RoboSub Competition
Preliminary Rules and Task Descriptions

18th Annual International RoboSub Competition
"Back to TRANSDEC"

July 20 - July 26, 2015
SSC Pacific TRANSDEC
San Diego, CA

www.RoboSub.org

We are releasing this preliminary mission statement for comment by the teams. Please direct your comments and questions to the RoboSub Community. Teams are encouraged to participate in the Community and to help guide the final rules for the competition. Discussion of the rules will be open for a period of time. After which, the rules will be finalized and released.

Reminder: Along with the Journal Paper, each team will also submit a 2-3 minute video. The video will "introduce" the team and their approach to the event. This video will be scored, and will be used online and onsite during the webcast. It will not be used for the oral presentation. More information to follow.

Reminder: A team may choose to have their own playlist playing during their semi-final runs (but not during the webcast of the finals). Please remember, this is a family event, so no explicit lyrics. This privilege can be revoked.

Mission: The fundamental goal of the mission is for an AUV to demonstrate its autonomy by returning "Back to the Future". Orange guide markers will help direct the vehicle to each task. The vehicle will have to check the flux capacitor (touch buoys), refule the Delorean (drop markers), set the proper date (fire torpedoes through cutouts), fly through a time portal (pass over an obstacle), and then fix what is broken to be able to return home (find a pinger, grab an object and move/release the object).

We expect each vehicle to have 15 minutes to complete the tasks (with an additional 5 minutes of dock preparation time). Any vehicle that touches a buoy, passes over the obstacle, places at least one marker in the bin or on the lip (or fires at least one torpedo through the cutout) and surfaces within the octagon will receive bonus points proportional to the unused time. Each vehicle must begin the run by passing under a validation gate. At any time during the run, if a vehicle breaches the surface, the run is terminated (See the section "Breaching" for the exception, *'cause there's always one*).

Important Dates

Dates	Event	Time
April 1	Registration and Payment Deadline	
May 18	Team Roster and T-Shirt Size Due	
June 10	Hotel Reservation (Holiday Inn San Diego Bayside) Deadline	
June 19	Team Video, Website, Journal Paper, Individual Resumes Due	
July 20	Check-In and Orientation	1600-1800
July 21	Practice Day (Qualifying Runs)	
July 22	Practice Day (Qualifying Runs)	
July 23	Practice Day (Qualifying Runs)	
July 23	Static Judging	
July 24	Static Judging & Semi-Final Round 1	
July 25	Semi-Final Round 2	
July 26	Second Chance Qualifying	0800 - 1200
July 26	RoboSub Finals	1300 - 1700
July 26	Awards Banquet	1900 - 2200

Weight and Size Constraints: For the RoboSub Competition, each entry must fit within a six-foot long, by three-foot wide, by three-foot high "box" (1.83m x 0.91m x 0.91m). Table 1 shows the bonuses and penalties associated with a vehicle's weight in air.

	Bonus	Penalty
AUV Weight > 125 lbs (AUV Weight > 56.7 kg)	**N/A**	**Disqualified**
125 lbs ≥ AUV Weight > 84 (56.7 kg ≥ AUV Weight > 38)	**N/A**	**Loss of** **250 + 5(lb - 125)** **250 + 11(kg – 56.7)**
84 lbs ≥ AUV Weight > 48.5 (38 kg ≥ AUV Weight > 22)	**Bonus of** **2(84 - lb)** **4.4(38 - kg)**	**N/A**
AUV Weight ≤ 48.5 lbs (AUV Weigh ≤ 22 kg)	**Bonus of** **80 + (48.5 - lb)** **80 + 4.7(22 - kg)**	**N/A**

Pingers: The pingers will be Benthos ALP-365. The Benthos ALP-365 is user selectable from 25 to 40 kHz in 0.5 kHz increments. They will only be set to an integer frequency (25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40).

Placement of Competition Elements in the Arena: The launch point, gate, Guide Markers, Check Flux Capacitor, Refuel, Set Date, Time Portal, and Return Home will be placed in such a way as to not have any three elements along a line.

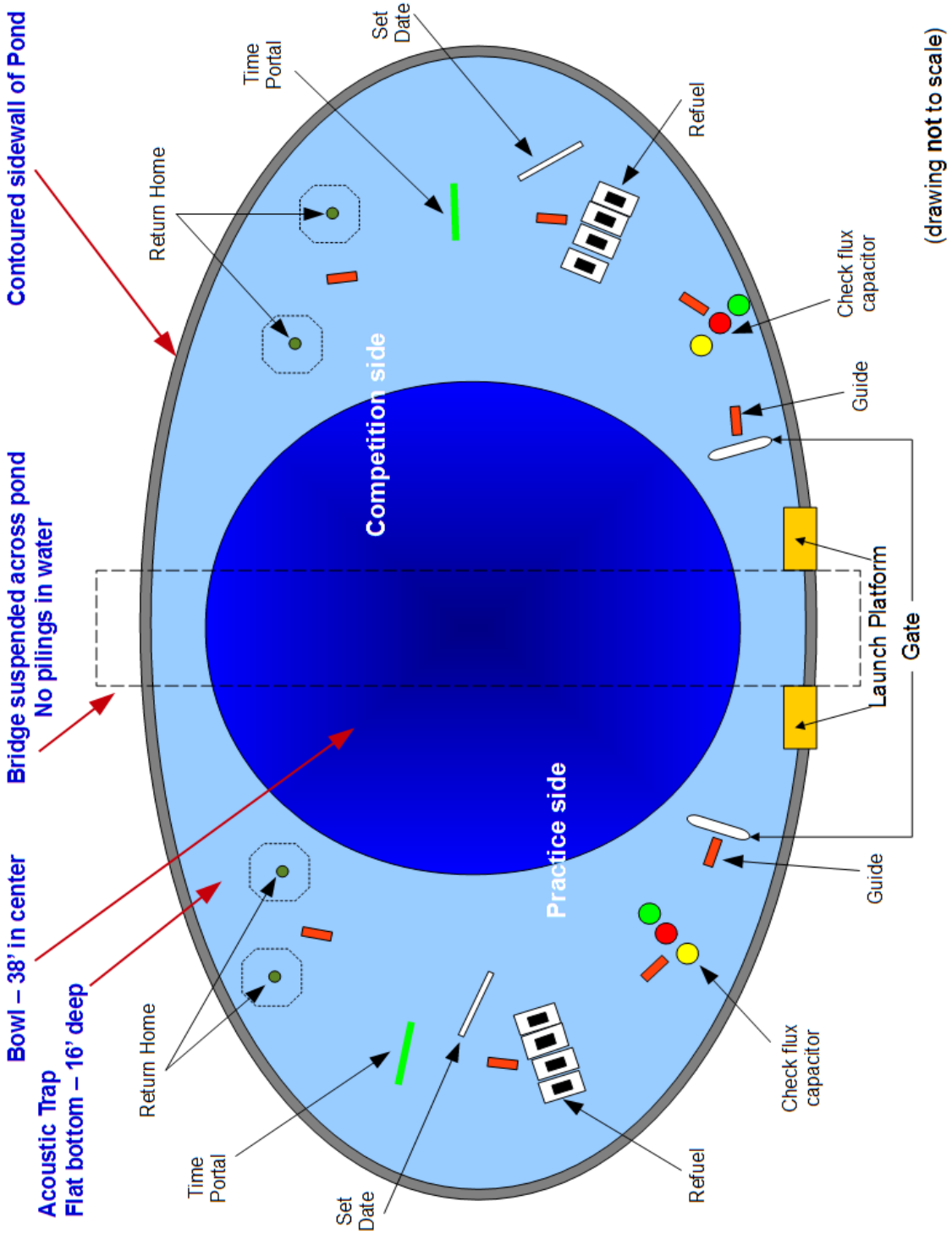

Figure 1: Overview of course layout

Description of Tasks:

This section further describes each task.

Guide Marker – The sections of path are 4 feet (1.2 m) long by 6 inches (15 cm) wide. The path will be covered in **BLAZE ORANGE** colored Duck Tape. Each path segment will be directly after the current task, and point to the next task or tasks. There will be one following the gate that points to the Check Flux Capacitor (buoy) task. After the Flux Capacitor, one will point to the area containing both the Refuel and Set Date tasks. Following these two tasks a segment will point to the Time Portal. There will be no segment following this task which points toward the Return Home. There will be a path segment from the Return Home which points back to the Refuel/Set Date tasks.

Check Flux Capacitor (Buoy) – There will be three 9" (23cm) diameter solid color buoys. Each buoy will be a different color. Points are awarded for touching any buoy. The maximum amount of points are awarded for touching two separate buoys in the proper sequence.

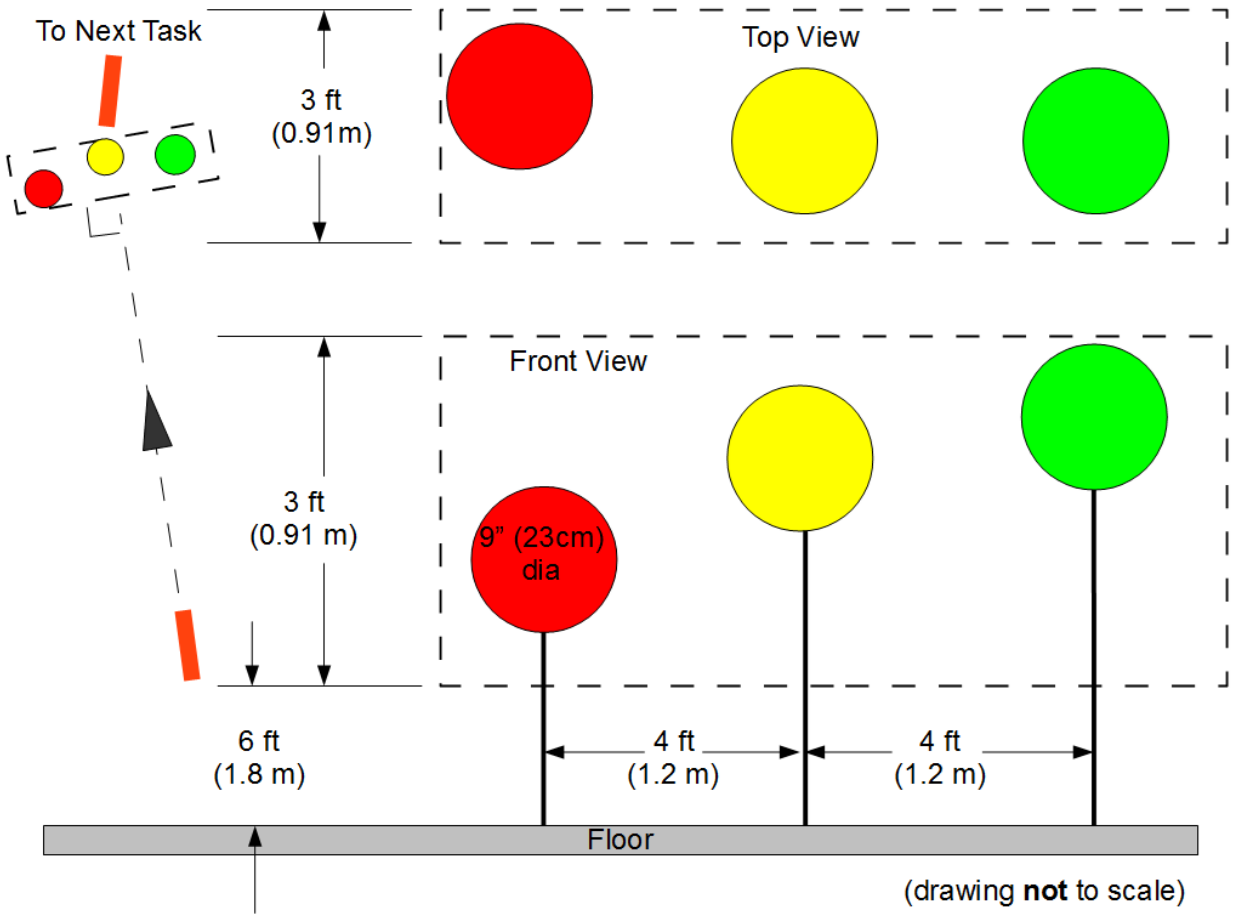

Figure 2: Check Flux Capacitor

Refuel (Bins) - Each black bin will be surrounded by a 6" white border. A total of two markers can be dropped from the vehicle. Inside the bins will be silhouettes. (**Question: Suggestions for silhouettes [lightning, power cord, banana peel, etc.], color?**). A primary and secondary silhouette will be assigned. The primary silhouette will be covered. To obtain maximum points, the vehicle must remove the cover and drop one marker in the primary bin, and one marker in the secondary bin. Points are also awarded for dropping markers in any bin.

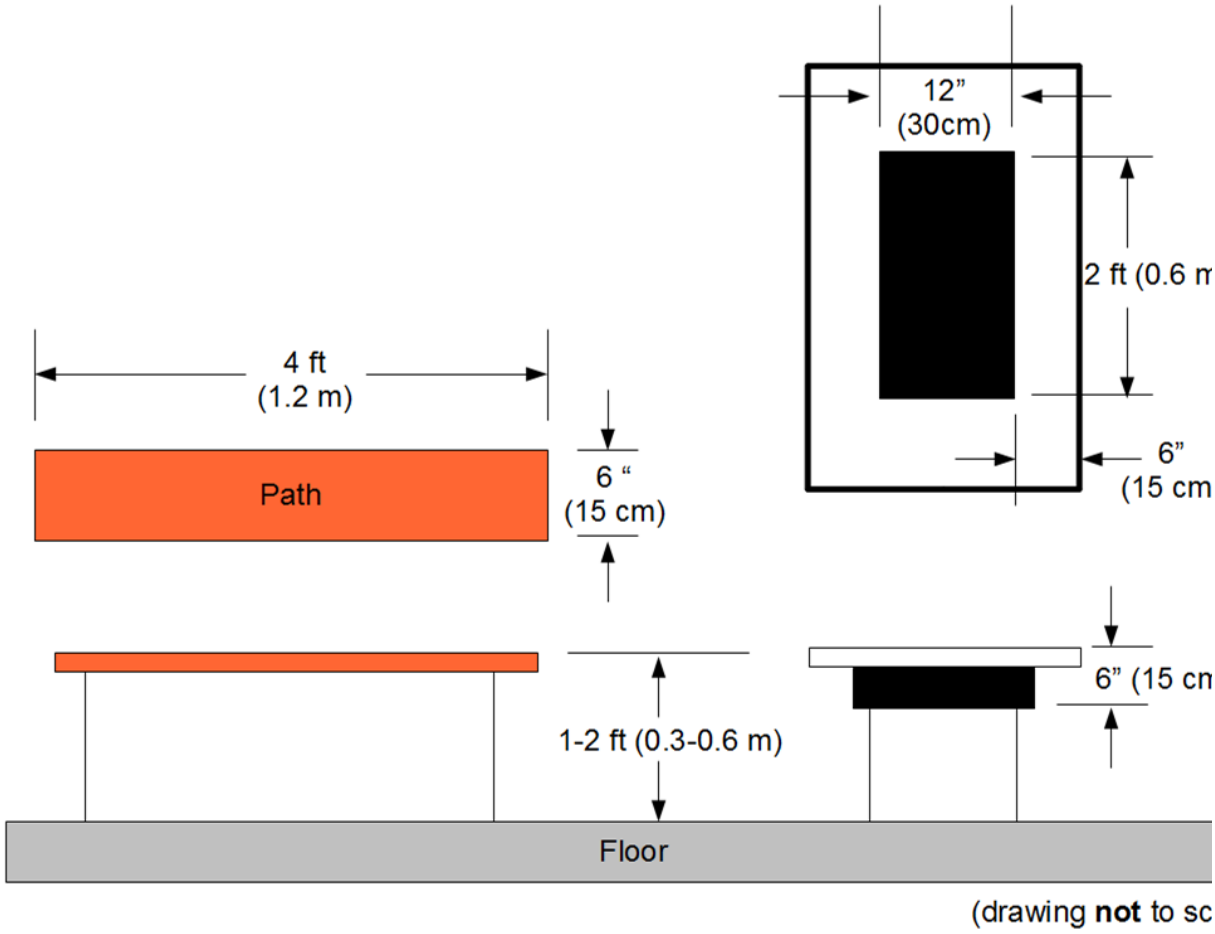

Figure 3: Path and Bins

Set Date (Window Cutouts) – There will be a vertical square moored to the floor with two different size square cutouts. (**Question: Sizes, colors, borders?**). One of the small squares and one of the large squares will be covered. There will be a primary and secondary cutout assigned, the primary square will be covered. Maximum points will be awarded for removing the cover on the primary square and firing a torpedo through the primary and secondary square. Points will be awarded for firing torpedoes through any cutout.

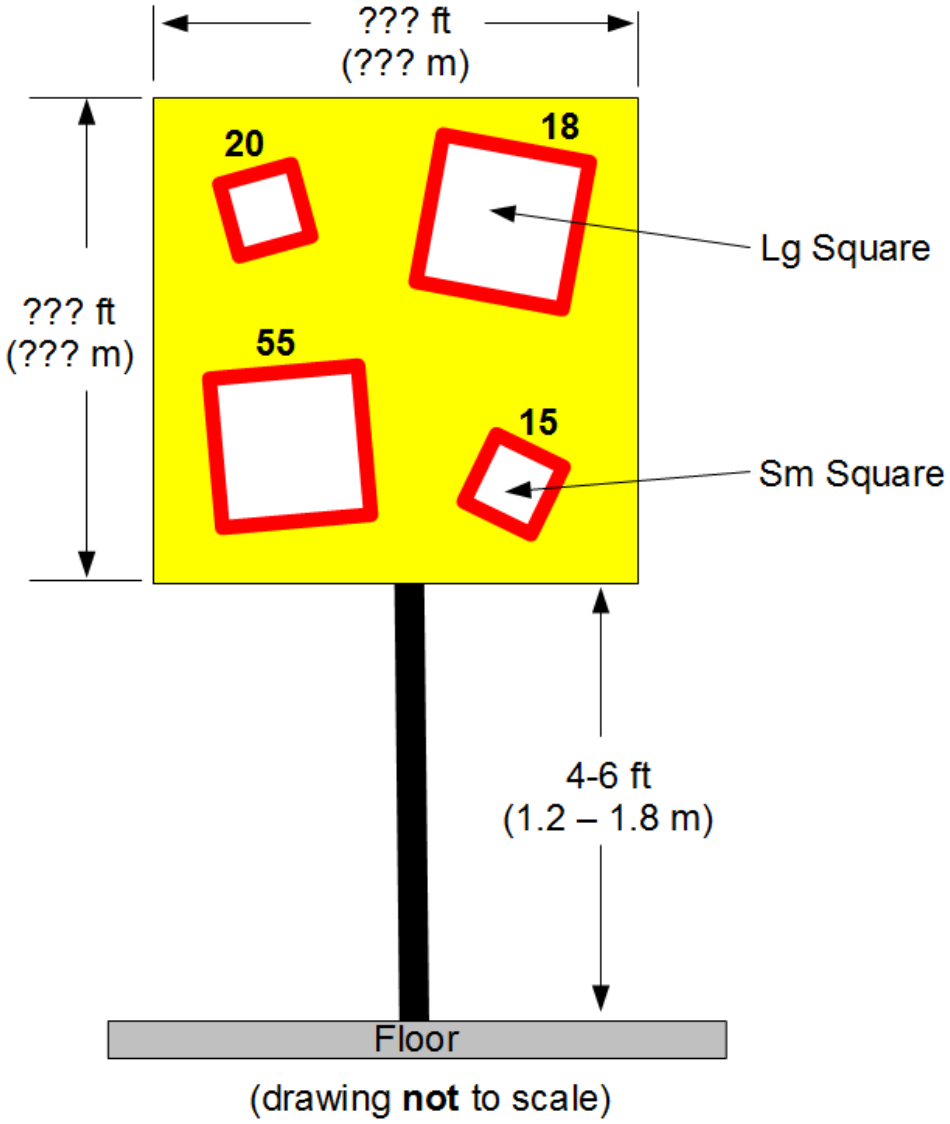

Figure 4: Set Date

Time Portal (PVC to pass over) – A horizontal section of 2" PVC pipe (**Question: Color?**) will be moored to the floor. Attached to this will be three vertical sections. The two outside vertical arms will be longer than the center one, which is colored **RED** (**Question: Color?**), Once your vehicle reaches 88 mph, you may pass through the portal. Points will be awarded for passing over the obstacle. More points will be awarded for sliding sideways or backward through the portal.

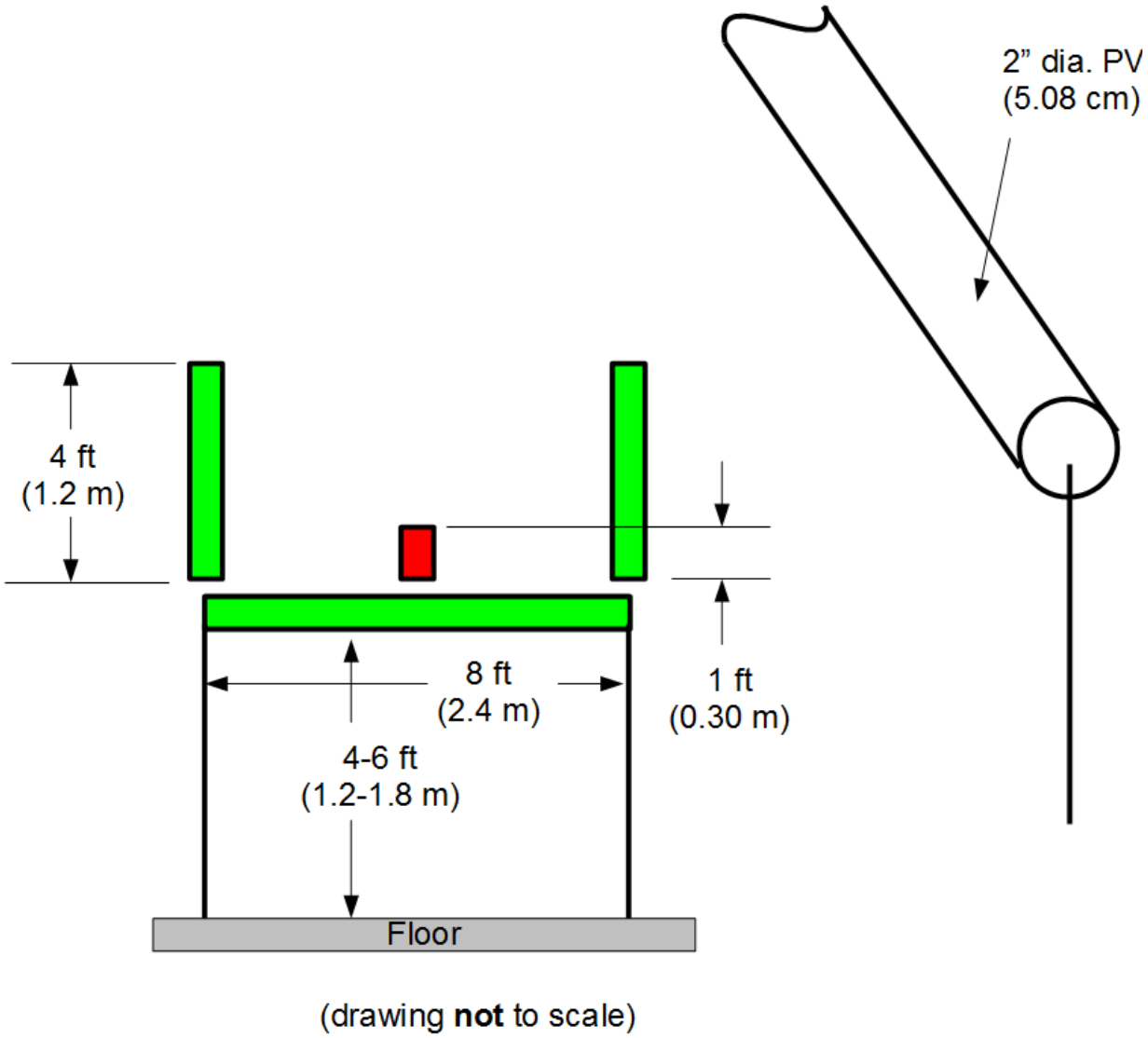

Figure 5: Time Portal

Return Home (Recovery and octagon) – This task consists of an acoustic pinger located off the floor of the pool. The Competition and Practice side pingers will be deconflicted as shown in the chart below. Placed directly above the pinger, on a tower, is an object. Floating above the pinger on the surface will be an octagon representing the Return Home. In order to obtain full points for the octagon, the vehicle must surface fully inside the octagon.

There will be two different octagons, and a team will get points for surfacing within either area. However, only one pinger will be active during a run, and a vehicle surfacing within the octagon with the active pinger will receiver more points.

There will be two different objects, one located at the tower above each pinger. There will be "hooks" on the object, and bars on each tower. A team will obtain maximum points by taking the object located at tower A and hooking it onto tower B. More points will be awarded for then taking the object at tower B and hooking it onto tower A.

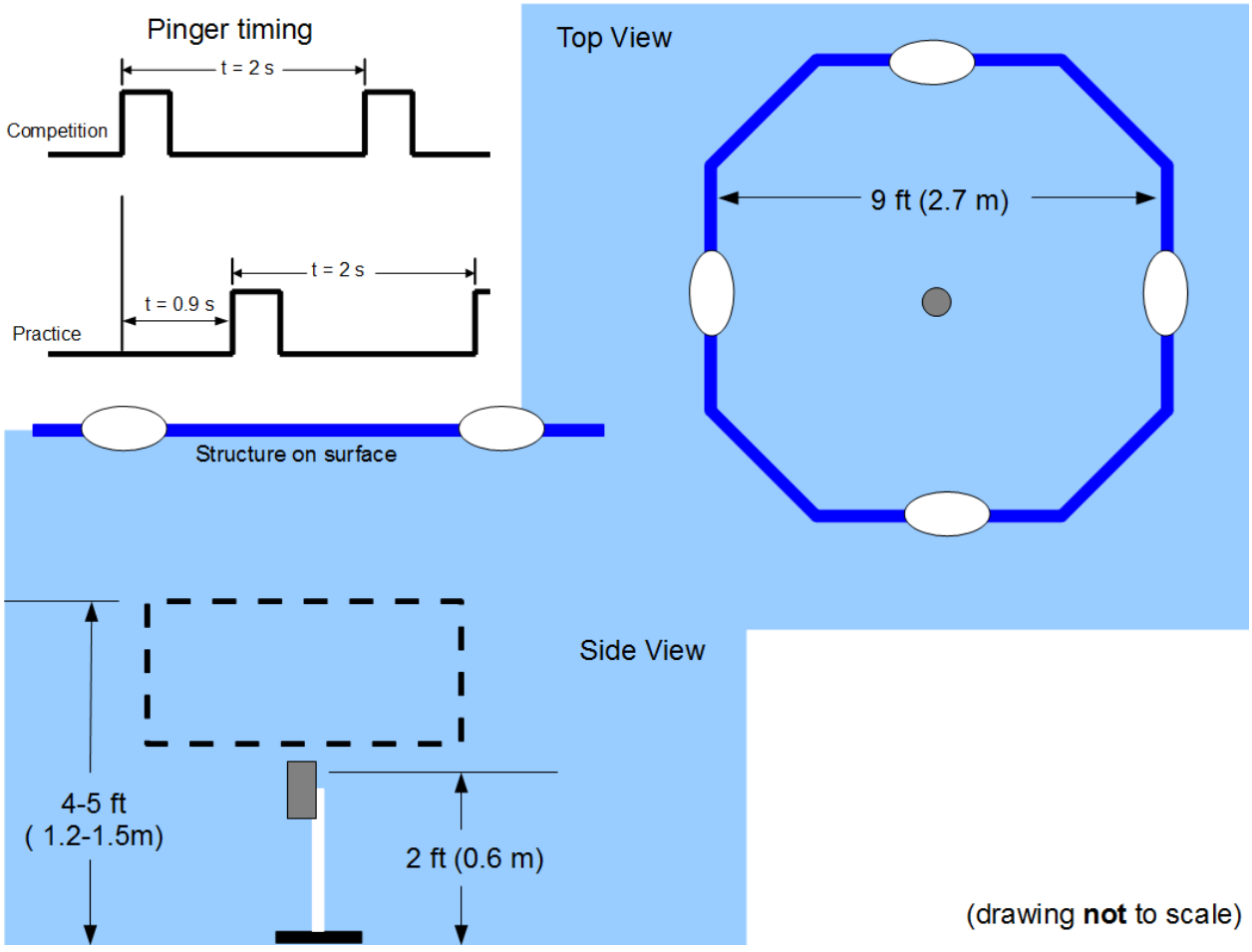

Figure 6: Return Home

Scoring: Each of the tasks has a point value associated with it. The tasks can be completed in any order. However, the recovery object must be attached to the vehicle while the vehicle is surfacing to obtain maximum points for “surfacing with object”.

Breaching: When completing the sequence of tasks, the octagon may not be the last task attempted. In this case, if the vehicle surfaces fully or partially within the octagon it can then submerge again to accomplished the remaining tasks.

Interference: Vehicles that interfere with competition elements may be disqualified at the judges' discretion. “Interference” does not include cases where, in the opinion of the judges, a vehicle is attempting to complete one of the tasks. If a vehicle becomes entangled on a competition element the run will be declared complete. Teams may keep the points earned on that run, or may have the vehicle returned to the launching platform and start another new run. If a new run is begun, all points from the previous run are lost.