

## Navigational Course (*Robot Operation*)

**DESCRIPTION:** Team Driving involving a team of two or more members with the whole team only seeing the field through multiple TV monitors in order to pick up and deliver robotic parts for assembly, maintenance, and activation of a robot patient. The team will consist of two robots on the mat at the same time. The robots may work together or separately on the tasks. Size of the field will be approximately 16' X 12'. All Robots will need to fit inside a box 18" X 18" X 18" at the time the game begins.

### Rules

1. Participants will have 5 minutes to complete the course. All team members may have hands on time in controlling the bots.
2. No team members will be able to directly see the driving course, but they will view the course from video camera feeds to TV monitors. No additional video feeds will be allowed.
3. The bots must navigate to each location and complete designated tasks.
4. Each completed task receives points as specified below.

**YOUR MISSION:** An emergency call has come out and you must quickly operate on Durango, a new robot being prepared for a special mission. To avoid possible contamination, all work done on Durango must occur in a clean lab with two surgery bots completing the tasks while being controlled by you through a video interface. You will only be able to see their work on a television monitor.

Appendage Delivery (40 points possible) - Four appendages, 2 hands and 2 feet must be delivered and attached to the correct spot on Durango. At the beginning of the game, two appendages will be on the upper left corner of the board and the other two on the upper right. The correct placement will be on the opposite side of Durango. Around Durango's belt line will be two teeter-totters to traverse across from one side of Durango to the other. Using the teeter-totters is not required but will gain the competitor additional points.

### Scoring:

1. Successfully transporting an appendage across a teeter-totter: 5 points (max. 20 points, 5 per appendage)
2. Delivery of appendage to correct zone within circle: 5 points (max. 20 points)

Power Delivery (45 points possible) - Durango runs off of nuclear power and needs to have fuel rods inserted into his reactors. 3 Fuel Rods will initially be located in the lower right corner of the board. Surgery bots must retrieve the rods, travel to the reactor portion in Durango's head, drive up a ramp and drop the fuel rods into the reactor core.

### Scoring:

1. Dropping of rod into the **Large Reactor Hole**: 10 points per rod
2. Dropping of rod in to **Small Reactor Hole**: 15 points per rod

Battery Replacement (60 points) - In addition to nuclear power Durango also has a battery which must be replaced. The old battery is located in the chest cavity of Durango with a cover holding it in place. The new battery is in the holding area located in the lower left corner of the board. Surgery bots must work together to replace the old battery by lifting the cover off of the old battery, removing it, and moving the new battery into

place. The cover is lifted by pushing a piece of PVC pipe in one direction and then back in the other direction to put the cover back in place. The old battery must then be returned to the holding area in the lower left corner of the field for recycling.

**Scoring:**

1. New battery in place with cover correctly over it: 30 points.
2. Old battery delivered to holding area for recycling: 30 points.

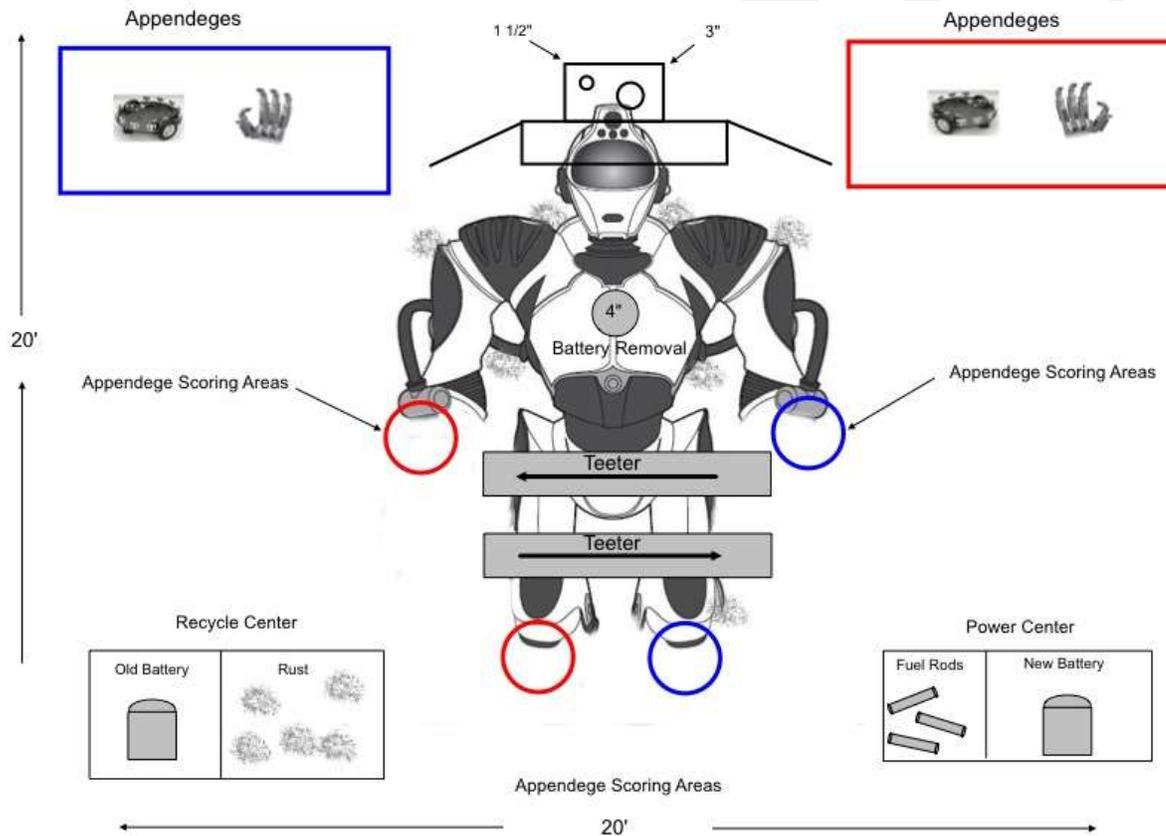
NOTE: Points can only be gained for recycling the old battery if the new battery has been successfully put in place.

Rust Removal (32 points possible)

Since Durango is made of metal he is prone to rust. While removing rust from Durango is not required for his special mission; it's never a bad time to keep him looking good and rust free. Surgery bots may collect rust that has fallen off of Durango and deliver them to the rust holding area in the lower left portion of the field.

**Scoring:**

1. Each piece of rust delivered to the holding area: 2 points (maximum 32 points)



**Please note:** Robots cannot have in use any modification that can damage equipment, other robots, and/or the playing field.

Judges rules are final and not subject to review.

**Robot Operation Scoring Sheet Team: \_\_\_\_\_**

**Appendage delivery**

	Traversed over teeter-totter?		In place at end of time?		Total points (Add up each row)
<b>Right Hand</b>	5	0	5	0	
<b>Left Hand</b>	5	0	5	0	
<b>Right Foot</b>	5	0	5	0	
<b>Left Foot</b>	5	0	5	0	
			<b>Total for Appendage Delivery (max 40)</b>		

**Power Delivery**

Number of rods in small hole	0	1	2	3	x 10	
Number of rods in large hole	0	1	2	3	x 15	
	<b>Total points for Power Delivery (max 45)</b>					

**Battery Replacement**

New Battery in place with cover lowered on it	0	30
Old Battery located in recycling area at end of time	0	30
<b>Total points for Replacement (max 60)</b>		

**Rust Cleanup**

	Number of rust pieces delivered to holding area
	_____ x 2 =
<b>Total points for Rust Cleanup (max 32)</b>	

**Final Score: \_\_\_\_\_ (max 177)**