

# robo sub

2023



TeamTime #3

Friday, June 23, 2023 | 7:00 PM Eastern Time





# robosub

## 2023

### GET STARTED



1

Edit your name to "Name | Team Name"

2

Let us know in the chat:

Have you watched Stargate? What's your favorite Season and/or Episode?



RoboSub 2023 Team Handbook Version 2  
Released



## AGENDA

- [19:00-19:05] Welcome
- [19:05-19:15] Deadlines & Schedules
- [19:15-19:25] On-Site Reminders & Venue Layout
- [19:25-19:35] Logistics (Shipping, Accommodations, Parking, Shuttle)
- [19:35-19:50] Whirlpool X-treme
- [19:50-20:00] Questions?



•REC





**ROBOSUB  
2023**

**WELCOME!**

**38 Days to Day 1**



[RoboSub.org/2023](https://RoboSub.org/2023)

# **EXPLORATION: WHIRLPOOL X-TREME!**

NIWC PACIFIC'S TRANSDEC  
SAN DIEGO, CALIFORNIA



**FROM JULY 31 -  
AUGUST 6, 2023**



26<sup>th</sup> Annual  
**RoboSub 2023**

**SCHEDULE &  
REMINDERS**







**ROBOSUB  
2023**

## Deadlines



[RoboSub.org/2023](https://RoboSub.org/2023)

## Pre-Competition Deadlines

Date/Deadline	Event
March 2 – April 15, 2023	Registration
June 9, 2023	Event Submissions Deadline: <ul style="list-style-type: none"><li>• Team Information</li><li>• Merchandise Order</li></ul>
June 11, 2023	Full 100% Refund Cancellation Deadline
June 16, 2023	<ul style="list-style-type: none"><li>• On-Site Requirements (<i>deadline extended to June 16</i>)</li></ul> Design Documentation Deadline: <ul style="list-style-type: none"><li>• Technical Design Report</li><li>• Team Introduction Video</li><li>• Team Website</li><li>• Optional Community &amp; Outreach</li></ul>
July 14, 2023	Optional Pre-Qualification ( <i>deadline extended to July 14</i> ) <i>*Email submissions to <a href="mailto:autonomy@robonation.org">autonomy@robonation.org</a></i>
July 25, 2023	50% Refund Cancellation Deadline
July 31 – August 6, 2023	RoboSub 2023





# ROBOSUB 2023

## Schedule Overview



[RoboSub.org/2023](https://RoboSub.org/2023)

## Schedule At-A-Glance

Monday 31 July	Tuesday 1 August	Wednesday 2 August	Thursday 3 August	Friday 4 August	Saturday 5 August	Sunday 6 August
	0630-0800 Breakfast Available for Purchase					
	Presentations / Assessments Day 1 (Tuesday) 0900-1700 Day 2 (Wednesday) 0800-1700 Day 3 (Thursday) 0800-1000			0700-1800 Autonomy Challenge Semi-Finals Day 2	0700-1800 Autonomy Challenge Semi-Finals Day 2	0800-1100 Third Chance / Finalist Practice Runs
	0700-1800 Autonomy Challenge Practice / Qualifying Vehicle Assembly & Safety Inspections					
	1100-1300 Lunch Available for Purchase					
	1215 Group Photo					1200-1600 Autonomy Challenge Finals
1600-1700 Team Check-in						
1700-1800 Mandatory Team Orientation						1700-1800 Awards @ TRANSDEC
				1800 Team Meeting		
	1900 TRANSDEC CLOSES					
	2200-0600 Overnight Pool Testing at The Dana on Mission Bay					
	2300-0600 Overnight Pool Testing at Holiday Inn Bayside					
						2200-2400 Pool Party (Teams Only) Holiday Inn Bayside







## Schedule - DAY 1

 [RoboSub.org/2023](https://RoboSub.org/2023)

# DAY 1 – Monday, July 31

## The Dana on Mission Bay

- 4:00 pm – 5:00 pm | Team Check-in
- 5:00 pm – 6:00 pm | **Team Orientation (MANDATORY)**
- 10:00 pm – 6:00 am | Overnight Pool Testing

## Holiday Inn Bayside

- 11:00 pm – 6:00 am | Overnight Pool Testing





**ROBOSUB  
2023**

## Schedules



[RoboSub.org/2023](https://RoboSub.org/2023)

# DESIGN PRESENTATION & SYSTEM ASSESSMENT SCHEDULE

**Tuesday, August 1 – Thursday, August 3**

## Design Presentations

Teams are assigned a 15-minute presentation time slot. Teams are invited to prepare visual aids. The presentation time slot is broken down to:

- Team presentation – 10 minutes
- Judges' Question & Answer – 5 minutes

## System Assessments

Following the presentation timeslot, teams will proceed to their assigned 15-minute assessment time slot.



## Team Photos

Teams will have team photos taken after the System Assessment. Teams that miss their scheduled photo time can reschedule on Thursday afternoon only.





26<sup>th</sup> Annual  
**RoboSub 2023**

# ON-SITE REMINDERS & VENUE LAYOUT

ON-SITE CONTACT: CHERI KOCH  
850.642.0536 // CKOCH@ROBONATION.ORG



[robosub.org](https://robosub.org)



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2023**

## On-Site Reminders



[RoboSub.org/2023](https://robosub.org/2023)

# On-Site Reminders!

## Registered Teams

- Name badges are required to enter TRANSDEC. Badges will be available at team check-in.

## Guest Registration Required

- Anyone who is not a registered team member must complete the guest registration form before arriving at NIWC Pacific's TRANSDEC.
- If you have colleagues, friends and family joining us, send them the link to the Guest Registration form: <https://robosub.org/2023/guest>.







## On-Site Reminders



[RoboSub.org/2023](https://RoboSub.org/2023)

## On-Site Reminders!

### Be Prepared!

- Pack a jacket / dress in layers. TRANSDEC can be cold in the morning and evening.
- Wear shoes with sturdy soles to avoid rocks/thorns.
- Avoid SUNBURN - Bring sunscreen, hat, and long-sleeved shirt.
- Hydrate, hydrate, hydrate! Bring your own water bottle – water and ice will be provided.

### Venue Closure

- TRANSDEC closes at 7:00 pm every evening.



[RoboSub.org/2023](https://RoboSub.org/2023)

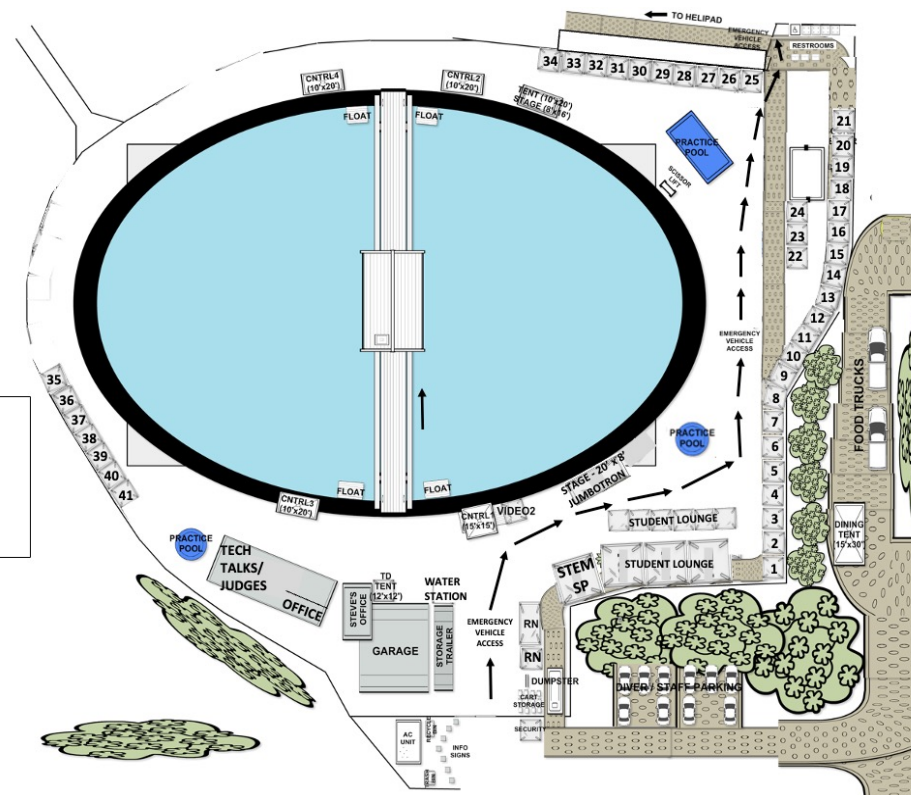
# Venue Layout

**2023  
RoboSub  
Competition**

## Layout

KEY

- Team Tents – 41  
Team Village Tents - 3  
RoboNation Tents – 3  
Sponsor Tents - 6  
Operations Tents – 6





26<sup>th</sup> Annual  
**RoboSub 2023**

**LOGISTICS**



[robosub.org](https://robosub.org)

# SHIPPING

Download the Shipping Guidelines: <https://robosub.org/2023#resources>.

- Teams may ship their equipment to our conference hotels (Holiday Inn Bayside or The Dana on Mission Bay) as long as they will be able to pick the shipment up by Monday, July 31.
- Shipments cannot arrive at hotels prior to July 28.
- Shipment must be shipped out before the team leaves (no later than August 7).
- Use the Inbound Shipping Label (in the Shipping Guidelines) for the hotel where you have a reservation.
- Use the Outbound Shipping Label (in the Shipping Guidelines) using the address of the hotel where you have a reservation or drop your crate off with your shipper directly.
- **Start now on planning on your outbound shipping arrangements now! Batteries are exceptionally difficult to ship.**
- Consult the Shipping Guidelines for Shipping Outlets in San Diego.





**ROBOSUB  
2023**

**Logistics**



[RoboSub.org/2023](https://RoboSub.org/2023)

# ACCOMMODATIONS

## RoboSub Hotels

Holiday Inn Bayside – Reservation Deadline was June 16<sup>th</sup>  
The Dana on Mission Bay - Reservation Deadline is June 30<sup>th</sup>

## Alternative Accommodation Options

Short Term Rentals – VRBO / AirBnB  
Search for other hotels near Holiday Inn Bayside





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2023

Logistics



[RoboSub.org/2023](https://RoboSub.org/2023)

# TEAM PARKING

Parking Reservations were DUE June 16th







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2023**

**Logistics**



[RoboSub.org/2023](https://RoboSub.org/2023)

## PUBLIC PARKING





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2023**

**Logistics**



[RoboSub.org/2023](https://RoboSub.org/2023)

# SHUTTLE

**Shuttle Reservations were DUE June 16th**





**ROBOSUB  
2023**

**Logistics**



[RoboSub.org/2023](https://RoboSub.org/2023)

## SHUTTLE SCHEDULE

	Loop #1	Loop #2	15 Min Driver Break	Loop #3	Loop #4	30 Min Driver Break	Loop #5	Loop #6	Loop #7	15 Min Driver Break	Loop #8	Loop #9	Loop #10	End Time
<b>Stop #1 – Public Parking</b>	0615	0730	0845	0900	1015	1130	1215	1330	1445	1600	1615	1730	1840	
<b>Stop #2 - TRANSDEC</b>	0640	0755	0845	0925	1040	1130	1240	1355	1510	1600	1640	1755	1900	
<b>Stop #3 – Team Parking</b>	0650	0805	0845	0935	1050	1130	1250	1405	1520	1600	1650	1800	1910	
<b>Stop #4 - TRANSDEC</b>	0700	0815	0845	0945	1100	1130	1300	1415	1530	1600	1700	1810	-----	
<b>Stop #1 – Public Parking</b>	0725	0840	0845	1010	1125	1130	1325	1440	1555	1600	1725	1835	1935	1945



26<sup>th</sup> Annual  
**RoboSub 2023**

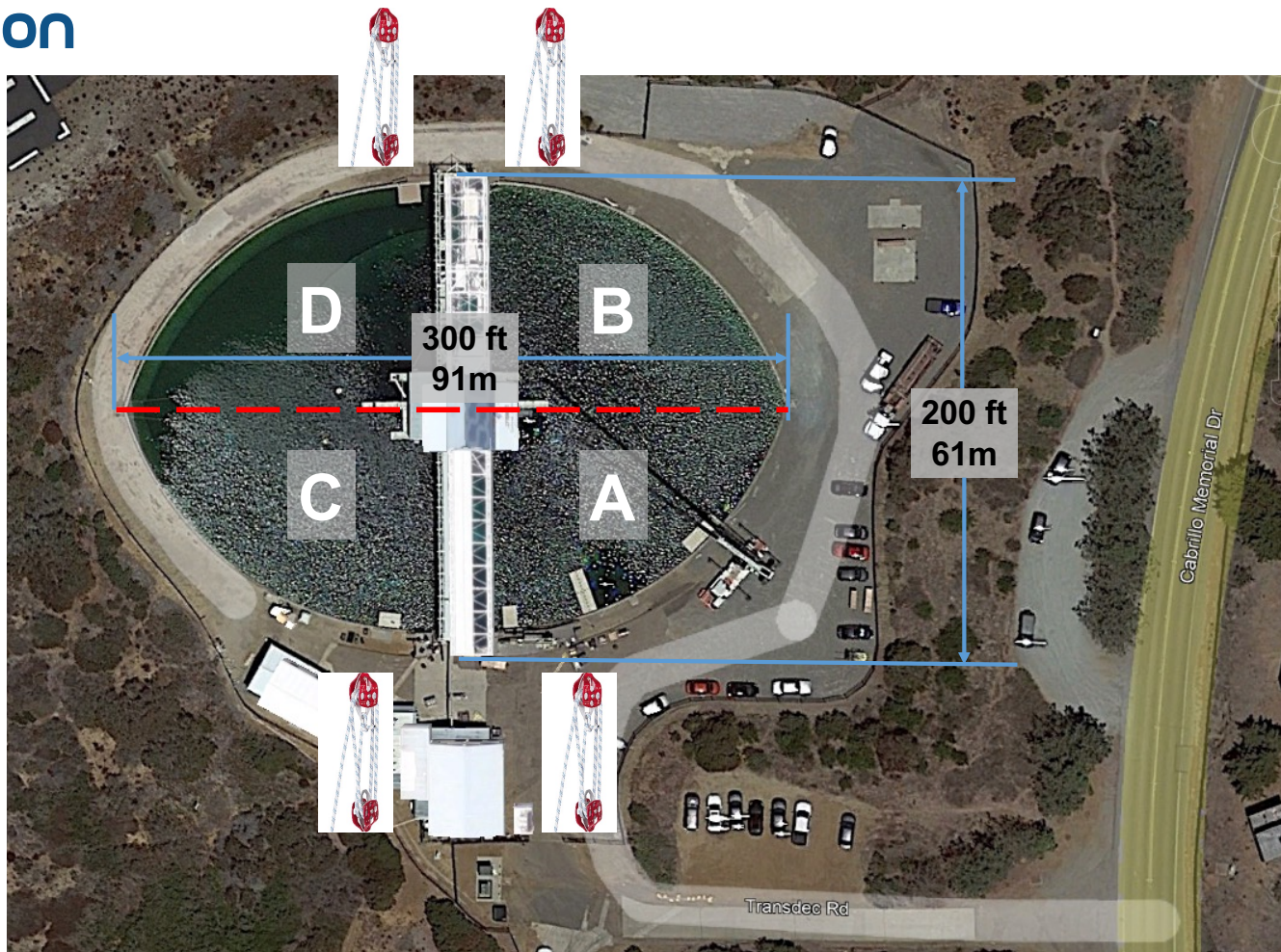
**Whirlpool**  
**X-treme**



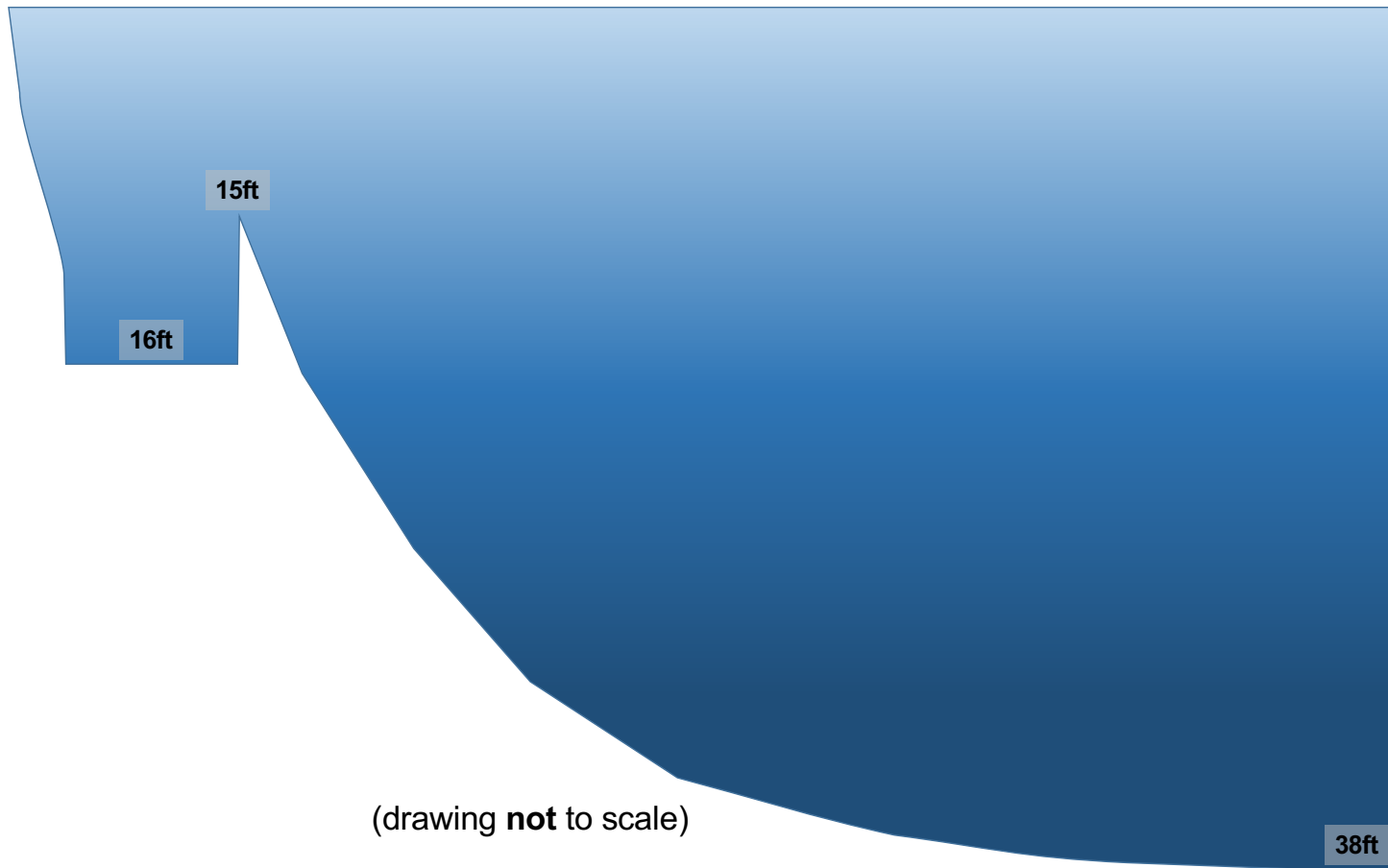
[robosub.org](http://robosub.org)

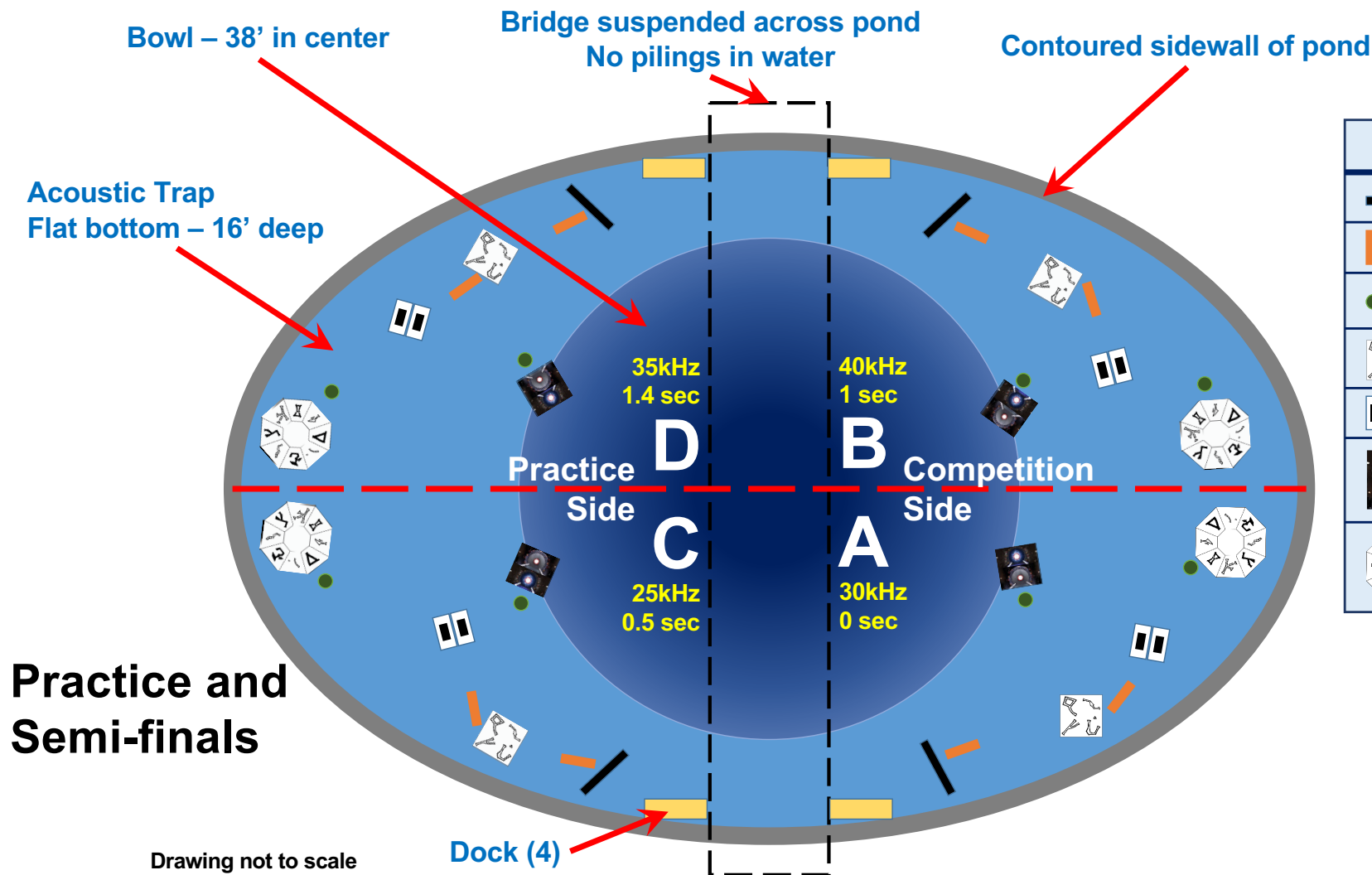


## Location

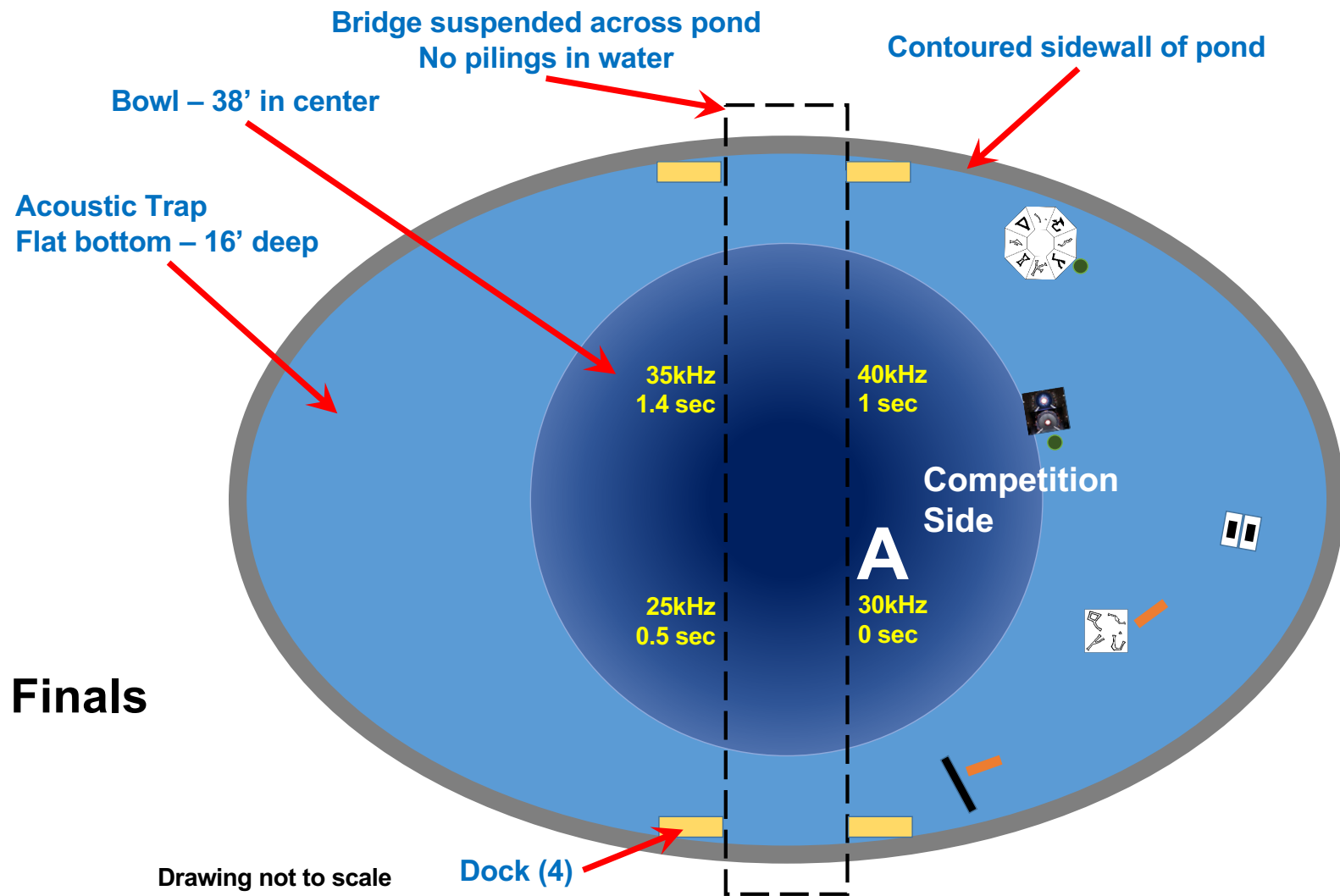







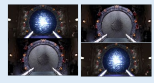

# Depth





Key	
	Gate
	Path
	Pinger
	Start Dialing
	Location
	Goa'uld Attack
	Engaging Chevrons

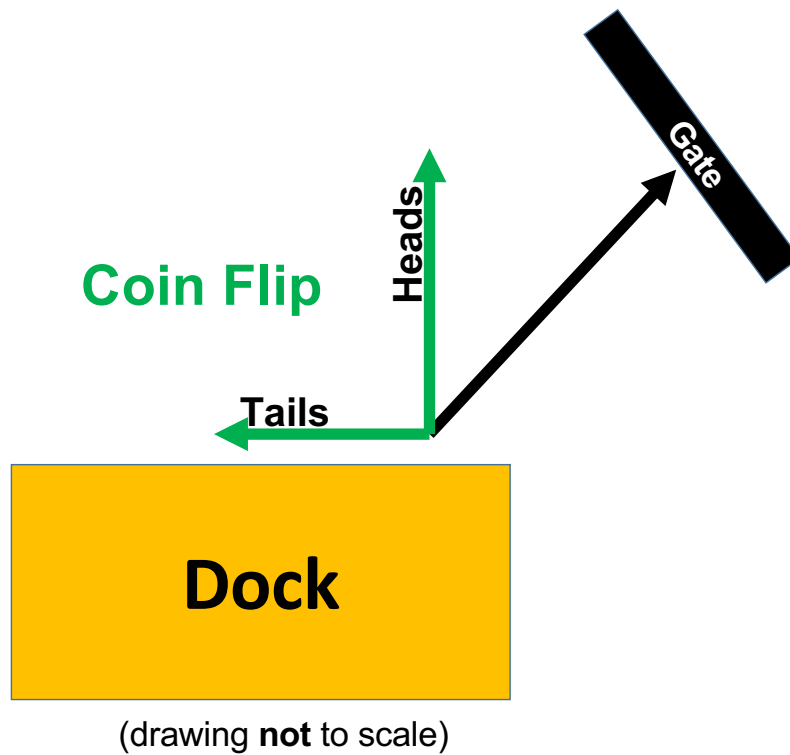


Key	
	Gate
	Path
	Pinger
	Start Dialing
	Location
	Goa'uld Attack
	Engaging Chevrons

Finals



## Oh for Crying Out Loud | Coin Flip



- Random orientation
  - 90° or 180° from dock

## Destination | Gate

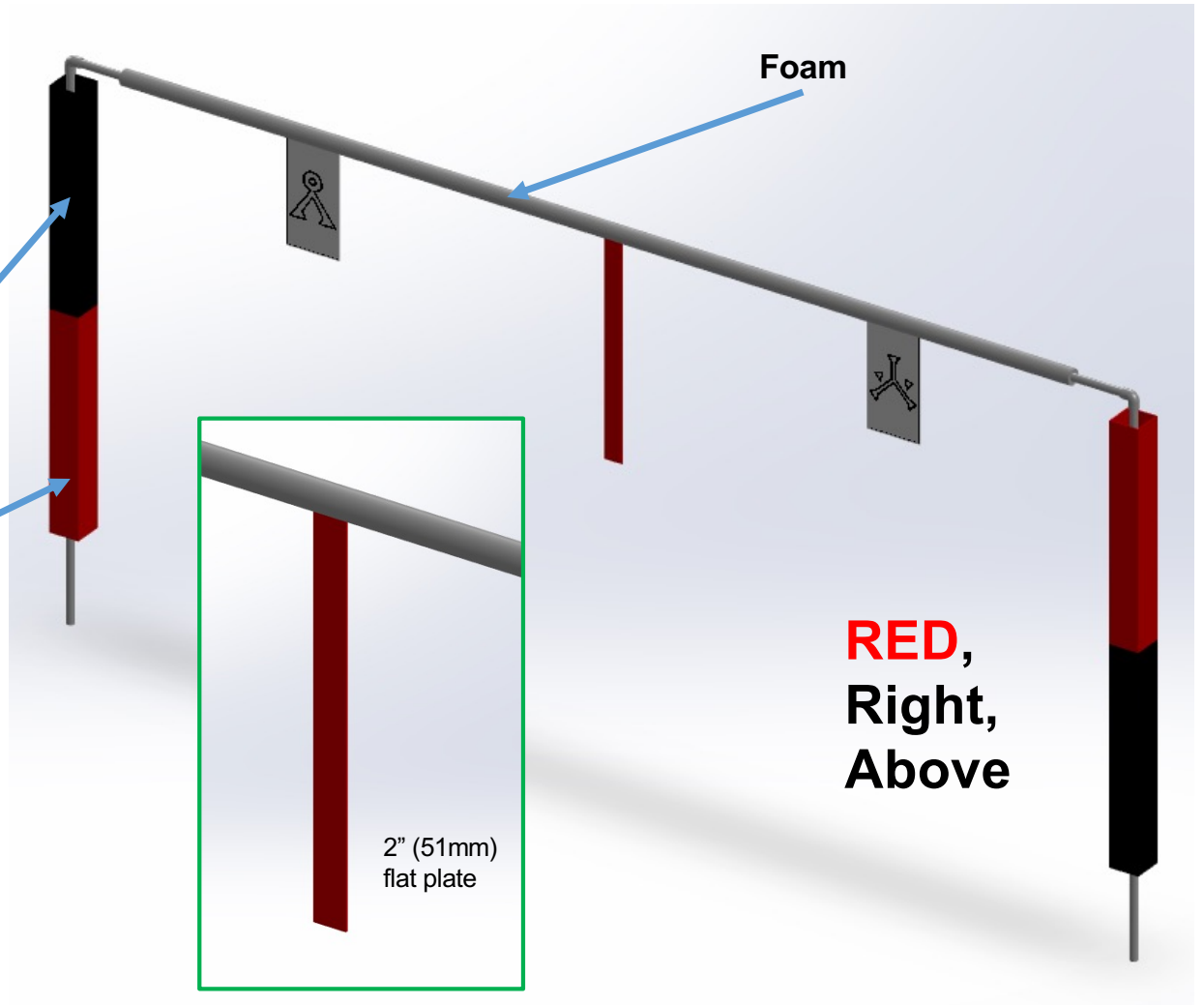
0.5" PVC Pipe

3" (76mm) box  
from black/red  
corrugated  
plastic sheets

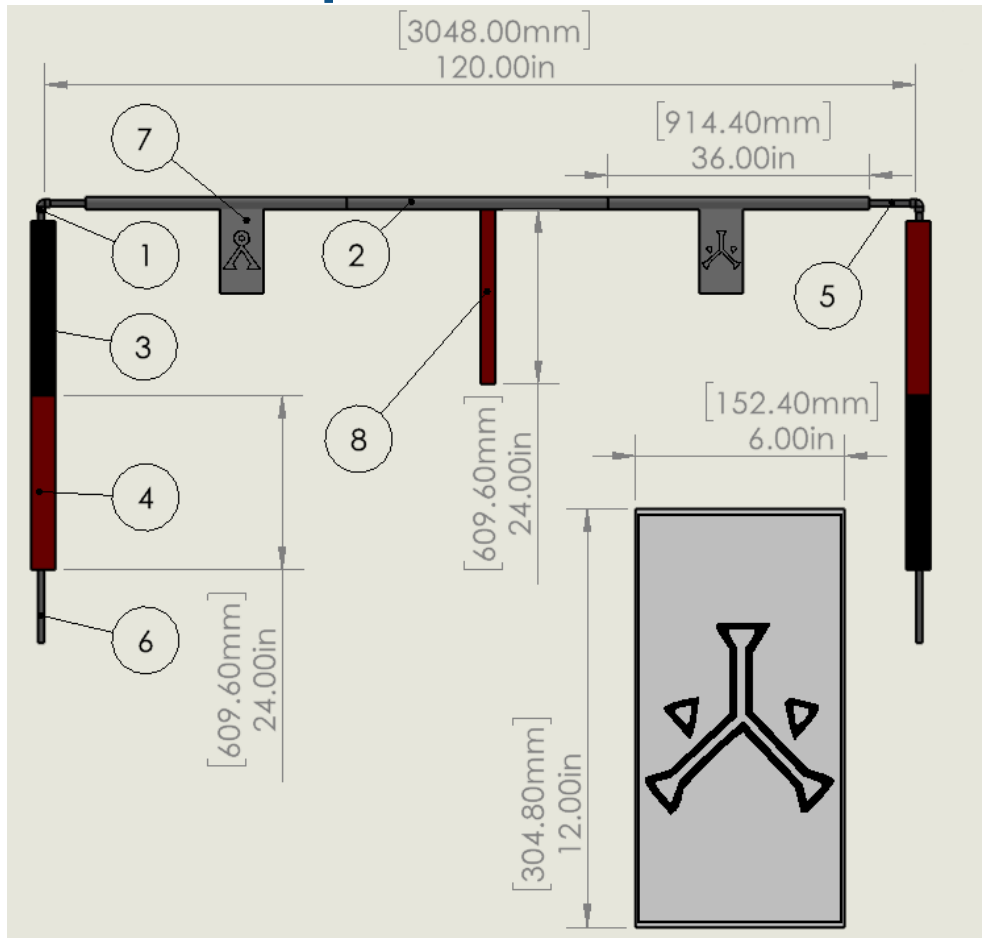
Foam

**RED,**  
Right,  
Above

2" (51mm)  
flat plate



## Destination | Gate



Choose your destination

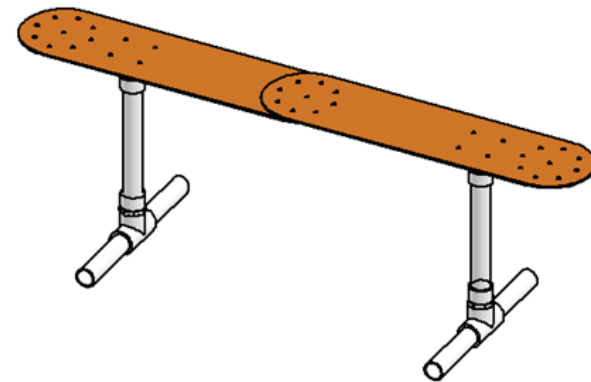
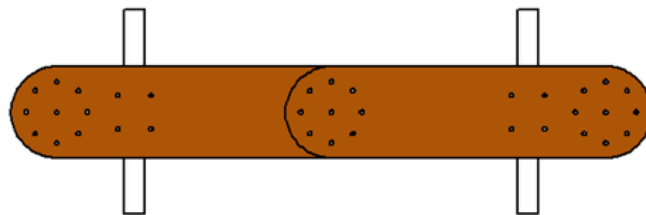
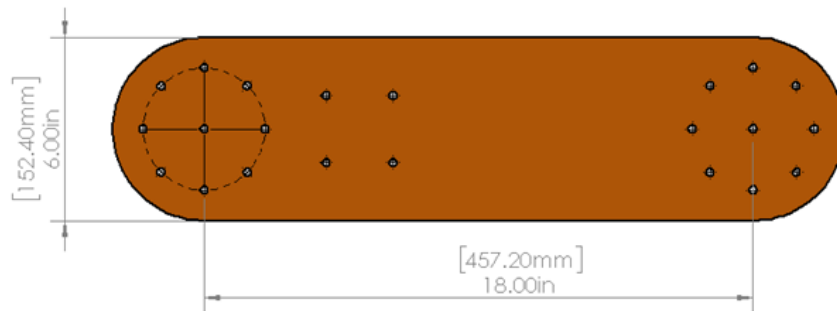
- Abydos
- Earth

Extra points for staying with your destination for the remainder of the tasks

- With Style

- 10 ft/3 m before/after gate
- Extra points
  - Every 90° change in orientation
    - Yaw: +100
    - Roll/Pitch: +200
  - Up to 800 points

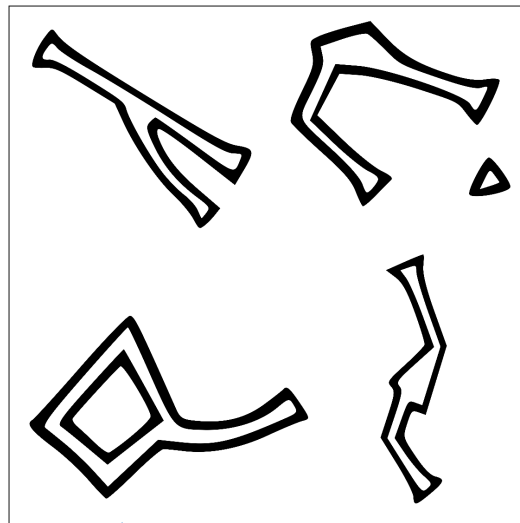
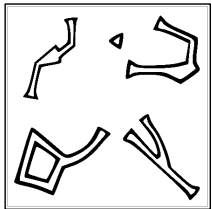
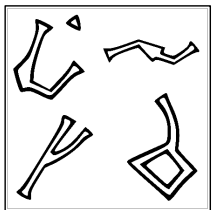
# Path





## Start Dialing | Buoy

- Buoy is two sided



2-4ft  
0.6-1.2m

Floor

Abydos

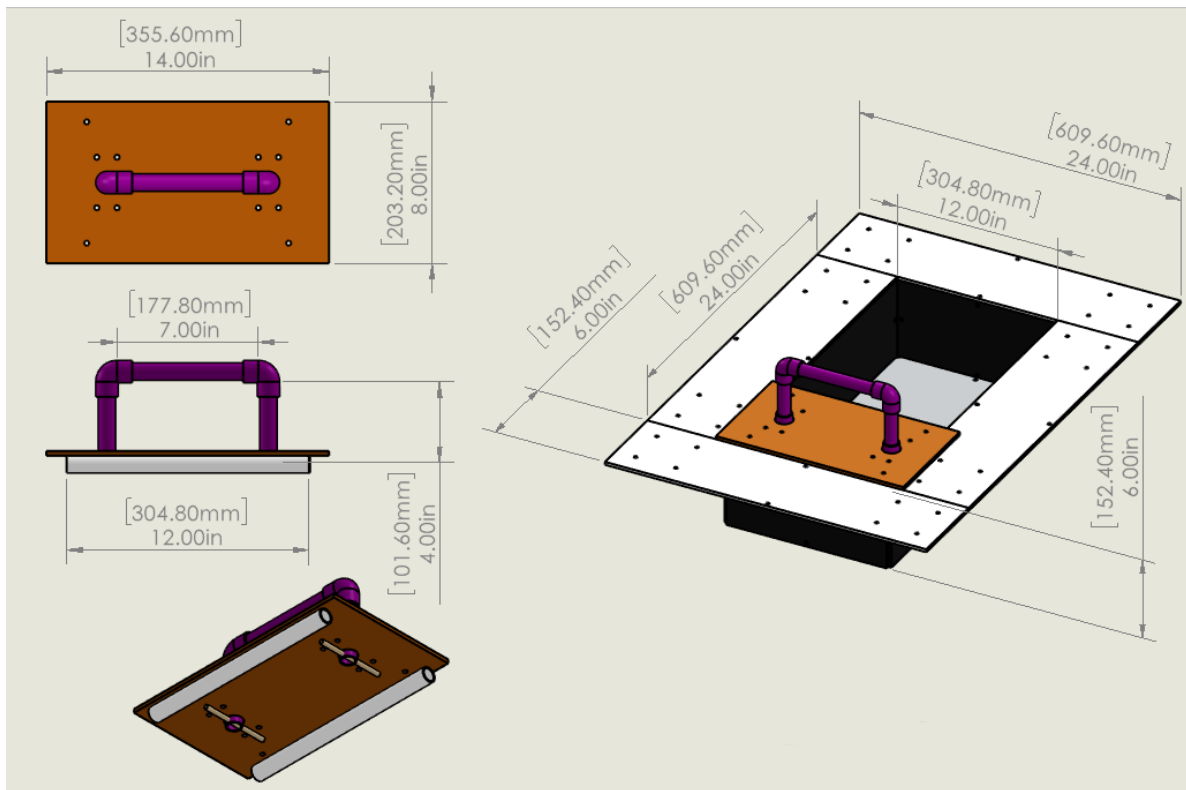


Earth



(drawing **not** to scale)

## Location | Bins



- 1/3 of each bin is covered
  - Lift off cover
- Place marker in correct bin for your destination
- Path points to this task

## Location | Bins



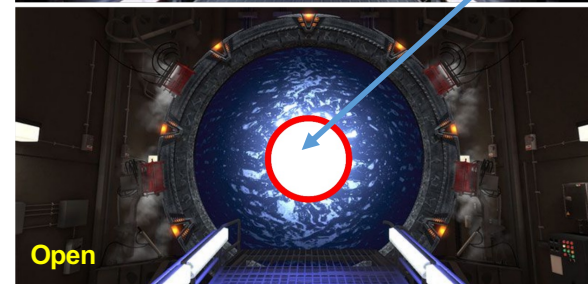
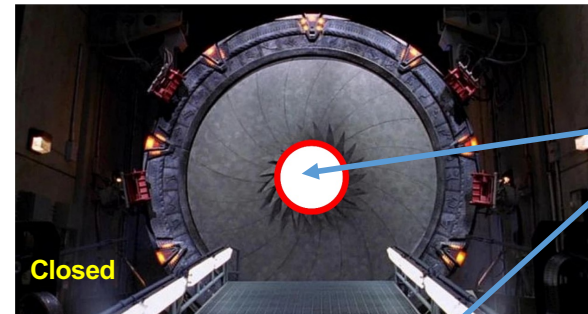
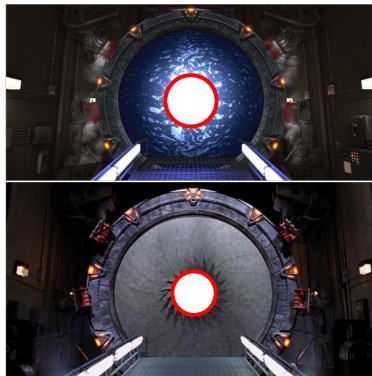
**Abydos**

**Earth**

- 1/3 of each bin is covered
  - Cover can be anywhere
  - Lift off cover
- Place marker in correct bin for your destination

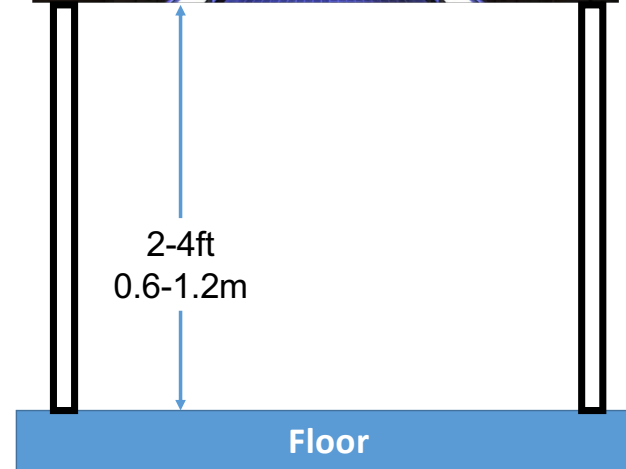
# Goa'uld Attack | Torpedoes

- The panel has two different openings
  - Close the Iris to stop the attack.
    - One torpedo through the open gate
    - One torpedo through the closed iris
- A pinger is used to find this task



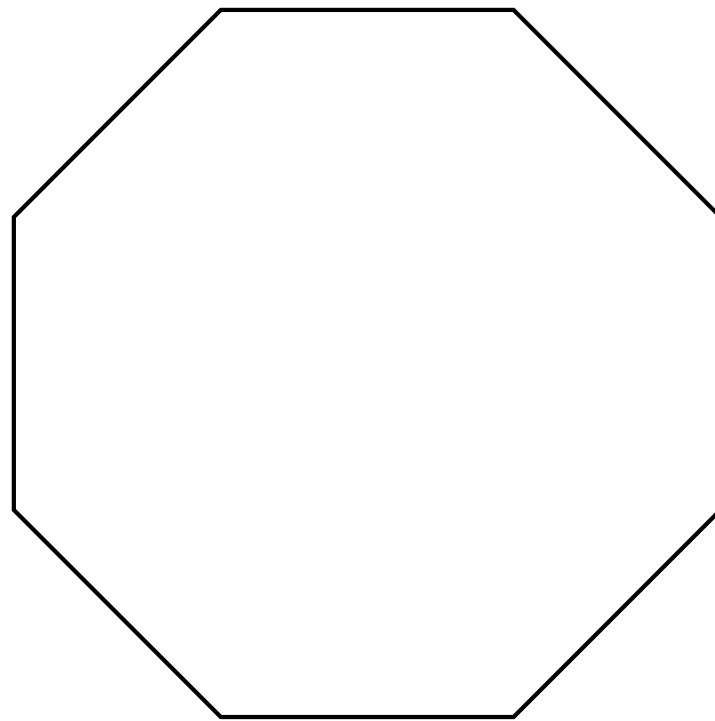
Border: 0.5" (1.3cm)  
Closed: 5" (13cm)  
Open: 6" (15cm)

Square: 4ft x 4ft  
(1.2m x 1.2m)



(Drawing **not** to scale)

## Engaging Chevrons | Octagon

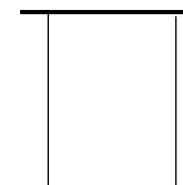


Octagon

- “Ring” floating on the surface
- 4 “chevrons” in the center of the Dial Home Device (DHD).
  - Use the 4 to finish the dialing sequence
- One Pinger located near the center of the octagon



DHD

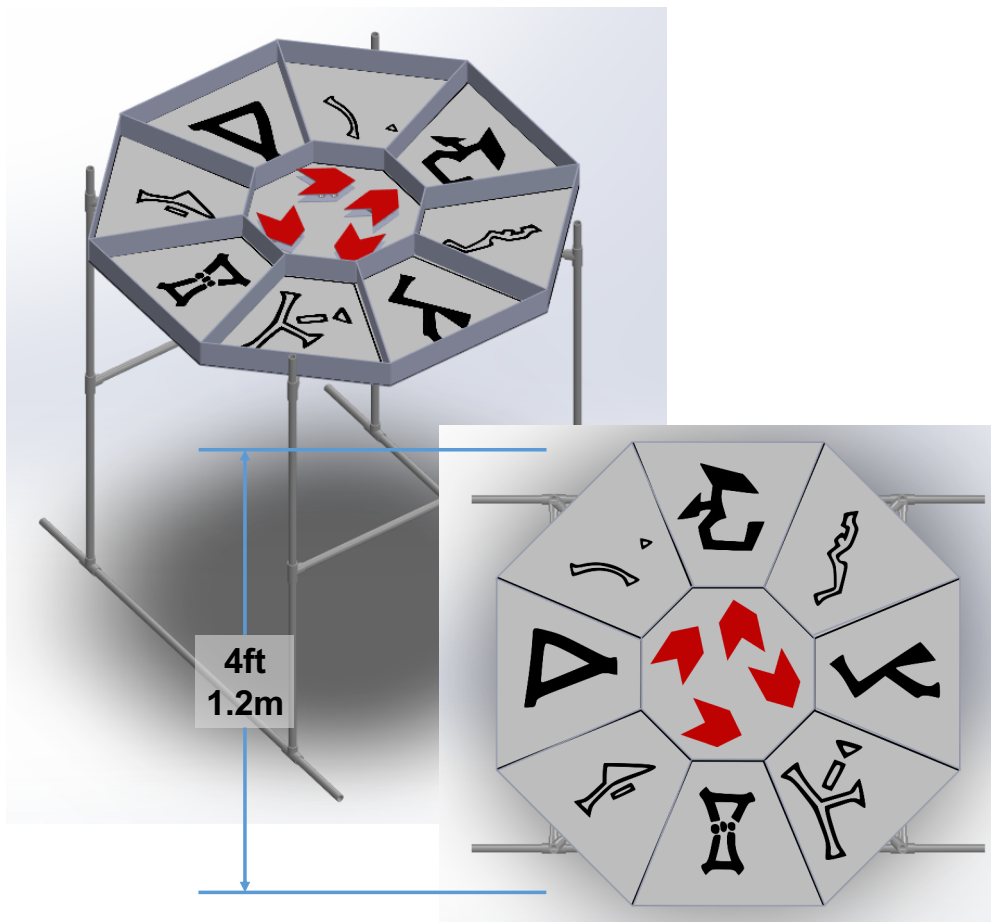


Floor

(drawing **not** to scale)



## DHD | Octagon

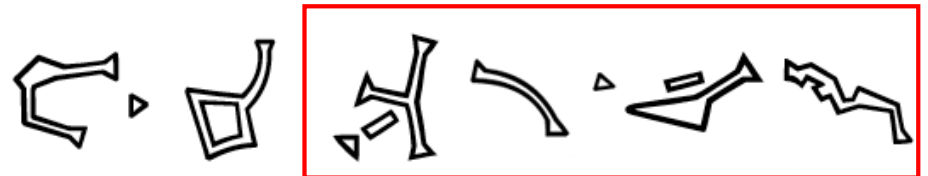


- 4 “chevrons” in the center.
- Place them in the correct bins to finish the sequence
  - Abydos
  - Earth

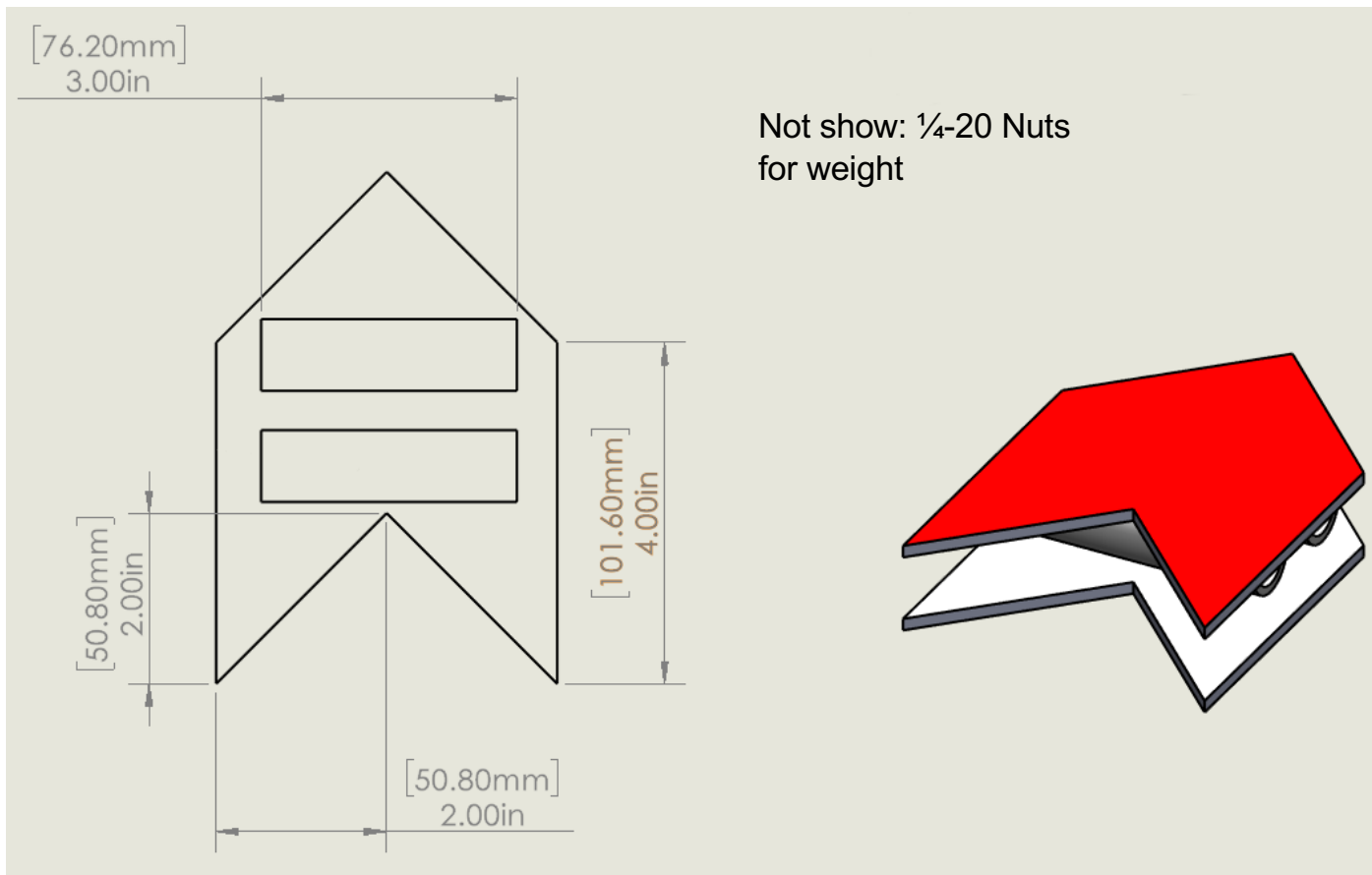
Abydos



Earth



# Chevrons



# Practice & Qualification

- Practice days: Tuesday, Wednesday, Thursday
  - Qualification
    - Each vehicle must autonomously pass through one of the gates (A,B,C,D)
      - This gets you two semi-final runs
      - Teams that have pre-qualified don't need to do this
  - Time Slots
    - 0700 to 1800 (7a to 6p, last run 1730)
    - 30mins in length (includes getting your vehicle in/out of the water)
      - The easier it is to hook up, the longer you have in the water
    - Sign up for any ONE time slot on site
      - You can sign up for another slot when your vehicle is lifted out of the water
    - Early morning time slot lottery
      - Meet at 0630, put your name in a hat. When your name is called, sign up for a time slot
      - Only need one team member



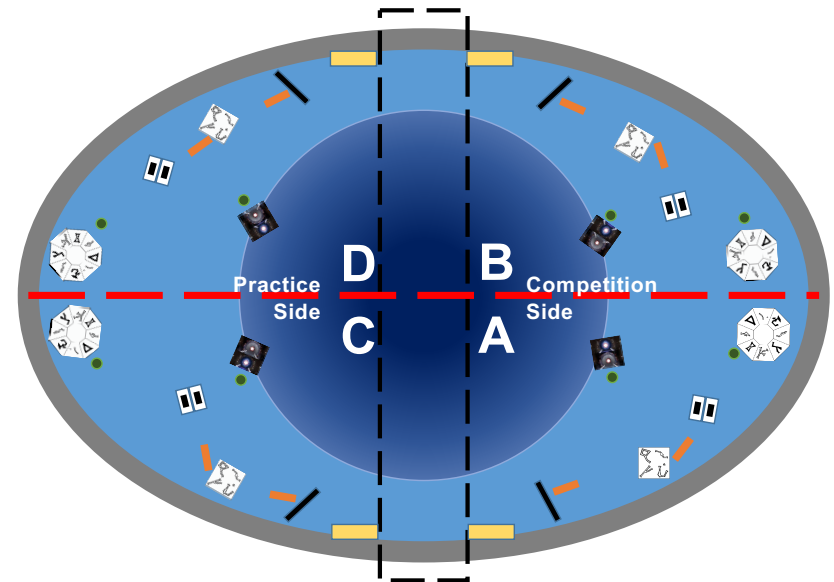
## Pre-Qualified!!!

- BRAC U
- Carnegie Mellon
- Cornell U
- École de technologie supérieur (2)
- Indian Institute of Technology Bombay
- National University of Singapore
- Si Se Puede Foundation
- THE OSU
- U Alberta
- U Michigan



## Semi-finals (Friday & Saturday)

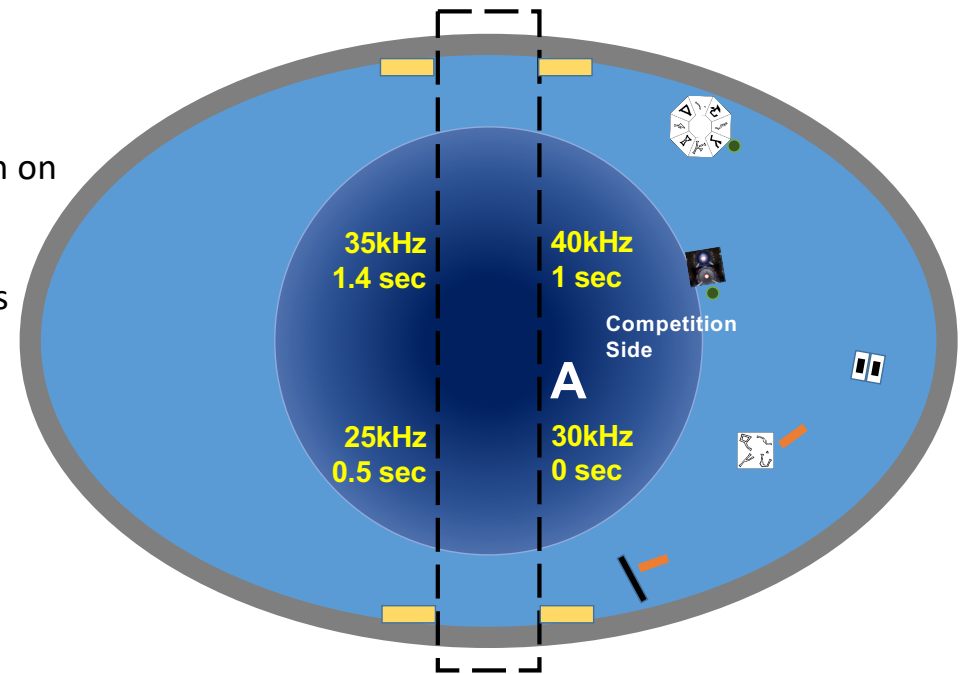
- Move course A & B around
  - Each team in the semi-finals will have one run on A, and one on B
- C & D still open for practice for everyone
- Wild cards
  - Teams that did not qualify during the practice days can still qualify for a semi-final run
    - Just do **everything** necessary to qualify, and you can sign up for a wild card slot for that day
    - You have to do it all over again on the second day for a second semi-final run
- Score: Last run
  - Stop the clock when retrieving the vehicle (modified for multi-vehicles in the water)
  - Best of the two runs





# Finals (Sunday)

- Combine A&B and streeeeeeech out the course
  - Teams in the finals will get a practice run on the course in the morning
    - Shift the course for the official finals
  - One Wild card
- Third Chance
  - Teams not in the finals will have an opportunity to run on the practice side for points
  - If the highest scoring team is above a given point threshold, they will get the wild-card slot for the finals
- Score: Best run
  - Free running clock





# Data Sharing

 [RoboSub.org/data-sharing](https://RoboSub.org/data-sharing)

## What is Data Sharing?



Centralized Repository



Community Driven



Competition  
focused

Vision  
Acoustics  
Mechanical Designs  
Electrical Designs



DATA FOR ALL  
TEAMS



LARGE DOMAIN  
OF DATASETS



BETTER PLATFORM  
FOR NEW TEAMS



**ROBOSUB  
2023**

**Stay in Touch**



[RoboSub.org/2023](https://RoboSub.org/2023)

# RoboSub 2023 Discord



**Discord**

Replacing BAND and  
Forum. All on-site  
communications will be  
posted on Discord.

## **JOIN TODAY!**

- Scan the QR Code
- Select the RoboSub23 role
- Turn on notifications





**ROBOSUB  
2023**

**Are You Ready?**



[RoboSub.org/2023](https://RoboSub.org/2023)

## Have you:

- ☐ Reviewed Version 2 of the Handbook?
- ☐ Tested your AUV in water?
- ☐ Secured your Outbound Shipping arrangements?
- ☐ Prepared your Design Presentation?
- ☐ Started your packing lists?
- ☐ Turned on your Discord notifications?





**ROBOSUB  
2023**



[RoboSub.org/2023](https://RoboSub.org/2023)

# GOT QUESTIONS?







# robonation



seaperch



seaglide



gosense



roboboat



robosub



robotx



RoboNation is a 501c3 nonprofit organization whose mission is to provide a pathway of hands-on educational experiences that empower students to find innovative solutions to global challenges. Working together with the industry, research and educators, we have grown to include over nine student competitions and programs and engage more than 250,000 students per year.

For more information contact [autonomy@robonation.org](mailto:autonomy@robonation.org)