Marine mammal observations

- Shut-down of under-water noise producing activities in the presence of whales is meanwhile a standard mitigation procedure required by many regulating agencies.
- Determination of whale presence is thereby mostly based on visual sightings of the whale’s blow by dedicated observers.
- Visual sightings are restricted to daylight hours, require utmost concentration by observers and large teams when conducted during month-long cruises.
- An automatic detection system with night-vision could support MMO’s detection efforts.

Detection

Thermal images provide clear signals of blows under varying (polar/subpolar) environmental conditions.

- Water temperature = 6.15°C
- Water temperature = 6.15°C

Tashtego software: Real-time display and event detection for MMO assistance.

Distance calculation

- Thermal images provide clear signals of blows under varying (polar/subpolar) environmental conditions.
- Water temperature = 0.23°C
- Water temperature = 3.46°C

Examples of tracked whales

- Minke Whale (2010-02-13)
- Humpback whales (2010-02-08)

Results

- Proof of concept established
- Image quality excellent, both night and day.
- Long term stability of image acquisition system (FIRST Navy sensor hardware) currently insufficient, debugging in progress.
- Graphical user interface (Tashtego) operational.
- 5 weeks (~837 hrs) operation in Greenland Sea and Southern Ocean.
- 4.7 TB data archived for retrospective analysis and development of automatic pattern recognition algorithm.
- >500 blows detected by retrospective visual screening of IR video.
- Blow detection in waters as warm as up to 10°C.
- Polar detection range.
- First automatic algorithm detects 19 of 20 blows.
- Relatively constant inter-blow interval throughout observations: 36 ± 13 s.
- Change of swim direction and speed from “along” (2.2 ms⁻¹) to “away” (6.4 ms⁻¹).
- No overt escape response.
- Apparently prolonged period near surface (~15 min) during ship’s passage.
- Time between synchronized dives: about 10 min.
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