A SMARTPHONE APPLICATION TO PROTECT MEDITERRANEAN WHALES

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Let's admit it, some smartphone applications are puzzling: pseudo fingerprint scan, revolving light simulator, anti-mosquitoes (yes!), love compatibility based on names, predicting the user's age of death or fake speed camera detector to make your friends laugh (because it is so funny). Deplorable examples are numerous, as if developers were sometimes… short on ideas!

Instead, why don't we protect whales with our smartphones? How? By giving regular sea users such as whale-watching operators the possibility to inform cargos and car-ferries of the presence of large cetaceans on their route in order reduce the risk of ship strikes.

1. Context

The NGO Souffleurs d'Ecume has been working since 2000 to preserve Mediterranean whales and dolphins. Following a collaboration dynamic with human activity representatives, the NGO deploys its actions in the framework of two international agreements for the protection of marine mammals: the Pelagos Sanctuary and ACCOBAMS. The project presented here falls within two major stakes of these agreements: collisions between ships and large cetaceans and guiding the whale-watching activity towards an environmental high quality perspective.

a. The shipping industry, ship strikes and the REPCET system

The first issue is related to collisions between commercial ships and large cetaceans, recognised as a major and worrying cause of mortality for several species by the scientific community. Implementing the Pelagos Sanctuary gave the opportunity for a better collaboration between researchers and shipping companies leading to a gradual improvement in our knowledge of this phenomenon. Therefore, we can now say with certainty that two species are affected in the Mediterranean: the fin whale (Balaenoptera physalus) and the sperm whale (Physeter macrocephalus), with small and isolated populations (3,500 fin whales, a few hundred sperm whales). Moreover, their late sexual maturity and low reproductive rate make them more sensible to all the human disturbances they must face.

Currently, at least one to two whales are killed each year as a result of a collision in the north-western Mediterranean Sea. But these are just the known cases and the scientific community agrees on the fact that this figure is widely underestimated (by a

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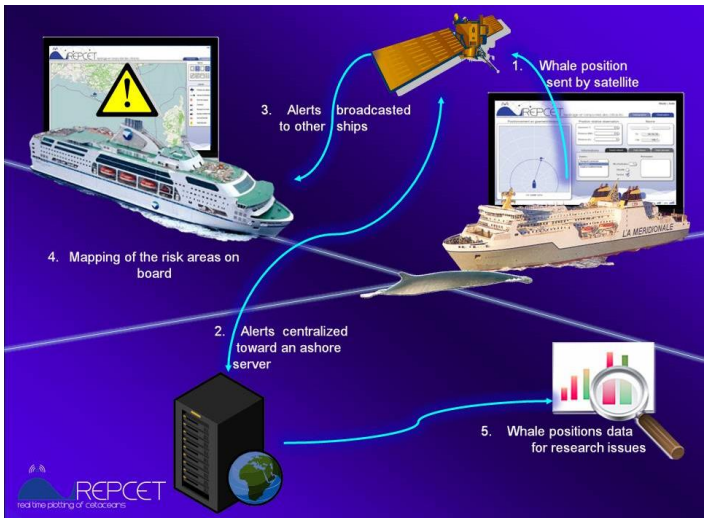
factor 10 to 30 according to publications on the issue). Thanks to the contribution of several shipping companies and the analysis of stranded cetaceans, it was estimated that at least 16 to 20% of known dead fin whales were killed by a strike, a worrying rate regarding the population ecological characteristics (above, a fin whale brought on the bulbous bow of a cargo in the Port of Marseille in June 2012).

All these elements gather scientists and managers around a clear idea: it is essential to quickly develop systems to reduce the risks of ship strikes which are threatening fin whale and sperm whale populations in the Mediterranean Sea.

In that context, in conformity with commitments of the *Grenelle de l'Environnement*, recommendations of international workshops on the issue of ship strikes, recommendations of the International Maritime Organization and the International Whaling Commission and several resolutions of the Pelagos and ACCOBAMS Agreements, the REPCET system was created (REal-time Plotting of CETaceans). REPCET is a collaborative computer system dedicated for shipping with the following principles: each observation of a large cetacean made by a crew member of a ship equipped with REPCET is transmitted in real time via satellite to a server on-land. This server centralises the data and sends alerts to ships equipped and likely to be concerned by an observation. Alerts are then mapped on-board on a dedicated screen (picture above and simulator online on www.repcet.com). Beyond the reduction of collision risks, REPCET gives the opportunity to gather a large amount of data on the distribution of cetaceans sighted by commercial ships.



To this day, *La Méridionale*, *Orange Marine*, *SNCM*, *GDF Suez*, *Someca Transports*, the French Navy, the Maritime Affairs and the *Bourbon* company have equipped ships in Pelagos. The CROSSMED (French Mediterranean MRCC), Port-Cros national Park and a private sailing boat used for research purposes are also equipped.

b. Whale-watching, its impacts, and the ACCOBAMS/Pelagos certification

The second issue is related to the development of whale-watching. This is a flourishing touristic activity in the Mediterranean (opposite picture, © CMO). In France, around 30 operators were inventoried and are at the basis of a 1,730,000-euro industry annually[1]. Several studies show that such a development when unreasonably practiced can have serious impacts on cetacean individuals and populations (animal displacements, hearing loss or behavioural changes, etc.) and thus, eventually, on the activity itself. These ravages sometimes lead to a reduced health state in the populations with the concerns they imply it terms of conservation, especially of sensitive populations.

[1] Information on this topic: www.souffleursdecume.com/etudes_whalewatching.html

However, the numerous advantages of this activity should not be obscured. Whale-watching give the general public the opportunity to discover cetaceans in their habitat. As such, when a quality awareness message is provided and with the emotional charge carried by these animals, the activity opens the mind on the necessity to preserve marine mammals but also all species and their habitats.

By being on the field whale-watching operators can be a good help to research and therefore participate to a better understanding and thus a better protection of cetaceans. In this way, the activity is a valuable tool offering mutual benefits to both cetaceans and the public while giving the opportunity for an economic development of the local communities.

In order to ensure a sustainable future to this activity, managers from the Pelagos Sanctuary and the ACCOBAMS Agreement chose to study whale-watching in the area, to monitor its evolution, to collaborate with stakeholders and to set up a concerted management plan. Implementing a certification associated with a training course and specifications was identified as a very concrete management tool to put these aspirations into practice. In a nutshell, this certification will enable to:

- respect rules to approach and observe cetaceans to reduce disturbances to the animals;
- promote tours with a naturalist perspective to limit pressure on the animals;
- promote collaboration between researchers and whale-watching operators;
- promote public awareness and education through a quality message given on-board;
- promote the certification to the general public;
- reduce the impacts of the activity on cetaceans in Pelagos and, eventually, in the whole ACCOBAMS area while ensuring a sustainable future for the activity.

The first training course was organised in 2012[2] (around 20 people attended it) and the certification, called “High Quality Whale-Watching”[3], was launched in France in 2014. It will first be extended to the Pelagos area as an experiment, before spreading to the ACCOBAMS area.

2. An application to gather commercial shipping and whale-watching around the reduction of collision risks between ships and large cetaceans

The REPCET system and the whale-watching certification affects two major stakeholders of the Pelagos Sanctuary; in this respect, a connection between these two sea users is considered. Therefore, on the one hand contributions of whale observers through REPCET need to increase and on the other hand whale-watching operators committed through the certification process to give the positions of the cetaceans they observe for scientific purposes regularly see large cetaceans.

Thus, Souffleurs d’Ecume proposed to **create a light version of REPCET for whale-watching operators as an ergonomic smartphone application. This app will enable operators to feed REPCET in real-time but won’t give them the possibility to receive observations from other contributors**. Indeed, the purpose is not to develop this function here as we would take the risk of increasing whale-watching pressure on animals. Finally, the application will provide educational tools including the Code of Good Conduct for the observation of cetaceans.

It should be noted that smartphones lose signal beyond 10 nautical miles from the coast. In that case, the entered data are saved on the device and sent at the next signal reception, considering the time difference between information entry and transmission.

[2] Training course dedicated webpage: www.souffleursdecume.com/formation_whalewatching.html
[3] https://www.facebook.com/highqualitywhalewatching

3. Objectives

The general purpose is twofold. The application will first notably increase the efficiency of REPCET and thus reduce the risk of ship strikes. Indeed, thanks to whale-watching operators, a larger number of whale observations will be transmitted to commercial ships equipped with REPCET. The project will also provide operators with a modern, ergonomic tool adapted to their commitments in the framework of the ACCOBAMS/Pelagos certification. It should be noted that Souffleurs d'Ecume freely provides the data collected via REPCET to all research programmes recognised by Pelagos or ACCOBAMS. Especially, a GIS3M (Group of Scientific Interest for the protection of Mediterranean Marine Mammals) database gathering all opportunistic data is being planned. The REPCET data will be integrated to it.

Moreover, several naturalist institutions informed us of their interest for this project. In particular, they highlight the scientific potential for other emblematic or threatened species. To consider this need, the first version of the application will enable to send sea turtle observations for scientific purposes in addition to cetacean observations (picture above). With this in mind, a partnership with the CESTMed (Centre for the Study and Conservation of Mediterranean Sea Turtles) is considered.

Eventually, the use of the application could be spread to a wider yet still targeted public in the framework of citizen science research programmes to be defined precisely.

Until then, people with sufficient cetacean knowledge spending a lot of time at sea interested in receiving the application can send a motivation email to appli@repcet.com.

4. Structure and functions

Texts were written to fill the needs of the application. Especially, an identification sheet format was be defined for each species and filled in according to our current knowledge on each of them in the Mediterranean. Representative pictures from typical observations at sea were included.

The REPCET graphics was adapted to the needs of the application. In particular, a new imagery was developed for the human-machine interface. Pictures presented in this document give an overview of the application.

The application is developed for devices working with Android in priority and secondly with IOS. It gathers the following functions:

- A home screen (opposite picture) giving access to REPCET, the Code of Good Conduct for the observation of marine mammals, instructions and parameters. Especially, the user must indicate his/her geographic area in order to download the

corresponding species sheets;

- A “Parameter” page where the user fills in his/her personal information when he/she uses the app for the first time. It can be modified afterwards by accessing to this page via the home screen;
- A mapping interface to visualise the boat position and the observed cetaceans (only the user’s own observations). Background is blue with a distance scale (opposite picture);
- An observation interface to send a cetacean position according to the position of the boat thank to a sight (picture below);
- An identification help for the observed species;
- User’s data and observation saving on the device to keep track of the user’s activity until their deletion;
- Sending observation data to the REPCET server in real-time if the device has signal or later when it get signal;
- Automatic check that the observation is at sea before sending.

A first version (Beta) was created in 2014 and tested for several weeks. The identified bugs are being solved. The final version will be available in spring 2015.

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