving eficiency in submarines** ICTINEU Submarins SL, SPAIN
	5:00 to 6:00		**2025 SYMPOSIUM COCKTAIL RECEPTION at Oceanographic Inst.**		
	6:00 to 7:00				

Welcome to the 22nd International Submarine Symposium!

Dear Members and Esteemed Delegates,

We are delighted to welcome you to the 22nd International Submarine Symposium, proudly hosted at the Instituto Español de Oceanografía, in partnership with the MTS Submarine Committee, the World Submarine Organization, and the Submersible Operators Group.

This year, in the dynamic city of Tenerife in the Canary Islands, we gather to connect, learn, and inspire following a pivotal year for our industry. The symposium brings together submarine professionals from around the world—manufacturers, operators, pilots, service providers, and regulators—united by a shared commitment to advancing innovation, strengthening standards, and upholding the highest levels of safety in subsea exploration. Together, we will explore the latest developments, exchange invaluable insights, and build lasting connections across the global subsea community.

We are especially proud to celebrate a significant milestone: for the first time, the symposium has moved to an international stage, marking the beginning of our long-term vision to rotate the event among the Americas, Europe, and Asia. We invite you to join leaders from across all sectors in sessions ranging from technical analyses and industry overviews to product showcases and networking opportunities.

Our deepest gratitude goes to our distinguished speakers for sharing their expertise. We also extend a special thanks to the Instituto Español de Oceanografía for hosting us, and to the Submersible Operators Group for their partnership in making this event possible. We also thank our generous sponsors who help make this event free to all and share the adventures of this unique technology.

Finally, we warmly invite you to join us at the Symposium Cocktail Reception on Wednesday evening. This relaxed gathering—featuring conversation, and the vibrant spirit of Tenerife—offers the perfect opportunity to unwind and connect with colleagues in a memorable setting. We look forward to an inspiring and enriching symposium, new collaborations and shared expertise. Here's to another remarkable year of innovation, discovery, and progress!

With warm regards,
Sincerely,

William Kohnen
Submarine Committee, Chair
Marine Technology Society

2025 International Submarine Symposium

Spanish Oceanographic Inst. Tenerife, Spain

DAY 3 Thursday OCT-9-2025

No	Session	Speaker	Company	Presentation Title
1	9:00 - 9:30	William Kohnen, Capt Gard Clark (USN Ret)	**MTS Submarine Committee World Submarine Organization**	Opening Remarks - 2025 Annual Overview
2	9:30 to 10:00	Anthony Tarantino Alvin Technical Program Manager	**Woods Hole Oceanographic Institution**	ALVIN Operations in 2025 and Emergency Planning
	10:00 to 10:30	**COFFEE BREAK**		
3	10:30 to 11:00	Dr.D.Sathia Narayanan Dpty Project Director MATSYA6000	**NIOT - National Institute of Ocean Technology**	MATSYA 6000 India's Deep-Water Manned Submersible- An Overview
4	11:00 to 11:30	Itaru Kawama Dpty Director, Engr & Maintenance Dept	**JAMSTEC - Japan Agency for Marine-Earth Science and Technology**	SHINKAI 6500 operations in 2025 and Emergency Planning
5	11:30 to 12:00	Rob McCallum Founder	**EYOS Expeditions Ltd.**	Diving the Last Frontier; Submersible Operations in remote Locations
	12:00 to 1:30	**LUNCH**		
6	1:30 to 2:00	Cynthia Rodriguez Correa Escape & Rescue System, APM	**US NAVY NAVSEA PMS390**	U.S. Submarine Rescue System Capability Gaps for Modernization
7	2:00 to 2:30	P. Corsi - RINA Naval Ships D. D'Alessio - DRASS Engr	**RINA / DRASS**	The DRASS Submarine Rescue System and its RINA modular certification approach
8	2:30 to 3:00	Dr. Greg Cotten, PhD Technical & Operational Authority	**JFD Global**	DSAR6 Hull Replacement Programme 2024-2025
	3:00 to 3:30	**COFFEE BREAK**		
9	3:30 to 4:00	Matthew Bryant President / Founder	**Deep Blue Specialty Brokers, LLC**	Manned Submersible Insurance Workshop – Securing Industry Feedback to Improve Rates & Availability
10	4:00 to 4:30	Ian Sheard Founding Member & Chief Engineer	**SEAmagine Hydrospace Corp**	Bridging Submersible Platforms: Training Experienced Pilots on SEAmagine Submersibles
11	4:30 to 5:00	Scott Waters President	**Pisces VI Submarine, SL.**	Submarine Training Academy and updates from Pisces VI

2025 International Submarine Symposium

Spanish Oceanographic Inst. Tenerife, Spain

DAY 4 FRIDAY OCT-10-2025

No	Session	Speaker	Company	Presentation Title
1	9:00 - 9:30	Steve Armstrong Chief Technology Officer	**Submergence Group LLC**	Concepts for New Manned Submersibles
2	9:30 to 10:00	Jonathan Struwe Dept Head - UW Systems	**DNV**	DNV Classification Rules for Underwater Habitats
	10:00 to 10:30	**COFFEE BREAK**		
3	10:30 to 11:00	Chris Haugen Bus Dev Manager North America	**FORCYS**	Improving Submarine Rescue with Autonomous Systems
4	11:00 to 11:30	Edward R. Cassano CEO and co-founder	**Pelagic Research Services**	Rapid Ready-State Response: System 3R for Manned Submersibles
5	11:30 to 12:00	Amber Rowson, CEO Tommy Beals, Deep Sub Expert	**Show Me Quality Consulting**	Leverage Established Submersible ERPs: Using Existing SOPs + USCG & International SAR to Achieve Timely Rescue
	12:00 to 1:30	**LUNCH**		
6	1:30 to 2:00	Roy Thomas Sr. Principal Engineer	**American Bureau of Shipping**	Overview of the ABS Underwater Rule Change Proposals
7	2:00 to 2:30	Karl Stanley President	**Stanley Submarines**	The pathology of OceanGate and its legacy for uncertified MUV'S
8	2:30 to 3:00	Bart Kemper Principal Engineer P.E.	**Kemper Engineering Services, LLC**	Investigating hypercapnia upon impaired decision-making onboard OceanGate's TITAN submersible
	3:00 to 3:30	**COFFEE BREAK**		
9	3:30 to 4:00	Chris Storey Senior Manager Ocean Sim Labs	**Southwest Research Inst.**	Explorations in Inconel 625 Cladding for Seal Surfaces
10	4:00 to 4:30	Mike Zintel Principal	**W. Michael Zintel Consulting**	Lessons Learned, Arronax Ver 2 Propulsion Control System on SEAmagine Aurora Submersibles
11	4:30 to 5:00	Carme Parareda Chief Operations Officer	**ICTINEU Submarins SL**	Lithium batteries, a key technology for improving eficiency in submarines

2025 INTERNATIONAL SUBMARINE SYMPOSIUM

Wednesday, October 8

WSO FLAG STATE MEETING

OBJECTIVE

The 2023 TITAN accident exposed outdated, inconsistent submersible regulations, endangering lives and trust in industry. The World Submarine Organization proposes a new governance framework with clear categories, public registration, and classification oversight, harmonized through the IMO. A round table of maritime authorities worldwide will convene to shape a framework balancing diverse national needs with international agreement. With decades of experience, WSO stands ready to guide safe, sustainable operations.

MEETING

Wednesday, October 8th, 1:30PM – 3:30PM

OPEN MEETING

VIP PARTICIPANTS – Active participants at the round table
GUEST AUDIENCE – Audience is invited to listen, may ask questions at Q&A

AGENDA

Opening remarks and welcome.
By: William Kohnen, WSO Exec Director

Introduction of Invited Guests
By: Gregory B. Cotten, PhD, WSO Secretary

Presentation - TITAN investigative findings and recommendations
By: Jason Neubauer, USCG COMDT, United States Coast Guard

Questions & Answer Session

Presentation - WSO General Overview, Path Forward
By: William Kohnen, WSO Exec Director

Current Status - Adequacy of Current Regulations
By: CAPT Gard Clark, USN (Ret), WSO Deputy Exec Director

Open DISCUSSION

Concluding Remarks
By: William Kohnen, WSO

2025 INTERNATIONAL SUBMARINE SYMPOSIUM
at Instituto Español de Oceanografía- SPAIN

Thursday, October 9

9:00 – 9:30

Opening Remarks & 2025 Overview
By:

William Kohnen,
MTS - Submarine Committee Chair
United States

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

This International Submarine Symposium marks a milestone in the evolution of the conference; held for 22 years in the United States and now for the first time convened in Spain. This opening session will welcome delegates from across the globe and recognize the pioneers, contributors, and key industry milestones that have shaped the past year. The address will provide a high-level overview of the state of the submarine industry in 2025, highlighting developments across research, commercial ventures, expeditionary programs, tourism and leisure, and government and security operations. It will address emerging regulatory directions that influence safe and sustainable subsea activity. With a focus on international dialogue, this session opens the symposium with a forward-looking perspective on collaboration, innovation, and stewardship in the submarine community.

9:30 – 10:00

ALVIN Operations in 2025 and Emergency Planning
By: Anthony Tarantino
DSV ALVIN - Technical Program Manager
Woods Hole Oceanographic Institution
United States

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 upcoming major overhaul period work. The presentation will also discuss the development work that is currently underway to review and improve the program's distressed submersible emergency response plan.

10:00 – 10:30 COFFEE BREAK

10:30 – 11:00 **MATSYA 6000 India's Deep-Water Manned Submersible – An Overview**

By: Dr. D. Sathia Narayanan
Deputy Project Director
MATSYA6000 (Human Occupied Submersible)
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 gather 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 is capable of housing 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.

11:00 – 11:30 **SHINKAI 6500 operations in 2025 and Emergency Planning**

By: Itaru Kawama
Director, Fleet Maintenance and Engineering Dept
JAMSTEC- Japan Agency for Marine-Earth Science and Technology
JAPAN

The manned submersible SHINKAI 6500, completed in November 1989, has now surpassed 35 years of operation and has conducted more than 1,800 dives. While the 2025 mission schedule is still underway, the submersible continues to carry out research primarily in the waters surrounding Japan. In parallel, efforts are ongoing to evaluate and refine emergency evacuation procedures for scenarios such as sudden illness occurring inside the pressure hull—a matter of shared concern within the Submersible Operators Group (SOG). This presentation will provide an overview of SHINKAI 6500's recent activities and highlight current progress in developing emergency evacuation strategies for manned submersible operations.

11:30 – 12:00 **Diving the Last Frontier; Submersible Operations in remote Locations**

By: Rob McCallum
Founder
EYOS Expeditions Ltd.

The global private yacht fleet is a primary market for submersible manufacturers. Within the yachting industry the fastest growing niche is 'expedition cruising', where yachts venture far away from the classic yachting regions of the Mediterranean and the Caribbean.

Expedition cruising is 'destination focused', with yachts venturing to the most remote and pristine parts of our ocean, far away from shipping lanes, shoreside infrastructure and rescue apparatus. Expedition yachts can be found around Antarctica, the Arctic, Melanesia and the wider Pacific; all regions that are well away from traditional cruising routes and dive sites.

Similarly, deep water philanthropic science is now being undertaken on many of the same regions, with most private science-based operations undertaken by private vessels in waters that have not been visited by submersible previously.

Submersible dive operations in remote locations can require longer lead times for permitting/permissions due to the need to educate and inform the competent authorities. In the operational phase operators require a more self-sufficient approach than traditional locations. In Antarctica, several operators have banded together to ensure a system that pledges of mutual support and cross-sharing of assets for incident response. In other regions these 'cooperatives' can be created through good communication between collectives of operators such as the Philanthropic Ocean Research Vessel Operators aka 'The Pink Flamingos'.

These operations have steadily ramped up over decades and have remained incident free. They offer an insight into how a responsible industry is undertaking challenging dive operations in remote locations, with little statutory oversight.

What lessons can be learned from these operations in the wake of the OceanGate disaster, which remains a solitary and bleak outlier in the industry's history? How can the industry best encapsulate their successes to lay the formal foundation for a collective set of standards? How can the industry best demonstrate its historical operational success to ensure the industry maintains its proud safety record?

12:00 – 1:30 LUNCH BREAK

1:30 – 2:00

U.S. Submarine Rescue System Capability Gaps for Modernization

By: Cynthia Rodriguez Correa
Escape & Rescue System, APM
US NAVY NAVSEA PMS390
United States

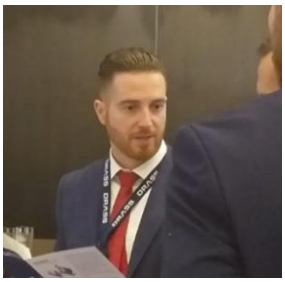
With recertification of the U.S. SRS coming to a close, efforts are being redirected into two main areas; upgrading and modernizing the SRS for operations through 2043, and defining capabilities for the next generation of SRS. Brief provides a high-level overview of SRS modernization efforts, areas of opportunity for technology development, and next generation.

2:00 – 2:30

The DRASS Submarine Rescue System and its RINA modular certification approach

By:

Pietro Corsi
Naval Ships, Project Manager
RINA Services
ITALY



Davide D'Alessio
Marine Engineer
DRASS
ITALY

The Deployable Submarine Rescue System for Italian Navy (SAVER) designed and built by DRASS and Saipem, represents a new standard in modular submarine rescue capabilities. The system includes a Submarine Rescue Vehicle (SRV600, rated to 600 msw), a Submarine Rescue Capsule (SRC), ROVs, a ventilation system, a Ballast blowing system and the Adjustable Container Support (ACS), enabling rapid, welding-free deployment on a vessel of opportunity. Designed to be installed on the ITS Olterra (aka SDO-SuRS, the mother vessel of the system), SAVER is fully containerized for global air transport and fast mobilization. The

certification of the complete asset is carried out by RINA with a tailored approach without impairing the flexibility of the system: a modular certification that allows the system to be deployed in several configurations ensuring the validity of the certificate. The Classification mainly according to RINA Rules for underwater Units started from the complete approval of the design, the testing of all the equipment installed on board up to the final deployable asset integrated testing and simulated sea trials. The key engineering innovation has been verified by RINA through a Technology Qualification to demonstrate the adequate level of safety and fully compliance of the system at the highest standard and Rules applicable. SAVER's flexible architecture and advanced certification path establish it as one of the most advanced submarine rescue solutions worldwide, ensuring the Italian Navy's readiness for deep-sea emergency operations.

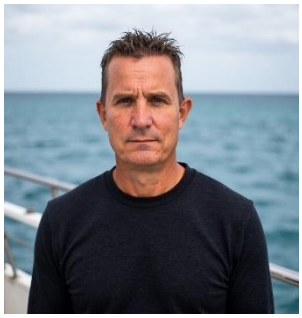
2:30 – 3:00 **DSAR6 Hull Replacement Programme 2024-2025**

By: Gregory B. Cotten, PhD
Technical & Operational Authority
JFD Global
UNITED STATES

DSAR6 is a Rescue Submersible Owned and Operated by JFD, Ltd, under a long-term lease to the Republic of Singapore Navy since 2008. Several hull sections were replaced in a short amount of time to ensure long term viability of the capability in the challenging corrosion environment of being permanently embarked on the support vessel MV Swift Rescue in Changi Naval Base, Singapore.

3:00 – 3:30 COFFEE BREAK

3:30 – 4:00 **Manned Submersible Insurance Workshop – Securing Industry Feedback to Improve Rates & Availability**



By: Matthew Bryant
President / Founder
Deep Blue Specialty Brokers, LLC
UNITED STATES

The insurance marketplace for manned submersibles is exceptionally limited. Few underwriters are willing to provide coverage, and securing adequate limits is often difficult. In the past couple years, two widely publicized fatal incidents further strained the market. These events triggered increased premiums and more restrictive coverage—compounding an already challenging environment. As the submersible industry works to rebuild public confidence and drive interest in exploration, there is a growing need for expanded insurance capacity and competition. A key barrier is the fear of the unknown, coupled with a failure to distinguish between well-managed, safe operations

and those involved in recent accidents. Insurers need a clearly defined strategy that demonstrates how manned submersibles can be underwritten with a high probability of profitability.
This workshop is designed to address those concerns. We are seeking industry input to improve our draft white paper and application form to review with currently interested insurers. The aim is to help underwriters back quality operators and avoid unsafe practices that harm the market. This presentation is a workshop aimed at gathering input from manufacturers, operators, and other stakeholders. The insights gained will then be presented the following week in London, where meetings are scheduled with underwriters open to engaging in this initiative. Our objective is to ease capacity constraints, reduce rates, and provide long-term insurance stability for the submersible industry's most responsible participants.

4:00 – 4:30

Bridging Submersible Platforms: Training Experienced Pilots on SEAmagine Submersibles

By: Ian Sheard
Founding Member & Chief Engineer
SEAmagine Hydrospace Corp
UNITED STATES

The yachting industry is on the cusp of a new era where the integration of submersibles is transforming seafaring luxury and exploration. This presentation examines the burgeoning opportunities that submersibles offer to yacht owners, builders, and the marine industry at large. We will explore how advances in submersible technology are making underwater exploration more accessible and safer, adding unparalleled value to the yachting experience. Key topics include the latest innovations in submersible design, compatibility considerations for yacht integration, and the regulatory landscape governing private submersible use. We will also discuss the potential for submersibles to contribute to marine research and environmental conservation efforts, aligning luxury with sustainability. By embracing submersibles, the yachting community can unlock new frontiers beneath the waves, offering clients unique adventures while promoting oceanic awareness and stewardship. Attendees will gain insights into market trends, investment opportunities, and practical guidance on incorporating submersibles into yacht operations. Join us to discover how submersibles are not just an addition to yachting but a gateway to the hidden wonders of the ocean depths.

4:30 – 5:00

Submarine Training Academy and updates from Pisces VI

By: Scott Waters
President
Pisces VI Submarine, SL.
SPAIN

Pisces VI Submarine is proud to announce a new partnership offering fully accredited submarine operations and pilot training through the submarine training academy in partnership with DNV. The speech will also include a brief summary of the last year of operations.

2025 INTERNATIONAL SUBMARINE SYMPOSIUM

Friday, October 10

9:00 – 9:30

Concepts for New Manned Submersibles

By: Steve Armstrong
Chief Technology Officer
Submergence Group LLC
UNITED STATES

Submergence Group LLC, M Subs Ltd., Promare LLC, and Marine AI Ltd. have been building and operating submersibles for over 30 years. This paper will trace the evolution of our vessels as they evolved from personal submarines to scientific research submersibles and drones, to diver lock-out submersibles, to new concepts for manned submersibles. We'll briefly discuss the design, construction, operations, synergies, and challenges we've experienced.

9:30 – 10:00

DNV Classification Rules for Underwater Habitats

By: Jonathan Struwe
Department Head - Underwater Systems
DNV - Det Norske Veritas
GERMANY

The objective of the presentation will be to provide the audience with an overview of DNV's new rules on underwater habitats. It will be based on DNV Rules for design and construction of underwater systems and the Class systematics which can be applied to new building projects for ensuring that a systematic safety approach is applied over the lifetime of the habitat.

10:00 – 10:30	COFFEE BREAK

10:30 – 11:00

Improving Submarine Rescue with Autonomous Systems

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

This presentation explores the application of autonomous undersea system technologies to significantly improve submarine rescue operations. By integrating mission-level autonomy, multi-vehicle coordination, and advanced sensing—such as synthetic aperture sonar, optical and laser scanning, and precision navigation—the approach aims to both reduce Time to First Rescue (TTFR) and increase the percentage of survivors successfully recovered. The concept addresses the entire rescue continuum from initial distress alert through final decompression, detailing where automation can accelerate mobilization, enhance search and localization accuracy, improve site surveys, and increase the reliability of docking and transfer under pressure. Existing systems are used as baselines to identify opportunities for autonomy integration. Case examples and proposed roadmaps illustrate how these technologies can shorten timelines, improve rescue success rates, and enable coalition interoperability for global submarine rescue readiness.

11:00 – 11:30

Rapid Ready-State Response: System 3R for Manned Submersibles

By: Edward R. Cassano
Edward R. Cassano
PRS - Pelagic Research Services
UNITED STATES

When the OceanGate Titan failed to return to surface after a planned mission to the site of the RMS Titanic in June of 2023, OceanGate activated Pelagic Research Services (PRS) for intervention. PRS immediately mobilized their 6000-meter Odysseus 6K ROV System, carried by USAF C-17s to an awaiting vessel in St. John's, Newfoundland, and raced against the clock to reach the seafloor to locate, and ideally rescue, the missing crew. Though the discovery of Titan’s catastrophic implosion was a devastating coda to the PRS mission, it highlighted a fundamental issue with private manned submersible operations: the availability of highly detailed emergency response planning along with asset coordination, and rapid, ready-state response systems standing by for immediate intervention when self-rescue fails. Edward Cassano, CEO of PRS, will discuss System 3R™, an integrated, submersible operations monitoring and mobile response system. System 3R™ provides the best opportunity to reducing response time and increasing the possibility for rescue if a submersible becomes disabled and the crew and support vessel are unable to activate self-rescue.

11:30 –12:00

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

By:

Amber Rowson
CEO
Show Me Quality Consulting
UNITED STATES

Tommy Beals
Deep Submersible System Expert
Show Me Quality Consulting
UNITED STATES

This session shows owners/operators how to convert existing submersible emergency SOPs into an executable, rescue-timed ERP—without starting from scratch. We align your present checklists, notification trees, and communications practices to the USCG National SAR framework and IAMSAR (RCC/SMC roles, cross-border coordination), and we hard-wire a five-phase rescue CONOPS (search, intervention, stabilization, recovery, medical) with training, tabletops, and drills that keep actions inside life-support windows.

12:00 – 1:30 **LUNCH BREAK**

1:30 – 2:00

Overview of the ABS Underwater Rule Change Proposals

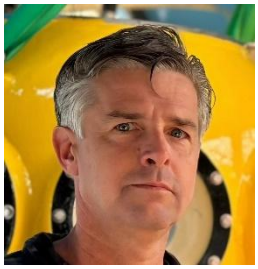
By: Roy Thomas
Sr. Principal Engineer
ABS - American Bureau of Shipping
UNITED STATES

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.

2:00 – 2:30

The pathology of OceanGate and its legacy for uncertified MUV'S



By: Karl Stanley
Principal
Stanley Submarines
HONDURAS

The peculiar motivations and circumstances that led up to the 1st submersible implosion in almost a century will be examined. MUV'S of different categories will be compared by cost, complexity and fatality rates. Suggestions will be made for how to use this rare opportunity to draft legislation that encourages HOV exploration for as many people as possible.

2:30 – 3:00

Validated methods of monitoring CO2 and Hypercapnia

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

The events around the 2023 implosion of OceanGate's submersible TITAN have been subject to considerable speculation. OceanGate rejected the use of standard engineering codes, standards, and established practices as being "too safe." While much of the discussion has focused on the carbon fiber composite hull, other items could have significantly impacted the operational safety of the submersible. Instead of using validated, commercially available components, OceanGate developed its own carbon dioxide (CO2) management system. The TITAN diving logs indicated multiple incidents of excessive CO2 levels. Hypercapnia is a medical condition characterized by an excess of CO2, which can lead to irritability and negatively impact decision-making processes. Testimony given in deposition and during the 2024 USCG Marine Board of Investigation suggests that this may have been a contributing factor in crew incidents on previous dives. The study examines the effects of the close confinement of five people on the gas flow within the TITAN and whether the crew likely developed hypercapnia. Using Computational Fluid Dynamics (CFD) enables the examination of three-dimensional, localized gas gradients that develop within the submersible over time, as well as modelling variables related to the CO2 capture system. The role of Verification, Validation, and Uncertainty Quantification (VVUQ) will also be addressed. The authors were part of the technical team that examined the Oceangate files and provided testimony at the Marine Board of Investigation.

3:00 – 3:30 COFFEE BREAK

3:30 – 4:00

Explorations in Inconel 625 Cladding for Seal Surfaces

By: Chris Storey, P.E.
Senior Manager
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Inconel® 625 weld cladding has been a historically popular choice for providing corrosion resistance in seal areas of pressure vessels. As part of the Southwest Research Institute (SwRI) design and fabrication efforts for submersible hulls and ASME Section VIII pressure vessels, bead-on-plate experiments were performed to determine (a) the minimum cladding thickness required to obtain full alloy 625 chemistry as well as (b) determine how many weld layers were necessary to achieve satisfactory alloy composition. In addition, SwRI has also developed a novel technique for the measurement of clad thicknesses where external dimensional measurements and ultrasonic techniques are not feasible. This concept utilizes magnetic flux leakage, which takes advantage of the base metal having magnetic properties while the Inconel 625 does not. The test approach and results will be presented. The design and test approaches have become the basis for the SwRI design requirements.

4:00 – 4:30

Lessons Learned, Arronax Version 2 Propulsion Control System for the SEAmagine Aurora Series Submersibles

By: Mike Zintel
Principal
W. Michael Zintel Consulting
UNITED STATES

The Arronax Drive System for the SEAmagine Aurora series of deep-sea submersibles introduces a fully proportional, digital propulsion control framework that ensures a precise and deterministic relationship between pilot inputs and submersible movements, enabling complex maneuvers such as crabbing in any direction without rotation and combining directional and rotational vectors seamlessly. The system features an embedded software architecture prioritizing reliability and safety, and specialized drive modes like Wall Mode to enhance visibility and operational efficiency. This paper explores the technical advancements and lessons learned during this phase of the project.

4:30 – 5:00

Lithium batteries, a key technology for improving eficiency in submarines

By: Carme Parareda
Chief Operations Officer
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From pressure-hull materials to syntactic foam, from composites to lithium batteries, a wide range of new enabling technologies have significantly increased the capabilities of deep ocean manned submersibles over the past 60 years. At the same time, advances in technologies and improved procedures — such as underwater communications and positioning or syntactic foam— have also greatly enhanced safety. In just the last decade, we have witnessed rapid progress in the design and manufacture of submersibles, with remarkable growth in quantity, quality, and capability.

Among the technologies applied to our ICTINEU 3, three have played a particularly important role in reducing weight and volume while improving performance: the use of new metallic materials, the extensive application of finite element calculations and FRP, and the incorporation of pressure-tolerant lithium-polymer batteries. The result was a highly innovative vehicle — one that did not rely on syntactic foam — even within the constraints of certification.

The adoption of lithium batteries in manned submersibles has clearly improved performance, but their benefits go beyond power. Making vehicles smaller and lighter brings many practical advantages: greater maneuverability, increased exploration capacity, reduction of maintenance and exploration costs, and easier launch and recovery and extended capacities in rough weather or emergencies.

This presentation will talk about past, current and future developments to continue to push these boundaries further.

BIOGRAPHIES – 2025 SPEAKERS

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Mr. Steve Armstrong has been with Submergence Group LLC since 2014. Previously, Mr. Armstrong was a career civil servant with US Department of Defense for 25 years, where he was on or led teams that developed and acquired numerous manned combat submersibles, high-performance combatant craft, and other maritime systems. Mr. Armstrong is also a retired Captain in the US Navy and Naval Reserve. He served as a nuclear submarine officer during the cold war and later held various leadership positions in Military Sealift Command in the Middle East during various military operations.

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Tommy Beals is a native of Modesto California. Tommy stayed in his hometown until he joined the U.S. Navy in 1985 where he served over 24 years. During the first 11 years, he served as a submarine Machinist Mate. His tours of duty include the USS Bergall (SSN 667), USS Parche (SSN-683), Naval Special Warfare Group 1 Detachment Alameda, and a final submarine tour aboard USS Parche as a member of the Oceaneering Department. In 1997 Tommy received a commission as a Submarine Engineering and Repair Limited Duty Officer. Following his commissioning, Tommy spent an additional 13 years operating conventional steam and electric plants on USS Simon Lake (AS-33) and USS Frank Cable (AS-40) where he served as the Chief Engineer and was responsible for supervising propulsion plant and auxiliary equipment operations.

Following his career in Navy, he became a member of the Navy Acquisition Team when he joined the Naval Sea Systems Command as a member of the Special Operations Forces Undersea Mobility Program Management Office in 2010. He provided support to Naval Special Warfare and United States Special Operations Command (USSOCOM) over the period of 2009 to 2020 as he rose to the rank of Principal Assistant Program Manager (GS-15). In this executive

leadership position he coached, mentored, and trained his team in all facets of sustaining and modernizing ten submarines, six Dry Deck Shelters, and their support systems.

His career culminated in his selection as the Deputy Program Manager for Undersea Systems reporting to the Program Executive Officer for Maritime systems at USSOCOM Acquisition, Technology, and Logistics department. He led his team of acquisition experts in the acquisition and transition of the Dry Combat Submersible program while simultaneously guiding a separate team in the development of requirements for another ACAT (Acquisition Category) II program.

He retired from civil service in March 2023 after 13 years of service to the Navy and Special Operations Forces. After leaving the civil service, he joined the private sector where he has been providing consulting services and program/project management support to various private sector activities and agencies and defense contractors.

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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.

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Edward R. Cassano is CEO and co-founder of Pelagic Research Services (PRS) (www.pelagicservices.com), an international, ocean services company that brings state-of-the-art deep-sea assets, subsea research, navigation, project planning, and execution to the global offshore industry and the ocean research community. With 30+ years of experience in ocean conservation, marine management and complex offshore operations, Ed has participated in, and directed, research expeditions throughout the world's oceans. As a former commissioned officer for the National Oceanic and Atmospheric Administration (NOAA), Ed holds a Third Mate, Unlimited Tonnage, Any Ocean, U.S. Coast Guard license (inactive) and has served as commanding officer of a NOAA Research Ship. Ed has also been trained as technical SCUBA diver and is certified to operate the manned submersible DeepWorker. He held senior and executive management positions at the Monterey Bay Aquarium, the Aquarium of the Pacific and the Ocean Futures Society, served as Executive Director of the Santa Barbara Maritime Museum and was the manager of the USA Channel Islands National Marine Sanctuary. Ed designed and built the deep water ROV system "Odysseus 6K" (a medium work class/science class hydraulic, 6000-meter rated ROV system), the same system that mobilized to rescue the crew of the OceanGate Titan yet ultimately found and recovered the debris from the seafloor near the RMS Titanic.

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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.

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Ms. Cynthia Rodriguez Correa currently serves as the Assistant Program Manager (APM) for Research & Development (R&D) of New Technologies under NAVSEA PMS390, Undersea Special Mission Systems. As part of her responsibilities, she oversees the execution of the US Submarine Escape and Rescue System (SERS) Modernization efforts as well as the development of the Acquisition Strategy for the Next Generation SERS while also working to identify opportunities for new technology development in the undersea domain.

Ms. Rodríguez has supported the US Navy throughout different roles since 2021. Previous to her current role with PMS391, she provided support in the Surface Weapons domain as the Systems Engineer of Packaging, Handling, Storage, and Transportation for programs such as IWS3L Vertical Launching Missile (VLS), STANDARD Missile, and ONR's Rearm At Sea effort. She's also supported the wider DoD Enterprise through highly engaging and valuable details with OPNAV N9I, OUSD R&E, NASA LSP, DASN RDT&E, and PMS450X Future Virginia Class Submarines.

Ms. Rodríguez holds a Bachelor's of Science in Mechanical Engineering, a Master's in Business Administration, and a Project Management Professional (PMP) certification from the Project Management Institute (PMI).

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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.

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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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Davide is a naval architect and marine engineer, and a former Italian Navy submariner. He served as Chief Engineer on the Navy's new-generation AIP submarines before moving to offshore Oil and Gas fields in Marine Operations. Since 2016, he has been Program Manager in the Defense and Submarine Rescue Unit at DRASS. Submariner, sailor and diver, enjoys the ocean 360°, both above and below the surface.

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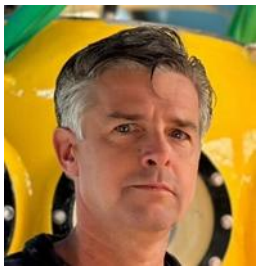
Chris Haugen leads FORCYS' business development in North America. He was a career submarine officer in the US Navy, including command of the nuclear-powered ballistic missile submarine, the USS NEBRASKA (SSBN 739)(Gold). FORCYS is an undersea mission company integrating the technologies of their partners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



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Karl Stanley has been offering tours to the general public , film makers and scientists since 1998. His first vehicle was the first ever MUV to utilize wings, was built for approximately $20,000 and made over 550 dives in 3 countries before being retired. The submersible Idabel has completed almost 2000 dives, the majority of them to 2000 feet. If the definition of innerspace is taken to mean where the ocean waters go completely dark, it is likely more civilians have departed RIDE's dock to enter innerspace than any other fixed point in history.

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Mr. Kawama is the Director of the Fleet Maintenance and Engineering Department at the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). He began his career as a deep submersible pilot at JAMSTEC, spending 15 years honing his skills in submersible operations. During this time, he both piloted these advanced vehicles and also assumed the role of Chief Mechanic, further deepening his understanding of the intricacies of underwater systems. His career then transitioned in a role overseeing the maintenance and engineering of JAMSTEC underwater vehicles and research fleet, where he spent several years dedicated to ensuring the reliability and functionality of these cutting-edge systems. With more than a decade of leadership experience in research fleet maintenance and engineering, Mr. Kawama brings a broad and practical perspective on the technologies and operations that drive deep-sea exploration.

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Bart Kemper, P.E. is a Louisiana-based mechanical engineer with 30 years of engineering consulting in a wide range of industries as well as a civil engineering background through the US Army Corps of Engineers. Kemper's winding career path developed expertise in pressure vessels, marine and subsea engineering, plastic engineering, life-safety applications, medical devices, human factors, and numerical modeling. He has worked on a number of saturation diving and submarine designs, to include being the lead investigator for a technical team supporting the USCG Marine Board of Investigation regarding OceanGate and the Titan Submersible. Kemper is also a retired US Army engineer officer with a background including construction management, infrastructure assessment & development, targeting, forensic post-attack assessments, blast effects modeling, and protective structure engineering. He has over 35 professional publications, is a peer reviewer for multiple publications, and is the current Editor in Chief for the Journal of National Academy of Forensic Engineers. He is a member of multiple ASME Codes & Standards committees, including Pressure Vessels for Human Occupancy, where he is chair of the Subcommittee on Viewports and the Task Group for Design-By-Analysis For Glassy Polymers.

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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 DNVGL 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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Rob McCallum is the Founder of EYOS Expeditions, the world's foremost private expedition services provider that has delivered over 1800 expeditions across every ocean and on every continent. He planned, managed and led the circumnavigation for the Five Deeps Expedition.

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Dr. D.Sathia Naryanan is Scientist F in Deep-sea technologies (DST) group, National Institute of Ocean Technology (NIOT), Ministry of Earth Sciences (MoES), Government of India. Dr. Dr. Sathia Naryanan has 18 years' experience in the design and development of underwater vehicles. He is a leading team member of mechanical engineering group for the projects namely Manned Submersible (MATSYA6000), Remotely Operated Vehicle (ROV) - ROSUB 6000, Wireline Autonomous Coring System (WACS) and Shallow / Polar ROV (PROVe). He is responsible for planning, execution, monitoring and reporting the on-shore and offshore project activities. He has Participated in the PROVe Trials with the 34th Indian Scientific expedition to Maitri station, Antarctica. Dr.D. Sathia Narayanan is an Indian representative member for Integrated Ocean drilling program (IODP) - Scientific Technology Panel (2012-14). He is a lifetime member of ocean society of India and The Institution of Engineers (INDIA) – MIE. He has published more than 60 international, National journal and conference papers in the field of ocean engineering. He is a doctoral degree holder in Mechanical Engineering from Anna university Chennai, India.

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Carme Parareda. Co-founder, administrator and COO of ICTINEU Submarins SL. As a Surveying Engineer she worked in the service of the Cartographic Institute of Catalonia for 15 years, since 1992, in the field of geodesy, high accuracy positioning and GPS navigation techniques. In 2004 she re-oriented her career to ocean observation and underwater technology, co-founding in 2004 the Ictineu Institute, Catalan Submarine Research Centre, and in 2007 ICTINEU Submarins SL where she develops her main professional activity as chief operations manager, sales, certification procedures and pilot in training. In parallel from 2007 to 2009 she coordinated the Argo Maris Foundation activities (sea exploration and outreach) and from 2009 to 2016 she was a board member of the Catalan Maritime Cluster. Member of the Marine Technology Society since 2009. A traveller who loves adventure sports and mountaineering, after crossing Mongolia by bike, she sailed across the Atlantic twice. She co-wrote a book l'Atlàntic a quatre mans (The Atlantic four hands).

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Ms. Rowson is an engineering, quality assurance, and auditing professional with extensive leadership and working-level experience on safety-critical systems and vehicles. She has more than 25 years of experience most recently as the President and CEO of Show Me Quality Consulting, providing management leadership, management consulting, supply chain risk management, engineering, quality assurance and program management support to NASA's Office of Safety and Mission Assurance, the NASA Safety Center, NASA's Office of the Chief Engineer, Naval Sea Systems Command (NAVSEA) – Submarine Safety and Quality Assurance Division, Woods Hole Oceanographic Institution, Veterans Affairs Hospitals, and various other Navy and contractor organizations. Ms. Rowson is experienced at assessing public policy and associated impacts to organizations and associated supply chains. Ms. Rowson serves as Chair of the Industrial Advisory Committee for the University of Missouri's Mechanical and Aerospace Engineering Department where she earned her BS in Mechanical Engineering. Ms. Rowson also serves on the planning committee for American Society for Quality's Collaboration on Quality in the Space and Defense Industries (CQSDI) Forum, holds a Director position for University of Missouri's (MU) Alumni Association Board where she also serves on MU's Flagship Council and associated Political Action Committee aimed at informing and partnering with legislators and leadership to support and align research, education and capital improvement efforts and securing the requisite funding. Ms. Rowson is Level III Certified in Defense Acquisition University DAWIA Production, Quality and Manufacturing, Society of Manufacturing Engineers (SME) Certified in APQP, FMEA, Control Plans and Mistake Proofing. Ms. Rowson earned her private pilot's license in 1994 and has received the NASA Aircraft Operations Excellence Coin for her support of NASA's aviation missions.

During Ms. Rowson's support of NASA, she has served as an auditor on NASA Headquarters' Quality Audit, Assessment and Review (QAAR) Audits, Intercenter Aircraft Operations Panel (IAOP) Reviews, Institutional and Programmatic Support (IPS), Programmatic Audit and Review (PA&R) audits, and Center Audit Program and Project audits. She also has served as a Member of NASA's Safety Management System Working Group, which achieved and sustained registration to the International Business Aviation Council (IBAC) International Standard for Business Aircraft Operations (IS-BAO) Safety Management System (SMS) for the Agency and all seven aero flight centers starting in 2010. During her support of NASA, Ms. Rowson's company has been selected to be part of the NASA Mentor-Protégé Program and has received two Group Achievement Awards and was the recipient of NASA's Aviation Operations Excellence Award.

Prior to working as a consultant, Ms. Rowson served at NAVSEA's Submarine Safety and Quality Assurance Division where she managed and led Deep Submergence System (DSS) vehicle certification surveys and audits and served as the on-site System Certification Authority Representative for manned testing evolutions of assigned DSSs (including onboard certification dive to 4356 meters on Deep Submergence Vehicle ALVIN). Prior to working for NAVSEA, Ms. Rowson served as the PSGS Director for DSS QA, responsible for providing and managing technical support for the Submarine Rescue Diving and Recompression System (SRDRS) Program Office and NAVSEA Submarine Safety and Quality Assurance Division.

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Mr. Ian Sheard, Chief Engineer and founding member of SEAmagine Hydrospace Corporation, has been a driving force behind the company's submersible technology for more than 30 years. He is the author and co-author of several SEAmagine patents and has played a pivotal role in every aspect of the company's submersible development, from engineering design and manufacturing to regulatory approval. With expertise spanning both engineering and piloting, Mr. Sheard serves as SEAmagine's principal test pilot during sea trials of new submersibles. He also leads the setup and integration of each delivered submersible, providing critical support for the company's pilot training program.

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Chris Storey is the Manager for the Marine Structures & Engineering Section at Southwest Research Institute where he manages subsea, various Oil & Gas, Submersible, Navy and other industries design and fabrication related projects. Mr. Storey gained his MS in Mechanical Engineering in 2014 and has 18 years of experience with design and design verification testing of surface and subsea structures/components from conceptual design to prototype. Chris was a team member in the design and fabrication of the pressure hull for the new Alvin deep submergence vehicle and recently served on the strain evaluation team for the submarine rescue vehicle for the U.S. Navy, the PRMS. He is skilled with analytical methods, the characterization of Titanium 6Al-4V ELI material properties, including creep and the Krenzke and Kiernan method for spherical pressure vessel design, applying BPVC requirements and with pressure vessel inspections and state code compliance. Mr. Storey has also lead several turn-key pressure chamber systems design, testing and initial commissioning projects. He is active in the areas of fatigue testing of subsea and other oil industry equipment involving strain gages, cryogenics and oil plume/dispersant behavior as well as hydrate formation. Mr. Storey's current interests include developing and supporting a growing team that address the demands of complex manned/unmanned systems.

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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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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 an Expedition Leader. He managed the Stage 2 Alvin Upgrade project which implemented the final modifications to the DSV Alvin to increase its operational depth from 4,500 meters to 6,500 meters and was pilot in command during the vehicle's certification dive to 6,400+ meters. In addition to Alvin, he has supported several other deep submergence vehicle projects and programs during his tenure at WHOI. He is currently managing a 5-year major overhaul of the DSV Alvin.

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Roy Thomas works as a Senior Principal Engineer 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 23 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. Mr. Thomas 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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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 lead to protection zones for critically endangered sharks.

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Mike Zintel is a software and business strategy consultant, who for the last 2 years has partnered with SEAmagine to develop the Arronax Drive System software for the SEAmagine Aurora submersibles. Mike has 40 years' experience in the tech industry spanning startups, Motorola and Microsoft, where he held the role of Distinguished Engineer / Corp Vice President of Engineering. Mike is an avid scuba diver, underwater photographer licensed deep see submersible pilot and licensed Display Firework supervisor.

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