

DIVE IN BLUE GROWTH

2nd INTERNATIONAL
CONFERENCE ON
THE PROMOTION
OF ACCESSIBLE
UNDERWATER
CULTURAL HERITAGE
SITES

**Under the Auspices
of the Hellenic Ministry
of Culture & Sports**

Online May 12-14, 2021



Co-funded
by the COSME programme
of the European Union

2nd International Conference on the Promotion of Accessible Underwater Cultural Heritage Sites “Dive in Blue Growth”

Under the Auspices of the Hellenic Ministry of Culture & Sports

Book of Abstracts

Online May 12-14, 2021

Organized by MeDryDive project, COSME Programme



Co-funded by the COSME programme
of the European Union

With the support of:



MeDryDive project partners:



2nd International Conference “Dive in Blue Growth”
on the Promotion of Accessible Underwater Cultural Heritage Sites

FOREWORD

The 2nd International Conference “*Dive in Blue Growth*” on the Promotion of the Accessible Underwater Cultural Heritage Sites (AUCHS) was organised in the framework of MeDryDive project, co-funded by COSME Programme (www.medrydive.eu). It was held under the auspices of the Hellenic Ministry of Culture and Sports, with the support of the National Superintendence of the Underwater Cultural Heritage and the Central Conservation Institute of the Italian Ministry of Culture, the University of Calabria, and the Region of Thessaly.

The conference was held online from 12 to 14 May 2021 and included 3 sessions daily with 40 presentations in total, introduced by international speakers. The 2nd Dive in Blue Growth brought together researchers, scholars, policy makers and relevant stakeholders from around the world, who exchanged views and experience on the responsible in-situ promotion of AUCHS and the broad accessibility of Underwater Cultural Heritage to both divers and non-divers through innovative technologies, as a means of protection.

We are grateful to our supporters, honourable guests, the presenters, keynote speakers, chairpersons, and members of the committees, who have contributed the most to the success of the conference.

Detailed information about the conference and the 52 videos of speeches, greetings and presentations are available on the conference link <https://www.livemedia.gr/diveinbluegrowth>.

The Organizing Committee

CONTENTS

COMMITTEE MEMBERS	5
SESSION CHAIRS	6
KEYNOTE SPEAKERS	9
SPEAKERS 1st Day (May 12, 2021)	11
SPEAKERS 2nd Day (May 13, 2021)	16
SPEAKERS 3rd Day (May 14, 2021).....	20
CONFERENCE AGENDA	25
CONFERENCE ABSTRACTS	32

COMMITTEE MEMBERS

The Scientific & Steering Committee

Dr. Pari Kalamara, Director of the Ephorate of Underwater Antiquities of the Hellenic Ministry of Culture and Sports.

Dr. Barbara Davide Petriaggi, Superintendent of the National Superintendence for Underwater Cultural Heritage of Italy.

Prof. Fabio Bruno, Associate Professor at the Department of Mechanical, Energetics and Management Engineering at the University of Calabria.

Dr. Dimitris Kourkouvelis, Underwater Archaeologist, Ephorate of Underwater Antiquities of the Hellenic Ministry of Culture and Sports.

Mr. Angelos Manglis, Founder of Atlantis Research.

The Organizing Committee

Aggeliki Veneti, Region of Thessaly

Dimitra Papadopoulou, Atlantis Consulting S.A.

Anastasia Fourkiotou, Atlantis Consulting S.A.

Anastasia Mitsopoulou, Ephorate of Underwater Antiquities of the Hellenic Ministry of Culture and Sports.

Antonio Lagudi, University of Calabria

SESSION CHAIRS



Fabio Bruno is Associate Professor at the Department of Mechanical, Energy and Management Engineering (DIMEG), University of Calabria (UNICAL). He is cofounder of 2 spin-off companies: 3D Research s.r.l. and Tech4Sea s.r.l.. His research interests include the development of new technologies and systems for the documentation, preservation, and exploitation of underwater cultural and natural heritage.

He has been and is currently in charge of the UNICAL and 3D Research teams in various European projects including: INTERREG MED – BLUEMED, H2020 – iMARECULTURE, EASME - “Underwater Cultural Route in Classical Antiquity”, EASME/EMFF Lab4Dive, EASME/EMFF DiveSafe; EASME MeDryDive.

He has been and is the principal investigator of the following projects: MSCA-RISE TECTONIC, "VISAS – Virtual and augmented exploitation of Submerged Archaeological Sites" and MOLUX “MOBILE Lab for Underwater eXploration”. He is co-author of more than 100 scientific papers.



Barbara Davide Petriaggi is an underwater archaeologist of the Italian Ministry of Culture (MiC). In 1993 she was the first female Underwater Archaeologist of the MiC, authorized by a Ministry Decree to direct underwater excavation and underwater documentation. Since December 2020 she is Superintendent of the National Superintendence for Underwater Cultural Heritage (Taranto) and since February 2021 she is also Superintendent ad interim of the Soprintendenza per i beni archeologici artistici e storici per le province di Brindisi e Lecce (Lecce).

2019 to present she is Member of the Scientific and Technical Advisory Body (STAB) - the 2001 UNESCO Convention on the protection of the Underwater Cultural Heritage (UCH)-UNESCO, Paris, France. 2009 to present she is adjunct professor of "Underwater Archaeology" at Roma TRE University (Rome)

2017 -2020 she was Official in charge of Underwater Archaeology - ICA - Central Institute for Archaeology (MiC). Since 1993 she worked for the Underwater Archaeology Operation Unit of the Central Institute for Restoration (ICR) and since 2011 to 2020 she Directed the Archaeology Operation Unit of the ICR.

She is author of numerous more than 130 scientific and popular papers on underwater archaeology and a manual on Underwater Archaeology with Roberto Petriaggi.

PETRIAGGI, R., DAVIDDE PETRIAGGI, B., Archeologia sott’acqua. Teoria e pratica, Second Edition, Pisa - Roma 2015.

https://media.beniculturali.it/mibac/files/boards/388a5474724a15af0ace7a40ab3301de/file_pdf/CV/CV_DAVIDDE_BARBARA_2021.pdf

Scopus Author ID: 6506123060; <https://www.scopus.com/authid/detail.uri?authorId=6506123060>

<https://icsr.academia.edu/BarbaraDavidde> orcid.org/0000-0002-7642-6791



Dr. Pari Kalamara is the Director of Maritime Antiquities, currently on a year leave, during which is the Deputy Director of Collections & Conservation of the NMoQ.

She studied history and archeology at the University of Athens and carried on doctoral studies at the School for Advanced Studies in the Social Sciences in Paris, in the sector “History and Civilizations”. She works in the Hellenic Ministry of Culture since 1988. From 2006 till 2021 she was head of the Division of Public Archeological Museums and Collections and director of the Ephorates of Antiquities of Euboea and Beotia, and of the Ephorate of Underwater Antiquities. She has also worked as lector of the University of Peloponnese, and since 2003 she works as associated professor in the Open University of Greece. Her publications focus on the byzantine dresses, on byzantine archaeology issues of Messenia, Laconia, Euboea and Boeotia, and on museum subjects. She has also published a children book dealing with byzantine textiles, which obtain the 1st State Award of 2003.



Dimitris Kourkoumelis – Rodostamos was born in Corfu-Greece. He holds a PhD from the University of Aix-en-Provence (France - 1988), on a subject regarding trade, economy and transport amphorae of ancient Corfu. Since 1999, he is working at the Ephorate (Department) of Underwater Antiquities of the Hellenic Ministry of Culture and Sports. Since 2018 he is charge of the Northern Greece Section of the Department. From 2000 - 2011 he taught “Maritime Archaeology” as adjunct faculty at the University of Thessaly. Since 1975 he participates in land excavations in Crete and Corfu as well as to the underwater archaeological excavations of the Hellenic Institute of Marine Archaeology at Dokos and Iria prehistoric wrecks. He directed (1993-2001) the underwater survey and excavation of the 4th c. B.C. shipwreck at Kythera of the Hellenic Institute of Marine Archaeology, as well as the survey at the ancient harbor of Kythnos (Cyclades) (2005-2011), as co-director, along with Professor Al. Mazarakis-Ainian. Since 2011, he is directing the underwater excavation at the

historical shipwreck MENTOR (1802) at Kythera, and he is co-directing the excavation at the ancient harbor of Lechaion (Corinth) (2013-2018) as co-director, along with Dr. Bjorn Loven. He has participated in a number of archaeological symposia and congresses and published papers on the transport of amphorae, ancient trade and economy as well as the results of his excavations. Also in 2019 was official evaluator, as expert, of the 2001 UNESCO Convention for the Protection of the Underwater Cultural Heritage.



Angelos Manglis is a member of the Hellenic Institute of Marine Archaeology, an experienced diver and sailor, as he has participated in numerous underwater archaeological expeditions in the last 17 years. He is a strong supporter of maintaining in situ the underwater cultural heritage and operating Accessible Underwater Cultural Heritage Sites in an inclusive way which contributes to their protection and to local sustainable growth. He has been actively engaged in the implementation of a number of European, National and Regional R&TDI Projects concerning the promotion and protection of the underwater cultural heritage; some of the most significant ones have been the Awarded project “Ano Magniton Nisi”, the Awarded project “BlueMED, the UCRCA, the Lab4Dive, the DiveSafe, the MeDryDive, the MAR-e-Box, the Awarded project 4Helix+ See the Sea and

the i-blueculture. Mr. Manglis has studied on a Master’s Level at the Department of History and Archaeology of the Aristotle University of Thessaloniki with a focus on Prehistoric Archaeology. He holds an MSc in

“Technical Change & Industrial Strategy” from PREST Institute of the University of Manchester and a Bachelor’s degree in Civil Engineering from the Democriton University of Thrace. Angelos Manglis has over a 30 year of consulting experience providing consultation to large portfolio of HiTech/IT Startups and Industrial and Non-Industrial SMEs. He is considered, amongst his colleagues, an expert in RTD project management, as he has contributed to the formation of strategies for technology and business development and has developed strong working relationships with many companies, organizations, institutions, academics as well as policy makers globally.



Aggeliki Veneti is a Rural & Surveying Engineer, with postgraduate studies (MSc) in Urban, Spatial Planning, Urban & Regional Development, and 26 years of professional experience. The last 5 years holds the position of the Director of Industry Energy and Natural Resources in the Region of Thessaly.

She has extensive experience in preparing and evaluating sectoral and regional development plans and operational programs, as well as in the implementation of Operational Programs and projects co-financed by EU funds, policy analysis and programming interventions in the areas of regional development.

She also communicates with many people in different roles: politicians, administrators, stakeholders, NGOs, citizens. She has participated in conferences representing the Region as well as presented of its activities with different groups and people in various parts of Thessaly or outside Thessaly.

Combining the scientific background with a management position in a public authority, combining scientific and policy issues, she is able to understand what the community and its demands are looking for, and to harness the benefits and results of a European project at local, regional, national and European level, as well as to the public and to the private / local end-users of the projects.

She was the Coordinator of the MED project BLUEMED.

KEYNOTE SPEAKERS



Igor Kalinić, PhD
Head of Sector – Competitiveness and Internationalisation
 Unit I-02: Single Market Programme / COSME Pillar
 European Innovation Council and SMEs Executive Agency (EISMEA)
 European Commission

Currently, I work for the **European Commission** at the **European Innovation Council and SMEs Executive Agency** (EISMEA) where I am Head of Sector for Competitiveness and Internationalisation within Single Market Programme / COSME Pillar Unit. Over last 20 years, as a policy officer of the European Commission and outside the EU institutions I have accumulated a substantial practical knowledge, academic experience, and policy-making understanding in international relations, focused on **international business, circular economy** and **entrepreneurship**.

Previously, I have covered academic positions at University of Groningen (Assistant Professor) and University of Leeds (Marie Curie fellow) and am currently collaborating with University of Turku (Senior Research Fellow). I earned my PhD from University of Padova (in collaboration with King's College London and Darden School of Business (USA)). I have integrated the policymaking and academic experience with 10+ years in the private sector focused on the support to the entrepreneurship and internationalisation.



Alan Vella
Project Adviser - European Innovation Council and SMEs Executive Agency (EISMEA) Established by the European Commission

Alan Vella has extensive institutional experience, and currently works as project manager at the European Innovation Council and SMEs Executive Agency (EISMEA). His previous experiences include six years at the European Commission and an additional two years at the United Nations Framework Convention on Climate Change. Outside the institutions, he also occupied important positions relating to public administration, marketing and communications, strategic planning and procurement.

Alan's main area of expertise is tourism, and he has lectured in tourism related fields across Europe, such as at the Sorbonne University in Paris, France. Alan Vella also acted as UNESCO National Focal Point for Periodic Reporting and was an award-winning journalist, having won the Tourism Journalist of the Year in his country of origin (Malta).



Associate Prof. Dr.-Ing. Dimitrios Skarlatos
 Vice Dean School of Engineering, Dept. of Civil Engineering and Geomatics
 Cyprus University of Technology, Photogrammetric-Vision Lab

Dimitrios Skarlatos is Associate Professor of Geoinformatics at the [Department of Civil Engineering and Geomatics](#) of the [Cyprus University of Technology](#) (CUT). He currently serves as Vice Dean of the School of Engineering and Technology. He has coordinated [IMARECULTURE](#) a H2020 Research and Innovation Project, for underwater XR museums, with 11 partners from Europe and Canada. His research interests and publication record include UAV mapping, optical bathymetry of coastal areas, underwater 3D modelling, and CH applications of the aforementioned topics. Recent areas of interest include mobile mapping and use of small ROVs for 3D recording.

For 12 years he worked as free-lance land surveyor in Greece, court expert and technical consultant in geoinformation companies in nationwide projects. During that period, he has participated in research projects for archaeological site and monument recording, copies of museum exhibits, real time quality control applications using machine vision, AUAVs for mapping. During his post in CUT, he has participated or coordinated in research projects with UAV mapping, UAV coastal mapping and bathymetry, Parthenon frieze precise 3d modelling, mobile mapping platforms and satellite imagery processing.

He is the lead surveyor in Mazotos shipwreck, underwater excavation, since 2010, Nisia excavation since 2014 and Protaras shipwreck since 2019. He is the academic representative of Cyprus in [EuroSDR](#) (since 2010) and co-chair in [International Society of Photogrammetry and Remote Sensing, Commission II \(2016-2021\), Working Group 9, about underwater photogrammetry](#). He has Chair of the organizing committee for the [Underwater 3D Recording and Modelling Workshop](#), organized in Limassol, Cyprus, in May 2019 under [ISPRS](#) and [CIPA](#) auspices.



Panagiotis Tripontikas, Commander in Hellenic Navy, Hellenic Ministry of National Defence, Directorate of Military and Technological Support, Department of Infrastructure and Environmental & Cultural Protection Commander

Panagiotis Tripontikas was born in Athens on March 18, 1972 and comes from Velanidia Voion Lakonias (Municipality of Monemvasia). He graduated from the Hellenic Navy Academy in 1995 as an Ensign of the Hellenic Navy. He is married to Irakleia Schoina and is the father of a son named John.

His operational service includes more than 12 years of deployment at sea onboard surface units, one year as the Commanding Officer of Mine Hunter HS KALYPSO. He was assigned as Director of the Floating Naval Museums Battleship "GEORGIOS AVEROF" and HS VELOS. His staff assignments include the Hellenic Fleet Command and Hellenic Navy Minewarfare Command. He was designated from Hellenic Fleet Command, Hellenic Navy General Staff and finally, Hellenic National Defence General Staff as "Friend of the Environment" on an individual level for the year 2019. From September 2020 until the present day, he is a staff officer of the Department of Infrastructure and Environmental Protection of Directorate of Military and Technological Support at the Hellenic Republic Ministry of National Defence. He has received medals and distinctions commensurate with his rank. He has completed the diving training in Underwater Demolition Command. He is a graduate of the Hellenic Joint Staff College, the Supreme Joint War College and the Hellenic National Defence College. He is a researcher and a writer and has published the following books: 1. "1900: The Adventures of Pavlos Kountouriotis during the first transatlantic voyage onboard masted cruiser "NAVARCHOS MIAOULIS" ISBN:978-960-88509-3-4 (<https://www.1900thebook.com>) 2. Wrecks In The Greek Seas 1830-1951-The Underwater Heritage Of Navy's Stakeholding Fund & Mariners' Pension Fund (www.seathewrecks.com)

SPEAKERS 1st Day (May 12, 2021)



Dr. Pari Kalamara,
Director of Maritime
Antiquities, Hellenic
Ministry of Culture and
Sports (on a year leave,
during which is Deputy
Director of Collections
& Conservation of the
NMoQ)

Pari studied history and archeology at the University of Athens and carried on doctoral studies at the School for Advanced Studies in the Social Sciences in Paris, in the sector “History and Civilizations”. She works in the Hellenic Ministry of Culture since 1988. From 2006 till 2021 she was head of the Division of Public Archeological Museums and Collections and director of the Ephorates of Antiquities of Euboea and Beotia, and of the Ephorate of Underwater Antiquities. She has also worked as lector of the University of Peloponnese, and since 2003 she works as associated professor in the Open University of Greece. Her publications focus on the byzantine dresses, on byzantine archaeology issues of Messenia, Laconia, Euboea and Boeotia, and on museum subjects. She has also published a children book dealing with byzantine textiles, which obtain the 1st State Award of 2003.



Darko Kovacevic,
Maritime archaeologist,
Heritage Malta's
Underwater Cultural
Heritage Unit

Darko is a maritime archaeologist at Heritage Malta's Underwater Cultural Heritage Unit. He obtained his B.A. and M.A. in History at the University of Novi Sad, which was followed with an M.A in Maritime Archaeology and Underwater Cultural Heritage at the University of Alexandria in Egypt. Over the last decade, Darko has been

involved in a number of collaborative research projects across the Mediterranean, participating in numerous surveys with various institutions, such as the Hellenic Institute for Ancient and Medieval Alexandrian Studies, Egypt and survey campaigns off the Fourni Islands, Greece. Other projects include excavations of Mycenaean Shipwrecks off the island of Poros, and a number of archaeology projects in Croatia, Montenegro, Lebanon and Malta. Darko is an active scuba diving instructor and technical diver.



Angelos Manglis,
Founder of Atlantis
Consulting S.A. &
Skopelos Diving
Center

Angelos Manglis is a member of the Hellenic Institute of Marine Archaeology, an experienced diver and sailor, as he has participated in numerous underwater archaeological expeditions in the last 17 years. He is a strong supporter of maintaining in situ the underwater cultural heritage and operating Accessible Underwater Cultural Heritage Sites in an inclusive way which contributes to their protection and to local sustainable growth. He has been actively engaged in the implementation of a number of European, National and Regional R&TDI Projects concerning the promotion and protection of the underwater cultural heritage; some of the most significant ones have been the Awarded project “Ano Magniton Nisi”, the Awarded project “BlueMED, the UCRCA, the Lab4Dive, the DiveSafe, the MeDryDive, the MAR-e-Box, the Awarded project 4Helix+ See the Sea and the i-blueculture. Mr. Manglis has studied on a Master's Level at the Department of History and Archaeology of the Aristotle University of Thessaloniki with a focus on Prehistoric Archaeology. He holds an MSc in “Technical Change & Industrial Strategy” from

PREST Institute of the University of Manchester and a Bachelor's degree in Civil Engineering from the Democriton University of Thrace Angelos Manglis has over a 30 year of consulting experience providing consultation to large portfolio of HiTech/IT Startups and Industrial and Non-Industrial SMEs. He is considered, amongst his colleagues, an expert in RTD project management, as he has contributed to the formation of strategies for technology and business development and has developed strong working relationships with many companies, organizations, institutions, academics as well as policy makers globally.



Young-Hwa Jung,
Researcher &
Conservation Scientist,
National Research
Institute of Maritime
Cultural Heritage,
Republic of Korea

Young-Hwa Jung is a Researcher & Conservation Scientist of Underwater Cultural Heritage in the WEST

SEA Cultural Heritage Division (2017s-present) & Underwater Excavation & Conservation Division (2002s-2017s) of the National Research Institute of Maritime Cultural Heritage of South Korea. He is conservation the wooden ships and ceramics excavated in underwater. He completed his PhD in 2008 at Kongju National University and graduated from Korea National Open University with a Bachelor of Laws in 2016. He has been involved in several maritime research projects including: Analysis of Manufacturing Technology and Production Area of Underwater Excavations Ceramics(2005-present), Exploration Project of Underwater Cultural Heritage by the EOS3D-A(3D Seismic Survey System), Development Project of Underwater Cultural Heritage Research Technology Using Crabster CR200, Development Project of Underwater Cultural Heritage Exploration Techniques Underwater Archaeology Vessel 'NURIAN(G/T 290ton)' Ship building, Underwater Cultural Heritage Protection Policy in Korea. In August 2019, the International Program for Protection of Underwater Cultural Heritage was

organized. Currently, he is in charge of planning and evaluating various projects of NRMCH.



Dr Panagiota
Galiatsatou, Diving
Archaeologist, Ephorate
of Underwater
Antiquities, Hellenic
Ministry of Culture and
Sports

Dr Panagiota Galiatsatou has completed her postgraduate studies (Master's Degree and

Phd: Grade 'Excellent') in the field of burial customs and pottery (Classical Archaeology). She has worked as an archaeologist in various departments of the Ministry of Culture and Sports since her graduation from the Department of History and Archaeology of the University of Athens in 2000 and since 2014 has been working as a diving archaeologist in the Ephorate of Underwater Antiquities conducting archaeological surveys and research in the Peloponnese and islands of the Argosaronic Gulf. Since 2018 she has been co-director (along with Dr B. Davidde) of a collaborative underwater archaeological project in Ancient Epidaurus of the Ephorate of Underwater Antiquities, the Italian Archaeological School in Athens and ISCR. She has published a number of articles on Classical burial customs and pottery, Underwater Archaeology and Cultural Management.



Carlota Pérez-
Reverte
Mañas,
Researcher,
University of
Cadiz.

Carlota is a Ph.D. student in Maritime Archaeology, with a degree in History and a Master's degree in cultural business management. She has developed her research activity focusing on the processes of communication, awareness-raising, and public access to underwater cultural heritage. She has participated in various projects aimed at the

preservation and knowledge of both maritime heritage and biodiversity.



**Rita Auriemma,
Archaeologist and
Researcher, Department
of Cultural Heritage,
Salento University**

I am archaeologist, researcher in the Department of Cultural Heritage at the Salento University, where I teach Underwater Archaeology and Coastal and Underwater Seascapes Archaeology. I have held teaching positions in other universities, as well as for PhD and extra-university courses. Furthermore, I carry out terrestrial and underwater archaeological excavation and survey projects and coordinate national and international research projects. The focuses of my research are archaeology (or geoarchaeology) of coastal landscapes and aspects of ancient economic history, in particular maritime routes and transport, goods and markets; other my own area of interest is the valorization and communication of the underwater cultural heritage, through exhibition and museum projects.



**Dr Gunnar Liestøl,
Professor, Dept. of Media
& Communication,
University of Oslo**

Gunnar Liestøl is professor at the Department of media and Communication, University of Oslo. He has conducted research and development

in digital media for more than 25 years, starting with hypermedia designs for The Kon-Tiki Museum and The Viking Ship Museum. He has authored and edited numerous books and articles on rhetoric, narrativity and digital media design, among them *Digital Media Revisited* (MIT Press). Liestøl has spent the last decade exploring the potential of location-based media, especially Augmented

Reality (AR). He is particularly interested in AR storytelling on location at Cultural Heritage sites. Recent experiments include AR applications for use at Ancient Phalasarna in Crete, on Omaha Beach in Normandy, the Calmecac Museum in Mexico City, and Old Narva in Estonia (the latter won a GLAMi-award at MW2019).

Dr Michael James Bendon, Independent Scholar and Researcher

Dr Michael James Bendon is now an independent scholar and researcher. He holds post-graduate qualifications in Archaeology, History, Education, Linguistics, Maritime Archaeology and Cultural Heritage Management. He has worked for a great number of years as an archaeologist on numerous sites around the Mediterranean and Europe including Israel, Portugal, Germany and Greece, with extended survey in Turkey, Syria and Jordan. Michael first started as a field archaeologist in Israel before moving briefly onto Portugal and then on to directing a Medieval church and cemetery excavation in Northern Germany for four years. For the last ten years, he has been assisting a colleague, Dr Elpida Hadjidakis, in investigations on Phalasarna, a large Classical/Hellenistic maritime city in Western Crete, as well as working, also with Dr Hadjidakis, on the excavation of the first Minoan shipwreck to be discovered. More recently his research has revolved around two British WWII wrecks located offshore from the ancient Phalasarna site. His newly published book, *The Forgotten Flotilla*, details this particular story. Michael is concurrently carrying out research to compile the first-ever nominal roll for Australian service personnel who served in the Greek and Cretan campaigns of 1941.



**Marco Cozza, Senior
Software Engineer,
Project Manager and
CTO at 3D Research**

Marco Cozza (male, 32) received his Master's Degree in Computer Science in 2015 at the University of Calabria,

with a thesis entitled “Mining and Recommendation Techniques for museums tours”. He is a Senior Software Engineer, Project Manager and CTO at 3D Research since 2014. He has experience in design and development of interactive applications for environmental protection and the exploitation of the Cultural Heritage. In particular, he has considerable experience in VR and AR applications, assisted underwater navigation and mission planning software tools. Marco is in charge of the management for the following research projects: EACEA – MarEBox “Culture Underwater, Time Capsules at the bottom of the sea” (<https://www.marebox.eu/>), EASME/COSME MeDryDive “Creating personalized dry dive experiences for the promotion of Mediterranean Underwater Cultural Heritage sites as distinctive tourism destinations” (<https://medrydive.eu/>), SmartCal “Smart Tourism in Calabria”, funded by the Italian Ministry of Economic Development (<http://www.smartcal.eu/>), SMILE “Smart methods and tools for the Digital Enterprise” – funded by the Italian Ministry of Economic Development, MOLUX “MOBILE Lab for Underwater eXploration”. Moreover, he coordinates the 3DR team and manages private contracts. He is co-author of 14 scientific papers and publications.



**Felipe Cerezo
Andreo, Post-doc
researcher,
University of Cádiz**

Doctor in Archaeology at the University of Murcia (Spain - 2016), since 2017 held a post-doctoral position at the University of Cádiz (Spain). He currently directs or collaborates in several research projects in underwater archaeology that contemplate objectives related to social participation and public access to Underwater Cultural Heritage. He has worked at the University of Murcia (2012-2016), the National Museum of Underwater Archeology. ARQUA (2009-2011). He also actively collaborates with the UNTWIN network and UNESCO in seminars and training courses in Underwater Archeology.



**Elia Vlachou,
Archaeologist -
Museologist M.A.**

Museum & Cultural Management Consultant, co-founder and Gal Secretary of the Hellenic Steam Institute, a nonprofit association dedicated to the preservation and valorization of industrial heritage. From 2003 to 2017 she worked at the Piraeus Cultural Foundation. Head of the Museums Department since 2007, she has coordinated the Department’s E.U.-financed projects and the Network’s numerous temporary exhibitions, educational programmes and various activities. She gives lectures on cultural management at graduate and postgraduate level. Member of the international juries for the prizes Živa Award and Heritage in Motion, of the European Museum Academy (Museum Expert), ICOM and TICCIH. Main research interests: cultural management; innovative methods of interpretation of material and intangible culture; analysis of the visitors' experience; protection and promotion of the technological heritage



**Javier Rodríguez
Pandozi, Instituto
Balear de Estudios
en Arqueología
Marítima (IBEAM),
Co-founder, Project
Manager**

Co-founder of the Instituto Balear de Estudios en Arqueología Marítima (IBEAM), he has been dedicated for more than ten years to the research, protection, and dissemination of the Maritime Cultural Heritage of the Balearic Islands. Within IBEAM he combines his work as Project Director with that of filmmaker. He has been director and participated in the main projects developed in recent years in the Balearic Islands, such as the excavation of the Late Roman shipwreck of Ses Fontanelles, (Palma de Mallorca) the excavation of the Early Imperial shipwreck of Porto Cristo (Manacor), the survey of the Late Roman shipwreck

Cabrera XIV located in the National Park of Cabrera (Mallorca) or the Underwater Archaeological Sites Catalogue for the islands of Formentera, Ibiza, and Mallorca.



Cristina Canoro, project manager and member of board of Campi Flegrei Diving s.r.l. , President of Legambiente Pozzuoli Città Flegrea Association

Cristina Canoro, is project manager and member of board of Campi Flegrei Diving s.r.l. Ph.D in Business Administration and Management, Postdoc Campania University Luigi Vanvitelli Department of Economics and Management.

She is involved in national and international projects to promote archaeological diving tourism through technology innovations, actually she is project coordinator for MeDryDive project. Guide of the Underwater Archaeological Park of Baia, Cristina founded the environmental association Legambiente Città Flegrea with the aim to protect the environment and to promote sustainable development of Campi Flegrei Area. As Expert environmental educator she works with schools in labs and projects to transfer knowledge to the young generation about the touristic development opportunities of the area and the use of new technologies for the promotion and valorization of the cultural patrimony. Main field of studies are: tourism marketing, archaeological diving tourism the cultural patrimony. Main field of studies are: tourism marketing, archaeological diving tourism, promotion and valorization of underwater cultural heritage.

SPEAKERS 2nd Day (May 13, 2021)

Foteini Vlachaki, Architect - Msc Protection of Monuments & Sites, National Technical University of Athens (N.T.U.A)

Paraskevi Nomikou, Associate Professor, Dep. of Geology & Geoenvironment, National and Kapodistrian University of Athens



Paraskevi Nomikou is a marine geologist who studies the morphology of the seabed with extensive

experience in marine volcanic and seafloor extruding processes. She is an Associate Professor at the Dep. of Geology and Geoenvironment of National and Kapodistrian University of Athens (Greece). She has participated in more than 80 oceanographic cruises that focused on active fault zones, submarine volcanism, landslides and slope stability and the exploration of seafloor mineral deposits. Her studies on underwater volcano areas where new earthquakes and deformations have been taking place are critical to the ongoing evaluation of future eruption scenarios. She effectively transfers her enthusiasm for sea floor exploration using innovative marine technologies to younger students through her educational lectures at the university creating a high-profile role model for young women thinking of pursuing careers in oceanography. She is an author of 135 peer review papers with h-index:22 (SCI) and is a PI (Virtual Diver, www.virtualdiver.gr) and co-PI in many national and international projects. She was also awarded by the Academy of Athens in 2017.

Dr Kalliopi Baika, Associate Professor in Mediterranean Maritime Archaeology, Master of Maritime and Coastal Archaeology (MoMArch) - Scientific Coordination, A*Midex - Académie d'Excellence, Centre Camille-Jullian, CNRS, Aix-

Marseille Université, Maison Méditerranéenne des Sciences de l'Homme

Josep Quitana Plana, Coronis Computing, Spain



Caterina De Vivo
Archaeologist, Member of Centro Studi Interdisciplinari Gaiola onlus

I am an archaeologist with a PhD in management and development of Cultural Heritage, obtained with a research developed between France, Italy and Spain.

Since 2009 I've been working in the fields of cultural heritage presentation and community engagement, collaborating with many no profit organizations and institutions. I am a member of the Centro Studi Interdisciplinari Gaiola onlus, a non profit organization Manager Authority, on behalf of the Italian State, of the Marine Protected Area Gaiola Underwater Park in Naples, Italy. My research interests are related to public archaeology and heritage interpretation and since 2009 I have been working on creating awareness on the importance of preserving underwater cultural heritage.



Valeria Li Vigni Tusa,
Superintendent of the Sea,
Department of Cultural Heritage Regione Siciliana

Valeria Li Vigni Tusa is the Superintendent of the Sea, the special office created in 2004 by the Regione Siciliana's

Department of Cultural Heritage. She is an Ethno-Anthropologist and diver, her curriculum is rich in many different assignments: she was director of the multidisciplinary Museum Palace d'Aumale, the regional Museum "Agostino Pepoli" in Trapani, the Museum Palace Riso for Contemporary Arts in Palermo at moment works are in progress to realize in the Palermo's ancient Arsenal a new Museum of the Sea and Navigation, following an Center of Excellence for the Underwater Cultural Heritage of Sicily. She carried out exhibitions concerned in art, anthropology, underwater archaeology and teaching too in Naples University as Museologist. She is the author of essays and publications dedicated to the interconnection of the sea in different fields of culture: archaeology, biology, life, fishing, shipbuilding, worship and religious ceremonies.



Floriana Agneto, Diver and functionary of the Superintendence of the Sea, Department of Cultural Heritage Regione Siciliana

Floriana Agneto works in the Regione Siciliana's Department of Cultural Heritage as

Superintendence of the Sea's functionary and diver. She takes part in all missions and underwater activities: studies, researches, surveys and archaeological excavations, drawings and concerned publications. Specialist in planning and realizing underwater itineraries, she provides the meetings and conferences organization too.

Prof Timmy Gambin, Associate Professor in Maritime Archaeology, Dept of Classics & Archaeology, University of Malta



Dr Luciana Randazzo, Post-doc researcher, Department of Biology, Ecology and Earth Sciences (DiBEST, University of Calabria)

Luciana Randazzo is a post-doc researcher at the Department of Biology, Ecology and Earth Sciences (DiBEST, University of

Calabria). She graduated in Geological Science in 2004 at the University of Palermo. In April 2009 she got Petrography and Petrology PhD in at the University of Catania. The research activity of Dr Luciana Randazzo has dealt mainly with topics in the field of applied Mineralogy and Petrography to Cultural Heritage. Her research concerns subjects focused on technical knowledge and conservation features of natural and artificial stone materials used in monuments as well as archaeometric characterization of archaeological ceramics (production and provenance).

Helen-Margarita Bardas, Ephorate of Underwater Antiquities (EUA) & Korseai Institute of Historical and Archaeological Research (Korseai Institute)



Helen-Margarita Bardas studied "Conservation of Antiquities and Works of Art" at the Technological Educational Institute of Athens, specializing in conservation of marine artifacts. She worked as an intern

for the "Ephorate of Underwater Antiquities" in Athens and "The Mary Rose Trust" in Portsmouth. Throughout her studies she had the opportunity to participate as a conservator-diver in numerous underwater archaeological projects in Greece and abroad. An important milestone was the Fourni Underwater Survey, where she became one of the founding members of the "Korseai Institute of

Historical and Archaeological Research”. During this time, she gained experience in lifting techniques, first-aid interventions and in-situ conservation of underwater archaeological finds. She is currently attaining an MSc in “Conservation of Cultural Heritage” at the University of West Attica whilst working as a contract conservator-diver for the Ephorate of Underwater Antiquities.

Massimo Capulli, Università di Udine, Dipartimento di Studi Umanistici e del Patrimonio Culturale



Vasilis Mentogiannis, Commercial diver, technical director of UFR team

Vasilis Mentogiannis, born in Athens in 1973, studied Mechanical Engineering at the Technological Educational Institution of Athens. Since 2005, he is technical director of UFR team, specialized as a commercial diver, in underwater services and documentation, covering a wide range of projects from marine construction industry to maritime cultural heritage. Among his main interests is the direction of historical and archaeological documentaries, some of which are awarded at international film festivals, as well as the writing and publishing of scientific articles connected to cultural heritage surveys and marine life. He is one of the co-founders of the Korseai Archeological Institute, founder of Hippocampus Marine Institute and one of the designers of the uNdersea visiOn sURveillance System (NOUS). He lives in Athens, he is married and has 2 children.

Dr. Sergey Fazlullin, Associate Professor, Russian State University for Humanities, Moscow

Associate Professor Dr. Sergey Fazlullin graduated from the Faculty of Geography of the M. V. Lomonosov’s Moscow State University with a degree in marine geochemistry in 1981. There he defended his PhD dissertation in 1995. From 1981 to 2001, he worked at the Institute of Volcanology of the Russian Academy of Sciences, where he



specialized in underwater volcanism, the study of volcanic lakes, the impact of volcanism on the environment, and the geochemistry of volcanic gases. Participant of 15 sea expeditions on scientific vessels and many land expeditions on volcanoes of Kamchatka, the Kuril Islands, Japan,

Indonesia, New Zealand, and the Philippines. Since 2001, Dr. Fazlullin has been working in Moscow at the P.P. Shirshov’s Institute of Oceanology, where he is engaged in the geochemistry of coastal marine geographical systems in the seas surrounding Russia. Since 1984, Dr. Fazlullin began to study underwater archaeology. First, in Kamchatka and the Kuril Islands. And since 2000, on the Black, Baltic, White and Barents Seas.

Since 1982, Dr. Fazlullin has been collaborating with leading Russian universities as a supervisor of field marine practices and theses. This work was continued in Moscow with the M. V. Lomonosov’s Moscow State University. Since 2010, in parallel with the Russian Academy of Sciences, he began working at the Department of Museology of the Russian State University for the Humanities, where he currently conducts a series of disciplines on marine archaeology, underwater cultural heritage, methods of scientific research, conservation and restoration, world cultural and natural heritage.

In 2001, Dr. Fazlullin was elected Vice-president of the Russian Underwater Activities Confederation, and in 2018 its president. Since 2002, he has been a member of the CMAS Scientific Committee. He represented Russia at several meetings of the Convention for the Protection of the Underwater Cultural Heritage of UNESCO. Participated as an expert in international seminars on underwater cultural heritage in Turkey and Kazakhstan. He is the author of more than 250 scientific and methodological publications.

Dionisia Koutsi, PhD Student, Department of Geography and Regional Planning, School of Surveying Engineering, NTUA



Dionisia Koutsi is a PhD Student in the Department of Geography and Regional Planning, School of Surveying Engineering, NTUA. She is an Urban Planner graduated from the University of Thessaly and also

holds a master degree on "Environment and Development", NTUA. She has participated in international and national conferences and has published work in academic magazines and books. Her research interests focus on the following areas: Integrated and sustainable land and underwater cultural heritage management, Maritime spatial planning, Participatory planning, Island development issues, Urban and regional development. She also works as a project manager in the private sector on co-financed projects by EU programs and is responsible for both their financial management as well as proposal writing and submission.

Yuri Tkachenko, Filmmaker



Yuri graduated the Moscow Aviation Institute with a technical specialization and worked as a programmer in the space industry. Later he was engaged in the development of

mobile TV centers for the leading TV channels of Russia. Currently he is a filmmaker, making films about sea travel and underwater archaeology. His hobbies include diving and yachting, and he is interested in researching in underwater archaeology as a member of the ANO "Underwater Archaeological Society" www.intersea.ru. Yuri lives in Russia, Moscow.



Ahmet Bilir, Asst. Prof., Director of the Duzce University Underwater Studies Application and Research Center

Ahmet Bilir gives courses in the Department of Archaeology at Duzce University where he is appointed. He received his PhD degree from Selcuk University, Institute of Social Sciences, Classical Archeology Department with his thesis entitled "The Importance of the Cilicia Region in the Eastern Mediterranean Maritime Trade in the Roman Period" in 2014. He is the Director of the Underwater Studies Application and Research Center and the Head of the Medieval Archeology Department at Duzce University. Bilir also manages the North East Marmara Sea Underwater Research (The NEMSUS Project) in Istanbul. Nowadays he also provides scientific consultancy to the Acheron Necropolis excavations in Herakleia Pontika

SPEAKERS 3rd Day (May 14, 2021)



Matteo Collina,
Research fellow
University of Calabria

Matteo Collina, a graduated in Cultural Heritage Photography, his main studies have included a dissertation project on photogrammetric reconstruction of San Pietro in Bevagna's sarcophagi shipwreck located in Manduria (Taranto, Italy) in collaboration with the National Institute for Conservation and Restoration (IsCR). From June 2018 he works as a research fellow at the University of Calabria on tridimensional underwater technical imaging surveys developing innovative methodologies for scientific diving. He has been involved in the MOLUX (MOBILE Laboratory for Underwater eXploration) and ScienceDIVER projects. From November 2019, he is an Adjunct Professor for Belle Arti Academy University in L'Aquila (Italy) teaching "Cultural Heritage Photography" and "Scientific Photography" courses. Experienced technical diver with a strong passion for shipwrecks and cave diving, Matteo has collaborated in several European projects leading underwater photogrammetric activities in different submerged archeological sites in the Mediterranean.



Paraskevi Nomikou,
Associate Professor, Dep. of Geology &

Geoenvironment, National and Kapodistrian University of Athens

Paraskevi Nomikou is a marine geologist who studies the morphology of the seabed with

extensive experience in marine volcanic and seafloor extruding processes. She is an Associate Professor at the Dep. of Geology and Geoenvironment of National and Kapodistrian University of Athens (Greece). She has participated in more than 80 oceanographic cruises that focused on active fault zones, submarine volcanism, landslides and slope stability and the exploration of seafloor mineral deposits. Her studies on underwater volcano areas where new earthquakes and deformations have been taking place are critical to the ongoing evaluation of future eruption scenarios. She effectively transfers her enthusiasm for sea floor exploration using innovative marine technologies to younger students through her educational lectures at the university creating a high-profile role model for young women thinking of pursuing careers in oceanography. She is an author of 135 peer review papers with h-index:22 (SCI) and is a PI (Virtual Diver, www.virtualdiver.gr) and co-PI in many national and international projects. She was also awarded by the Academy of Athens in 2017.



Alessio Calantropio, PhD
Student in Architectural and Landscape Heritage, Laboratory of Geomatics for Cultural Heritage, Politecnico di Torino

I graduated in Architecture at Politecnico di Torino, with a thesis on the use of UAV for safety application in construction sites and in technical measures for seismic emergency response. I currently work as a researcher in the Department of Architecture and Design. Along with the Lab G4CH (Laboratory of Geomatics for Cultural Heritage) and the student team DIRECT (Disaster REcovery Team) I've carried out mapping research in earthquake-hit regions in central Italy and other relevant projects in

collaboration with the firefighters and first responders. Since 2017 I have been working at PIC4SeR (PoliTO Interdepartmental Centre for Service Robotics) as industrial representative for DJI, the world's leader in commercial and civilian drone industry. From 2019 I am pursuing a PhD in Architectural and Landscape Heritage, with a thesis focused on Photogrammetric multisensor application for the documentation of the Underwater Heritage. I have an extensive knowledge of drones and their application for research, mapping, humanitarian relief, public safety, built heritage monitoring and damage assessment.



Sergey Khokhlov,
Director in LLC
"Laboratory of
Network Technologies"

Sergey graduated the Moscow Engineering Physics Institute in technical specialization and worked as IT- engineer and programmer. Currently he is the director in LLC "Laboratory of Network Technologies" www.nt-lab.ru. He is responsible for direction building robotic sea and underwater vehicles. His hobbies include diving, yachting and he is interested in researching in underwater archaeology as a member of the ANO "Underwater Archaeological Society" www.intersea.ru. Sergey lives in Russia, Moscow.



Barbara Barbaro,
Underwater Archaeologist
of the Italian Ministry of
Culture

Underwater Archaeologist of the Ministry of Culture. Head of the Quality Service of cataloging processes for the Central Institute for Catalog and Documentation. Control the cataloging and inventorying processes through the SIGECweb; promotes the establishment of the network of national cataloging bodies; supports the cataloging

bodies in the management of the operational planning phases; supports the integration between the systems used by the Ministry and those of the Bodies that cooperate in the protection and cataloging through interoperability services. Director of the underwater excavations in the lake of Bolsena.



Marco Medici,
Assistant Professor,
University of
Ferrara,
Department of
Architecture

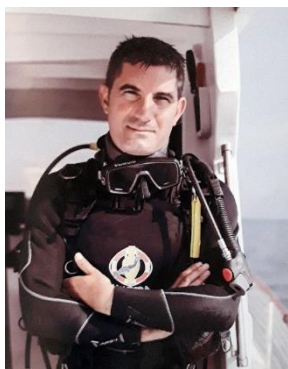
Marco is part of the DIAPReM-TekneHub research center since 2013, where he has been involved in several research and training projects, as well as technology transfer activities. He developed advanced skills in the digitization of the built environment, focusing in particular on BIM modeling applied to Cultural Heritage. On these topics, he took part in international conferences, published several scientific papers, and since 2020 he's one of the founding members of the INCEPTION company, an innovative start-up. In the last years, he's also developing research activities on web-based technologies, virtual environments, and algorithm-aided design for architectural modeling.



Despoina Koutsoumba,
Underwater Archaeologist,
Ephorate of Underwater
Antiquities, Hellenic
Ministry of Culture and
Sports

Despoina Koutsoumba is a graduate of Archaeology of the University of Athens with a Master's degree from the National Technical University of Athens in the program "Protection of Monuments - Conservation and restoration of historical buildings

and complexes". Since 2006, she has been working at the Ephorate of Underwater Antiquities of the Hellenic Ministry of Culture as an underwater archaeologist and has participated in various underwater archaeological projects. She has participated in the marine excavation of the Pavlopetri prehistoric settlement in 2011 (cooperation of the Ephorate of Underwater Antiquities and the British Archaeological School of Athens) and co-wrote the ministry-approved Master Plan for the managing of the archaeological site and its surrounding ecosystem. She is responsible for the Aigina Harbour Project 2019-2023, a cooperation programme of underwater research conducted by the Ephorate of Underwater Antiquities and the French School of Athens. She has written, translated, and scientifically edited many archaeological publications.



GianPaolo Colucci,
Professional underwater
archaeologist, President
of L'ANFORA, Cultural
and Amateur Sports
Association

Professional underwater archaeologist since 2002. Outside collaborator of the Superintendency and the General Directorate of Apulia Museums. He works for public authorities and private entities making archaeological evaluation required for the design and realization of public works to be carried out both on land and underwater. He is a founding member and the president of L'ANFORA, Cultural and Amateur Sports Association, intended to promote the underwater archaeological heritage through educational and popularization activities. Since 2016 he has been an external contact person responsible for matters relating to underwater archeology of the National Museum and Archaeological Park of Egnazia and also he has been in charge of conducting underwater tours. Underwater Instructor, Pediatric Basic Life Support-Defibrillation instructor. In 2020 he became an instructor of ASBI, Albatros Scuba Blind International Disabled dive School, and then he

qualified as a Disabled Diver Instructor, becoming the first archaeologist and instructor certified to accompany blind divers to underwater archaeological sites.

Barbara Davide Petriaggi, Superintendent of the National Superintendence for Underwater Cultural Heritage (Taranto), Superintendent ad interim of the Soprintendenza per i beni archeologici artistici e storici per le province di Brindisi e Lecce (Lecce).



Barbara Davide Petriaggi is an underwater archaeologist of the Italian Ministry of Culture (MiC). In 1993 she was the first female Underwater Archaeologist of the MiC, authorized by a

Ministry Decree to direct underwater excavation and underwater documentation. Since December 2020 she is Superintendent of the National Superintendence for Underwater Cultural Heritage (Taranto) and since February 2021 she is also Superintendent ad interim of the Soprintendenza per i beni archeologici artistici e storici per le province di Brindisi e Lecce (Lecce). From 2019 to present she is Member of the Scientific and Technical Advisory Body (STAB) - the 2001 UNESCO Convention on the protection of the Underwater Cultural Heritage (UCH)-UNESCO, Paris, France. 2009 to present she is adjunct professor of "Underwater Archaeology" at Roma TRe University (Rome). From 2017-2020 she was Official in charge of Underwater Archaeology - ICA - Central Institute for Archaeology (MiC). Since 1993 she worked for the Underwater Archaeology Operation Unit of the Central Institute for Restoration (ICR) and since 2011 to 2020 she Directed the Archaeology Operation Unit of the ICR. She is an author of numerous more than 130 scientific and popular papers on underwater archaeology and a manual on Underwater Archaeology with Roberto Petriaggi.



Vasiliki Kyprouli,
Maritime
Archaeologist, Ephorate
of Underwater
Antiquities, Hellenic
Ministry of Culture and
Sports.

Vasiliki was born in 1982. In 2007 she graduated in Archaeology from Athens University and in 2011 she received her master's degree in Maritime Archaeology from the University of Southern Denmark. Since then she collaborates with the Greek Ministry of Culture in several archaeological projects, surveys, excavations and supervisions, both on land and underwater. She is currently working in the Ephorate of Underwater Antiquities for the project "ANDIKAT" (INTERREG V-A Greece-Cyprus 2014-2020), concerning the Development of Diving Tourism Network in Greece and Cyprus, and specifically in the islands of Fournoi and Leros.



Athanasios E. Zlatoudis,
Authorised Councillor of
Sporades R.U. (for
Tourism, Culture, Ferry
Connections and
Transport)

Athanasios Zlatoudis is elected Board Member of Region of Thessaly, Authorised Councilor for the exercise of the responsibilities of Tourism, Culture, Ferry Connections and Transportation, of the Regional Unity of Sporades. He is a business consultant in Tourism, certified adult trainer and member of National Center of Public Administration and Local Government (EKDDA) Teaching Personnel. He holds a Master's Degree in Spatial Planning, Urban Planning and Development with a focus on Spatial Analysis and Policy (University of Thessaly, Department of Spatial Planning, Urban Planning and Regional Development). He holds a Diploma in Management (University of Surrey, Surrey European School of Management), with a Bachelor's degree in International Hospitality and Tourism Management (University of Surrey, School of Management Studies for the Service Sector). As elected official,

he has served the first degree of Local Government from 2007 to 2019 in the Municipality of Skiathos (chairman of the Municipal Council and chairman of the Municipal Committee for Tourism Development and Promotion), while from 2019 he serves the second degree of Local Government in Region of Thessaly. As member of Chamber of Magnesia Board, he represents the Chamber in INSULEUR, the Network of Insular Chambers of Commerce and Industry of the European Union and in EOAEN. As member of Chambers Group for the Development of Greek Isles (EOAEN) Board, he is an alternate member of the Insular Policy Council (SYNIPO) Board of the General Secretariat of Aegean Sea and Insular Policy of the Ministry of Maritime Affairs and Insular Policy. As permanent resident of Skiathos and insular businessman, along his systematic involvement with the Municipal, Chamber and Regional public affairs, he possesses deep knowledge of the disparities related to insularity, that enables him to work effectively on insular policy, on integrated smart and sustainable insular development, through stakeholder' participatory planning.



Paschalina Giatsiatsou,
Maritime Archaeologist

Paschalina holds a master diploma in Maritime Archaeology from the University of Southern Denmark. She has also completed her training as a Commercial Scuba Diver in Denmark in 2017 and since then she has participated in maritime excavations as an underwater archaeologist and as a teaching assistant in the university's diving courses. She is part of the Underwater Survey Team (UST) that collaborates with members of the diving community for the research, the documentation, the study and the promotion of maritime features, whilst taking over information and awareness of public. She knows English, Italian and Danish and she is involved in the implementation of several EU co-funded projects (BLUEMED, ScienceDIVER).



Vedran Dorušić, Foka Ltd. Founder and Director.

Vedran Dorušić is the owner and director of Dive Centre FOKA Ltd. Always fascinated by

the sea, in 1998 he became a SKIN Diving Instructor and decided to follow a professional diving career. In 1999 he obtained the title of NAUI Instructor and earned great experience in the navy service, as a navy diver. In 2002 he opened his own dive center based in Šimuni on the island of Pag. In 2005 and 2006 he experienced commercial diving services, working for the Italian company RANA (Ravenna, Italy), which provides underwater services for the oil and gas industry. Over the last decade, he has participated in underwater archaeological research in the quality of permanent team member of the University of Zadar maritime archaeology team. He also cooperates with other institutions from Croatia and abroad, engaged in research and protection of cultural and natural heritage of the Adriatic Sea. He is the co-founder and current president of the association NAVALIS, and active member of Institute for Maritime Heritage ARS NAUTICA.

environment. More than 25 original research papers have been presented and published in accredited refereed international conferences and journals. She has worked as an adjunct lecturer in the University of Thessaly and Technical Institute of Sterea teaching undergraduate courses on tourism development, urban development and culture, cultural tourism and more and at a postgraduate level she has taught in the University of West Attica, Tourism Destination development and in an Intensive Socrates Program between Greece, Germany and Spain. She has cooperated as an independent consultant for tourism development and promotion with Municipalities in Greece (Poros, Amarousion and more), with European Grouping for Territorial Cooperation Amphictyony, and the Hellenic Agency for Local Development and Local Government (E.E.T.A.A.). She has participated in many tourism development projects for the development and management of tourism and cultural destinations (Venice, Magnesia, coast of Lebanon). She is appointed add hock expert in strategic tourism planning by the URBACT European initiative and has participated in many research and development European funded proposals.

Dr. Maria Vrasida, Architect, Planner, Tourism Development Consultant



Dr. Maria Vrasida holds a PhD in Planning Policies for the Development of Tourism from the University of Thessaly. She received an MA in

Town and Regional Planning with Specialization in Destination Development from the University of Liverpool and a BA in Architecture and Building Engineering from the University of Liverpool. Within the research interest of Dr. Vrasida are the spatial aspect of sustainable tourism development, the integrated tourism destination management and relationship between culture, tourism and the

Under the Auspices of the Hellenic Ministry of Culture & Sports

**2nd Virtual International Conference on the
Promotion of Accessible Underwater Cultural Heritage Sites**

“Dive in Blue Growth”

May 12-14, 2021

CONFERENCE AGENDA

All times listed in CET hours.

DAY 1: Wednesday 12 May 2021

09:30 – 10:00 Late Registration / Technical Support

10:00 – 10:30 WELCOME & OPENING STATEMENTS

Welcome by: **Angelos Manglis**, Member of the Steering Committee

Opening Statements addressed by:

Lina G. Mendoni, Minister, Hellenic Ministry of Culture and Sports

Nikolaos Panagiotopoulos, Minister, Hellenic Ministry of National Defense

Lucia Borgonzoni, Senator of the Italian Republic, Undersecretary of State at the Ministry of Culture

Kostas Agorastos, Regional Governor of Thessaly

Angela Gerekou, President of the Greek National Tourism Organization

10:30 – 10:50 **Keynote Speeches**

“The COSME experience”

Igor Kalinić, Head of Sector of COSME Programme

“MeDryDive: The Project and its European context”

Alan Vella, MeDryDive Project Officer

10:50 – 12:30 **SESSION 1: The promotion and protection of Accessible Underwater Cultural Heritage Sites (AUCHS)**

Session Chair: Barbara Davide Petriaggi

10:50 – 11:10	Different approaches for the protection and enhancement of Underwater Archaeological sites: acquirements and aspirations Pari Kalamara
11:10 – 11:30	The Innovative and State of the Art Public Access Management of Malta’s Underwater Cultural Heritage Darko Kovacevic
11:30 – 11:50	A Roadmap for the sustainable valorization of Accessible Underwater Cultural Heritage; Integration of BLUEMED model for Open and Accessible to all sites Angelos Manglis, Anastasia Fourkiotou, Dimitra Papadopoulou
11:50 – 12:10	Laws, Policies, Techniques, and Utilization for the Protection of Underwater Cultural Heritage in Republic of Korea Jung Young-Hwa
12:10 – 12:30	Protection and promotion of the submerged “Villa of the dolia” off ancient Epidaurus: methods and strategies of an international project Barbara Davidde Petriaggi, Panagiota Galiatsatou
12:30 – 13:30	Lunch Break & Networking Lobby
13:30 – 14:50	SESSION 2: Dry dive technologies: dematerializing Underwater Cultural Heritage to make it accessible to everybody Session Chair: Pari Kalamara
13:30 – 13:50	Dry Dive experiences on the far side of the Mediterranean. VR and live video applied for making UCH accessible Carlota Pérez-Reverte Mañas, Felipe Cerezo Andreo, Pablo Osorio López, Luis Mariscal Rico
13:50 – 14:10	The underwater wonderland of ancient Puglia Rita Auriemma, Italo Spada, Giuseppe De Prezzo, Nicoletta Spisso, Andrea Picciolo, Cosimo Buccolieri, Simone Parizzi, Elisa Costa
14:10 – 14:30	Dry Diving and Augmented Reality Simulations of Historical Events and Artefacts Gunnar Liestøl, Michael Bendon, Elpida Hadjidaki-Marder
14:30 – 14:50	Dive in The Past: A Serious Game to promote the Underwater Cultural Heritage of the Mediterranean Sea Marco Cozza, Salvatore Isabella, Paola Di Cuia, Fabio Bruno
14:50 – 15:10	Coffee Break & Networking Lobby
15:10 – 16:30	SESSION 3: Accessible Underwater Cultural Heritage Sites (AUCHS): reaching the public Session Chair: Aggela Veneti

15:10 – 15:30	4 sites and 2 little museums. Raising awareness through Accessible Underwater Cultural Heritage Sites (AUCHS). Protecting and promoting Underwater Cultural Heritage on the Algeciras Bay, The Herakles Project Felipe Cerezo Andreo, Carlota Pérez-Reverte Mañas, Raúl González Gallero, Alicia Arévalo González
15:30 – 15:50	SoPHIA meets BLUEMED: A new Holistic Impact Assessment Model Despoina Koutsoumba, Elia Vlachou
15:50 – 16:10	Formentera Project: Conservation and integration of Underwater Cultural Heritage in the island community Javier Rodriguez Pandozi, Enrique Aragon, Andrea Sanz
16:10 – 16:30	Dry dive experience in the Underwater Archaeological Park of Baiae: gamification to promote Underwater Cultural Heritage destinations Cristina Canoro, Fabio Bruno, Marco Cozza, Francesco Izzo
16:30 – 17:15	Conclusions & Discussion Concluding Discussion Panel: Pari Kalamara, Barbara Davidde Petriaggi, Aggela Veneti, Angelos Manglis

DAY 2: Thursday 13 May 2021

10:00 – 10:30	Late Registration / Technical Support
10:30 – 10:50	Keynote Speech “iMARECULTURE project: From 3D documentation to VR Visits” Dimitrios Skarlatos, Associate Prof. Dr.-Ing. Vice Dean School of Engineering, Dept. of Civil Engineering and Geomatics Cyprus University of Technology, Photogrammetric-Vision Lab
10:50 – 12:30	SESSION 1: Technologies and approaches for the in-situ promotion of Accessible Underwater Cultural Heritage Sites (AUCHS) Session Chair: Fabio Bruno
10:50 – 11:10	Design and implementation of signage for the first Accessible Underwater Cultural Heritage Site in Greece Elianna Kolyva, Foteini Vlachaki
11:10 – 11:30	NEANIAS innovative services for Underwater Cultural Heritage Sites Paraskevi Nomikou, Kalliopi Baika, Paul Wintersteller, Konstantinos Karantzalos, Josep Quitana, Danai Lampridou, Effie Zafeirakopoulou, Jafar Anbar and NEANIAS team members

11:30 – 11:50	<p>The MPA Gaiola Underwater Park: towards a new and more sustainable model of management of an underwater Park. Maurizio Simeone, Caterina De Vivo, Paola Masucci, Martina Defina, Giuseppina Campanile</p>
11:50 – 12:10	<p>Underwater itineraries in Sicily: submerged museums and new technologies Valeria Li Vigni Tusa, Floriana Agneto, Pietro Selvaggio</p>
12:10 – 12:30	<p>From discovery to public consumption: The process of mapping and evaluating underwater cultural heritage in Malta Timmy Gambin</p>
12:30 – 13:30	<p>Lunch Break & Networking Lobby</p>
13:30 – 15:10	<p>SESSION 2: The promotion and protection of Accessible Underwater Cultural Heritage Sites (AUCHS)</p> <p>Session Chair: Angelos Manglis</p>
13:30 – 13:50	<p>MaTaCoS project outcomes: innovative products and electromechanical tools for supporting the restoration of underwater CH Luciana Randazzo, Michela Ricca, Natalia Rovella, Silvio Antonio Ruffolo, Fabio Bruno, Alessandro Gallo, Emanuele Marino, Marco Lupia, Gianni Cario, Mauro Francesco La Russa</p>
13:50 – 14:10	<p>Protection and promotion of coastal archaeological sites, with the application of soft shore protection methods against erosion, in the context of sustainable environmental protection of the coastal zone. The case of ancient Asopos (Plytra) Foteini Vlachaki</p>
14:10 – 14:30	<p>Creating a practical tool for monitoring the preservation state of ancient shipwrecks Helen M. Bardas, Angelos Tsompanidis, Aggeliki Bei</p>
14:30 – 14:50	<p>CAORLE 1 Shipwreck (II-I B.C.). The ongoing project for a remote protection of the site Massimo Capulli, Alessandro Asta, Stefano Furlani, Mirko Loghi</p>
14:50 – 15:10	<p>NOUS - uNdersea visiOn sUrveillance System at the sea wreck of Peristera, Alonnisos George Papalambrou, Vasilis Mentogiannis, Kostas Katsioulis, Pari Kalamara, Despina Koutsoumba</p>
15:10 – 15:30	<p>Coffee Break & Networking Lobby</p>
15:30 – 16:50	<p>SESSION 3: The promotion and protection of Accessible Underwater Cultural Heritage Sites (AUCHS)</p> <p>Session Chair: Pari Kalamara</p>

15:30 – 15:50	Underwater Parks of the Northern Black Sea Region and Sustainable Development of Tourism Sergey Fazlullin, Elena Ezhova
15:50 – 16:10	Sustainable and Resilient Management of Underwater Cultural Heritage (UCH) in Remote Mediterranean Islands: A Methodological Framework Dionisia Koutsis, Anastasia Stratigea
16:10 – 16:30	Promotion of Accessible Underwater Cultural Heritage Site (AUCHS) on the example of an XVIIIth-century frigate that sank in the Aegean Sea Yury Tkachenko, Sergey Khokhlov, Michael Bardashov, Valeria Shemyshevskaya, Ivan Gorlov, Rolan Sadekov
16:30 – 16:50	An Archaeopark proposal in the Black Sea in the light of underwater research of Ancient Calpe Port Ahmet Bilir, Serkan Gedük, Günay Dönmez, Ramazan Sayim
16:50 – 17:30	Conclusions & Discussion Concluding Discussion Panel: Pari Kalamara, Barbara Davidde Petriaggi, Fabio Bruno, Angelos Manglis

DAY 3: Friday 14 May 2021

10:00 – 10:30	Late Registration / Technical Support
10:30 – 10:50	Keynote Speech “Environmental, Energy and Climate Change Adaptation Policy of the Hellenic Ministry of National Defence and the Underwater Cultural Heritage – From where we are now to where we must get to.” Panagiotis Tripontikas, Commander in Hellenic Navy, Hellenic Ministry of National Defence, Directorate of Military and Technological Support, Department of Infrastructure and Environmental & Cultural Protection
10:50 – 12:30	SESSION 1: Dry dive technologies: dematerializing Underwater Cultural Heritage to make it accessible to everybody Session Chair: Fabio Bruno
10:50 – 11:10	Exploring modern shipwrecks using digital technologies: the case study of the Christoforos Shipwreck Fabio Bruno, Matteo Collina, Antonio Lagudi, Anastasios Ktistis, Nicolas Sidiropoulos, Angelos Manglis
11:10 – 11:30	Introducing Virtual Interactive Navigation in the submarine environment of Santorini

Paraskevi Nomikou, George Pehlivanides, Christos Stentoumis, Alexandros Arapantonis, Maria Douza, Varvara Antoniou, Michalis Sarantinos, Konstantina Bejelou, Othonas Vlassopoulos, Ilias Kalisperakis, Kostas Monastiridis, Anna Dura, Giotis Ioannidis, Vasiliki Pierrou, Elli Karyati, Alexandros Tourtas, Konstantinos Karantzalos

- 11:30 – 11:50** **Photogrammetric techniques for digitalization of underwater cultural assets: The case study of the Torre Santa Sabina’s Shipwreck**
Rita Auriemma, [Alessio Calantropio](#), Filiberto Chiabrande, Luigi Coluccia
- 11:50 – 12:10** **Use of cheap surface and submarine automated vessels for research and promote Accessible Underwater Cultural Heritage Site (AUCHS)**
[Sergey Khokhlov](#), Ivan Gorlov, Yury Tkachenko, Michael Bardashov, Rolan Sadekov
- 12:10 – 12:30** **Towards an innovative system for the cataloguing of underwater cultural heritage: the case of “Gran Carro” of Bolsena (Viterbo, Italy)**
[Barbara Barbaro](#), Elena Musumeci, [Marco Medici](#), Egidio Severi, Chiara Veninata
- 12:30 – 13:30** **Lunch Break & Networking Lobby**
- 13:00 – 13:30** **Parallel Session** [through the Networking Lobby link]

“DiveSafe - Integrated system for scientific and environmental underwater surveys, with advanced health & safety features”

[Polyvios Raxis](#), DiveSafe project coordinator, R&D Dept. ATLANTIS Consulting
- 13:30 – 14:50** **SESSION 2: The promotion and protection of Accessible Underwater Cultural Heritage Sites (AUCHS)**

Session Chair: Dimitris Kourkoumelis
- 13:30 – 13:50** **The ancient shipwreck of Peristera, Alonissos, as the first accessible underwater cultural heritage site in Greece**
[Pari Kalamara](#), [Dimitris Kourkoumelis](#), [Despoina Koutsoumba](#)
- 13:50 – 14:10** **ACCESSIBLE UNDERWATER TOURISM: archaeology at your fingertips**
[GianPaolo Colucci](#)
- 14:10 – 14:30** **Archaeological sites open to visits in the marine environment: the case of the so-called "Terme del Lacus" in Baiae (Italy)**
[Barbara Davidde Petriaggi](#), [Enrico Gallochio](#), [Salvatore Medaglia](#)
- 14:30 – 14:50** **Different approaches for the protection and promotion of ancient and WWII, Accessible Underwater Cultural Heritage Sites (AUCHS). The cases of Fournoi and Leros wreck sites under the ongoing INTERREG V-A Greece- Cyprus2014-2020 project “An.Di.Ka.T.”**
[Vasiliki Kyprouli](#), [Foteini Vlachaki](#), [George Koutsouflakis](#)

14:50 – 15:10	Coffee break & Networking Lobby
15:10 – 16:30	SESSION 3: The promotion and protection of Accessible Underwater Cultural Heritage Sites (AUCHS) Session Chair: Aggela Veneti
15:10 – 15:30	The importance of Stakeholders' participation in the management of Accessible Underwater Cultural Heritage Sites (AUCHS) towards local sustainable development of Alonissos Athanasios E. Zlatoudis
15:30 – 15:50	Implementing multi-criteria analysis in the selection of AUCHS for the integration of digital technologies into the tourism offering; the case of MeDryDive Angelos Manglis, Paschalina Giatsiatsou, Dimitra Papadopoulou, Vasiliki Drouga, Anastasia Fourkiotou
15:50 – 16:10	Comparison of economic and tourist factors in the protection of underwater cultural heritage in the Republic of Croatia: a case study on the ancient shipwrecks protected by metal cages and shipwreck from the bay Letavica on the island of Pag Vedran Dorušić, Matko Čvrljak
16:10 – 16:30	Underwater Cultural Heritage Tourism and Alternatives to Diving Tourism Maria Vrasida
16:30 – 17:15	Conclusions & Discussion Concluding Discussion Panel: Fabio Bruno, Dimitris Kourkoumelis, Aggela Veneti, Angelos Manglis

CONFERENCE ABSTRACTS

Different approaches for the protection and enhancement of Underwater Archaeological sites: achievements and aspirations

Pari Kalamara

Ephorate of Underwater Antiquities, Hellenic Ministry of Culture and Sports

Keywords: Underwater Archaeological sites, Cultural management, New technologies

Abstract

What has to be done first is to classify the different types of Underwater Archaeological sites from a managerial aspect, which means different characteristics that impose different actions. Shipwrecks in deep water, accessible in situ with scuba or free diving only, need a management framework focusing on accompanying diving tours, underwater systems of supervision and soft conservation solutions. Underwater sites near the shore, accessible to everybody without special restrictions, mainly by snorkeling, rose different problems such as the conservation of archaeological structures in situ, the need to delimitate their area and inform the general public for their identity e.tc. The immaterial, digitized underwater cultural heritage, an asset growing in a fast-pace, which should search for a meaningful existence. The approaches and methodologies implemented during the last three years by the Ephorate of Underwater Antiquities as well as some proposals for the future will be illustrated with examples.

The Innovative and State of the Art Public Access Management of Malta's Underwater Cultural Heritage

Darko Kovacevic

Underwater Cultural Heritage Unit, Heritage Malta

Keywords: Public access, Maritime archaeology, Underwater Cultural Heritage Management, Collaboration, Management framework

Abstract

The obligation to preserve underwater cultural heritage is a core principle of the UNESCO Convention on the Protection of the Underwater Cultural Heritage. A key element to this obligation is a balance of scientific research, protection and the promotion of responsible access to underwater cultural heritage sites. Such a balance requires the setting up of a network of communication between the tourism and heritage sector on the hand and the maritime and diving communities on the other. A variety of approaches have been developed to promote responsible access to underwater cultural heritage sites, and since the vast majority of humanity does not dive, this also includes the development of virtual access. In Malta, maritime archaeology can be traced to somewhat humble and sporadic beginnings in the late 1950s. The following decades brought with them a growing interest in diving activities and a rising number of diving schools and clubs. Whilst Malta has today established itself as a diving tourism destination, the responsible access to underwater cultural heritage sites was not always entrenched in dive operations, or recognized institutionally. Protection and management of underwater cultural heritage has recently firmly established and institutionalized itself within Heritage Malta, the national agency for museums, conservation and cultural heritage. A number of collaborative initiatives are being implemented by the agency's Underwater Cultural Heritage Unit, responsible for the managed access to Malta's spectacular underwater cultural heritage resources. This talk will cover the management of underwater cultural heritage in Malta in the 21st century, presenting the opportunities that are opening up and the challenges being faced.

A Roadmap for the sustainable valorization of Accessible Underwater Cultural Heritage; Integration of BLUEMED model for Open and Accessible to all sites

Angelos Manglis¹, Anastasia Fourkiotou¹, Dimitra Papadopoulou¹

¹Atlantis Consulting S.A.

Keywords: Roadmap, Accessible Underwater Cultural Heritage Sites, Knowledge Awareness Centres, sustainability

Abstract

Given the increased interest in the Underwater Cultural Heritage encouraged by impressive underwater archaeological discoveries worldwide, it is great timing for the responsible promotion of underwater cultural assets in the Mediterranean – mostly unknown to the public - and an opportunity for blue growth through Underwater Cultural Tourism. This paper presents the Roadmap developed under the BLUEMED project. BLUEMED developed an integrated plan so for Accessible Underwater Cultural Heritage Sites (AUCHS) to become accessible to all, (divers and the general public), through the use of innovative Virtual Reality technologies. Such technologies introduce citizens into the diving experience of the AUCH site(s) and are hosted in Knowledge Awareness Centers (KACs).

The Roadmap provides guidelines to coastal areas and islands for implementing the BLUEMED model, encountering various environmental, cultural and socioeconomic factors of each area (locality), so to be sustainable in the long-term. The Roadmap can be a bottom-up and top-down approach to be used by among local and regional stakeholders and competent authorities and management bodies. The Roadmap focuses on policy and technical aspects to be considered when drafting AUCH valorization action plans, including AUCH site features and selection criteria, the legislative framework, funding or the technologies available, the prospects for sustainable tourism development in the area, the stakeholders' engagement and the cooperation framework, as well as management and operational issues of the KACs.

Laws, Policies, Techniques, and Utilization for the Protection of Underwater Cultural Heritage in Republic of Korea

Jung Young-Hwa

National Research Institute of Maritime Cultural Heritage, Republic of Korea

Keywords: Korea, Underwater Archaeology, Law, Policies, Techniques, Utilization

Abstract

South Korea's underwater archaeology has been for 45 years since it began with the underwater excavations of the Sinan shipwreck, which began in 1976. Since then, a total of 28 underwater excavations have taken place, with 14 shipwrecks and about 100,000 of relics being excavated. The investigation and protection of the Underwater Cultural Heritage (UCH) of Korea are managed by the national government. The National Research Institute of Maritime Cultural Heritage (NRIMCH) is dedicated to the investigation and protection of UCH. Also, NRIMCH enacts a wide variety of activities, from Conservation and Analysis of UCH, Restoration and Research regarding traditional Korean wooden ships, Research and Study on Maritime Cultural Heritage (MCH), MCH Exhibition, Activation of tailor-made Public Participation Education, and Promotion related to maritime historical relics. It introduces laws and policies related to the protection and investigation of underwater cultural heritage.

The Sea of south Korea has low visibility and strong currents. In this environment, an exploration of the use of the optical camera and the diver is limited. To solve this problem, The NRIMCH has promoted projects for the precise exploration of Underwater Cultural Heritage. Various equipment is being developed in Korea. seabed-mounted 3D Scanner, Underwater Metal Detection System (EOS-Mado1), underwater walking robot Crabster (CR-200), 3D seismic survey system (EOS3D-A). Recently, VR, AR, and MR contents are produced using the results obtained from such research and research. This content is being used for exhibition and education on underwater cultural heritage. Due to the difference in maritime and underwater environments, it is possible to compare with each other what policies and laws should be used to investigate and protect underwater cultural heritage.

Protection and promotion of the submerged “Villa of the dolia” off ancient Epidaurus: methods and strategies of an international project

Barbara Davidde Petriaggi¹, Panagiota Galiatsatou²

¹ *Istituto Centrale per il Restauro*

² *Ephorate of Underwater Antiquities, Hellenic Ministry of Culture and Sports*

Abstract

The submerged “*Villa of the dolia*” extends for about 1600 square meters below sea level off ancient Epidaurus, and it is characterized by the presence of several rooms mostly connected with the processing of the agriculture products, including a warehouse with twenty dolia still preserved *in situ*.

Since 2018 this archaeological complex has been the object of a Project conducted by the Ephorate of Underwater Antiquities, the Istituto Centrale per il Restauro of Rome and the Italian Archaeological School of Athens. After a brief overview of the results of the 2019 excavation and restoration campaign, the paper will present the activities conducted by the international team to document, conserve and protect this very significant archaeological site. Particular attention will be given to the photogrammetric techniques in shallow water used to the 3D documentation of the site; to the innovative materials used for *in situ* restoration of architectural remains and of one of the dolia (specially formulated hydraulic mortars, methodologies and tools etc.) and the enhancement plan, in progress, that involves guiding in a glass-bottom boat, which is intended to increase the opportunities for the public to visit the site.

May 12 | Session 2: Dry dive technologies: dematerializing Underwater Cultural Heritage to make it accessible to everybody.

Dry Dive experiences on the far side of the Mediterranean. VR and live video applied for making UCH accessible.

Carlota Pérez-Reverte Mañas¹, Felipe Cerezo Andreo¹, Pablo Osorio López¹, Luis Mariscal Rico¹

¹ *University of Cádiz*

Keywords: VR experiences, Dry Dive, Underwater video streaming, public archaeology

Abstract

Public access to Underwater and Maritime Cultural Heritage has proven to have a very positive effect on the local economy. This type of heritage is very attractive for the cultural tourism sector in general and in particular for active and diving tourism.

Since May 2019, within the framework of the TIDE project (Interreg Atlantic Area), various partners from more than 5 countries have been working on the development of tourism packages based on the enhancement of the Maritime and Underwater Heritage through the application of new technologies.

In this paper, we will present the advances in the project in the Strait of Gibraltar, based on the first phase of scientific analysis and on the definition of a common working methodology that has resulted in a toolkit for the development of tourism activities linked to the MCH and UCH. The application of this toolkit throughout 2020 has resulted in different activities, experiences, and actions to facilitate access to the Atlantic Area's shared history and Maritime Heritage. Among these, we highlight the VR applications to create Dry Dive experiences and the streaming of underwater archaeological works, thanks to a bottom-surface acoustic communication buoy, which is freely accessible to other partners and other interested public.

May 12 | Session 2: Dry dive technologies: dematerializing Underwater Cultural Heritage to make it accessible to everybody.

The underwater wonderland of ancient Puglia

Rita Auriemma¹, Italo Spada², Giuseppe De Prezzo², Nicoletta Spisso², Andrea Picciolo³, Cosimo Buccolieri³, Simone Parizzi⁴, Elisa Costa⁵

¹ University of Salento, Department of Cultural Heritage

² CETMA (Technologies Design and Materials European Research Centre)

³ Marine Protected Area Porto Cesareo

⁴ Independent researcher

⁵ University of Venice Ca' Foscari, Department of Humanities

Keywords: Puglia, underwater photogrammetry, underwater 360° video, 3D modeling, wearable VR device

Abstract

The projects *Puglia Seascapes - looking at Apulia from an underwater perspective* – and *UnderwaterMuse, Immersive Underwater Museum Experience for a wider inclusion*, both coordinated by Puglia Region, aim to make a significant contribution to better understanding of the underwater cultural heritage; the study cases concern different sites in the Marine Protected Areas of Porto Cesareo and Torre Guaceto: a cargo of columns from Evia island and another cargo of amphoras scattered in the shallow waters of Torre Chianca (Porto Cesareo, Lecce) and the remains of a Late Antique cargo (V-VI century AD) found in the waters of Torre Guaceto (Brindisi). The interpretation of the archaeological and geoarchaeological data about the sites, their formation process and the coastal landscape evolution, as well as the 3D models obtained through photogrammetry techniques based on SfM (Structure from Motion) and underwater 360° and 5K videos, allowed us to develop a methodological and technological protocol based on the use of a software (App), i.e. *Puglia Seascapes VR*. It provides suggestive scenarios through advanced 3D modeling and animation techniques and results in interactive videos that reconstruct and above all narrate in an emotional way the last journey of the ship in the ancient seascape, deeply different from the current, and the formation of the underwater context. Moreover, the application of immersive techniques accessible from a single VR application for wearable devices allows the large public to discover new environments and the scholars to face a new approach for rewriting the history of ancient Italy.

May 12 | Session 2: Dry dive technologies: dematerializing Underwater Cultural Heritage to make it accessible to everybody.

Dry Diving and Augmented Reality Simulations of Historical Events and Artefacts

Gunnar Liestøl¹, Michael Bendon², Elpida Hadjidaki-Marder

¹Dept. of Media & Communication, University of Oslo

²Independent researcher & scholar

Keywords: Dry diving, Augmented Reality, Digital Cultural Heritage, AR

Abstract

Underwater heritage and archaeology is in general limited to the few that have permission and means to actually dive on location and experience the submarine sites themselves. With dry dive technologies such as Augmented Reality (AR) this is about to change. In this paper we will explore AR storytelling with regard to a World War II landing craft at Phalasarna, Greece. Tank Landing Craft A6 was sunk by German aircraft while evacuating Allied troops from Crete in 1941 and its remains still lie in a few metres of water off the coast. In this project we are developing a 3D-animation, accessible to those who cannot dive, reconstructing the dramatic event of the craft's final moments before it ended up on the sea bed under German attack as well as the site's present condition. The simulation will contain two modes: 1) an animation sequence that reconstructs how the ship went down, and 2) a reconstruction of the site as it looks today with detailed multimodal explanations based on historical research. Due to the Indirect AR approach, which employs a full screen 3D-environment, it is possible to use the app both on and off location, combining AR and VR modes of representation. This increases the availability and usability of the simulation dramatically. Tourists may visit the site online prior to a physical trip and students may explore the site as part of their curriculum. When on location it will be possible to experience the landing craft in situ, both from the nearby shores or from a boat close to the site.

May 12 | Session 2: Dry dive technologies: dematerializing Underwater Cultural Heritage to make it accessible to everybody.

Dive in The Past: A Serious Game to promote the Underwater Cultural Heritage of the Mediterranean Sea

Marco Cozza¹, Salvatore Isabella¹, Paola Di Cuia¹, Fabio Bruno¹

¹ 3D Research Srl

Keywords: Serious Game, Gamification, Underwater Cultural Heritage, Virtual Reality, Accessibility

Abstract

In the last decades, the popularity of video games increased a lot since they have the unique ability to engage their audience and create empathy. Among them, serious games have additional purposes besides entertainment, such as learning and behaviour change. Recently, serious games and gamification have been successful applied to different fields, including education, health, and tourism.

Tourism is an experience-based industry, and it can be supported by new technologies, such as electronic games, virtual and augmented reality. In particular, game-based marketing is a new form of digital marketing that aims at increasing brand awareness and attract potential customers by providing immersive and engaging experiences with virtual and real destinations.

This paper describes the activities carried out within the MEDRYDIVE project, co-funded by the COSME Programme of the European Union, to develop the Dive in The Past Serious Game. It allows players to virtually dive in some of the most appealing Underwater Cultural Heritage Sites of the Mediterranean Sea. The purpose of the game is twofold: attract tourists (both divers and non-divers) from all over the world by stimulating their interest on selected locations and UCH in general; provide non-divers with a “Dry Dive Experience”, a VR simulation of a diving session from the scuba diver’s point of view. This is achieved by integrating the interactive exploration of the underwater sites with digital storytelling, challenges and puzzles. The Serious Game is available for free on iOS and Android devices, as well as Head-Mounted Displays.

4 sites and 2 little museums. Raising awareness through Accessible Underwater Cultural Heritage Sites (AUCHS). Protecting and promoting Underwater Cultural Heritage on the Algeciras Bay, The Herakles Project

Felipe Cerezo Andreo¹, Carlota Pérez-Reverte Mañas¹, Raúl González Gallero¹, Alicia Arévalo González¹

¹ University of Cádiz

Keywords: Public Access to UCH, public studies, Underwater trails, interpretation for protecting UCH, public response

Abstract

The Herakles project (FEDER-UCA18-107327) was created to research the UCH of Algeciras Bay (Spain), but also with the commitment to disseminate the results and make this heritage accessible to the public through different experiences. Here we present the first results of the three experiences that we are developing in close collaboration with local stakeholders, ranging from public institutions such as the Museum of Algeciras, the Port Authority of Algeciras Bay, or the Natural Park of the Strait of Gibraltar to several active tourism and diving companies.

The Herakles project is based on three lines of work that address 3 different audiences or communication problems.

- 1 - Establishment of various underwater trails in 16th, 18th, and 19th-century shipwrecks. Accessible Underwater Cultural Heritage Sites (AUCHS).
- 2 - Creation of two centres for the interpretation of the Maritime and Underwater Cultural Heritage of the Strait Natural Park (including historical information, virtual models, and VR Glasses) as an educational complement to the underwater trails.
- 3 - Study of the impact of tourism based on virtual or direct access to the UCH in the Bay of Algeciras, analyzing parameters linked to the conservation of heritage and the effectiveness of the transmission of values and the rise of awareness among divers and other audiences.

SoPHIA meets BLUEMED: A new Holistic Impact Assessment Model

Despoina Koutsoumba², Elia Vlachou¹

¹ *European Museum Academy*

² *Ephorate of Underwater Antiquities, Hellenic Ministry of Culture and Sports*

Keywords: AUCHS, public opinion, survey, Peristera shipwreck, holistic impact assessment

Abstract

In this paper, a new Holistic Impact Assessment Model (HIAM), currently under development in the framework of SoPHIA, a Horizon 2020 project, is presented and assessed in relation to the opening of the first Greek AUCHS, the shipwreck of Peristera.

SoPHIA's HIAM, aiming to assess the cultural, social, economic and environmental aspects of cultural heritage interventions, found an ideal case study in the AUCHS of BLUEMED: the first pilot site, Peristera, aspires to promote a sustainable and responsible model for the protection of both cultural and natural underwater heritage, while empowering local communities and boosting economic development.

In view of the assessment, available qualitative and quantitative data from BLUEMED-Peristera (ex-ante and ex-post surveys, number of divers, KAC visitors etc) have been collected. Moreover, a public opinion survey has been conducted on Alonissos island. All data have been reviewed and evaluated using the HIAM, while extensive focus group discussions with the project's stakeholders have provided useful feedback for both testing the model and developing relevant indicators for the AUCHS.

Formentera Project: Conservation and integration of Underwater Cultural Heritage in the island community

Javier Rodriguez Pandozi¹, Enrique Aragon², Andrea Sanz¹

¹ *Instituto Balear de Estudios en Arqueología Marítima (IBEAM)*

² *IBEAM/Flinders University*

Keywords: Underwater Archaeology, Community engagement, Accessibility, Training and Education

Abstract

IBEAM was established in 2012 for research, protection, preservation and dissemination of the richness of the underwater cultural heritage (UCH) in the Balearic Islands (Spain); in line with the 2001 UNESCO Convention. This organisation aims to cooperate with the local authorities improving human well-being and social equity, while significantly reducing risks and impact on the coastal and sea cultural environment. Over the last 5 years IBEAM has provided critical information to local authorities essential for informed decision-making and adaptive management. The protection of all kinds of cultural heritage is a very important aspect to safeguard cultural diversity and reinforces society's sense of identity, strengthens social cohesion and facilitates mutual understanding, as well as bringing economic benefits. Formentera Project: Conservation and integration of Underwater Cultural Heritage in the island community, is an action program developed in the Balearic Islands (Spain) since 2015. This initiative aims to fill the gap between the protection of underwater cultural heritage and the accessibility of the general public. In this case, our efforts aim to cover three types of audience 1. children's education 2. university students 3. divers by proposing experiences generating integrative experiences that allow a basic understanding of best practices in their interaction with the UCH.

Dry dive experience in the Underwater Archaeological Park of Baiae: gamification to promote Underwater Cultural Heritage destinations

Cristina Canoro¹, Fabio Bruno², Marco Cozza³, Francesco Izzo⁴

¹ *Campi Flegrei Diving Center*

² *University of Calabria, Italy*

³ *3D Research Srl*

⁴ *Luigi Vanvitelli University, Italy*

Keywords: gamification, UCH destinations, serious game, VR experience, tourism marketing

Abstract

In the last years gamification has become a focus in the research field in a multidisciplinary perspective (Xu, Buhalis and Weber, 2017), many scholars underline the lack of research in marketing and service industry field (Huotary and Hamiri, 2012; Lucassen and Jasen, 2014; Xu et al. 2014). In particular only few researchers highlight the use of gamification in tourism sector (Sigala, 2015; Xu et al., 2014; Correa and Kitano, 2015; Negrusa et al., 2015). Actually, gamification can be an effective method to digitally engage visitors with a use of their smartphones, tablets or other digital devices. In tourism industry, gamification is useful not only for engaging visitors, but also for increasing customer loyalty or promote destination, cultural sites and tourist attractions.

In such a perspective the paper aims to analyse how gamification can promote UCH destinations and how it would influence users experiences. A case study about dry dive experience in the Underwater Archaeological Park of Baiae is presented to show how serious games, AR and VR experiences can benefit tourism marketing in UCH destinations, supporting the promotion of the targeted destinations by attracting and educating visitors. This study also provides managers and policy makers with some implications useful to exploit the new development opportunities provided by serious game and VR experience for promoting UCH destinations. In particular for young generation gamification may become a powerful tool to combine education and entertainment and also to look at UCH destinations in a new perspective (Bakhsheshi and Ghaziani, 2019).

Design and implementation of signage for the first Accessible Underwater Cultural Heritage Site in Greece

Elianna Kolyva¹, Foteini Vlachaki¹

¹Architect – MSc Heritage Conservation

Keywords: underwater signage, underwater museum, archaeological diving routes

Abstract

A Signage Design and Implementation project was carried out for the Underwater Archaeological Site of Peristera Alonissos, in the context of the INTERREG MED Program “Plan/test/coordinate Underwater Museums, Diving Parks and Knowledge Awareness Centers in order to support sustainable and responsible tourism development and promote Blue growth in coastal areas and islands of the Mediterranean - BLUEMED”. The project is based on the perspective of the diver/visitor that was already designed by the EUA for the diving public during the preliminary planning of the UAS visit and the purpose of the signs is to facilitate that visit. The object of the Signage Design included the design of the form of the signs, the selection of materials and support system, the design of the layout and the form of the content on the plates that were to be placed at specified general view stops of the shipwreck as well as individual points of archaeological interest. The implementation of the Signage Design on the Peristera Shipwreck of Alonissos was a welcomed by the diving public and also yielded several construction aspects that were to be taken into account for the next projects of Underwater Archaeological Signage.

NEANIAS innovative services for Underwater Cultural Heritage Sites

Paraskevi Nomikou¹ Kalliopi Baika², Paul Wintersteller³, Konstantinos Karantzas⁴, Josep Quitana⁵, Danai Lampridou¹, Effie Zafeirakopoulou¹, Jafar Anbar^{1,2} and NEANIAS team members

¹ National and Kapodistrian University of Athens, Department of Geology and Geoenvironment

² Centre Camille Jullian, Aix-Marseille Universite

³ Teledyne Marine, Germany

⁴ Research and Innovation Center in Information, Communication and Knowledge Technologies “Athena”, Greece

⁵ Coronis Computing, Spain

Abstract

NEANIAS project engages Open Science practices, through the European Open Science Cloud (EOSC) ecosystem, aiming at a wide variety of scientific and professional communities emanating from the Underwater, Atmospheric and Space domain. The Underwater thematic services are designed to deliver user-friendly and cloud-based solutions with respect to bathymetry processing, seafloor mosaicking and seafloor classification, addressing the needs of the end-users. This service will exploit cutting-edge technologies and hub infrastructures in order to be easily accessible and attain highly sophisticated and accurate results, regardless the level of expertise of the end-users. Geologists, archaeologists, and people involved in offshore industry could incorporate the aforementioned services into their research and work, reducing time and costs or efforts. Throughout efficiently designed and tested workflows the users would be able to securely upload and process their data, therefore would have the ability to produce bathymetry and seabed classification maps from acoustic data and seafloor mosaics from optical data, therefore achieve precise *in situ* photogrammetric documentation of archaeological and geological underwater heritage sites. Moreover, accessibility to sophisticated services and high accuracy of results will facilitate and promote the correlation of interdisciplinary data towards a comprehensive interpretation of the geoarchaeological context. Finally, NEANIAS underwater service offers the possibility to the users to expand and advance their activities by consolidating *ad hoc* techniques and a simplified user interface. The contribution of these innovative services is expected to be of high value to the marine geoarchaeology community.

The MPA Gaiola Underwater Park: towards a new and more sustainable model of management of an underwater Park.

Maurizio Simeone¹, Caterina De Vivo¹, Paola Masucci¹, Martina Defina¹, Giuseppina Campanile¹

¹Centro Studi Interdisciplinari Gaiola onlus

Keywords: *accessibility, sustainable management, local community, monitoring, sustainable growth*

Abstract

The MPA Gaiola Underwater Park is an underwater archaeological Park located in the densely inhabited area of Naples. This MPA preserves the remains of a I century B.C. Roman *villa* and since it is located in one of the few freely accessible spots of the coastline of Naples, the human pressure on the site is very high and undermines the preservation of the site. As data collected throughout the years prove, despite the many awareness creation campaigns, the common perception of the Park as a sun-and-bathe destination is misleading and makes it difficult to the public to understand the value of the area. During the recent Covid-19 crisis all the problems related to overcrowding of the Park became even more relevant; the chance was taken to change the paradigm of access to the MPA and to study a new model of accessibility that guarantees a more respectful preservation of the underwater heritage and at the same time a better experience for the visitors as well as more awareness-creation on the relevance of the area. This work will show the results of the monitoring activity carried out on the visitors throughout the years and the study carried out to conceive a new management and accessibility model as well as the first results of the monitoring activity on the visitors carried out after the experimentation of the new model. This study would be a good example for all the sites that preserve underwater heritage in densely visited or urban sites.

Underwater itineraries in Sicily: submerged museums and new technologies

Valeria Li Vigni Tusa¹, Floriana Agneto¹, Pietro Selvaggio¹

¹ *Superintendence of the sea, Region of Sicily*

Abstract

Underwater itineraries in Sicily start from the 2001 UNESCO Convention, supported by the prof. Sebastiano Tusa's great contribute. The conviction that archaeological finds must remain *in situ* in their original position is the best way to fight against robberies and general indifference, in fact local communities step by step changed their opinions becoming conscious guardians of their underwater heritage, starting at same time a touristic and economic loop by great visibility of media. The Superintendence of the Sea, created and conducted by Sebastiano Tusa carried out during the years many underwater itineraries available for divers: an authorized guide shows to visitors the way to follow above the site rich in ancient finds marked by plastic floating labels identifying type and age of amphorae, anchors, wrecks, etc. Indeed, archaeology meets biology and marine landscapes, an amazing trip for all level of divers. Moreover, dedicated waterproof book-guides provide to visitors further information. The last edition of this system introduced "RFID" technology by "speaking" floating labels that by a microchip contact provide on the display of the small computer on the diver's wrist some more images, text and didactic drawings. Technology gives great emphasis and visibility to underwater finds and in Sicily it has been applied on some cultural underwater itineraries. In particular, at Cala Minnola in Levanzo island and at Cala Gadir in Pantelleria island, a video camera system was installed, in the aim to protect the sites and at the same time allowing the best fruition to visitors. Conceived for non-divers the rapid development of technology allowed in 2006 the installation in Cala Gadir of a new video surveillance and fruition system by 2 webcams, with a big reduction in dimensions of equipment and best quality of images definition. Images are visible online on dedicated website, camera can be moved 24h a day all around the world discovering different points of view, at the same time watching some moments of sea life. Indeed, the site reached in few months the top position among the more visited webcam. Furthermore, underwater tour was expressly realized for handicapped people and for blind people consisting in authentic and tactile replications finds marked whit special labels in Braille language. Technology in progress ever provides new solutions for study, protection and fruition of underwater cultural heritage, so we have to research and experiment new solutions that, applied on underwater archaeology, increase the frontier of human knowledge.

From discovery to public consumption: The process of mapping and evaluating underwater cultural heritage in Malta.

Timmy Gambin

Heritage Malta

Keywords: *Remote sensing, Mapping, Heritage Management, Deep-sea exploration, Technology*

Abstract

The in-situ promotion and preservation of Underwater Cultural Heritage (UCH) sites is one of the main principles of the UNESCO Convention on the Protection of the Underwater Cultural Heritage. On-site examination and in-situ preservation have become the mainstay of underwater cultural heritage management, safeguarding the contextual authenticity and integrity of underwater cultural heritage sites. To date, the majority of shipwrecks discovered and documented in the Mediterranean are situated in waters shallower than the 50-metre contour. Continued technological advances and an increase in technical diving and deep-water exploration point towards a shift in this statistic that's set to increase exponentially in the not too distant future. Thus, it is imperative to look at ways in which such a directive can be implemented. This paper will highlight the synergy between existing remote sensing technologies and the management of underwater cultural heritage. Examples of on-going research projects, such as Malta's approach to surveying and implementing a scoring system for historic wreck sites, based on local and global considerations of historic, natural and condition of site elements. Such an approach allows for the scaling of sites based on a number of parameters and provides instructive information for the creation of management strategies. The intention here is to demonstrate how large-scale remote sensing surveys can make major contributions to site management, which in-turn facilitates the decision-making process in terms of how and what information is transmitted to divers and members of the public.

MaTaCoS project outcomes: innovative products and electromechanical tools for supporting the restoration of underwater cultural heritage

Luciana Randazzo¹, Michela Ricca¹, Natalia Rovella¹, Silvio Antonio Ruffolo¹, Fabio Bruno², Alessandro Gallo³, Emanuele Marino², Marco Lupia⁴, Gianni Cario⁴, Mauro Francesco La Russa¹

¹ Department of Biology, Ecology and Earth Sciences (DiBEST), University of Calabria

² Department of Mechanical, Energy and Management Engineering (DIMEG), University of Calabria

³ Tech4sea s.r.l.

⁴ Applicon s.r.l.

Keywords: Innovative mortars, antifouling, cleaning tool, biofouling detection

Abstract

This work is part of a research project titled MaTaCoS (Advanced materials and technologies applied to the conservation of underwater cultural heritage) funded by the Italian Ministry of Economic Development (MISE), concerning development of innovative tools and methods for the protection of Underwater Cultural Heritage, with particular regard to cleaning and consolidating procedures to be carry out directly in situ. The fishpond of the archaeological site of Castrum Novum (Santa Marinella, Rome, Italy) was chosen as a pilot site for experimentation. Selected mortars' fragments from the fishpond structure were fully characterized and the achieved results allowed the definition of the used "recipe", information needed for the delineation of restoration interventions and for the planning of maintenance protocols (Randazzo et al., 2019). Starting from the acquired textural and minero-chemical features, the formulations of innovative mortars, to be applied directly in situ, preventing mainly the biological growth and the development of electromechanical devices for supporting the restoration of underwater archaeological artefacts were specifically designed. The antifouling efficacy of the different formulations, monitored over time, was investigated on specimens settled both in laboratory and in situ (Randazzo et al., 2020). Three different tools have been designed and manufactured: a brush-based cleaning tool, a percussion-based cleaning system and a tool for the injection of mortar during the consolidation procedures. Regarding the cleaning system tool, preliminary tests were carried out on various mortars' specimens. Several parameters (engine rpm, execution time, pressure on the surface to be cleaned, bristles material) were taken into account in order to assess its performance both in terms of cleaning efficiency and damage effect caused by the bristle-brush contact on the surface of the specimens. The percussion cleaning tool has been developed as part of a more complex tool for core sampling. Experimental tests (impact resistance, surface hardness) have been conducted on different metal alloys to define the best material to manufacture the impact mechanism, capable of 2.6 J of impact energy. The injection tool has been manufactured using state of the art 3D printing technologies. The maximum thrust of 225 Kg, allows using mortars with a wide range of densities. Moreover, an integrated system for biofouling detection and environmental parameters monitoring was designed. The main objective of the monitoring system is to

provide indications on the state of biodeterioration of the archaeological artefacts after the cleaning and mortars application, through appropriate in-situ image processing and environmental parameters acquisition. The system integrates a remote device and a web server. The remote device consists of a multi-parameters probe and NIR camera integrated in one underwater housing. A cleaning method for the camera lens with UV light was also investigated. The web server collects the transmitted data from the remote devices and make the information available for consultation and post-processing, providing information and alert on biofouling growth.

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Protection and promotion of coastal archaeological sites, with the application of soft shore protection methods against erosion, in the context of sustainable environmental protection of the coastal zone. The case of ancient Asopos (Plytra).

Foteini Vlachaki

Architect – MSc Heritage Conservation

Keywords: coastal archaeological sites, erosion, restoration of coastal monuments

Abstract

The issue of protection of coastal archeological sites, possibly more than in-land sites, is intertwined with the protection of the host environment. Any study for the protection and promotion of ancient coastal structures should be part of an overall management plan of the coastal zone that addresses with priority the intense problem of erosion. In Greece there is a large number of coastal archaeological sites that are located in the beach zone and are therefore subject to the action of currents that cause erosion. The action of the waves and currents, on structures that are found above sea level most of the year, results to the transport of aggregates from the shore to greater depths and is actually, a form of gradual excavation - with simultaneous rinsing of preserved mortars and other binding materials.

The coastal and underwater archaeological site of ancient Asopos (modern Plytra) in the Peloponnese - with important structures dating from the Hellenistic to early Byzantine period- having undergone documented destruction through the last 60 years, becomes a pilot site for the establishment of principles for an holistic approach of cultural and environmental protection and promotion of coastal archaeological sites. Through this approach, sustainable growth in the area, promotion and accessibility of UCHS can only be achieved in conjunction with the protection and restoration of the natural environment, using soft methods of intervention.

Creating a practical tool for monitoring the preservation state of ancient shipwrecks

Helen M. Bardas¹, Angelos Tsompanidis², Aggeliki Bei³

¹ Ephorate of Underwater Antiquities & Korseai Institute of Historical and Archaeological Research

² Ephorate of Underwater Antiquities

³ Korseai Institute of Historical and Archaeological Research

Keywords: monitoring, accessible, ancient shipwrecks, Peristera shipwreck, Fourni

Abstract

Until recently, visiting ancient shipwrecks in Greece, a breathtaking experience in itself, was not possible for the general public due to concerns about their protection and preservation. Over the last few years, the Ephorate of Underwater Antiquities has chosen shipwrecks from the islands of Alonissos, Fourni, Leros and from the western Pagasetic Gulf and is carrying out preliminary work with the aim to make them accessible to recreational divers. This is a huge responsibility; as well as being accessible, the present state of the shipwrecks has to be ensured for future generations. What are the dangers though, from being accessible and how can the possible degradation of an ancient shipwreck be monitored?

This article aims to present a practical tool of systematic monitoring of the changes and the possible degradation of ancient shipwrecks which will be opened to the public as accessible underwater archaeological sites. This model includes the digital drawing of the shipwreck's cargo, initially categorizing the current preservation state into three categories and subsequently documenting the preservation state of each object separately. The combination of the above data can offer a digital interactive monitoring tool, which can potentially be used with the appropriate means in real time, underwater. Moreover, the field work which has been carried out so far within the framework of the BLUEMED Interreg MED and An.Di.Kat. programmes, at the ancient shipwreck of Peristera in Alonissos and at shipwrecks 4 and 13 of the island complex of Fourni of Ikaria will be presented.

CAORLE 1 Shipwreck (II-I B.C.). The ongoing project for a remote protection of the site

Massimo Capulli¹, Alessandro Asta², Stefano Furlani³, Mirko Loghi⁴

¹University of Udine, Department of Humanities and Cultural Heritage

²Ministry for Culture, Superintendence for the Venetian Province

³Geoscienze University of Trieste, Department of Mathematics and Geosciences

⁴University of Udine, Polytechnic Department of Engineering and Architecture

Keywords: shipwreck, video-surveillance, experiments, Adriatic Sea, protection

Abstract

The shipwreck is located about 12 nautical miles off the coast of Caorle (Venezia), the hypothetical harbor of the ancient Iulia Concordia, at 28 m below sea level. The cargo is contained inside a biogenic concretion that is 23 m long, more of 7 m wide; this concretion rises from the surrounding flat sea bottom to a height of about 3 meters, so it looks like seems a kind of small relief in the Adriatic seabottom. The conditions of the site suggested the use of a remote system to protect it. This meant the development of a feasibility study, which was carried out by an interdisciplinary team of archaeologists, engineers and geologists. A few years ago, a very preliminary study was followed by positive functional tests on the field; thanks to funding from the Ministry for Cultural Heritage, the implementation of the project has now begun.

The project foresees the creation of a video surveillance system capable of continuously monitoring both the sea surface and the actual site. The system involves sending video streams, collected by underwater cameras to be installed at various points of the archaeological site, to a management and sorting system located on a buoy, on which additional cameras will be placed to record the surface, combined with motion sensors. The acquired images will be also transmitted in real time to a remote server and recorded at the same time. The paper will present an overview of this project and the conference will be also the opportunity to present the ongoing fieldwork.

NOUS - uNdersea visiOn sURveillance System at the sea wreck of Peristera, Alonnisos

George Papalambrou¹, Vasilis Mentogiannis², Kostas Katsioulis³, Pari Kalamara⁴, Despina Koutsoumba⁴

¹ National Technical University of Athens, School of Naval Architecture and Marine Engineering

² UFR Team

³ NGUE (North Greece Underwater Explorers)

⁴ Ephorate of Underwater Antiquities of the Hellenic Ministry of Culture and Sports

Abstract

At the Sporades Archipelago in northern Greek, at the island of Alonnisos lies a remarkable ancient ship wreck that was sank around 425 B.C. and was discovered in the early 1990s, laden with thousands of amphoras. The remains of the massive cargo ship that changed archaeologists' understanding of shipbuilding in antiquity has become the first ancient shipwreck that is accessible to the public worldwide, naming itself an underwater museum. The operation of this museum was possible following the successful deployment of the NOUS Undersea Vision Surveillance System. The system consists of five prototype submarine housings equipped with cameras and windshield wipers for the camera lenses. The whole operation is controlled by a number of multitasking computing units. The network of the underwater cameras ends up in a submarine hub, which is powered by a 200 m. long cable from the shore, via a purpose-built solar power station at Peristera. Functionality has been enhanced by a weather station and a remotely-controlled 360 deg. camera for sea and land monitoring. The system transfers its data via fiber optic and RF link to an internet connection, to a server and cloud. NOUS is equipped with Artificial Intelligence capabilities in order to distinguish, classify, associate and perceive significant differences in measurable parameters that take place and are considered of interest within the area of sea wreck. Machine Learning algorithms are implemented for intelligent information processing from images and video streams. State of art methods are used for the customization -"or training"- of networks and their preparation for real time operation. Operating depth is from -23 to -33 m, at an area of 300 sq. m. The prototype system commenced its pilot operation in March 2020. The project was commissioned and funded by the Ephorate of Underwater Antiquities / Ministry of Culture & Sports under the European program "BLUEMED MED 2014-2020".

Underwater Parks of the Northern Black Sea Region and Sustainable Development of Tourism

Sergey Fazlullin¹, Elena Ezhova²

¹ *Russian State University for Humanities, Moscow*

² *P. P. Shirshov's Institute of Oceanology RAS, Moscow*

Keywords: underwater parks, recreational diving, blue growth, underwater technology, sustainable tourism

Abstract

One of the basic principles of preserving the underwater cultural heritage is the organization of storage and access to it on the spot in such a way as not to harm it. To date, hundreds of underwater archaeological sites have been explored in the Northern Black Sea region, some of which can be used in tourism or are already visited by divers individually or through diving centers.

In Russia and Ukraine, about 250 thousand divers and about a thousand diving centers and clubs are together. The main number of divers in these countries dives into the Black Sea, where they get acquainted with diving and for beginners. This mainly happens in the summer months. The Northern Black Sea region is a place of intensive tourism development. In 2019, 17.5 million people rested in the Krasnodar District, in the Crimea - 6.9 million people. In Odessa, Nikolaev and Kherson regions, about 4.3 million people rested together. About 0.5% (140 thousand people) of this number knew the joy of diving with scuba diving in warm Black Sea water.

The lack of prepared underwater routes until recently significantly reduced the possibilities of scuba diving in the Northern Black Sea region. Over the past 5-6 years, the situation has begun to change. Projects for the creation of underwater parks began to appear. Already, diving centers have organized underwater routes that specialize in attractive underwater landscapes and flooded objects of the First and Second World Wars. Some of them specialize in underwater archeology. The proposed report informs about the current state of underwater parks and underwater routes of the Northern Black Sea region and how the situation with underwater archaeological parks will change in the near future. The ideas proposed as part of the development of the concept of Blue Growth are productively used by the diving industry to promote the territory among tourists.

Sustainable and Resilient Management of Underwater Cultural Heritage (UCH) in Remote Mediterranean Islands: A Methodological Framework

Dionisia Koutsi¹, Anastasia Stratigea¹

¹Dept. of Geography and Regional Planning, School of Rural and Surveying Engineering, National Technical University of Athens, Athens, Greece

Keywords: Mediterranean Island Regions, Underwater Cultural Heritage (UCH), Heritage-led Local Development, Participatory e-Planning, Social Networks

Abstract

Contemporary trends in the tourism reveal a steady shift of tourist demand towards more authentic and experience-based consumption patterns. This tendency has brought to the forefront the less-known, small islands in the Mediterranean as potential tourism destinations; which although endowed with exquisite tangible and intangible, land and underwater cultural resources are still lagging behind due to insularity. However, the exceptional land and especially underwater cultural heritage (UCH) and its sustaining experience-based tourist potential is nowadays highly acknowledged; keeping track with the escalating trend for diving tourism activities. This calls for UCH preservation; but also, its sustainable and resilient exploitation, an effort that necessitate community engagement in respective planning endeavors in order for attractive, place- and value-based narratives to be built in alignment with local expectations. This paper attempts to reveal the potential of contemporary planning approaches in dealing with UCH sustainable management for serving local developmental goals in insular regions. Towards this end, it introduces a participatory and strategic planning framework, which embeds modern planning approaches and tools, such as scenario planning, Web-GIS data management, e-planning and e-participation, etc. Such a framework is used both for raising awareness and informing local stakeholders as to the value of UCH for gaining competitiveness in the evolving cultural tourism geography; and communicating planning outcomes for community assessment. Reference is made to a specific case study, the one of Leros Island – Greece, namely a distinguishable insular territory and battlefield scenery; revealing the community's eagerness to cope with insularity bottlenecks and pave more promising future development trails that keep track with local values, expectations and visions.

Promotion of Accessible Underwater Cultural Heritage Site (AUCHS) on the example of an XVIIIth-century frigate that sank in the Aegean Sea

Yury Tkachenko¹, Sergey Khokhlov¹, Michael Bardashov¹, Valeria Shemyshevskaya¹, Ivan Gorlov¹, Rolan Sadekov¹

¹ ANO Underwater Archaeological Society

Keywords: frigate "St. Theodore", wreck, exhibition, Mediterranean`s corsairs

Abstract

Our team of underwater archaeologists (ANO Underwater Archaeological Society), historians and museologists make a project to promote the frigate "St. Theodore". This frigate where Russian and Greek sailors served. It is possible to create (AUCHS) on its wreck. It sank as a result of a strong leak in the Aegean Sea near the island of Agios Efstratios in 1771. The ship's documents indicate that Russian and Greek sailors were on board and all of them were rescued by Greek corsairs. The location of the wreck suggests that amateur divers can dive here. At the bottom, it is assumed the presence of fragments of a large sailing ship, cast iron cannons and anchors. The island of Agios Efstratios as a significant part of AUCHSs is far enough away from tourist centers and a long excursion is needed to visit this wreck. That's why serious advertising campaign is needed. Our report offers creation of a virtual museum exhibition about the ship "St. Theodore" and about the events in which she participated. Such an exposition will consist of copies of documents from archives, 3D models of ships, video materials about the history of the discovery of the wreck, reconstruction of the death and recreation of its original appearance using augmented reality technologies. In addition, it is possible to broadcast the wreck online using deep-sea video cameras. Such an exposition can be exhibited in museums, travel agencies and online in Internet. As an example of promoting, our team plans to present the exhibition "Corsairs of the Mediterranean Sea", which illustrate the actions of Greek corsairs during the Russian-Turkish war 1768-1774.

An Archaeopark proposal in the Black Sea in the light of underwater research of Ancient Calpe Port

Ahmet Bilir¹, Serkan Gedük², Günay Dönmez³, Ramazan Sayim²

¹ Duzce University, Underwater Studies Application and Research Center

² Kocaeli Archeology and Ethnography Museum

³ Akdeniz University, Mediterranean Civilisations Research Institute, Antalya

Keywords: Calpe, Shipwreck, Ancient Port, Archeopark, Nicomedia

Abstract

Ancient Calpe Port was established on a natural bay in modern Kerpe, located in Kandira district on the Black Sea coast of Kocaeli (Nicomedia). The name Calpe is mentioned in the ancient writer Xenophon's work Anabasis. The port is a good example of the Ancient Black Sea ports in terms of its period, location, construction technique and plan. Therefore, it has been an important trade center since ancient times.

Underwater surveys was carried out here by Kocaeli Archeology Museum Directorate in 2020. As a result of these surveys around the port, wrecks that have survived to the present day have been identified. Apart from the intact wooden pieces, many terracotta (amphorae, oinochoe, plates, sherds etc.) artifacts belonging to these shipwrecks were also found. In the following years, excavations will be carried out in this area, the depth of which varies between 2-8 meters. Thus, it is planned to reveal the underwater cultural heritage of the region at accessible depths.

There are currently diving centers for tourism purposes in Kerpe. The shipwreck areas would have been an exceptional cultural tourism attraction for diving enthusiasts, short diving sessions are planned to be held during scientific excavation works. With this project, it is aimed to create sustainable underwater tourism areas. It is also among our aims to establish an underwater museum here with the data to be obtained from the excavations and researches.

May 14 | Session 1: Dry dive technologies: dematerializing Underwater Cultural Heritage to make it accessible to everybody.

Exploring modern shipwrecks using digital technologies: the case study of the Christoforos Shipwreck

Fabio Bruno¹, Matteo Collina¹, Antonio Lagudi², Anastasios Ktistis³, Nicolas Sidiropoulos⁴, Angelos Manglis⁴

¹ Department of Mechanical, Energy and Management Engineering (DIMEG), University of Calabria

² 3D Research s.r.l.

³ Skopelos Diving Center

⁴ ATLANTIS CONSULTING S.A.

Keywords: 3D Modelling, 3D Recording and Mapping, Photogrammetry, Modern Shipwreck, Virtual Reality

Abstract

An estimated 3 million shipwrecks are spread across ocean and sea floors around the planet. Some of these wrecks are thousands of years old and can provide precious historical information. But also modern shipwrecks are important testimonies of the recent past, being witnesses of commercial routes, battles, and also how human factors can impact the marine environment. In fact, they are good case studies to understand more about the marine life that starts growing around these artificial reefs. Moreover, they represent a great touristic attraction for divers that enjoy this kind of underwater environment and the habitat created by these huge structures. 3D digital surveying and mapping techniques represent an invaluable set of effective tools for reconnaissance, documentation, monitoring, but also public diffusion and awareness for these historical and naturalistic assets. This paper describes the activities carried out for the SEE THE SEA project, financed in the context of the Interreg 4helix+ European project and aimed at the 3D reconstruction of the Christoforos Shipwreck. The huge wreck lies in the Panormos Bay of the Skopelos island (Greece) at a depth of 45 meters. The applied methodology, based on an advanced underwater photogrammetry scheme, is capable to provide a high detailed 3D reconstruction of the shipwreck. The model represents the base for a Virtual Reality scenario that aims to recreate the exact ambient conditions inside and outside the water, simulating the flora and fauna, the coastline, and the experience of a virtual dive in the underwater site.

May 14 | Session 1: Dry dive technologies: dematerializing Underwater Cultural Heritage to make it accessible to everybody.

Introducing Virtual Interactive Navigation in the submarine environment of Santorini

Paraskevi Nomikou¹, George Pehlivanides², Christos Stentoumis³, Alexandros Arapantonis⁴, Maria Douza⁴, Varvara Antoniou¹, Michalis Sarantinos⁴, Konstantina Bejelou¹, Othonas Vlassopoulos³, Ilias Kalisperakis³, Kostas Monastiridis², Anna Dura¹, Giotis Ioannidis², Vasiliki Pierrou⁴, Elli Karyati², Alexandros Tourtas², Konstantinos Karantzalos⁵

¹National and Kapodistrian University of Athens, 1Department of Geology and Geoenvironment

²TETRAGON

³up2metric P.C., Computer Vision Engineering

⁴STEFICON

⁵National Technical University of Athens, Remote Sensing Laboratory

Abstract

Until recently, the magnificent world beneath the sea waves could only be reached through conventional ways, such as diving or snorkeling, or via costly methods of Oceanography using submersibles, e.g. ROVs and AUVs. The dynamically advancing fields of Virtual and Augmented Reality create opportunities to a wider community to access the submarine world. Nonetheless, the necessary tools for virtual storytelling are still at an early stage and, thus, VIRTUALDiver aimed at developing a novel interdisciplinary approach, which fuses the current technological developments in VR and AR, with photogrammetry and oceanography to highlight the terrestrial and underwater wealth of Santorini volcano island. VIRTUALDiver's approach provides a successful educational and entertaining cultural product. A detailed and visually accurate mapping of the underwater and terrestrial relief was reconstructed based on significant, multi-temporal, validated information and data, which were collected using state-of-the-art technologies. Multibeam data ensured accurate reconstruction of wide underwater areas, whereas a ROV provided images for detailed reconstructions of specific scenes, such as shipwrecks. Advanced image processing algorithms ameliorated the visual appearance of the photo-textured 3D models. Moreover, multimedia content, such as interviews from experts and locals, was created with green screen photography and 360° video production. Through a set of specially designed and developed tools for multimedia content management in Unity 3D, the design team was able to write narrative scenarios and produce interactive experiences for VR and AR environments without the need of specialized programming knowledge. This paper presents VIRTUALDiver's interdisciplinary approach on developing technologically advanced cultural-touristic applications.

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Photogrammetric techniques for digitalization of underwater cultural assets: The case study of the Torre Santa Sabina's Shipwreck

Rita Auriemma¹, Alessio Calantropio², Filiberto Chiabrando², Luigi Coluccia¹

¹ Department of Cultural Heritage, University of Salento

² Department of Architecture and Design (DAD), Politecnico di Torino, Laboratory of Geomatics for Cultural Heritage

Keywords: Underwater Photogrammetry, Digital archaeology, Geomatics, Underwater Cultural Heritage Documentation, UCH Enhancement

Abstract

Underwater cultural sites are, for their intrinsic nature, among the most difficult-to-reach heritage. The difficulty of operating in underwater environments derives not only from the reduced stay time of the operator on the site but also to environmental condition that might affect the survey (such as light condition, turbidity of the water, etc.) reducing its overall quality. The possibility offered nowadays by the adoption of digital photogrammetry techniques allows one to virtually reconstruct the surveyed underwater assets to make it accessible also remotely, via visualization and dissemination platforms (online or offline). In order to improve the study of the documented cultural heritage artefacts and sites, it is crucial to adopt the right photogrammetric principles, such as carefully planning the acquisition geometry, opportunely calibrating the camera before the final acquisition, correctly acquire the images with satisfying the optimal overlap and side-lap, using metric scale bars and or Ground Control Points in order to achieve 3D metric and georeferenced products that are geometrically consistent and coherent with the real object of the survey. This paper is related to the photogrammetric survey of the late-imperial era roman shipwreck, located in Baia dei Camerini, Torre Santa Sabina (BR), Italy, in the framework of the project *UnderwaterMuse* (Italia-Croatia 2014-2020 Cooperation Programme).

An integrated topographic and photogrammetric (underwater and UAV) survey has been conducted, and in the present research the last advancements in the underwater photogrammetry data acquisition and processing will be addressed in combination with the UAV achievable products. More in detail a focus on camera calibration and quality assessment of the achieved results will be presented.

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Use of cheap surface and submarine automated vessels for research and promote Accessible Underwater Cultural Heritage Site (AUCHS)

Sergey Khokhlov¹, Ivan Gorlov,¹ Yury Tkachenko¹, Michael Bardashov¹, Rolan Sadekov¹

¹ANO Underwater Archaeological Society

Keywords: USV, ROV, underwater monitoring, opensource, AUCHS

Abstract

The development surface and submarine automated vessels (USV, U-ROV etc.) progressing for more than 30 years, but their cost is too high for use in small scientific projects. Our team developing the system that is comparable in functionality to similar devices, but at cost up to 10 times cheaper than existing commercial solutions. This will allow use those technologies small-budget projects. Parallel with the development specialized companies, opensource solutions are being developed, which are most often used in amateur robotics. Our goal is to build on the basis of opensource solutions a modular system with interchangeable components with the possibility of simultaneous use of a whole fleet of such devices, united into a single network. Using those components, depending on the task, it can be assemble the necessary vessel for solving specific task. It can be Unmanned Surface Vehicle USV, Underwater Remote Operated Vehicle (ROV) or monitoring online-video system for AUCHS.

The report will show the results of the working prototypes of the system:

1. In 2019-2020, in the flooded port area of Preserve "Tauric Chersonese", successful tests were carried out of a prototype of an Unmanned Surface Vehicle (USV) for building a side-scan sonar mosaic and for researching Accessible Underwater Cultural Heritage Sites (AUCHS) in open water conditions.
2. Underwater Remote Operated Vehicle (U-ROV) for building a 3D-model of the bottom.
3. An underwater camera module for online-monitoring the situation under water AUCHS.

May 14 | Session 1: Dry dive technologies: dematerializing Underwater Cultural Heritage to make it accessible to everybody.

Towards an innovative system for the cataloguing of underwater cultural heritage: the case of “Gran Carro” of Bolsena (Viterbo, Italy)

Barbara Barbaro^{1,2}, Elena Musumeci¹, Marco Medici³, Egidio Severi², Chiara Veninata¹

¹ICCD - Istituto Centrale per il Catalogo e la Documentazione (MiBACT)

²Soprintendenza Archeologia Belle Arti e Paesaggio per la provincia di Viterbo e l'Etruria meridionale (MiC)

³Università di Ferrara - Dipartimento di Architettura

Keywords: 3D model; BIM (Building Information Modeling); tourist platforms; linked open data; semantic web; digital ecosystem

Abstract

We present an innovative system for the participatory production and return of data and images relating to the underwater cultural heritage, which has been tested and developed by the Central Institute for Cataloguing and Documentation and the Archaeological Superintendence of Southern Etruria in a pilot project involving the archaeological area of the Early Iron Age's site named "Gran Carro" of Bolsena (late 10th-9th century BC). The site is unique for its state of conservation among the pile-dwelling settlements in Italy, and it certainly represents one of the most important discoveries that took place at the end of the 1950s. It is currently submerged halfway along the eastern coast of the Bolsena Lake and it is the first protohistoric deposit identified in the inland waters of peninsular Italy. The study of this site has recently become part of the ICCD Digital Library of Italian Culture project with the aim of creating a **3D model** of the archaeological context and developing a **BIM** model to be subsequently uploaded to the INCEPTION platform (University of Ferrara). A **3D model** that can be interrogated, building a new concept of cataloguing for the management, conservation and enhancement of accessible and inaccessible cultural heritage. The INCEPTION platform is in fact equipped with customizable tools aimed at increasing searches, data use, download / upload and accessibility through applications that allow new forms of use by tourists and operators in the cultural heritage sector, by connecting or integrating with existing **tourist platforms**. The data made available through the use of **linked open data** deriving from systematic scientific recognition, documentation and cataloguing activities, including photographs, audio-visuals and sounds recordings, appropriately described and contextualized, are then put in a **semantic relationship** with data from other sources on cultural heritage and tourism, thus favouring the creation of a **digital ecosystem** that can also narrate submerged realities in an innovative way.

The ancient shipwreck of Peristera, Alonissos, as the first accessible underwater cultural heritage site in Greece

Pari Kalamara¹, Dimitris Kourkoumelis¹, Despoina Koutsoumba¹

¹ Ephorate of Underwater Antiquities, Hellenic Ministry of Culture and Sports

Abstract

In the summer of 2020 the ancient shipwreck of Peristera, a Classical antiquity merchant ship found off the shore of the island of Alonnisos in the Sporades, was made accessible to the public during a trial period. This trial period was part of the Project “Creation of Accessible Maritime Archeological Sites in Alonnisos and the Western Pagasetic” funded by the 2014-2020 Partnership Agreement for the Development Framework (“ESPA”). From the 3rd of August to the 2nd of October 2020 246 divers visited the ancient shipwreck and 66 scheduled dive visits were organized by the diving centres.

The creation of the first accessible underwater archeological site in Peristera was welcomed by both the community of experts and the general public and there many positive comments in the national and international diving community. The trial period helps to assess the facilities of the site, the diving routes but also the experience of the visitors.

ACCESSIBLE UNDERWATER TOURISM: archaeology at your fingertips

GianPaolo Colucci

Underwater Archaeologist - External reference for underwater archaeology of the National Museum and Archaeological Park of Egnazia - Director of the cultural association L'Anfora - Albatros diving Scuba Blind International Disabled dive School Instructor

Abstract

From 8 to 12 September 2020, a specific course was held in Porto Cesareo (LE) for archaeologists who are former diving instructors for accompanying blind divers into the sea. This project, promoted by REGIONE PUGLIA promotion aimed at expanding the tourist offer - has been realized by the association ALBATROS Progetto Paolo Pinto ONLUS Scuba Blind International Disabled dive School, specializes in the social promotion of diving activities for the blind and motor disabled.

The underwater archaeologists who participated in the course learned not only the techniques to accompany blind divers underwater, but also, with the support of special teaching aids in Braille, how to "show" their sites and underwater archaeological finds. Accompanied by specially trained archaeologists, blind divers can dive safely and also visit and appreciate underwater archaeological sites.

This methodology enables the blind diver to explore, observe and recognize not only the marine environment and its species but also the site or archaeological find independently and at any dive site free of the constraints of dedicated routes. The blind diver, accompanied by able-bodied underwater archaeologists, can logistically rely on the diving centers and practice underwater archaeological tourism by integrating with groups of normal divers. Underwater archaeology therefore becomes a cultural and integration vehicle aimed at achieving maximum motor and perceptual autonomy.

Archaeological sites open to visits in the marine environment: the case of the so-called "Terme del Lacus" in Baiae (Italy)

Barbara Davidde Petriaggi¹, Enrico Gallocchio², Salvatore Medaglia³

¹*Nucleo Interventi per l'Archeologia Subacquea-Istituto Centrale per il Restauro – Superintendent of the National Superintendence for Underwater Cultural Heritage*

²*Parco Archeologico dei Campi Flegrei*

³*External collaborator of the "Restoring Underwater Project"*

Abstract

The contribution intends to focus on the recent underwater investigations carried out in Baiae (Na, Italy) at the so-called "Terme del lacus". It is a sumptuous complex of buildings, probably incorporated within the imperial *palatium*, located on the north-eastern sides of the *Baianus lacus* and which has recently been partially made accessible to archaeological underwater tourism. The investigations were carried out by the Parco Archeologico dei Campi Flegrei and by the Istituto Centrale del Restauro with the aim of carrying out an accurate archaeological and architectural study of the submerged evidence and at the same time providing a mapping of the state of decay of the architectural evidence in order to proceed with the definition of the protection actions to be launched in the coming years. The investigation campaign of July 2020 was realized inside a room with a geometric polychrome mosaic floor dated between the Severian and Diocletian periods. An exploratory survey carried out within a lacuna of the tessellated area allowed not only to acquire information on the executive techniques for laying the mosaics in the later phase of the settlement, but also to obtain important data on the phases of occupation of the complex in relation to the negative type of Phlegraean bradism. Parallel to the stratigraphic excavation, the consolidation and restoration of the mosaic was carried out using innovative techniques and tools that are the result of twenty years of experimentation that the Istituto Centrale per il Restauro is carrying out in the Gulf of Pozzuoli in the context of project called "Restoring underwater". An important innovation launched for the entire duration of the diving site was to include the site within the circuit of visits that daily, through the diving centers and under the coordination of the Park Visitor Center, allow divers to immerse themselves on the ruins of the ancient *Baiae*. This initiative, called "Open yard", although now widespread in the terrestrial environment, is still little practiced for underwater archaeological sites. At set times, and without hindering the work in any way, the divers had the opportunity to reach the specially defined site with special guides, observing at a safe distance the activities carried out by archaeologists, restorers and diagnosticians. The success of this initiative has been remarkable and has allowed a considerable increase in the experiential baggage of underwater tourists.

Different approaches for the protection and promotion of ancient and WWII, Accessible Underwater Cultural Heritage Sites (AUCHS). The cases of Fournoi and Leros wreck sites under the ongoing INTERREG V-A Greece- Cyprus2014-2020 project “An.Di.Ka.T.”

Vasiliki Kyprouli¹, Foteini Vlachaki¹, George Koutsouflakis¹

¹*Ephorate of Underwater Antiquities, Hellenic Ministry of Culture and Sports*

Keywords: ancient wrecks, WWII wrecks, Fournoi, Battle of Leros, AUCHS

Abstract

In the context of the promotion and utilization of the rich Underwater Cultural Heritage of our country, the Ephorate of Underwater Antiquities (EUA) participates as a partner in “An.Di.Kat”, an INTERREG V-A, Greece-Cyprus 2014-2020 programme, titled “**Diving Routes in Marine Protected Areas of the Eastern Mediterranean - Development of Diving Tourism Network**”. Among the main goals for EUA are the “field study - identification, delimitation and mapping of diving routes of environmental and archaeological / historical interest in the areas of Fourni and Leros islands” (D: 4.3.1), a “protocol and instructions for development and operation of a diving network” (D: 6.3.1) and the participation in drawing up an action and business plan (D: 6.3.2) from the results of the field study. The archipelago of Fourni, after the systematic research of the Fournoi Underwater Archaeological Project, during the years 2015 - 2020, emerged as one of the richest archaeological sites in the Mediterranean with an extremely large concentration of ancient, medieval and modern shipwrecks while in the sea area of Leros, a large number of modern shipwrecks related to the famous “Battle of Leros” that took place between the Allies and the Axis powers during World War II and are protected monuments. Both cases have been selected due to their large concentration of UCH monuments of indisputable historical/archaeological value for each respective period. Both islands have the capacity to become attractive diving destinations with an abandonment of AUCHS, even though they are not among the famous tourist destinations. In both cases significant historical and archaeological research needs to be carried out prior to protection and promotion proposals. Despite their similarities, the two cases exhibit specific features and significant differences in relation to the approach of their field study as well as the methodology applied for protection and promotion of the sites. With the most important one being the chronological difference of the majority of wrecks found in the respective areas, there are also differences in the scale of the sites, the mass of the materials found, as well as different approaches regarding some ethical issues that arise in the case of Leros, for example in relation to the survivors of these wrecks. This paper aims to focus on these differences.

The importance of Stakeholders' participation in the management of Accessible Underwater Cultural Heritage Sites (AUCHS) towards local sustainable development of Alonissos

Athanasios E. Zlatoudis¹, Anastasia Psomiadi²

¹Authorised Councillor for Regional Unity of Sporades, Region of Thessaly, Board Member of Chamber of Magnesia and of Association of Chambers of Commerce for the Development of Greek Islands

²Founder & President Apson CSR

Keywords: stakeholder management; cultural tourism; Accessible Underwater Cultural Heritage Sites (AUCHS); heritage-led Local Sustainable Development (LSD)

Abstract

Cultural heritage, is the fundamental second component of tourism industry together with natural environment since it embodies the course of human history worldwide from antiquity till today. In the same time, it has always been a significant competitive advantage, if not the most unique component of the strategy of each place towards its establishment and further flourish as a tourist destination. Museums as entities that preserve and promote this heritage, tend to be more actively involved with their local communities, in the sphere of sustainable cultural tourism. The present paper investigates the complex relationships existing between Accessible Underwater Cultural Heritage Sites (AUCHS) and their stakeholders, in an effort to implement a heritage-led smart insular cultural tourism development strategy for Alonissos and Sporades Islands area in general. In particular primary and secondary research methods are applied for the needs of the paper. Firstly, the responses of local stakeholders to the opening of the underwater museum of Peristera Shipwreck in Alonissos, being the 1st Accessible Underwater Cultural Heritage Site in Greece are analysed via interviews. Followed by a benchmarking of best practices of existing underwater museums management systems, of equal characteristics to the area of Sporades islands, on the basis of local stakeholders' level of participation in them and the related effectiveness and efficiency of this strategic decision on local sustainable development.

Implementing multi-criteria analysis in the selection of AUCHS for the integration of digital technologies into the tourism offering; the case of MeDryDive

Angelos Manglis¹, Paschalina Giatsiatsou¹, Dimitra Papadopoulou¹, Vasiliki Drouga¹, Anastasia Fourkiotou¹

¹Atlantis Consulting S.A.

Keywords: Accessible Underwater Cultural Heritage Sites (AUCHS), site selection methodology, multi-criteria analysis, CCI integration, dry dive

Abstract

Focusing on both physical and virtual accessibility, this paper presents the methodology for the selection of AUCH Sites in Greece, Italy, Croatia and Montenegro in the context of MeDryDive, a project that aims to create personalized dry dive experiences for the promotion of the Mediterranean Underwater Cultural Heritage sites as distinctive tourism destinations. The UCH sites are assessed for their inclusion in the project's transnational thematic tourism product "Dive in the Past" and their promotion through Creative and Cultural Industry applications. These applications include a Serious Game, an Augmented Reality (AR) app and a promotional video for the purpose of the project.

The main goal of the developed methodology is meeting the requirements for both the thematic tourism product and for digital application development. The assessment of AUCH Sites is based on specific criteria which result from setting weighing factors and classifying indicators as critical and non-critical. The criteria are categorized to core (feasibility) criteria and complementary (appropriateness) criteria for determining the total level of readiness. This set of criteria enables site selection through an elimination method, identifying the suitable pilot and follow-on sites for the integration of digital technologies into the tourism offering.

Comparison of economic and tourist factors in the protection of underwater cultural heritage in the Republic of Croatia: a case study on the ancient shipwrecks protected by metal cages and shipwreck from the bay Letavica on the island of Pag

Vedran Dorušić¹, Matko Čvrljak²

¹*Foka Ltd. Croatia*

²*OIKON Ltd. – Institute of Applied Ecology, Croatia*

Keywords: Underwater Cultural Heritage, in situ preservation, active monitoring, economic impact, tourist valorization

Abstract

The Republic of Croatia is a country with a long tradition and experience in the protection of underwater Cultural Heritage. As an example, the practice of physical protection of ancient shipwreck sites is made in the form of placing metal cages and physically protecting the CH sites. As of the end of 2020, 9 sites have been protected by metal cages. Although this practice has proven to be successful, new knowledge and experiences gained through the application of this practice have opened some questions and pointed out the shortcomings of this method of protection. In 2018 new Roman shipwreck in the bay of Letavica on the island of Pag was discovered. After the discovery and preliminary research, it was decided to establish active monitoring using modern technologies. This approach eliminated the use of a metal cage, and open the possibility of archaeological research. Apart from the archeological research, this practice opens the possibility of a diving visit for tourist purposes.

This paper aims to make comparisons of underwater protected sites in Croatia and their economic and tourist valorization. The first group would consist of sites protected by metal cages, while the second group would include the site of Letavica, where protection in the form of active monitoring was applied. Also, this paper aims to present detailed data and make general comparisons on the effectiveness of protection at protected underwater sites, discuss and compare economic aspects and their impacts between the case studies, keeping in mind the above parameters.

Underwater Cultural Heritage Tourism and Alternatives to Diving Tourism

Maria Vrasida

Architect Planner Tourism Consultant, European Grouping of Territorial Cooperation (EGTC) Amphictyony

Keywords: underwater cultural heritage, cultural observatories, in-situ underwater observation, diving tourism

Abstract

Although many efforts have been made, still mass tourism is intense in Greece and is prevailing. The factors that explain the development of this form of tourism are the natural environment, the cultural wealth, the good climate, the kind hospitality and the rich history. This type of tourism has been greatly analysed in previous studies, but nowadays yet another untapped opportunity presents. Promoting sea sand sun tourism with a twist can provide a viable sustainable alternative of undersea, sand sun by combining coastal and heritage tourism. The very recent adoption of a new legal framework concerning recreational diving activities in Greece has generated an increased demand for the development of diving tourism in the country. Underwater archaeological parks that combine diving with dry foot access to cultural heritage can provide a viable yet sustainable economic activity with the potential of regenerating areas and regions that have undergone an economic crisis.

From a policy of restriction to the permission of recreational diving, the process of valorising, representing and managing underwater archaeological heritage in Greece has been a recent development. The emphasis is on capitalizing on culture and heritage while at the same time appealing to a new target market of divers. His paper explores the potential for developing a hybrid alternative to underwater archaeological exploration combining both diving and dry foot access. The paper aims to promote underwater cultural heritage as an additional asset for the Greek tourism market. Innovative ways of observation and interaction with the underwater cultural heritage of Greece can include land observatories and simulated diving experiences and create a framework for experiencing in-situ underwater cultural heritage while offering the required protective framework.

DIVE IN BLUE GROWTH



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