WORKSHOP "3D UNDERWATER MAPPING OF HABITATS AND BIOLOGICAL COMMUNITIES"

GEOHAB
Marine Geological and Biological Habitat Mapping

Monday, May 8, Hotel Le Récif Saint-Gilles Les Bains

Speakers: Iason-Zois Gazis, Simon Desol, Clément Delamare, Valentin Danet, Vincent Mahamadaly*, David Price*, Alexandre Sneessens*, Isabel Urbina-Barreto*, Loïc Van Audenhaege*

(*) Organizing committee

REGISTRATION	7:45 - 8:45

08:45-09:00 Introduction (agenda)

Introduction and layout of the day
Price, D., Van Audenhaege, L.

09:00-09:15 Introduction (SfM)

Presentation of the basic concepts: Steps from image acquisition to 3D reconstruction
Van Audenhaege, L.

**09:15-10:30 Presentations
Survey design**

- Photography basics: Procedure to acquire good quality raw data - exposition, aperture, speed - *Mahamadaly, V.*
- Aerial survey: Preparation of a drone survey and examples *Price, D.*
- Underwater survey: Plan and prepare an underwater survey and examples - *Mahamadaly, V.*
- Deep sea survey: Planning of deep-sea survey - Acquisition platforms and challenges - *Price, D., Van Audenhaege, L.*

10:30-10:45   Coffee break

**10:45-13:00 Hands on exercises
Object reconstruction and step-by-step process in small groups ***

* Three stands will be held. Attendees will be assigned one of those stands for the whole hands-on session.

- Image acquisition on 3D structures: Practice how to acquire images of a scene - *Ubina-Barreto, I., Delsol, S. and Delamare, C. Mahamadaly, V. Price, D., Van Audenhaege, L.*
- 3D reconstruction demonstration: learn to reconstruct and process your scene in 3D

  Mahamadaly, V.: A step by step seascape and object reconstruction process using Agisoft Metashape

  Urbina-Barreto, I.: OpenDroneMap https://docs.opendrone map.org/ : IRD workstation/server

  Price, D., Van Audenhaege, L.: Reconstruction of a benthic scene with Agisoft/Meshroom
- Visualization and analyses: learn how to handle and extract data from your 3D model

  Mahamadaly, V.: Underwater photogrammetry, an innovative tool to monitor seascape and submerged artificial structures

  Urbina-Barreto, I.: Examples of photogrammetric outputs : 3D models colonies, reefscape mapping (temporal survey of coral colonies) and artificial reefs mapping. Ecological analyses and artificial intelligence applications to automate labeling on pho togrammetry outputs

  Price, D., Van Audenhaege, L.: Habitat description and faunal mapping for ecological surveys in the deep sea

13:00-14:00   Lunch

14:00-15:00 Case studies - Shallow and aerial

- POSEIDON Platform Operating in Shallow-water Environment for Imaging and Digital Object Numerization: case study of the   Reunion lagoon TELEMAC project (WIO - France) *Delsol, S.*
- Underwater and drone photogrammetry applications for coral reefs conservation programs: case study of the Future Maore Reefs project (WIO - Mayotte, France) - *Urbina-Barreto, I.*
- Photogrammetry to characterize the natural rocky environment and monitor the colonization of artificial structures in Saint-Malo Bay (Manche, France) - *Danet, V.*
- REBIOMA-3D: 3D structure of reefs, pilot study for improving management of reef biodiversity of Mayotte - *Sneessens, A.*
- Integrating autonomous platforms to map a shallow bay with SfM - *Price, D.*

15:00-15:15   Coffee break

15:15-16:00 Case studies - Deep Sea

- Using 3D photogrammetry to investigate ecological patterns in cold-water coral habitats - *Price, D.*
- The use of photogrammetry in topographically complex environments: the case of hydrothermal vents - *Van Audenhaege, L.*
- Nodule abyssal plain:Large-scale photo mosaicking of deep-sea polymetallic nodules and mining trials - *Gazis, I.*

16:00-17:00 Panel discussion

Perspective and future of SfM

Discussion on current limitations, perspectives, future challenges and standardization of approaches.