

# A Framework of Acoustic Channel Availability Prediction for Avoiding Interfering Marine Mammals

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# Outline

- ▶ Problem
- ▶ Challenges
- ▶ Proposed Solution



# Problem

- ▶ Acoustic Communications May Interfere Marine Mammals

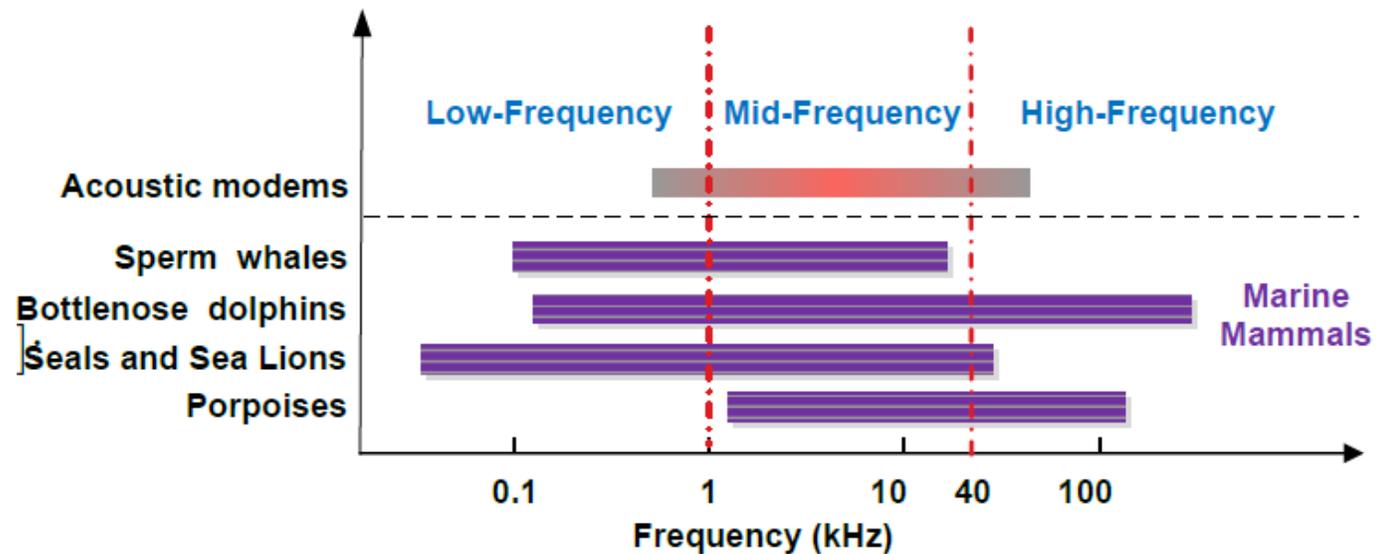


Figure 1: Frequencies used by acoustic modems and different marine mammals

# Proposed Solution

- ▶ Approach
  - ▶ Prediction based channel assignment and switching
- ▶ Motivation
  - ▶ Avoiding the problem is better than solving the problem
  - ▶ Remedy the hardware's limitation on channel monitoring
  - ▶ Increase the channel utilization
    - ▶ Reduce the unnecessary switching for monitoring



# Proposed Solution

- ▶ Methodology
  - ▶ Collecting and modeling the marine mammals' activities
  - ▶ Analyze the activity pattern
  - ▶ Utilize the pattern to calculate the marine mammal's appearance probability
  - ▶ Adopt the Stopping Theory to determine when to switch channels

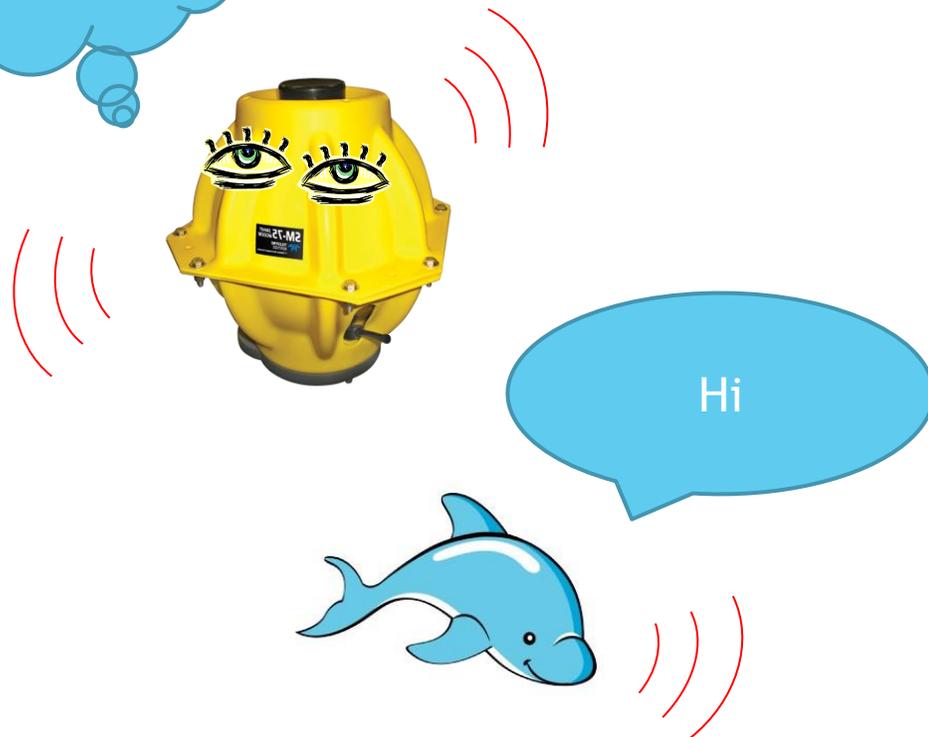
Know when to



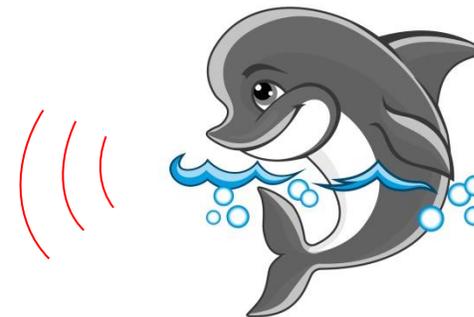
**SHUT UP**

# Proposed Solution

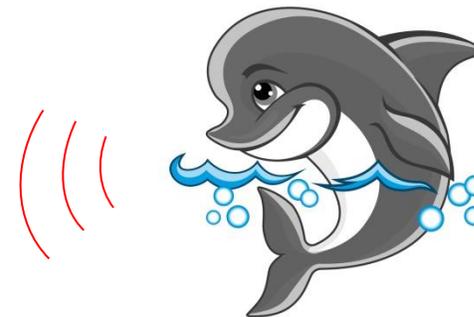
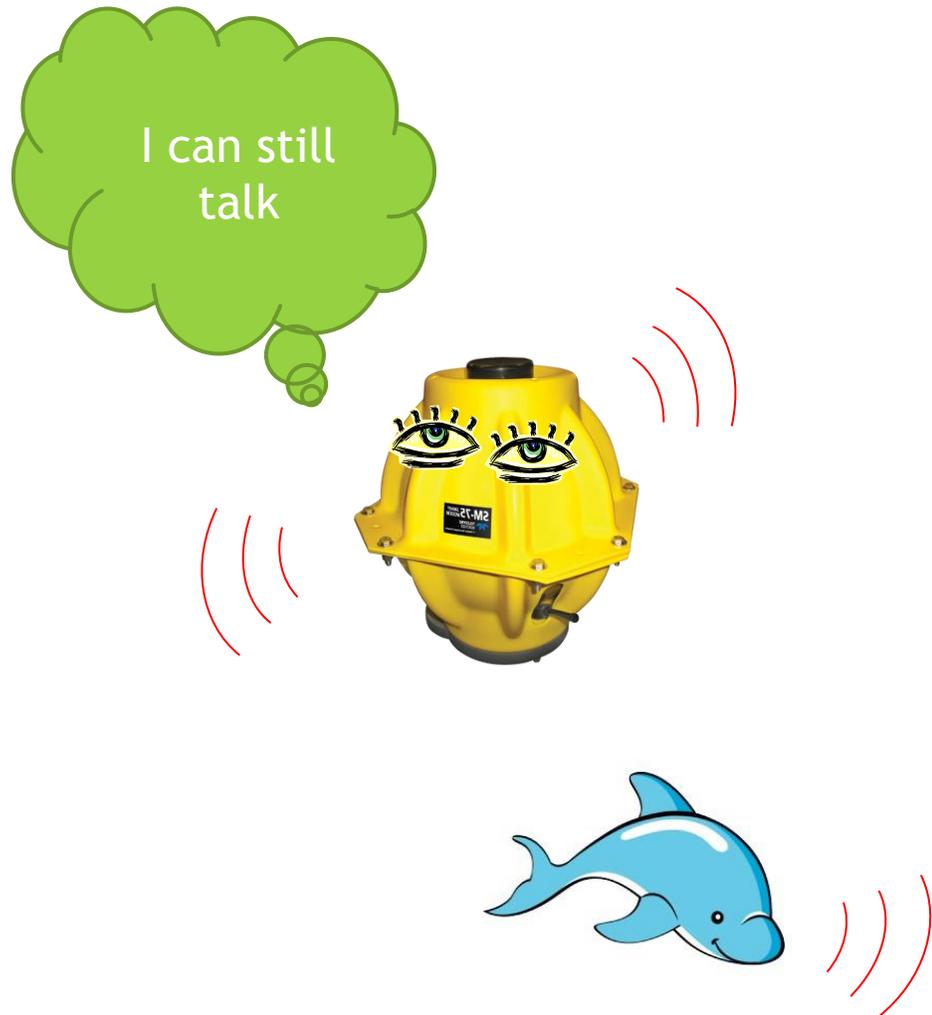
SU or not,  
that's a  
question ...



A!\$@!#3F



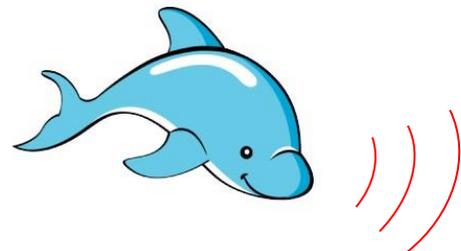
# Proposed Solution



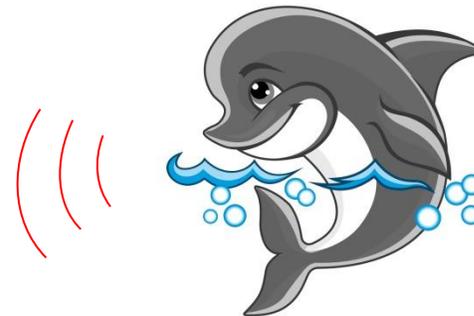
# Proposed Solution



Time to SU



I'd like to talk about your last year's tax return

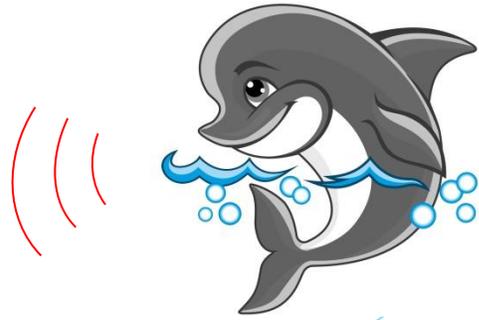


# Proposed Solution

Optimal stopping problem!



A!\$@!#3F



# Summary

- ▶ Preliminary Results
  - ▶ Long Island sea test-bed collecting sound information
  - ▶ Channel utility function
    - ▶ Designed by utilizing stopping theory
    - ▶ Refer to the paper for detailed design due to the time limit
  - ▶ Channel switching condition
    - ▶ The time for monitoring a channel
    - ▶ The time for stopping using a channel
- ▶ Future Work
  - ▶ Activity model verification
  - ▶ Algorithm performance evaluation
  - ▶ Test-bed implementation



# Thank you!

