

Data integration of Scuba benthic communities' photography surveys with physico-chemical multiparameter sensor platform as a means for more efficient coastal ecosystems studies



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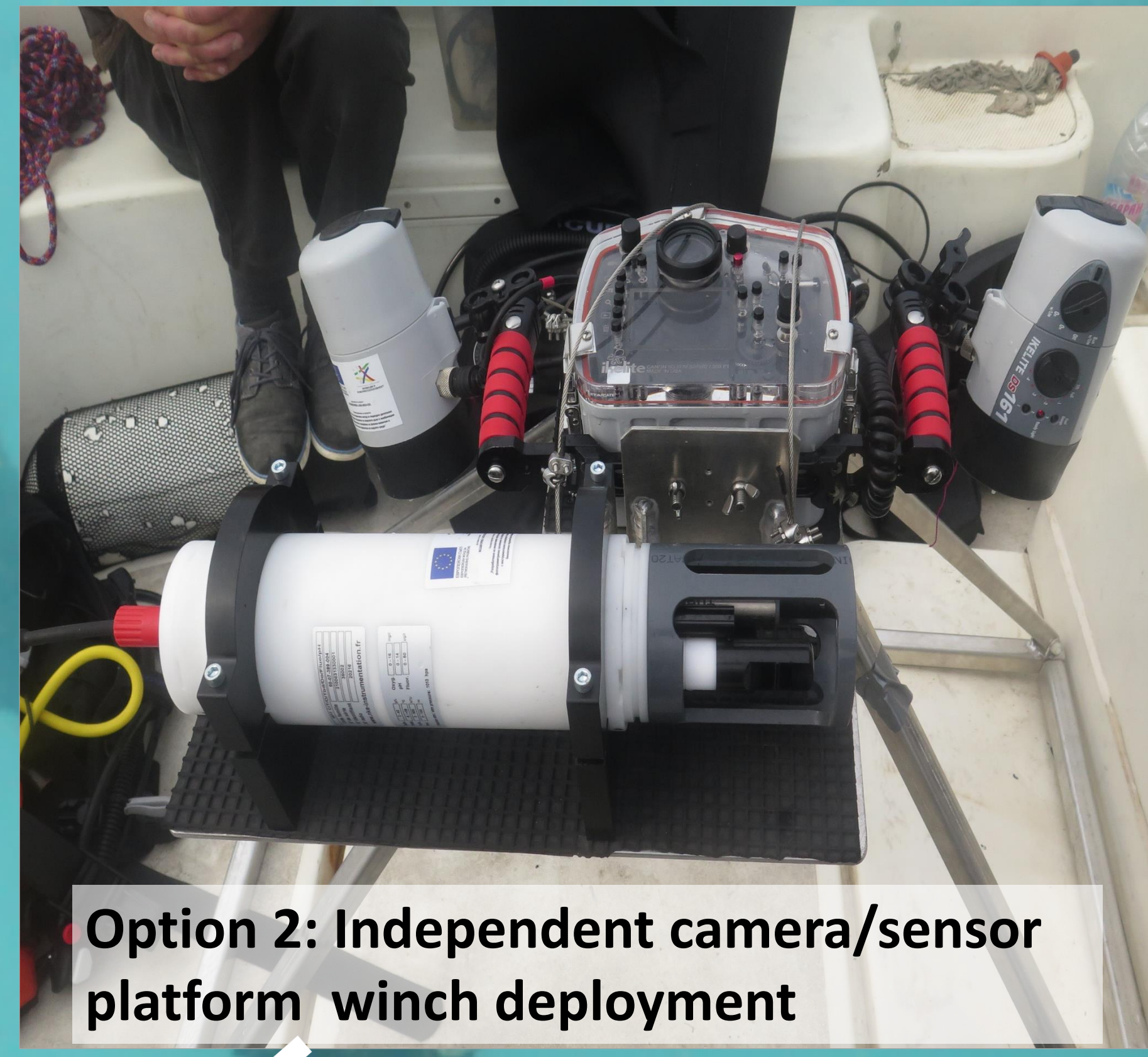
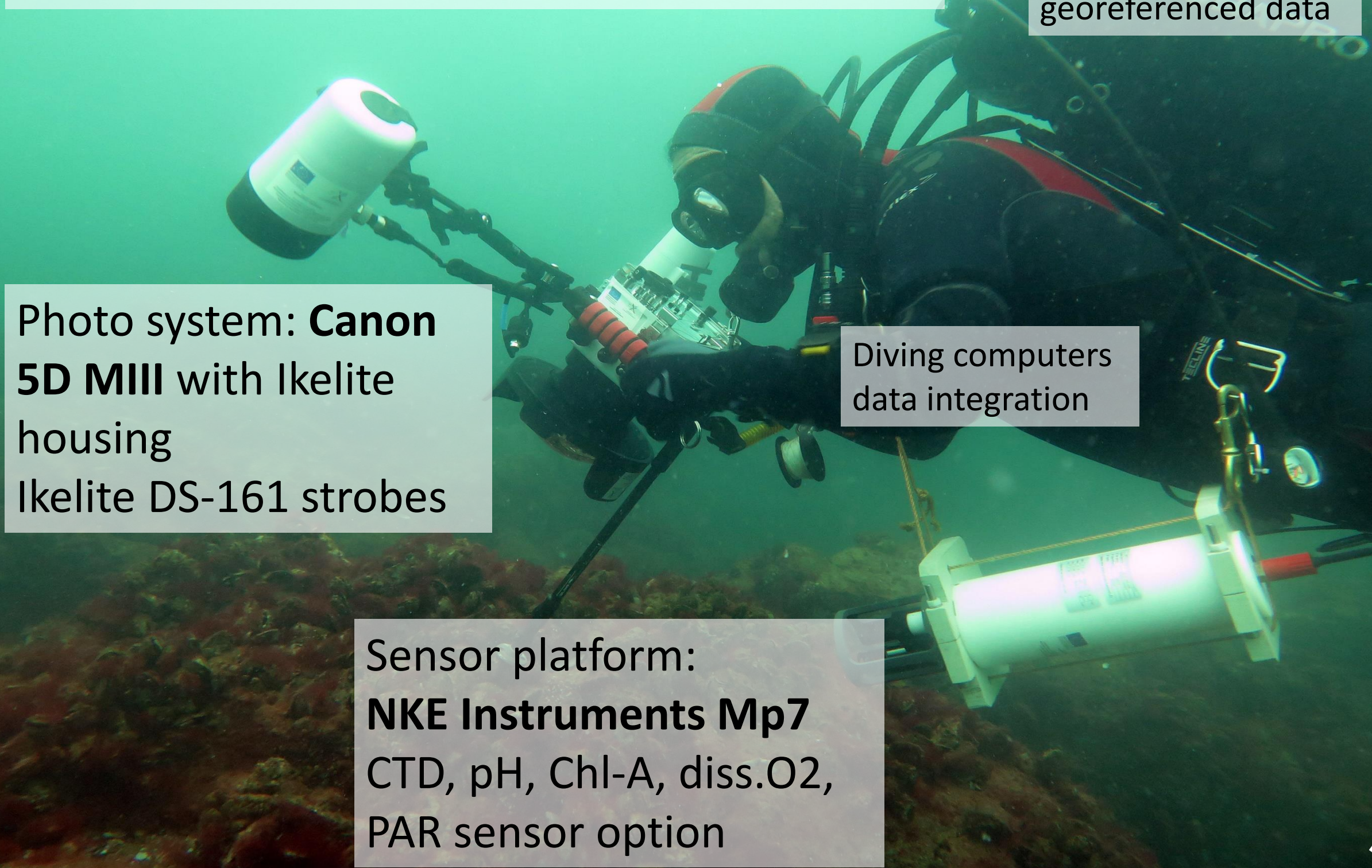


1. Background and project goals

Modern advances in **digital underwater photography and photogrammetry** allow a rapid and more efficient survey of benthic communities. The usage of photography as a method for sampling allows the surveyors to gather significant amount of data in the limited time available underwater, which could then be quickly processed with image analysis software and analyzed with statistical software and GIS, thus significantly shortening the time needed for **sampling, data analysis and results generation**. Recently developed **multiparameter sensor platforms** are compact enough to be used by scuba divers, opening up the opportunities for measuring relevant environmental factors in the exact locations of the benthic ecology surveys, thus putting the obtained biological results in the correct oceanographical context.

The purpose of this project was to **develop and test a modular system, integrating data** from photogrammetry benthic surveys, GPS navigation data and physico-chemical parameters measurements, with possibilities for results exports in statistical packages, GIS, and oceanographical data visualization programs.

Option 1: Scuba diver Operated version



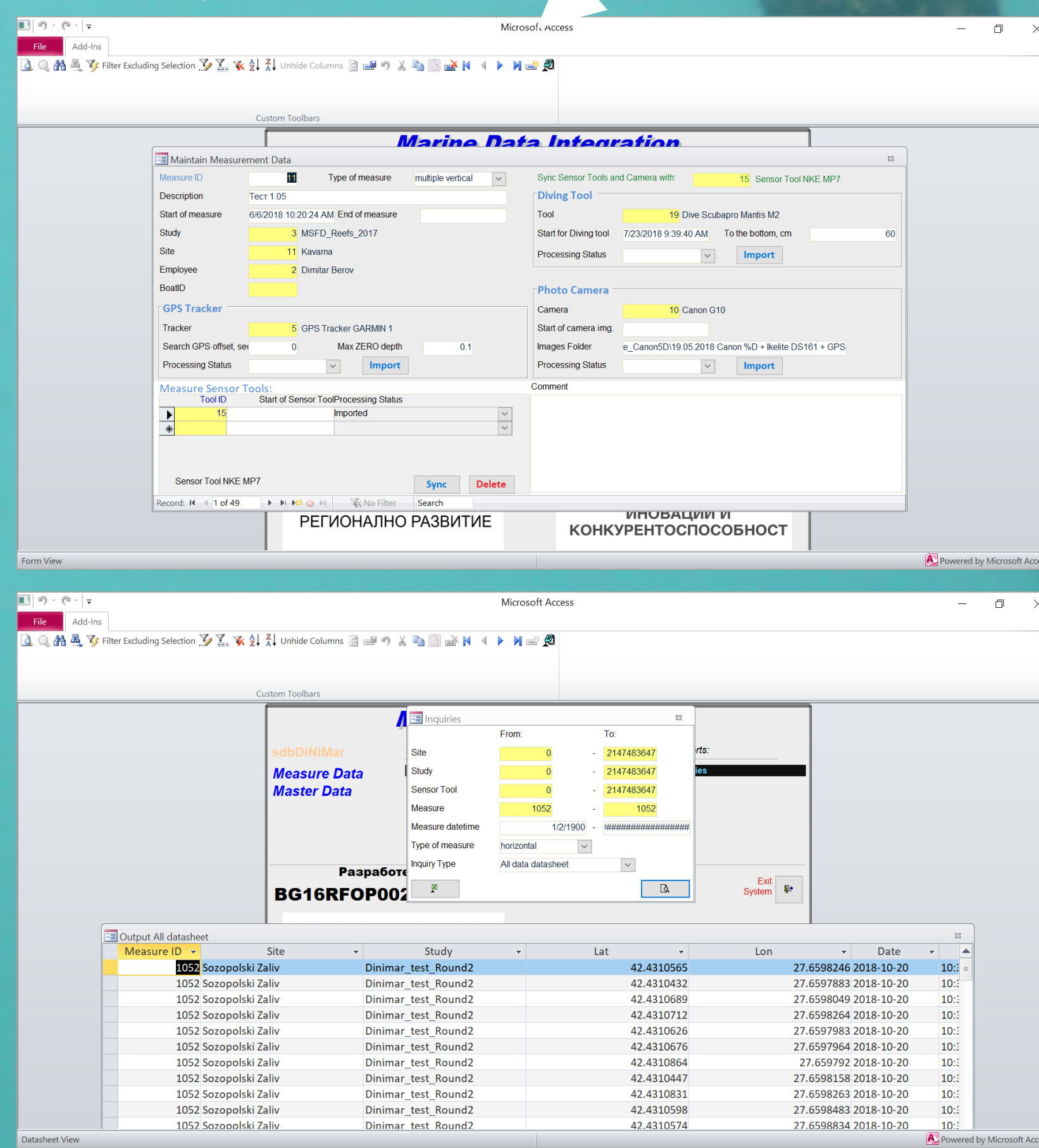
2. Data processing and integration platform

MS Access-based front-end interface

- Surveys metadata write up
- Raw data input and output selection
- Queries options

Microsoft SQL server back-end platform:

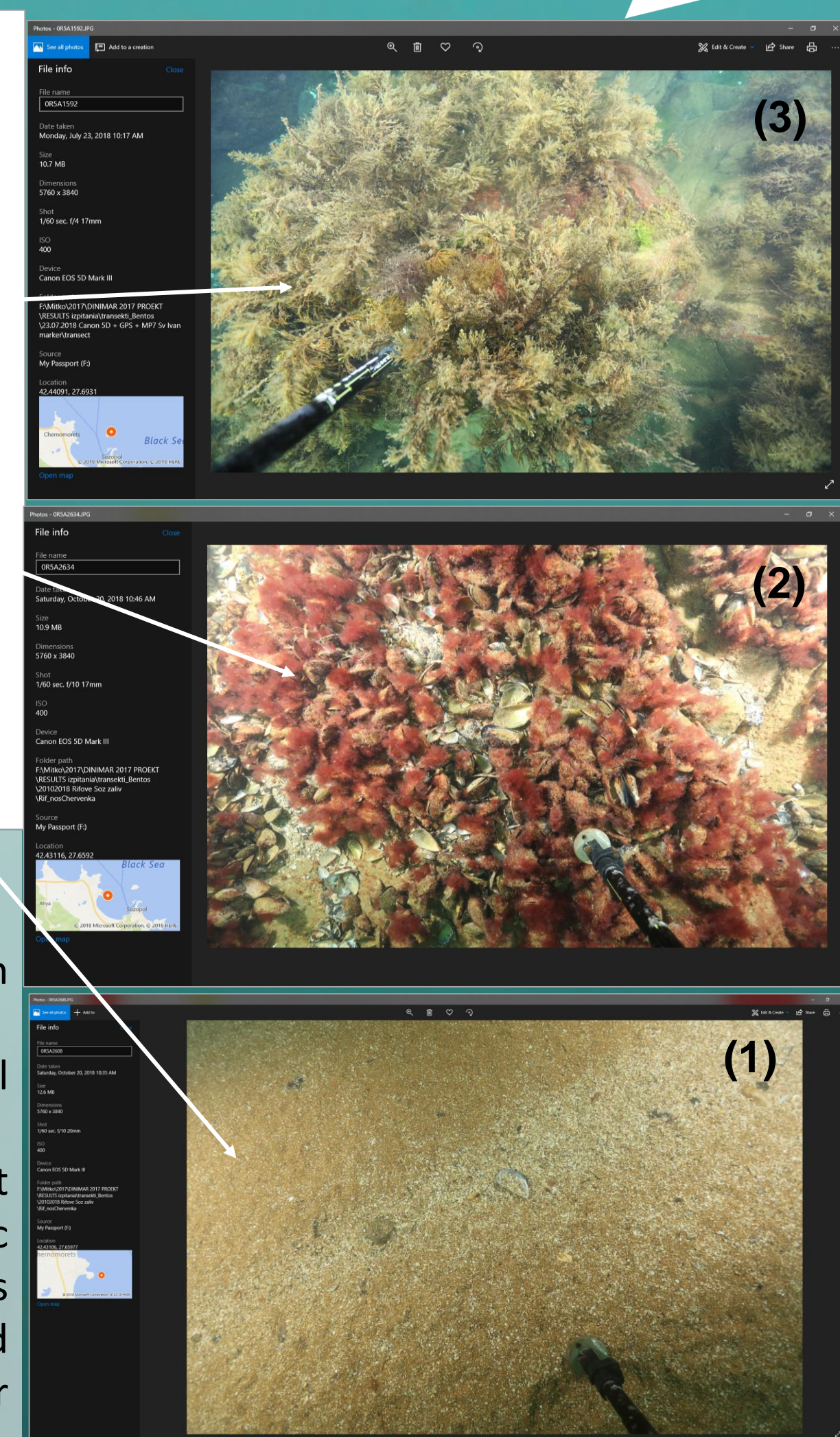
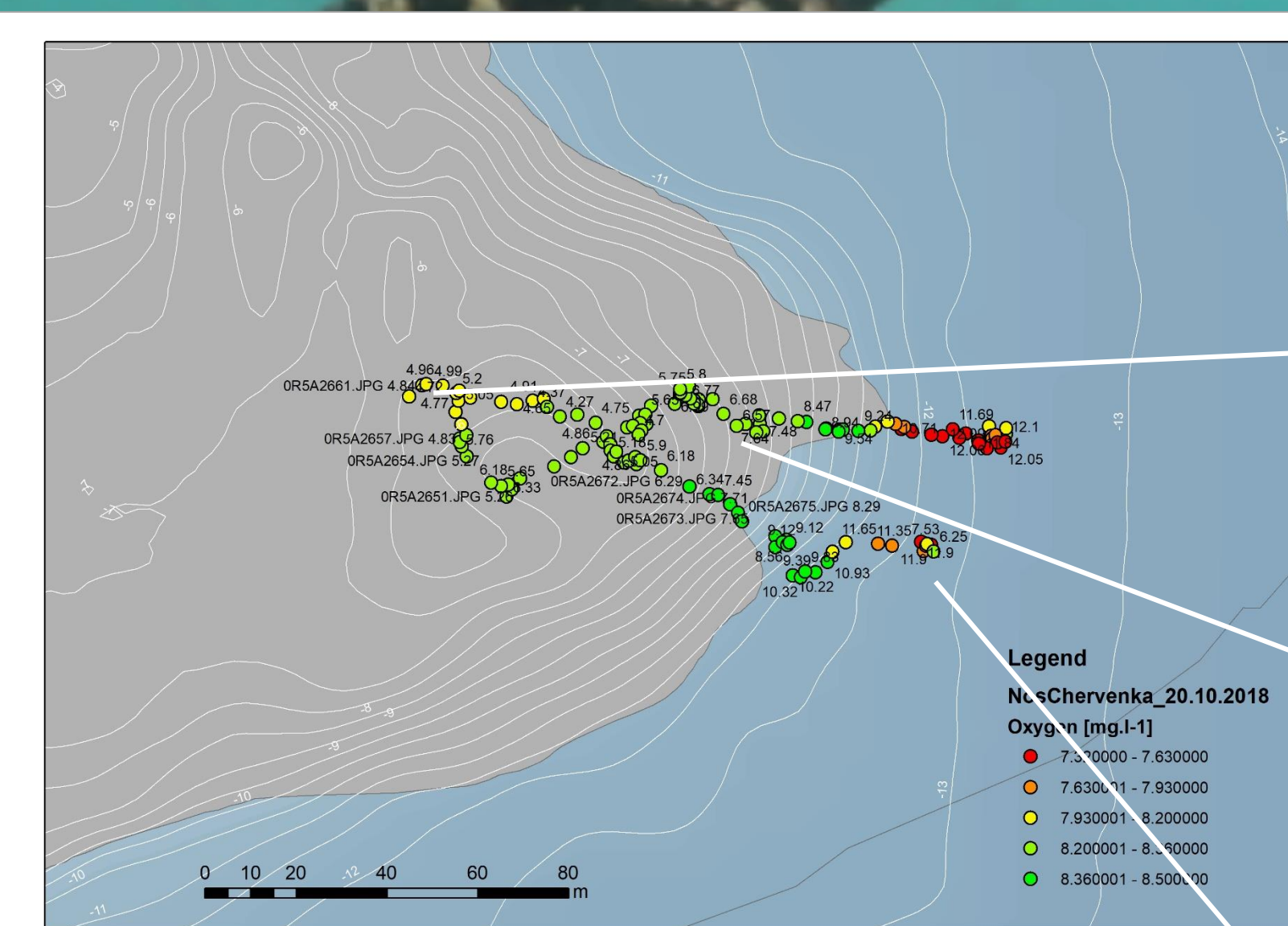
- **Time-based synchronization of data** from diff. data sources (GPS, sensors, camera)
- **Dive computers data import in .xml** format exports from www.divelogs.de (most common brands supported)
- **EXIFF write up** of georeferenced of photos (CLR VB .NET- based)
- **Automatic water column profiles** start detection
- **Modular system** – can accommodate new instruments and data formats



3. Data outputs

Synchronized and georeferenced **tabular data** (csv, xlsx) from all systems and sensor from diver and platform deployment surveys for imports to Arc GIS, statistical software.

SeaDataNet ODV datasheets for oceanographic data analysis from water column profiles and diver surveys.



4. Results: case studies

- Mussel farms development and impact on benthic communities
- Mapping of coastal benthic ecosystems - MSFD Descriptor 1.6 surveys
- Coastal water quality monitoring from small vessels (of opportunity)
- Environmental impact assessment studies - 'Mopang' oil spill, Burgas Bay

4.2 Shallow coastal waters ecological status 'express' survey

- from a vessel of opportunity
- detection of local blooms and small-scale ecological status deterioration
- 'instant' data processing in ODV

