11.2 Tries

Each team will be able allowed two attempts for each mission task the time of the attempts will be scheduled.

11.1 Obstacle Channel

Successful completion of the Obstacle Channel task demonstrates the ability to sense and maneuver through a complex path, staying within the defined pathway, and avoiding contact with obstacles along the way.

The drone passes between multiple sets of gates designated by pairs of red and green buoys. The entire drone should pass through all sets of the gates without touching the buoys. To score points for a gate it must be passed correctly one time, no points are scored on subsequent passing of same gate. The drone must also avoid intermittent yellow buoys placed within the pathway described by the location of the red and green pairs of buoys (gates) hitting an obstacle buoy will give penalty points.

This is a timed mission and for every minute spent on the mission points are subtracted from an initial starting number of points.

The removal of yellow obstacle buoys is possible by the discretion of the Regatta Manager, the change will then apply equally for all contestants.

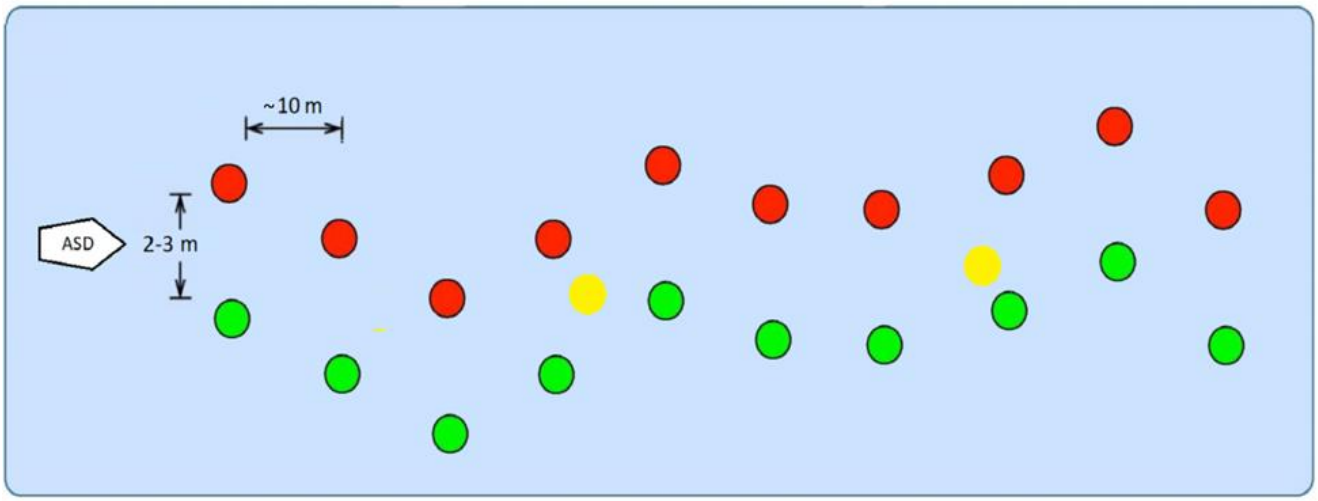

Figure 5 Obstacle Channel overview

Points		
Gate	**Obstacle**	**Time**
+5	-10	100 - 5/min

11.2 Collision avoidance

The purpose of the Collision Avoidance task is to demonstrate complex path planning. The drones must move through an area with crossing traffic from both port and starboard. The ASD should behave according to Convention on the International Regulations for Preventing Collisions at Sea (COLREGs). The direction of the arriving crossing traffic will be randomized.

The ASD must hold a speed below 4 knots and complete the mission in less than 10 minutes.

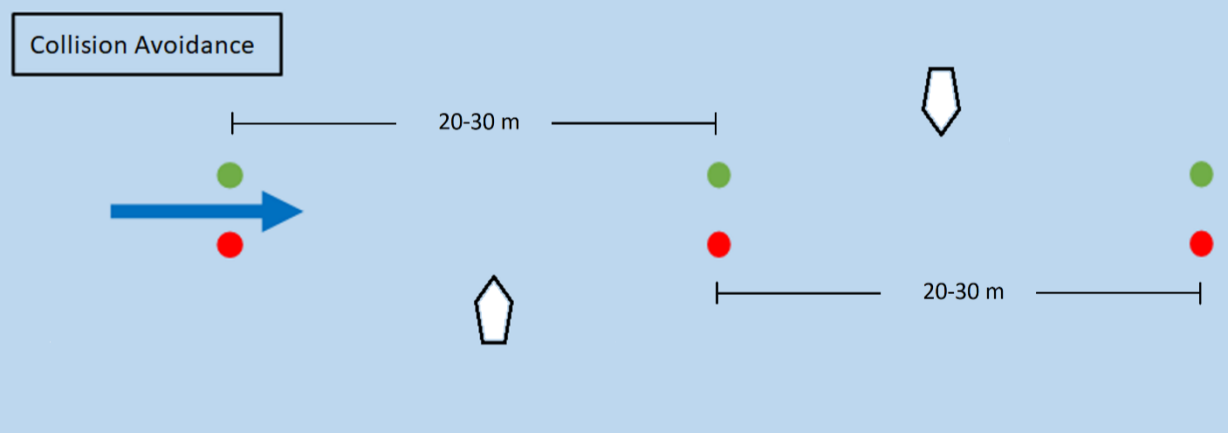

Figure 6 Collision Avoidance (crossing traffic for illustration only)

Points		
Gate	**Collision**	**COLREGs**
+10	-30	+30/rule followed

11.3 Visual Docking

Successful completion of the Visual Docking task will demonstrate the ability to localize the docking area, and maneuver into docking position in a defined area.

The docking area will be an area of a pier marked with a green and red buoy two meters apart. The ASD should navigate to the area between the buoys and dock with its port or starboard side to the pier. It should be docked at least for 30 sec (can use thrusters to keep the ASD at dock). Then after this time the ASD must leave the dock.

Points are given for reaching the docking area, docking correctly and then for every second the ASD is kept docked.

The mission must be completed in less than 10 minutes.

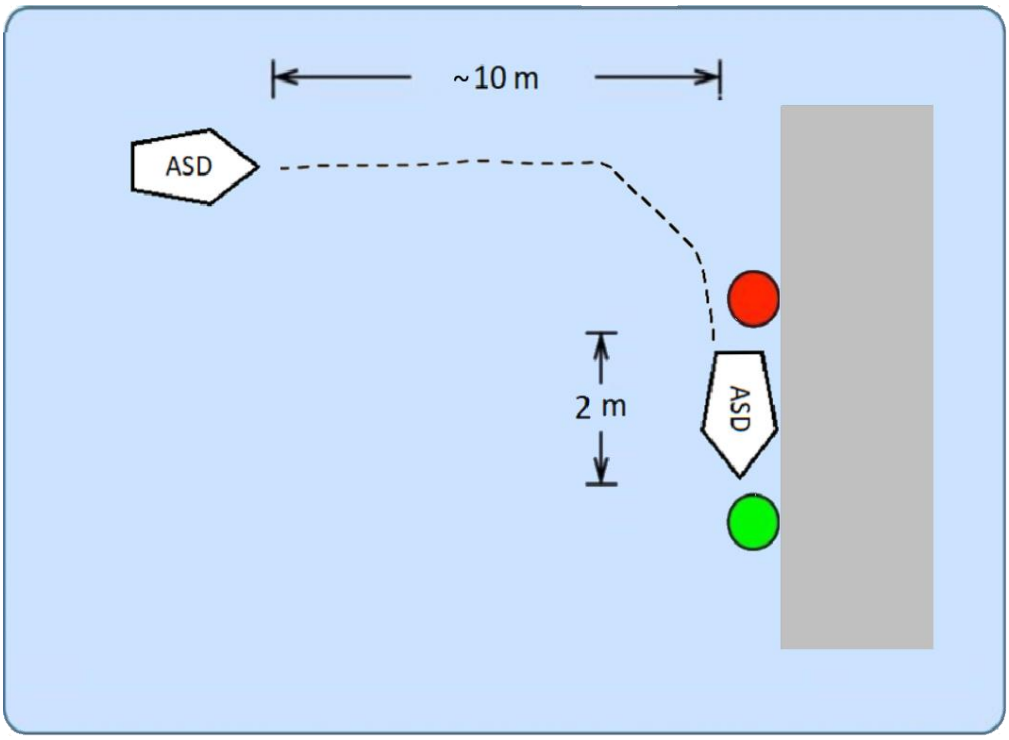

Figure 7 Docking (illustration only)

Points		
Dock Reached	**Docking correct**	**Docking time**
+10	+30	+ 2 /sec docked (max 60p)

11.4 Speed Gate

Successful completion of the Speed Gate task demonstrates the ASD's hull form efficiency coupled with its propulsion system, and the resulting maneuverability. Furthermore, it demonstrates object recognition and decision making with respect to sensing the task elements.

The drone must enter through the gate buoys, go around the Mark buoy (counterclockwise or clockwise), and exit through the same gate buoys, as quickly as possible. The gate buoys are moored 2-3m apart, and the Mark buoy is placed 20-30m from the gate buoys.

This is a timed challenge. Time starts when the bow (front) of the drone crosses the Gate buoys (entry) and stops when the stern (back) of the drone crosses the Gate buoys (exit).

Completing the course in less than 10 minutes gives 20 points, additional points are given to the three fastest ASDs.

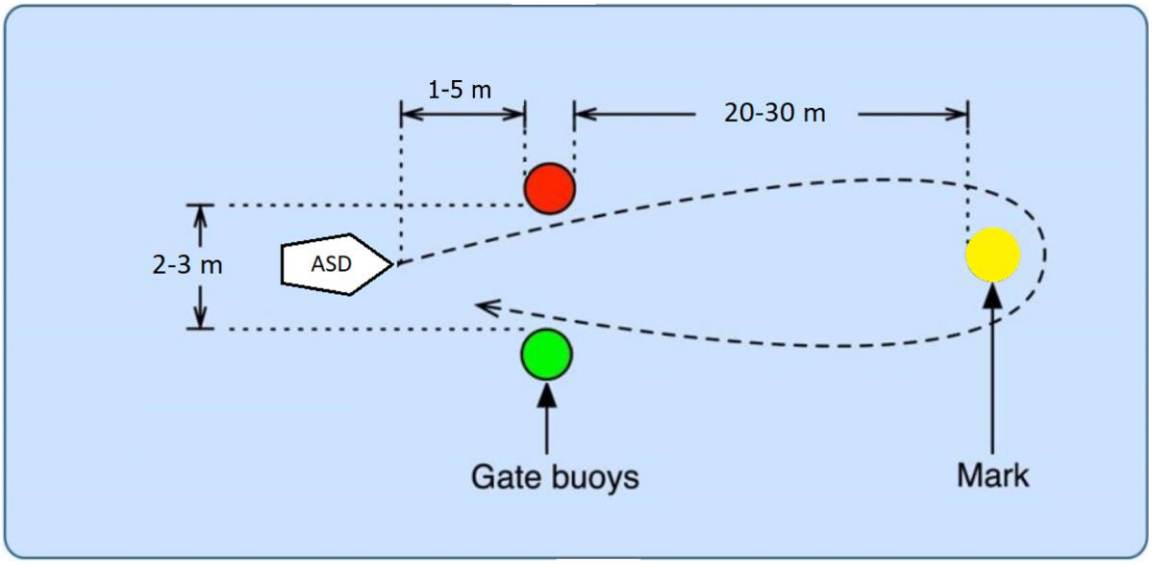

Figure 8 Speed Gate (Illustration only)

Scoring	
Criteria	**Points**
Time criteria	80*1/place
Exit through gate	20
Round the mark	15
Reach Mark	10
Enter through gate	5