

Project Deliverable #4: Simulator Manual

Arden Davis - Sailing Simulation

Your Goal

Your goal is direct your boat to avoid obstacles, stay in the wind, and follow the directions given by the radio.

Stay in the Wind: In order to power the boat, you must be turned at an angle that allows you to catch the wind. For our purposes, your boat must be at least 30 degrees away from the origin of the wind in order to move. You can turn your boat by pressing the 'f' key for left and the 'j' key for right. The user is expected to press the spacebar and hear a full "ready" from the crew before pressing either of the turn buttons.

Avoid Obstacles: If you hear an oncoming boat, that means the boat has the right of way and you do not, so you should turn away from the boat. Make sure to check with your crew before doing so. After avoiding a boat, you want to get back into the wind.

Follow Directions: If you hear a message from the radio with instructions, follow the instructions.

The User Interface

The three keys the user is expected to be interacting with while using this simulator are 'f' for turning left 30 degrees, 'j' for turning right 30 degrees, and the **spacebar** to play the sonification of crew's readiness.

A UI button labeled **repeat** will repeat the previous radio message.

The **stop event stream** button stops all notifications from the given data set and resets the timer to 0.

The **pause event stream** button stops all notifications from the given data set. Upon pressing play you will resume the previous stream.

The **play event stream** button collects all notifications from the given data set.

There are a series of **training buttons** described below.

The **Test 1** button will begin the event stream to test your ability to navigate changing wind conditions.

The **Test 2** button will begin the event stream to test your ability to follow radio messages.

The **Test 3** button will begin the event stream to test your ability to avoid incoming boats.

The Training Buttons

Press each of these buttons to hear the different training scenarios. Each time you press a button it will play the next of three sound segments.

Oncoming Boat: This is the sound of an oncoming boat.

- Click one: the boat is traveling on a path to your right.
- Click two: the boat is traveling on a path to you on your left.
- Click three: the boat is traveling on a path from the left to the right.

Radio: This button plays instructions from the race committee or weather information.

- Click one: "This is just a test".
- Click two: "There is a massive storm so Point your boat into the wind because you need to motor back"

- Click three: “Check if your crew is ready”

Turning and Wind:

- Click one: If you hear this noise, it means that you are pointing directly into the wind and you should move either to the right or left.
- Click two: The wind will get higher pitched if the wind gets heavier, which sounds like this.
- Click three: The wind will get lower pitched if the wind gets milder, which sounds like this.

Crew: Press the spacebar to hear if the crew is ready.

- Click one: *hit space* → This noise signals that everyone is ready.
- Click two: *hit space* → This noise signals that no one is ready. *hit space* → This noise signals that everyone is ready.
- Click two: *hit space* → If upon pressing the button the response is not that everyone is ready, press it again until it signals that they are ready before making a turn.

Repeat: If the radio has just spoken a message, this button will say “I repeat” followed by the message all long as you are inside of one of the simulation loops.

The sounds

For each of the sounds, the **xPos** and **yPos** are inputs into a function that determines the **relative angle** and **distance** from your boat in radians and meters respectively. Some of the sounds also have a variable called **normalizedAngle** which is a value from -1.0 to 1.0 that signifies the stereo balance of the sound.

Oncoming Boat:

Oncoming boats are represented by the song “Call me maybe” and are designed to be locatable in space by sounding fatter away with distance.

The low pass filter is controlled by the **computed relative distance** from your boat to the oncoming boat. If the boat is more than 50 meters away, you should not hear it at all. The closer the boat is to you, the more frequencies are passed through the filter.

The location of an incoming boat is given by a **Panner** which plays the sample player at the balance indicated by the incoming boat’s **normalized angle**.

Radio: Given a notification that has a message tag, this **sample player** will play two clicks to signal a message is about to read, followed by a **text to speech sample** which reads the message and is distorted by a **bandpass filter** and **waveshaper** to sound like an am radio. The **wind speed** determines the **q value** of the **bandpass filter**.

Turning and Wind: The **boat speed** and **wind direction** are indicated by a **modulated wave player**. At speed equals zero, the carrier frequency of the wave is 0.5, but this frequency increases with the speed of the boat. The location of the wind is given by a **Panner** which plays the wave at the balance indicated by the wind’s **normalized angle**.

Crew: There are 4 people on your boat. Given a Crew notification, if the **xPos** and **yPos** added together are an even number, the **gain** that holds the choir of sample players saying “ready” is set to 0.25, signifying that the crew is not ready. If it is an odd number, the crew is ready and the gain is set to a 0.7, giving the choir of voices a more fuller and louder sound.