Annotating optical images from ROVs or towed cameras in Vulnerable Marine Ecosystems studies

Brigitte Guillaumont[1], Cyril Carré[1], Inge van den Beld[1],
Lydia Beuck[2], Jaime Davies[1]

[1]IFREMER REM/LEP, B.P.70, 29280 Plouzané, France bguillau @ifremer.fr
[2] Senckenberg am Meer, D-26382 Wilhelmshaven, Germany

CoralFISH

Ifremer

Introduction
Interest in Vulnerable Marine Ecosystems in the deep sea such as cold-water corals and sponge grounds has increased in the last few decades. The development of optical remote sensing has played an important role in this. Image footage from Remotely Operated Vehicles (ROVs) or towed cameras is a useful tool to analyse and compare abundances and compositions of large epifaunal species in deep-sea areas. However, with varying systems used in acquiring imagery, methodologies need to be developed to optimise the comparability and use of these data.

Software development
Within the European fp7-funded project CoralFISH, IFREMER (France) has developed the software COVER (Customizable Observation Video imagE Record). It makes standardisation possible to facilitate comparison between regional studies by different partners:
- Standard protocols can be developed using this software
- Use of common knowledge tables taking existing references (EUNIS, CMECS, Worms Register etc.) into consideration
- Standard terms and glossary used by scientists
The software is flexible

Knowledge tables
Common knowledge tables and interface developed in cooperation with CoralFISH partners. They meet criteria of the user, such as information about anthropogenic impact, bioturbation and corals, and can be as broad or detailed as the user requires. The hard geoform table is given as an example.

Date	03-05-2010
Time	16:01
m² ID	1
Observer	John Doe
Hard geoforms	1. crevices; 2. cracks; 3. joints; 4. step-like; 5. wall; 6. scarp; 7. cliff; 8. deformed; 9. faulted; 10. folded; 11. overhang
Slope inclination	1. Flat (0-5°); 2. Sloping (5-30°); 3. Steep sloping (30-45°); 4. Vertical (45-90°); 5. Overhang (>90°)

Information in grey is automatically recorded by the software; information in blue can be selected by the user

Image window:
- Basic and advanced window
- Possible to move between images
- Calibrate surface by lasers, object or known area
- Grid or random points on image → (substrate and coral) surface coverage

©NUIG
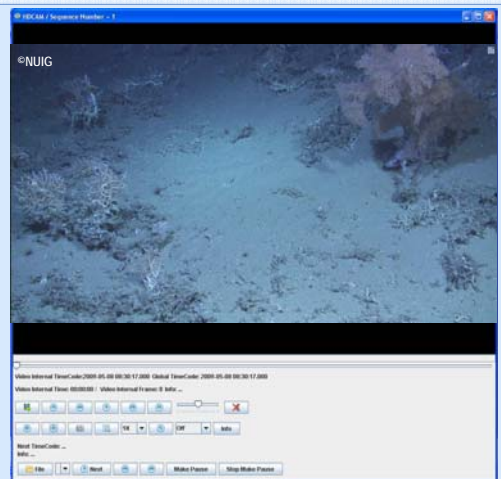
Video window:
- Loads videos in many formats
- Possible to play, pause, rewind and forward (also by 10 seconds)
- Connect image file → video stops automatically at timecode of next image
- Extraction of frame grabs from video

COVER

Annotation window:
- Use of lists, buttons, sliders and comments in thematic blocks
- Link with knowledge tables in .csv format and observation file
- Observation file is out-put file
- Possible to customise it for goals and wishes
  → useful in many (research) fields (geology, biology…)
  → complex structures for habitat mapping

©NUIG
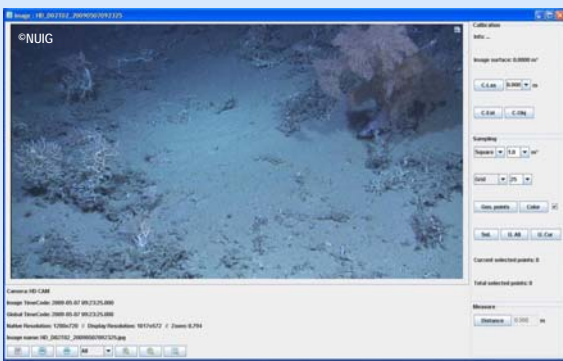
Navigation and other data
- Visualise navigation data (possible to load plot on bathymetry jpg)
- Visualise other data, such as depth
- Red point indicates ROV position of representative image/video along transect
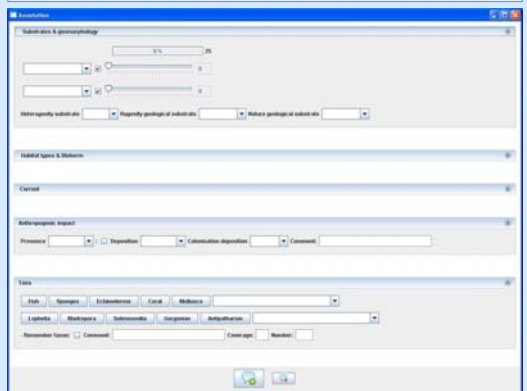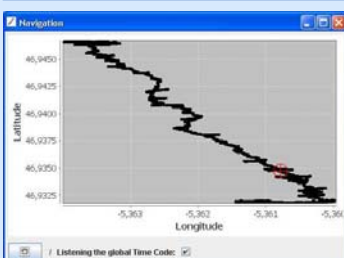
Other functions:
- All components connected to each other with the timecode
- Snapshot generator for frame grabs on time and distance interval
- Time code converter: converts two columns displaying date and time into one

Future:
Cover functions will be integrated into Adelie software (IFREMER), a tool for synchronising different types of data (localisation, videos, still images, altitude etc.)