Deliverable D3.5

Proceedings of Breaking the Surface summer school 2

Project Acronym:	EXCELLABUST
Grant Agreement number:	691980
Project title:	Excelling LABUST in marine robotics
Funding:	Horizon2020 Twining
Call:	H2020-TWINN-2015
Type of action:	CSA
Start date of project:	1st January 2016
Duration:	36 months
Project website:	http://excellabust.fer.hr/
Delivery date:	31st October 2017
Version:	1.0
Lead participant	UNIZG-FER

Dissemination level:		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691980.

DELIVERABLE DATA SHEET

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Deliverable number:		**D3.5.**			
Deliverable title:		**Proceedings of Breaking the Surface summer school 2**			
Work package:		**WP3 – Broad networking events**			
Type:		**Delivery date**	**31/10/2017**	**Version:**	**1.0**
Lead participant		**University of Zagreb Faculty of Electrical Engineering and Computing (UNIZG - FER)**			
Dissemination level:					
PU	**Public**				**X**
CO	**Confidential, only for members of the consortium (including the Commission Services)**				

Version log			
Revision no.	Date	Author (Partner)	Change

Deliverable summary

The **2nd EXCELLABUST summer school "Breaking the Surface"** 2017 (http://bts.fer.hr/) was held from 1st until 8th October in Biograd na Moru, Croatia and more than 190 people participated. The programme was divided in five program tracks: marine robotics (MAROB); marine biology and marine nature protection (MARBIO); maritime security, naval and coast guard operations (MARSEC); maritime, nautical and ship archaeology (MARCH), and this year's novelty in the programme: Innovation Tuesday programme (INNOVA). In 7 days 29 lectures, 11 demonstrations and 1 tutorial were presented.

This deliverable offers report on organization of BtS and its programme. The deliverable is accompanied with appendixes with abstracts, biographies and presentations of the programme presenters:
APPENDIX I. – Abstracts and biographies
APPENDIX II. – Presentations (slides)

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Table of contents

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1. INTRODUCTION

The **2nd EXCELLABUST summer school Breaking the Surface** 2017 was held from 1st until 8th October in Biograd na Moru, Croatia and more than 190 people participated. The programme was divided in six program tracks: marine robotics (MAROB); marine biology and marine nature protection (MARBIO); maritime security, naval and coast guard operations (MARSEC); maritime, nautical and ship archaeology (MARCH); maritime geology (MARGEO) and Innovation Tuesday programme (INNOVA). In 7 days 38 lectures, 10 demonstrations and 5 tutorials were presented.

Dates: 1st – 8th October 2017
Location: Biograd na Moru, Croatia
Website: http://bts.fer.hr/

2. REPORT ORGANIZATION

The first part of the report describes the BtS 2017 organization, including the work program. The deliverable is accompanied with appendixes with abstracts, biographies and presentations of the programme presenters:
APPENDIX I. – Abstracts and biographies
APPENDIX II. – Presentations (slides)

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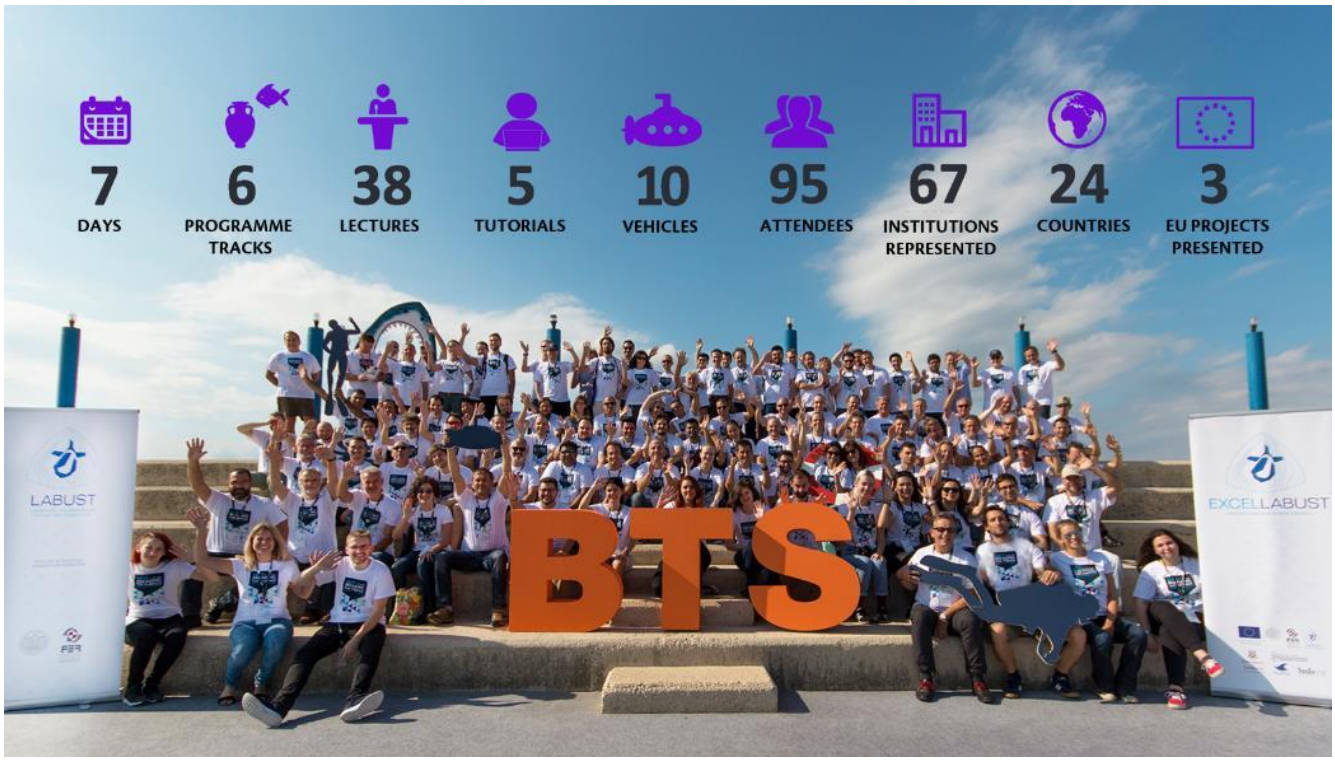
3. ABOUT BREAKING THE SURFACE

Breaking the Surface - BtS summer school has been organized by UNIZG FER LABUST for the last 8 years – first three years as a part of FP7-REGPOT CURE project, while in the following years with Office of Naval Research Global support. During the years, BtS served as a meeting place of experts and students of marine robotics and the marine robotics application areas such as marine biology, marine archaeology, marine security, oceanography, marine geology and oceanology. This is the world's first successful, multi-year field training program that combines academic topics in marine robotics and robotics application areas and hands-on working experience in the sea, doing remote sensing and sampling for various ocean sciences.

Breaking the Surface summer school is organized in attempt to strengthen links between marine robotics research and end-users and provide EXCELLABUST partners with one-week intense summer school consisting of plenary talks, hands-on trainings and demonstrations of marine technologies, by EXCELLABUST partners and worldwide experts.

The program is organized in the form of plenary talks, hands-on tutorials and demonstrations of marine technologies, e.g. marine robotics (MAROB); marine biology and marine nature protection (MARBIO); maritime security, naval and coast guard operations (MARSEC); maritime, nautical and ship archaeology (MARCH), oceanography (OCEAN), and this year's novelty in the programme: Innovation Tuesday programme (INNOVA).

BTS2017 IN NUMBERS:



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4. ORGANIZERS

Breaking the Surface summer school is organized under the European Union's Horizon 2020 project EXCELLABUST - Excelling LABUST in marine robotics (GA 691980). The main organizers are University of Zagreb Faculty of Electrical Engineering and Computing, Laboratory for Underwater Systems and Technologies and Centre for Underwater Systems and Technologies with organization support from Institute of Studies on Inteligent Systems for Automation - ISSIA, National Research Council of Italy (CNR), University of Girona (UdG), and University of Limerick (UL).

ORGANIZERS

University of Zagreb

Faculty of Electrical Engineering and Computing

Laboratory for Underwater Systems and Technologies

Centre for Underwater Systems and Technologies

IN PARTNERSHIP WITH

Institute of Studies on Inteligent Systems for Automation - ISSIA, National Research Council of Italy (CNR)

University of Girona (UdG)

University of Limerick (UL)

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BREAKING THE SURFACE ORGANIZATION STRUCTURE:

4.1. COMMITTEES CHAIRS

Prof. Dr. Sc. Zoran Vukić
General Chair

University of Zagreb, Faculty of Electrical Engineering and Computing, Laboratory for Underwater Systems and Technologies

Assoc. Prof. Dr. Sc. Nikola Mišković
Programme Committee Chair
EXCELLABUST project Coordinator

University of Zagreb, Faculty of Electrical Engineering and Computing, Laboratory for Underwater Systems and Technologies

Ivana Mikolić, mag. ing.
Organizing Committee Chair

University of Zagreb, Faculty of Electrical Engineering and Computing, Laboratory for Underwater Systems and Technologies

mr. sc. Antonio Vasilijević,
Technical Committee Chair

University of Zagreb, Faculty of Electrical Engineering and Computing, Laboratory for Underwater Systems and Technologies

4.2. PROGRAMME COMMITTEE

Marco Bibuli, PhD

Centre Nazionale delle Richerce - CNR Institute of intelligent systems for automation - ISSIA

Prof. Bridget Buxton, PhD

University of Rhode Island, Department of History

Massimo Caccia, MSc

Centre Nazionale delle Richerce - CNR Institute of intelligent systems for automation - ISSIA

Assoc. Prof. Marc Carreras, PhD

University of Girona Computer Vision and Robotics Research Institute - VICOROB

Damjan Miklić, PhD

University of Zagreb, Faculty of Electrical Engineering and Computing, Laboratory for Underwater Systems and Technologies

Edin Omerdić, PhD

University of Limerick

Asst. Prof. Dr. Sc. Irena Radić-Rossi

University of Zadar, Department of Archaeology

Prof. Pere Ridao, PhD

University of Girona Computer Vision and Robotics Research Institute - VICOROB

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Prof. Asgeir Sørensen, PhD

Norwegian University of Science and Technology
Department of Marine Technology
Centre for Autonomous Marine Operations and Systems

Prof. Daniel Toal, PhD

University of Limerick

4.3. ORGANIZING COMMITTEE

Tonko Bogovac

CUST

Marija Havaić

CUST

Barbara Klier

CUST

Ena Lucija Kovač

CUST

Petra Kovačević

CUST

Andrea Radmanić

CUST

Alan Vukić

CUST

Valentino Žinić

CUST

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4.4. TECHNICAL COMMITTEE

Anja Babić, mag. ing.

UNIZG FER LABUST

Nadir Kapetanović, mag. ing.

UNIZG FER LABUST

Ivan Lončar, mag. ing.

UNIZG FER LABUST

Filip Mandić, mag. ing.

UNIZG FER LABUST

Milan Marković

UNIZG FER LABUST

Đula Nađ, dipl. ing.

UNIZG FER LABUST

M. Eng. Marin Stipanov

UNIZG FER LABUST

Kruno Zubčić

Croatian Conservation Institute

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5. PROGRAMME

5.1. PROGRAMME STRUCTURE

BtS program is comprised of academic lectures, hands-on tutorials, presentation of projects and equipment and company demonstrations.

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5.1.1. LECTURES

Lectures by experts in the domains of:


marine robotics
MAROB


marine biology
MARBIO

maritime
archaeology
MARCH


maritime
security
MARSEC


marine
geology
MARGEO

Innovations and
entrepreneurships
INNOVA

List of speakers:

Marine robotics (MAROB):

- **Marc Carreras**, Computer Vision and Robotics Institute of the Universitat de Girona (ViCOROB/UdG): *Towards persistent AUVs for seabed inspection*
- **Jeremi Gancet**, Space Applications Services: *DexROV: 2017 trials results and perspectives*
- **William Kirkwood**, Monterey Bay Aquarium Research Institute: *FOCE – Long Term In Situ Ocean Acidification Instrumentation*
- **Nikola Mišković**, University of Zagreb Faculty of Electrical Engineering and Computing: *Human-robot interaction under water*
- **Eduardo Silva**, INESC TEC / ISEP: *Localization and mapping in dynamic underwater environments*
- **Kimon P. Valavanis**, University of Denver: *Navigation and Control of Unmanned Vehicles: A Fuzzy Logic Perspective*

Marine biology (MARBIO):

- **Renee E. Bishop Pierce**, Pennsylvania State University: *Subterranean Groundwater Discharge and Marine Ecosystems*
- **Draško Holcer**, Croatian Natural History Museum / Blue World Institute of Marine Research and Conservation: *Cetaceans and sea turtles of the Adriatic – the next step*
- **Craig R. Smith**, University of Hawaii at Manoa: *Extreme seafloor ecology: use of ROVs and AUVs to evaluate biodiversity and ecosystem function in the world's most remote ecosystems*

Marine archaeology (MARCH):

- **Guillermo de Anda**, Instituto Nacional de Antropología e Historia / National Geographic Society / Proyecto Gran Acuifero Maya: *The Great Maya Aquifer*
- **Andreas Kallmeyer Bloch**, The Viking Ship Museum in Roskilde: *Technology, archaeology and student challenges Finding a best practice for presenting maritime archaeology*
- **A.Harun Özdaş**, Dokuz Eylul University Institute of Marine Science and Technology: *Shipwrecks discovered along the western coast of Turkey*
- **Irena Radić Rossi**, University of Zadar:
- **Augusto Salgado**, CINAV - Centro de Investigação Naval: *Contemporary Underwater Archaeology in Portugal. New challenges, new ideas*
- **Kotaro Yamafune**, A.P.P.A.R.A.T.U.S. LLC & **Matko Čvrljak**, Roskilde Viking Ship Museum: *A Methodology for Accurate and Quick Photogrammetric Recording of Underwater Cultural Heritage*

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Maritime security (MARSEC):

- **Richard J. Nagle**, Naval Sea Systems Command/PMS-408; Navy EOD Program Support Senior Program Analyst, G2 Software Systems, Inc.: *Relevance of UMS for Below the Surface (BTS) Tasks*
- **John Potter**, NATO STO Centre for Maritime Research and Experimentation (CMRE): *Ex Machina – Integrating maritime robots into human endeavours*

Maritime geology (MARGEO):

- **Slobodan Miko**, Croatian Geological Survey: *Late Quaternary and Holocene Submerged Landscapes of the Eastern Adriatic Sea*
- **Javier Escartin**, CNRS/IPGP*: Breaking the surface of the seafloor: Studying the traces of earthquakes underwater*

Innovation Tuesday (INNOVA):

- **Alex Alspach**, Toyota Research Institute: *Soft Sensing and Simulation*
- **Marin Bek**, UNIZG FER / H2O Robotics: *Breaking the corporate*
- **Fabio Bruno**, University of Calabria: *From research to business: some experiences at the University of Calabria*
- **Thomas Curtin**, Applied Physics Laboratory, University of Washington: The Scaling of Innovation Tools
- Cesare Fantuzzi, University of Modena and Reggio Emilia: *Bridging the gap between academic research and commercially viable technology*
- **Vladimir de Franceschi**, Founder Institute, Inc.: *Startup How To*
- **Gerardo Morales-Hierro**, Triple Helix Venture Capital: *Financing of Early Stage Technology Startups*
- **Vlatka Petrović**, University of Zagreb: *Paths to market – getting university innovation into the right hands*
- **Tom Runge**, German Research Center for Artificial Intelligence DFKI, Robotics Innovation Center: *Rich & Famous with Underwater Robotics? Attempt of an objective assessment*
- **Martina Schraudner**, Fraunhofer Center for Responsible Research and Innovation: *Uncovering the impact of the institutional environment on transfer activities*

5.1.2. TUTORIALS

- **H2020 EXCELLABUST project: Omnidirectional Vision for Underwater Robots** by Nuno Gracias, Ricard Campos, Computer Vision and Robotics Institute of the Universitat de Girona (ViCOROB/UdG)
- **H2020 EXCELLABUST project: Parallel Computing with CUDA made (almost) simple** by Matija Rossi, Univeristy of Limerick
- **H2020 EXCELLABUST project: POP ART (POrtable Pelagic Autonomous Robotic Technology) concept & field demonstration** by Massimo Caccia, Marco Bibuli, Gabriele Bruzzone, Angelo Odetti, Consiglio Nazionale delle Ricerche – Istituto di Studi sui Sistemi Intelligenti per l'Automazione
- **H2020 DexROV project: Teleoperation of a simulated ROV and arm** by Gianluca Antonelli, ISME / University of Cassino
- **Underwater Camera Calibration with the Pinax model** by Andreas Birk, Tomasz Łuczyński, Jacobs University Bremen, Robotics Group

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5.1.3. DEMONSTRATIONS

- **H2020 DexROV project: Experiencing and mitigating latency in remote ROV operations** by Jeremi Gancet, Space Applications Services
- **H2020 DexROV project: Dexterous manipulation** by Alessio Turetta, Graal Tech
- **H2020 subCULTron project - first swarm tests** by Tamara Petrović, Barbara Arbanas, Anja Babić, Ivan Lončar, Milan Marković, Goran Vasiljević, University of Zagreb Faculty of Electrical Engineering and Computing

5.1.4. COMPANY PROGRAMME

- **BluEye Robotics** by Martin Ludvigsen, Sindre Hansen
- **Blueprint subsea** by Robin Sharphouse, Kevin Webster
- **EvoLogics** by Konstantin Kebkal, Oleksiy Kebkal
- **NORBIT** Subsea by Thomas Rygh

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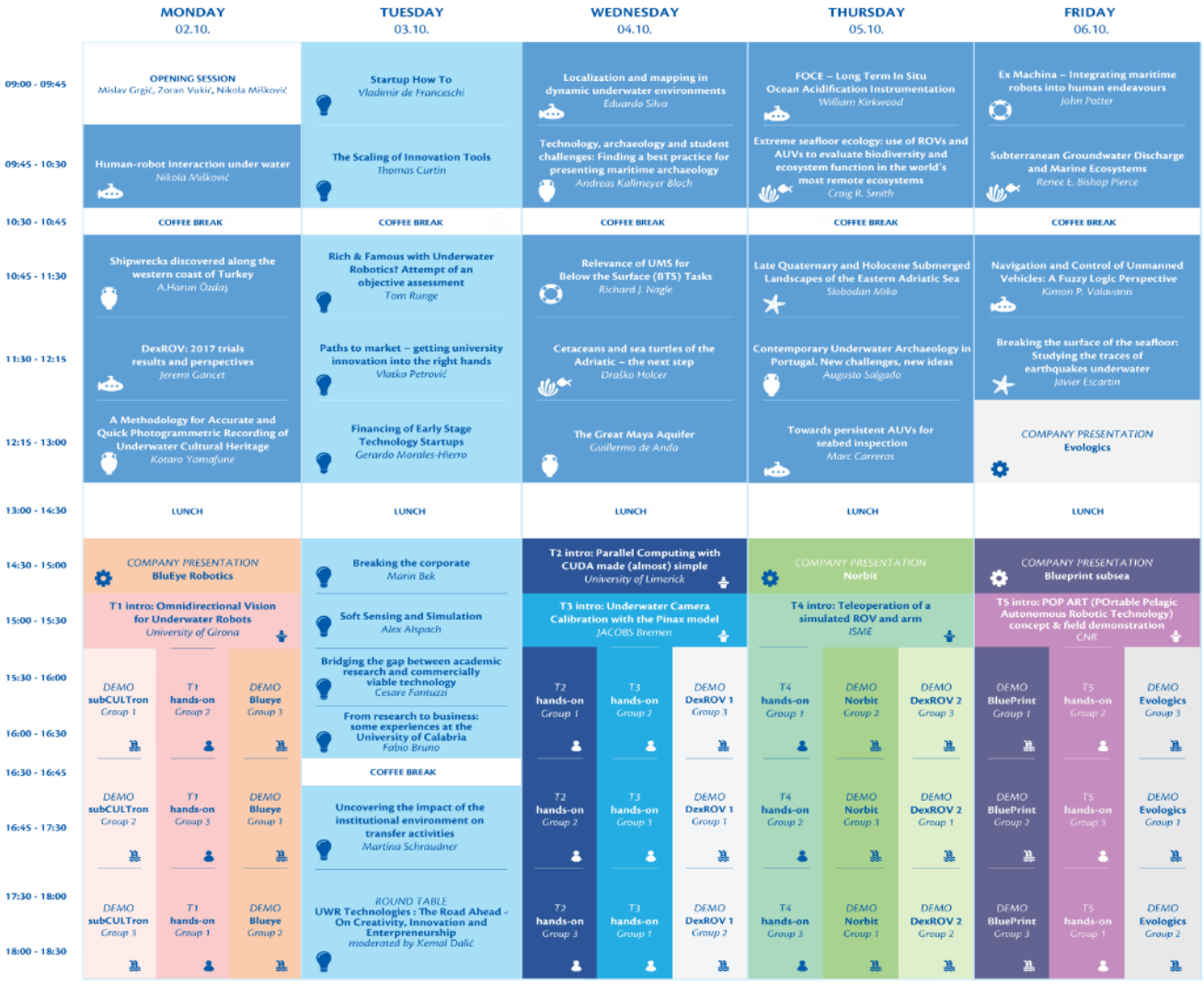
5.2. SCHEDULE



REGISTRATIONS

Sunday, 1.10.
16:30 – 18:00

WELCOME DRINKS

Sunday, 1.10.
18:00 – 19:30

NORWEGIAN PARTY

Monday, 2.10.
20:30 – 0:00

EXCELLABUST PARTY

Tuesday, 3.10.
21:00 – 0:00

KARAOKE NIGHT

Thursday, 5.10.
21:00 – 0:00

CLOSNING CEREMONY GALA DINNER

Friday, 6.10.
19:30 – 21:00

HAWAII POOL PARTY

Friday, 6.10.
21:00 – 0:00

FIELD TRIP

Saturday, 7.10.
8:00 – 16:00

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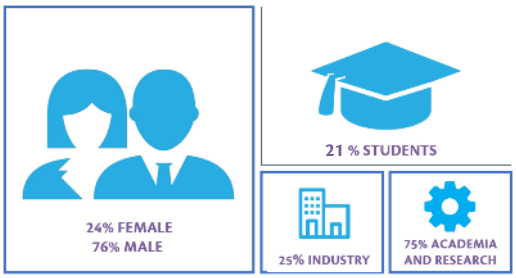
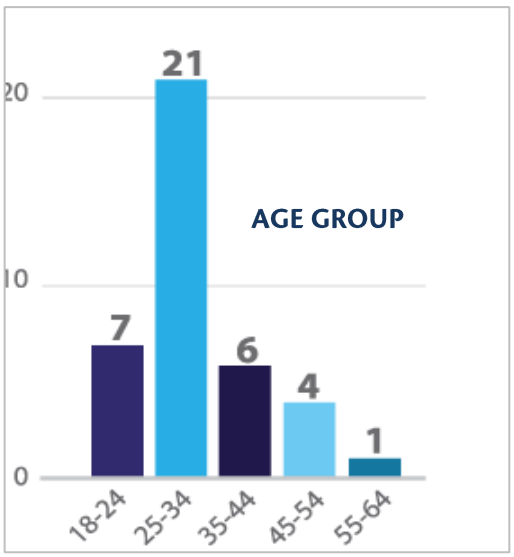
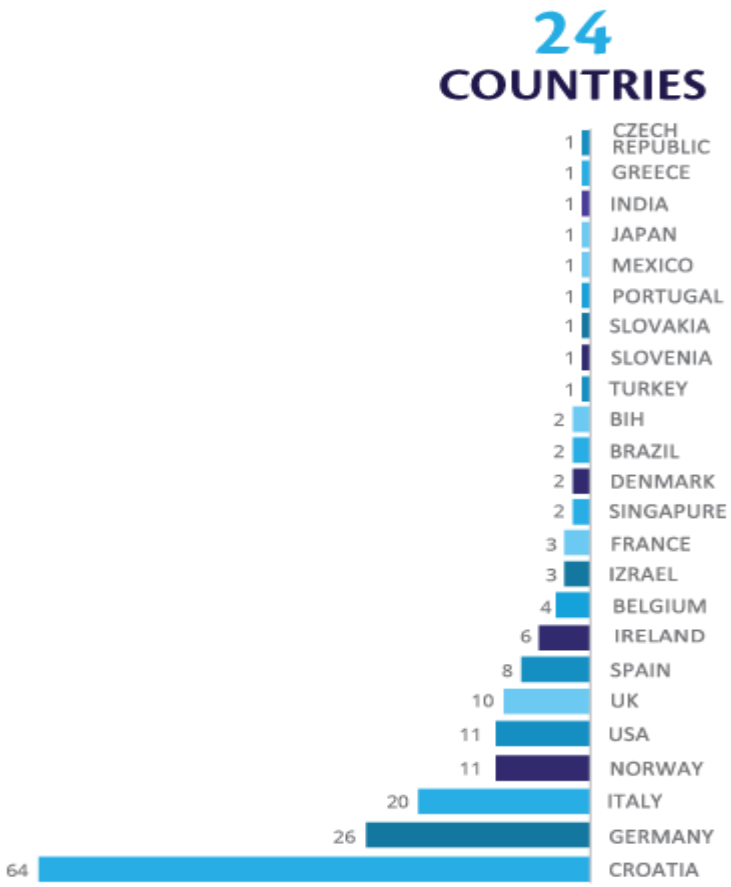
6. BTS PARTICIPANTS

In 2017, 192 participants from academia and industry from various fields joined Breaking the Surface.

PARTICIPANTS PROFILE







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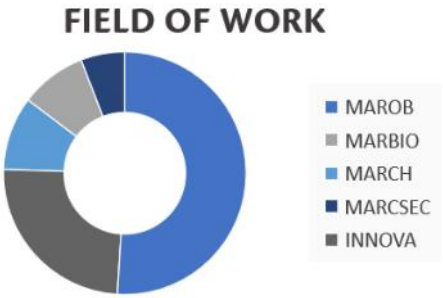

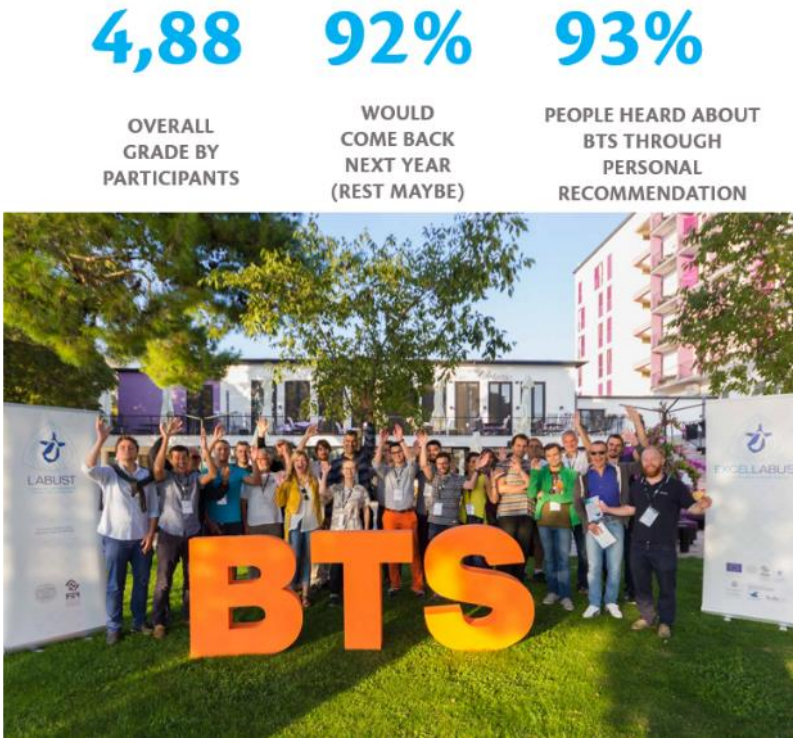

TESTIMONIALS

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REASONS TO ATTEND:

- Knowledge and Collaborations
- Great opportunity to come in touch with many expertees in the field of marine sciences
- Because it is a great combination of lectures, workshops and demonstrations from maritime fields. And for me, big plus was innovation day!
- Because it provided a great opportunity to inform students and engineers about the technology needs for studying and monitoring the deep sea, i.e., the largest and most pristine ecosystems in the biosphere
- Because it's awesome!
- Friend told me it's the best conference ever
- BtS each year brings together the most important research groups and companies from the field of marine robotics existing in the world today. BtS gives me the opportunity to get to know them, listen to their work in person and all that in a friendly and relaxed atmosphere. Further, due to great facilities available, BtS allows for on-site testing and demonstrations of equipment.

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7. PROGRAMME ABSTRACTS, BIOGRAPHIES AND PRESENTATIONS

Lectures' abstracts and lecturers' biographies are available in ***APPENDIX I. – Abstracts and biographies.***
Slides from presentations are available in ***APPENDIX II. – Presentations (slides).***

8. SUPPORTERS

FINANCED BY

EXCELLABUST

Financed in the scope of project EXCELLABUST - Excelling LABUST in marine robotics (GA 691980) which has received funding from the European Union's Horizon 2020 research and innovation programme.

SUPPORTED BY

Embassy of the United States Zagreb – Croatia

Royal Norwegian Embassy in Zagreb

Foundation of the Croatian Academy of Sciences and Arts – HAZU

Križevačka Pivovara

Rakije Perković

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 691980

9. APPENDIX I – ABSTRACTS AND BIOGRAPHIES

Abstracts and biographies are available here.

10. APPENDIX II – PRESENTATIONS

Presentations are available here.

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