Maneuvering and Mobility Tests

Ground Robots

Version 2021A

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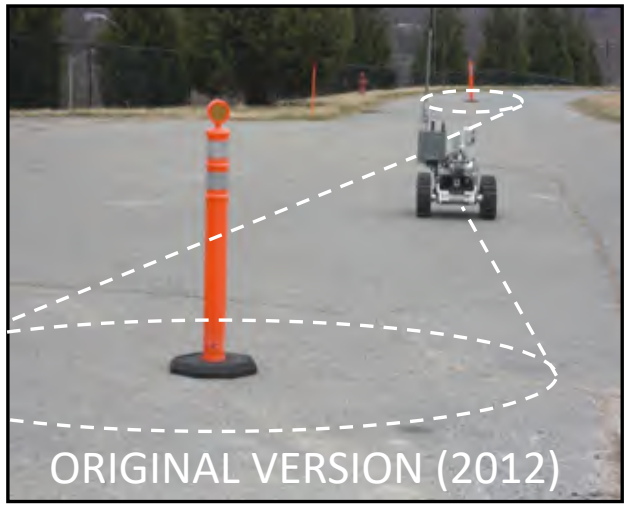
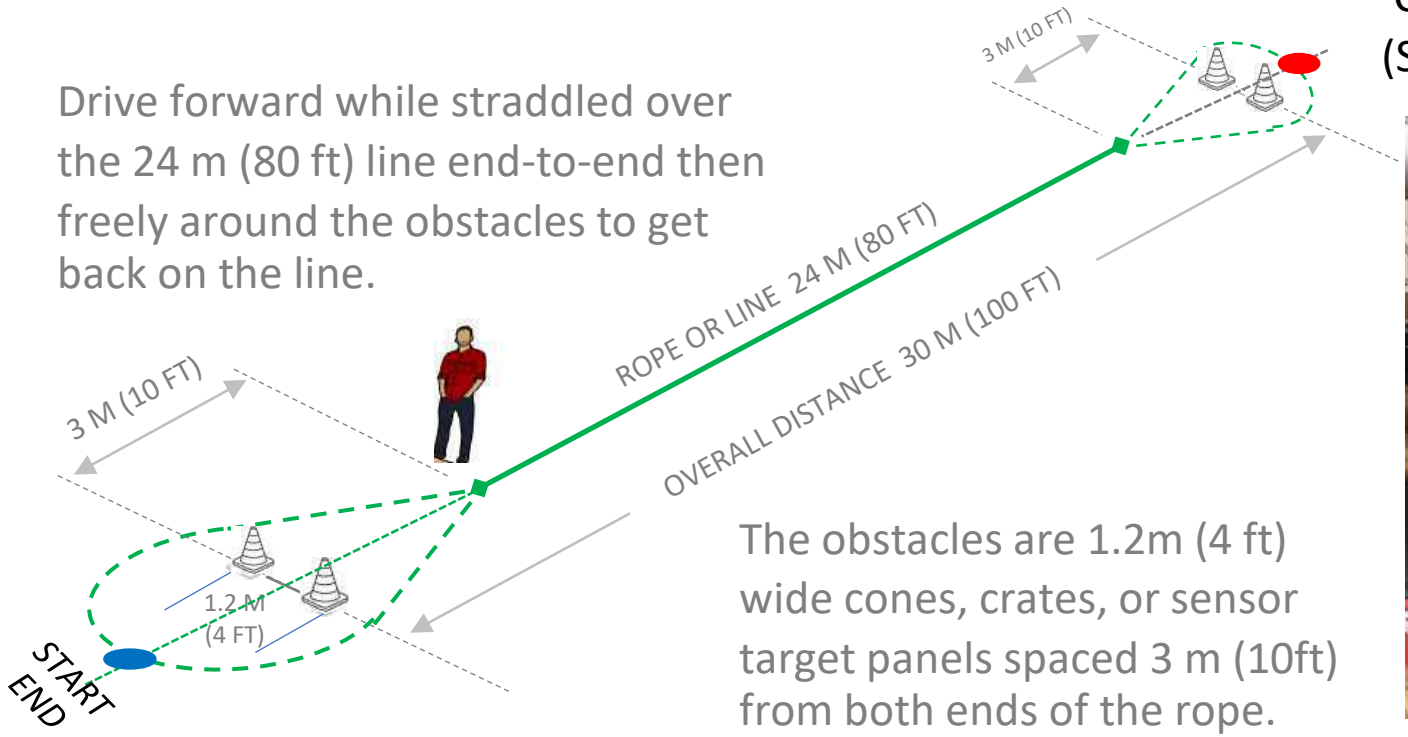
Maneuvering: Sustain Speed (Forward Only)

ASTM E2829



Drive forward while straddled over the 24 m (80 ft) line end-to-end then freely around the obstacles to get back on the line.

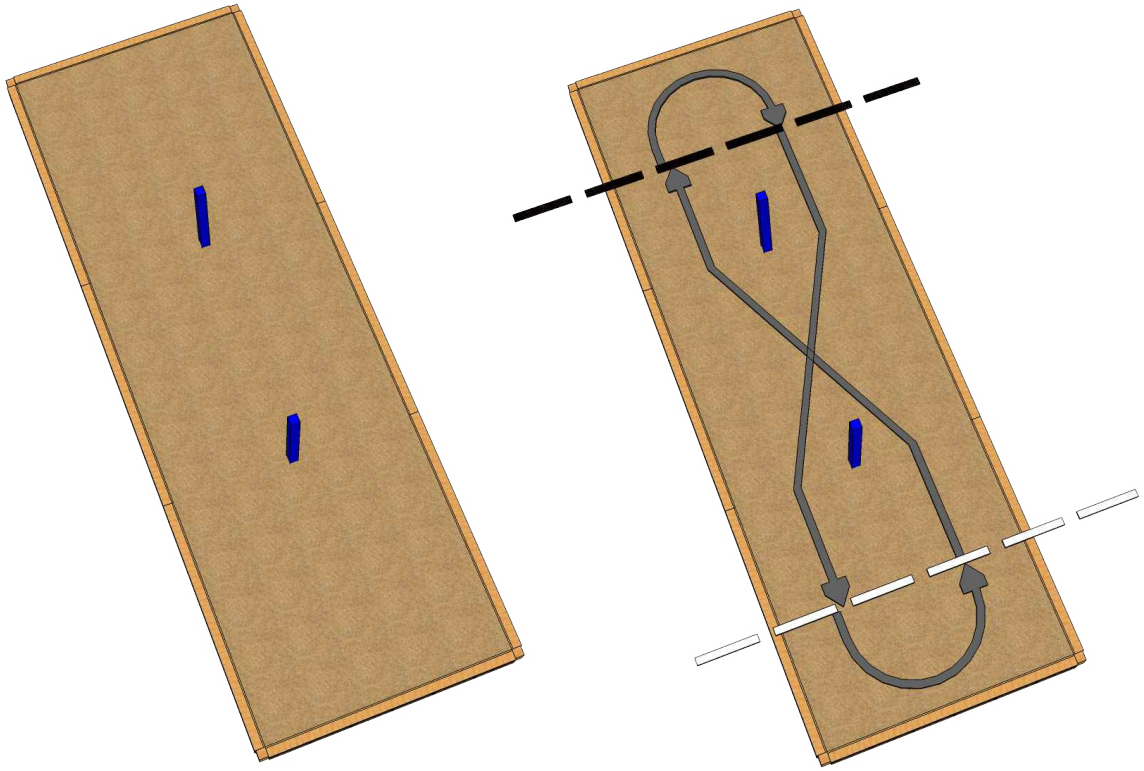


The obstacles are 1.2m (4 ft) wide cones, crates, or sensor target panels spaced 3 m (10ft) from both ends of the rope.

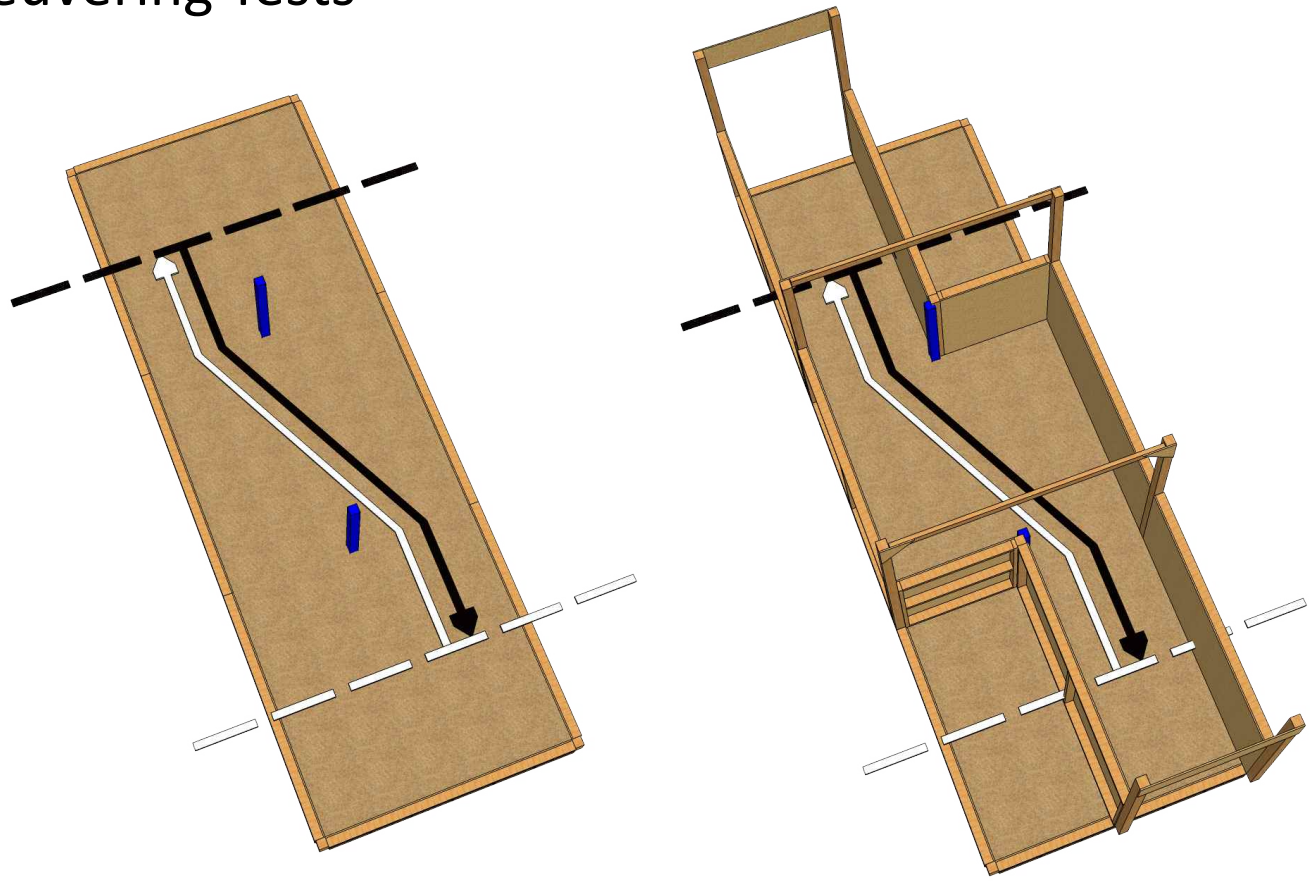
CARRY CRATE WEIGHT
(Some Visual Blockage)

Options for Robot Paths

Maneuvering Tests



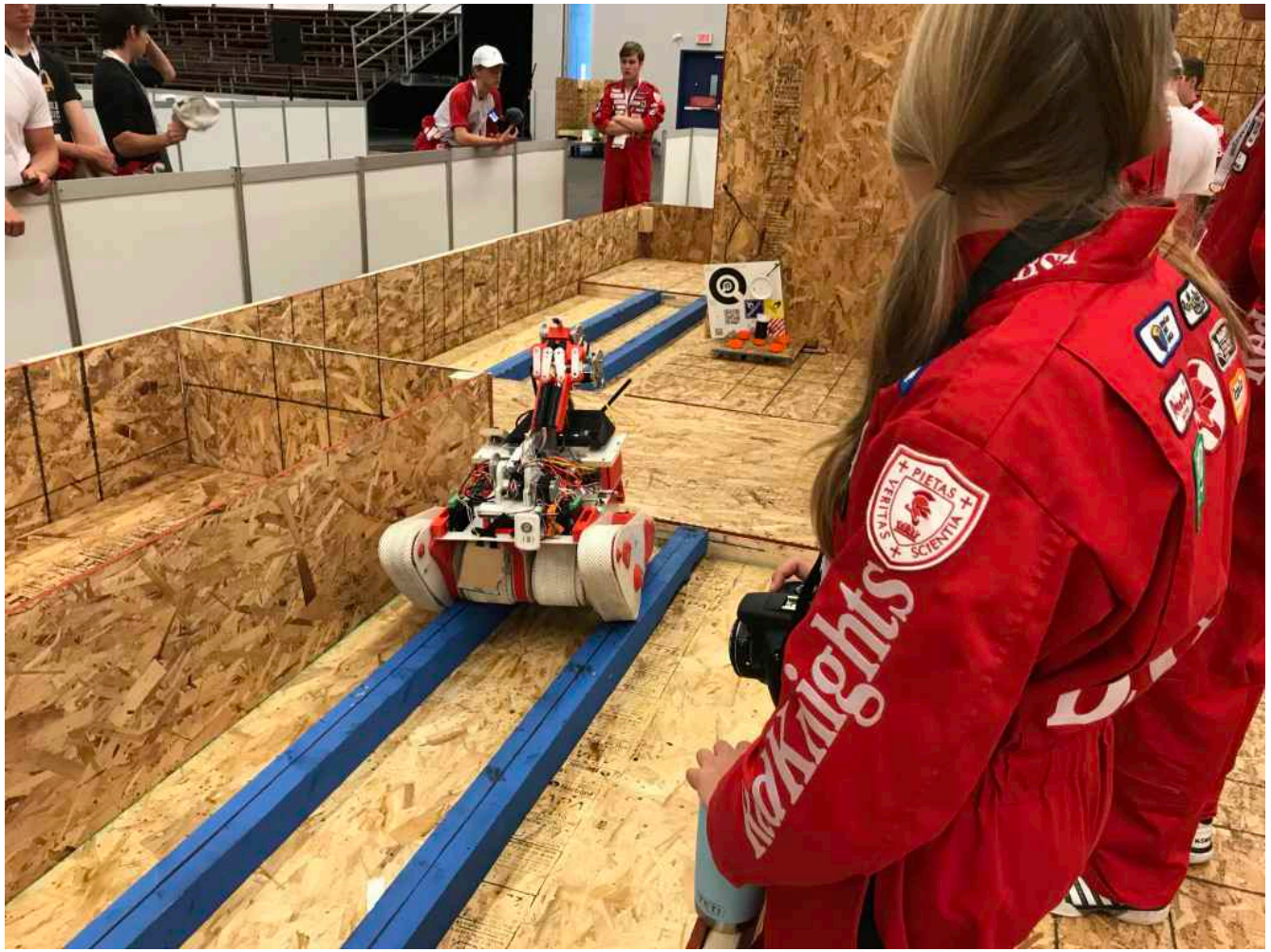
FLAT FIGURE-8 PATH
CONTINUOUS DOWNRANGE
(2012)



ZIG-ZAG PATH
FORWARD and REVERSE
(2019)

Maneuvering: Align Ground Contacts (Forward/Reverse)

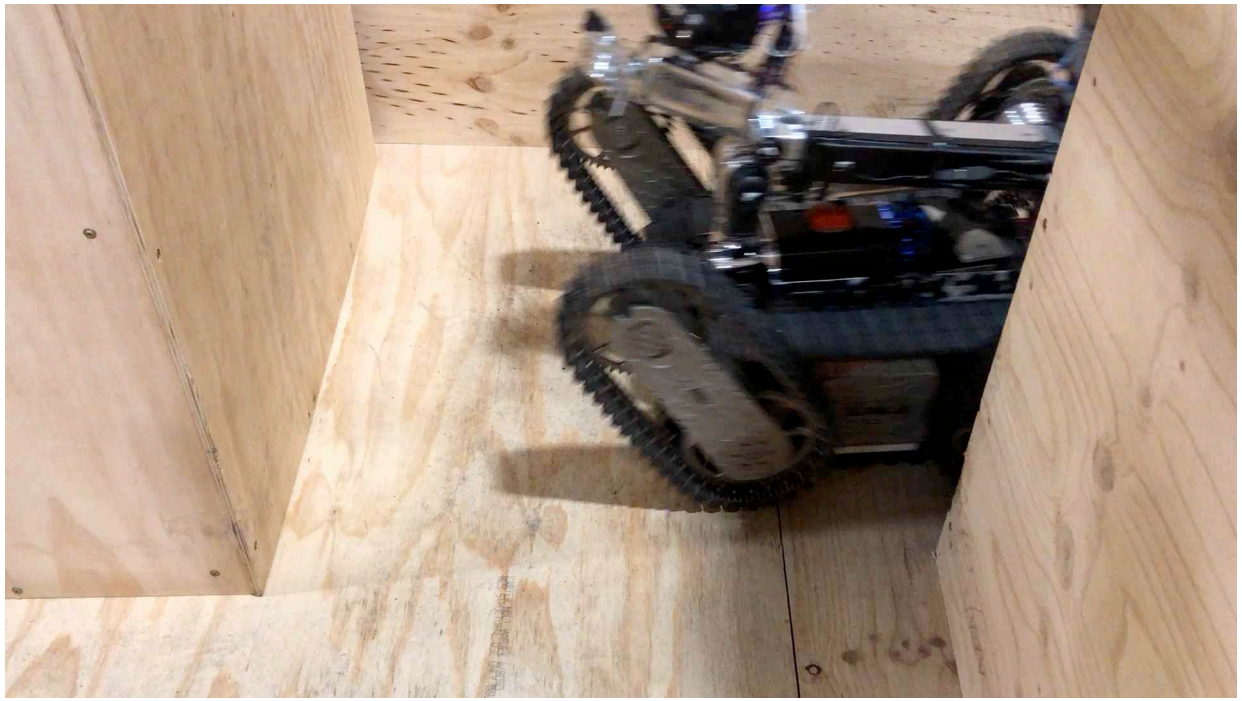
ASTM WK53649



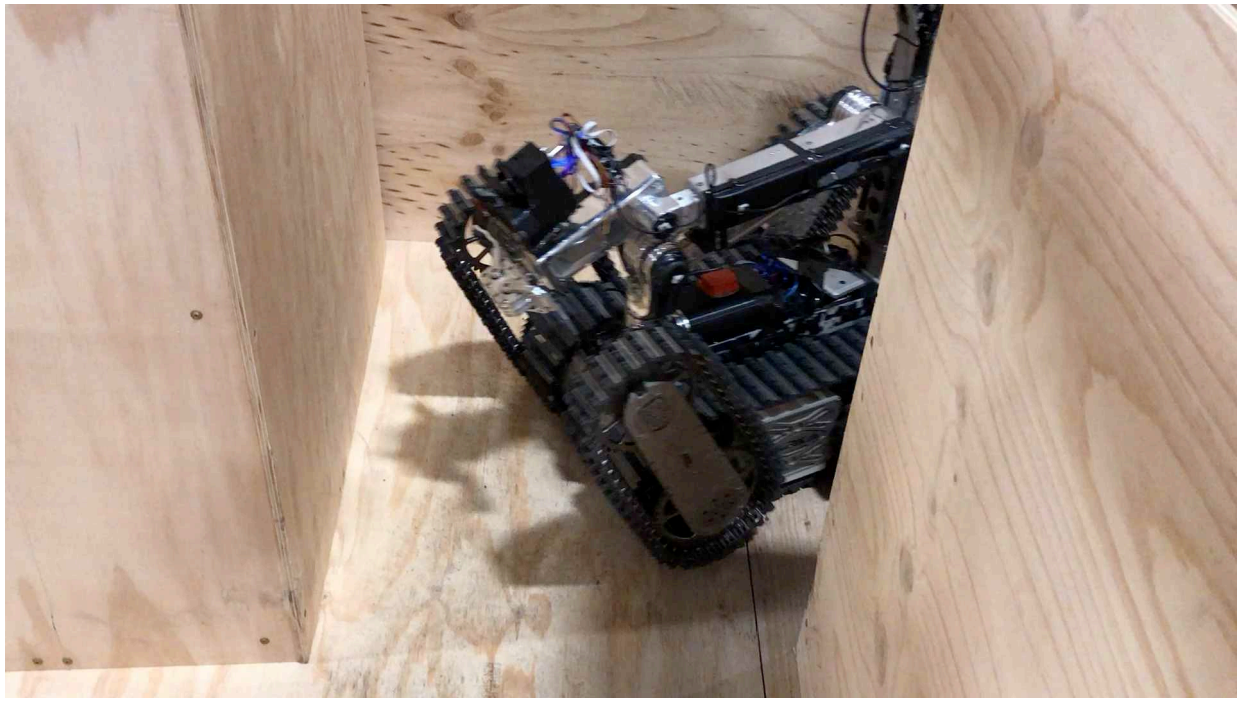
Maneuvering: Center Through Turns (Forward/Reverse)

ASTM WK_____

SPACE = ROBOT DIAGONAL
(GROUND PROJECTION)

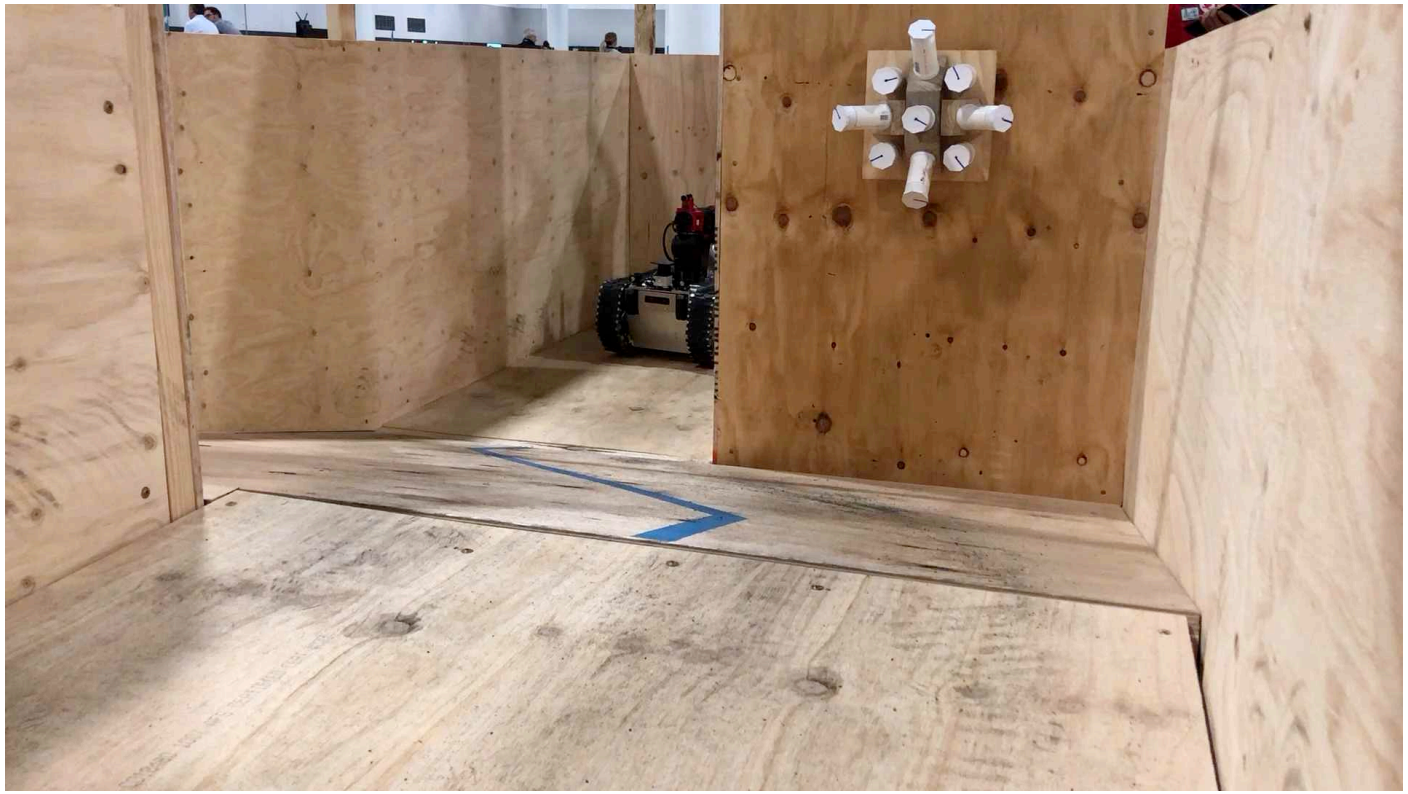


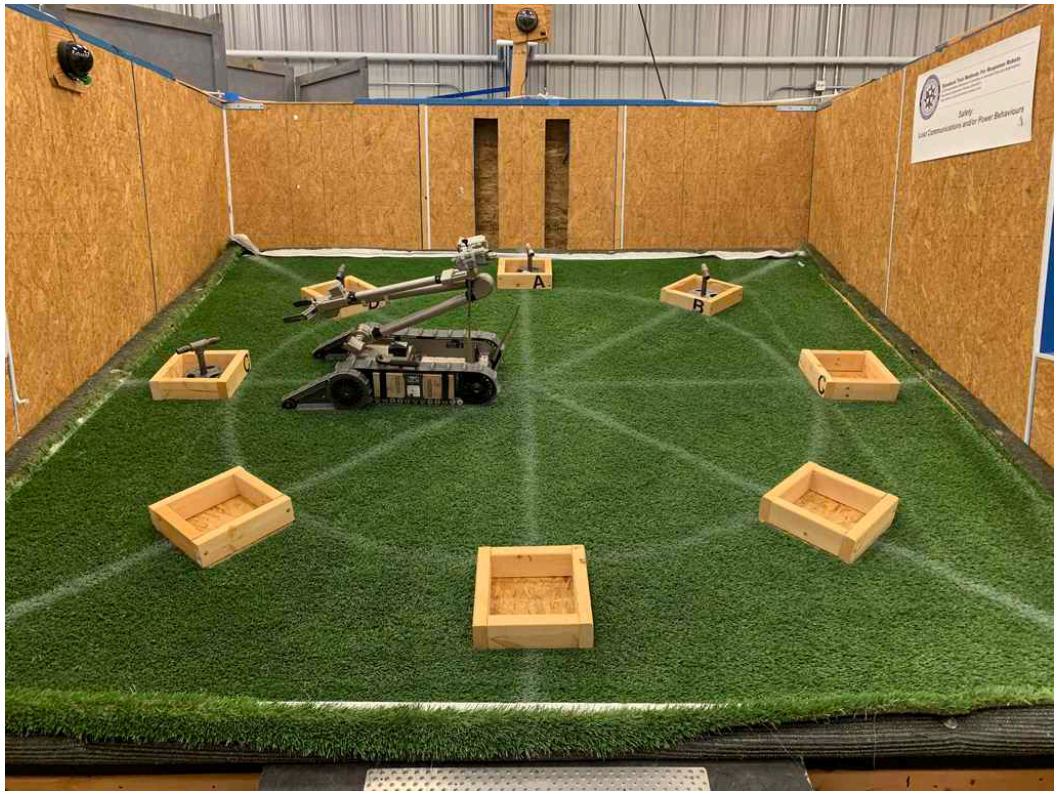
SPACE = 120% ROBOT WIDTH
(ENCOURAGING AUTONOMY)



Maneuvering: Traverse Inclines (Forward/Reverse)

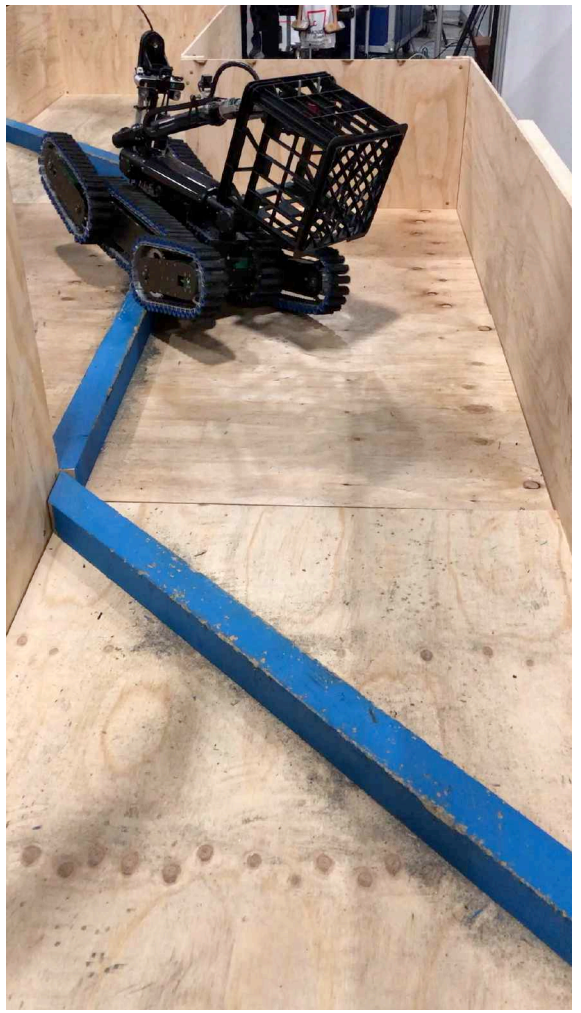
ASTM E2803





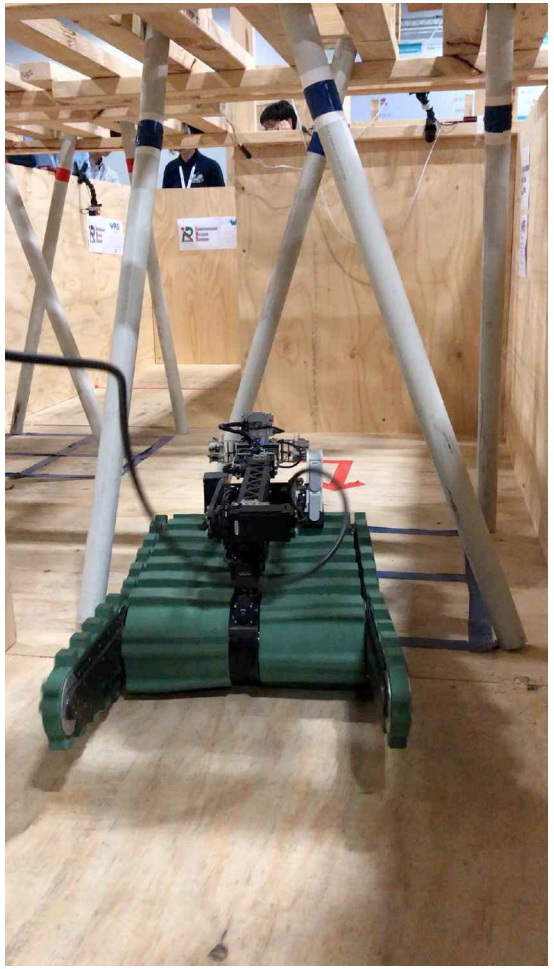
Maneuvering: Diagonal Curbs (Forward/Reverse)

ASTM WK54291



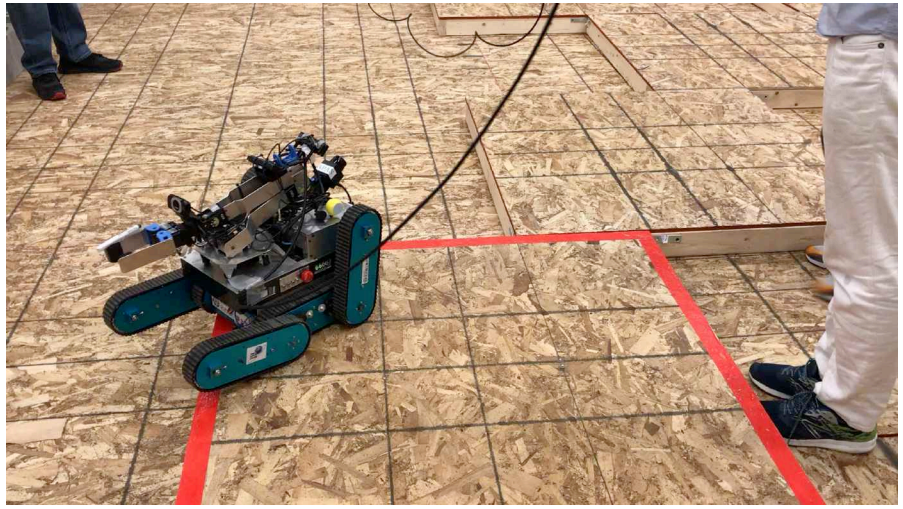
Maneuvering: Negotiate Leaning Obstacles (Forward/Reverse)

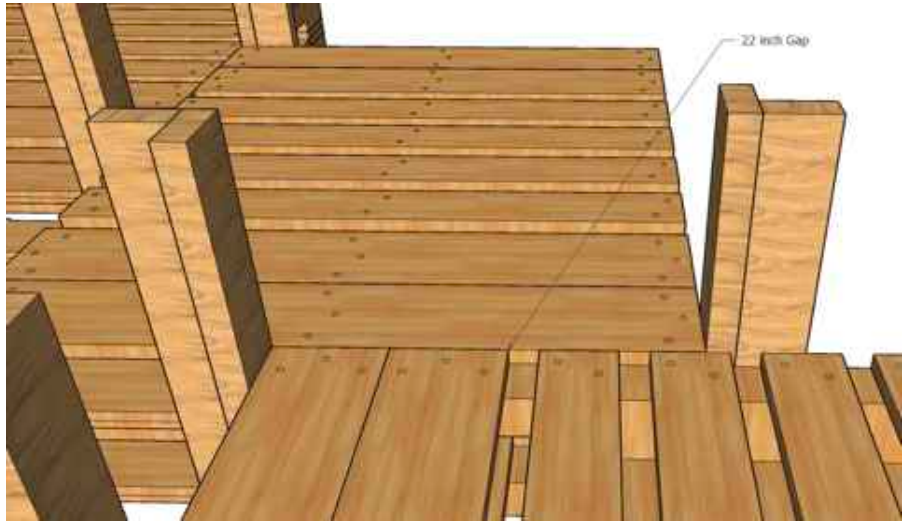
ASTM WK _____

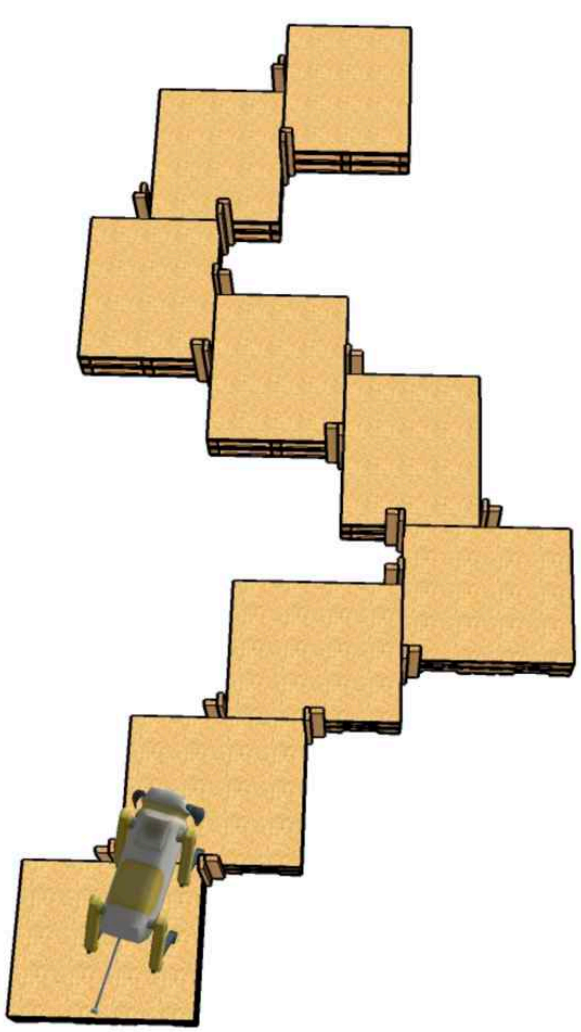


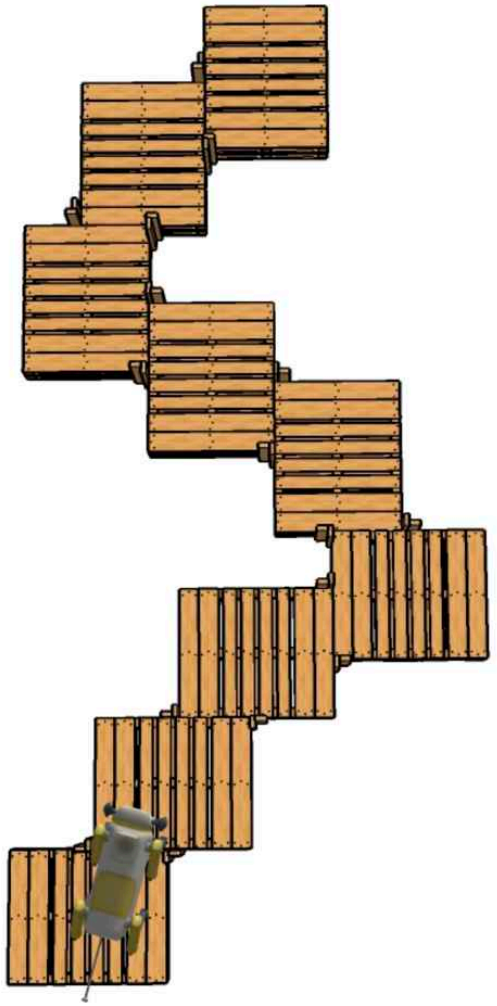
Maneuvering: Avoid Positive & Negative Obstacles (Autonomous)

ASTM WK_____







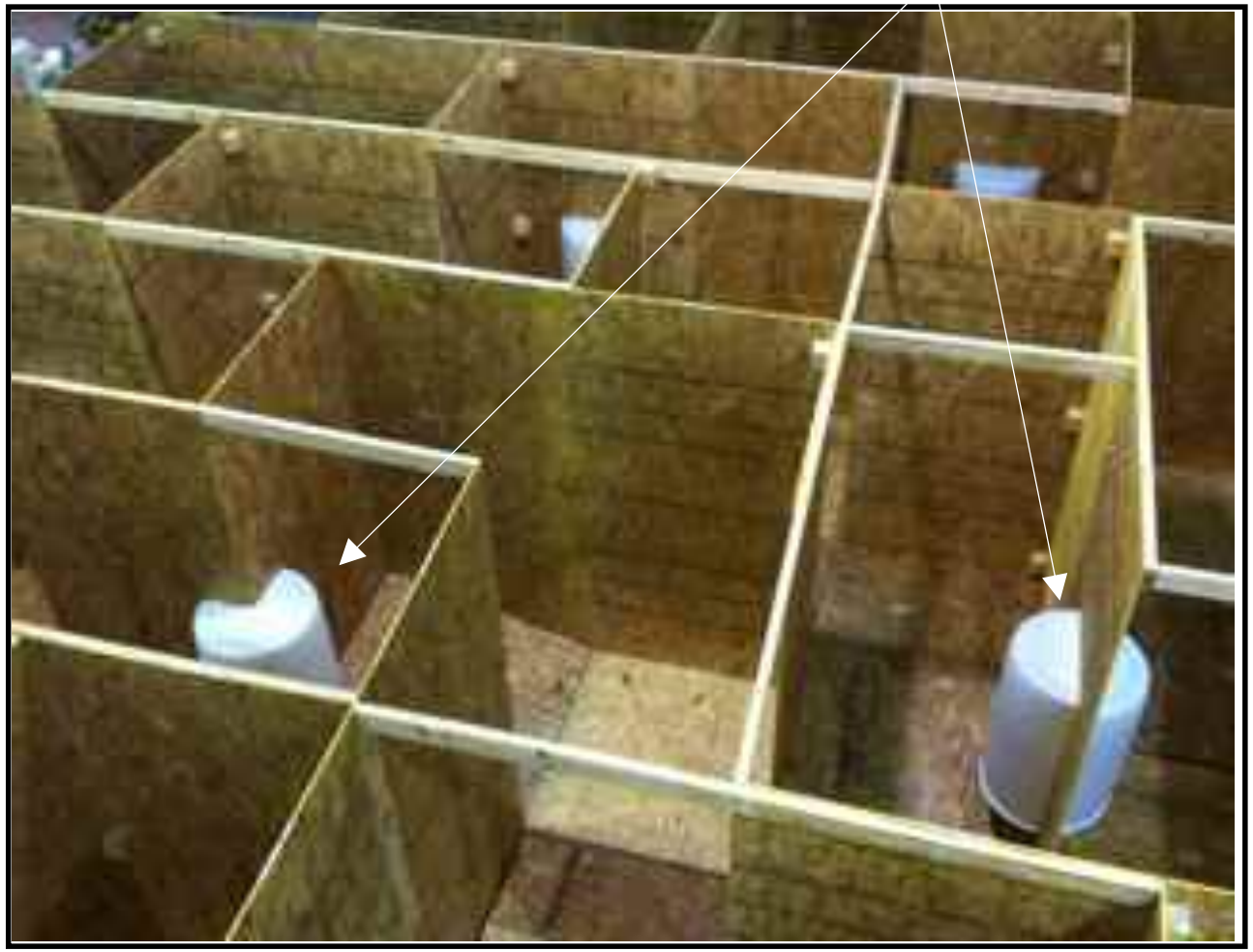


Maneuvering/HIS: Search Labyrinth/Maze

ASTM E2853

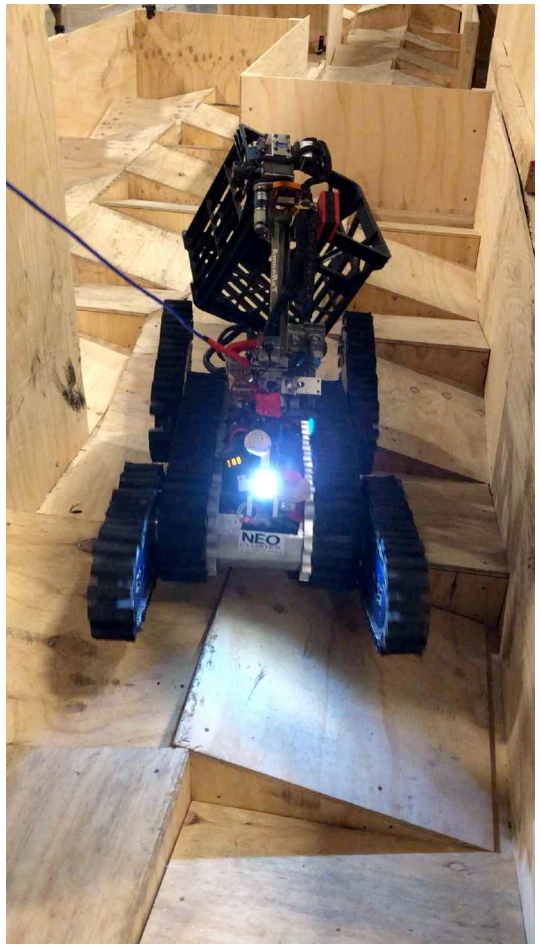
Mapping Fiducials (Half Barrels)

Mapping Fiducials (Half Barrels)



Mobility: Continuous or Crossing Pitch/Roll Ramp Terrain

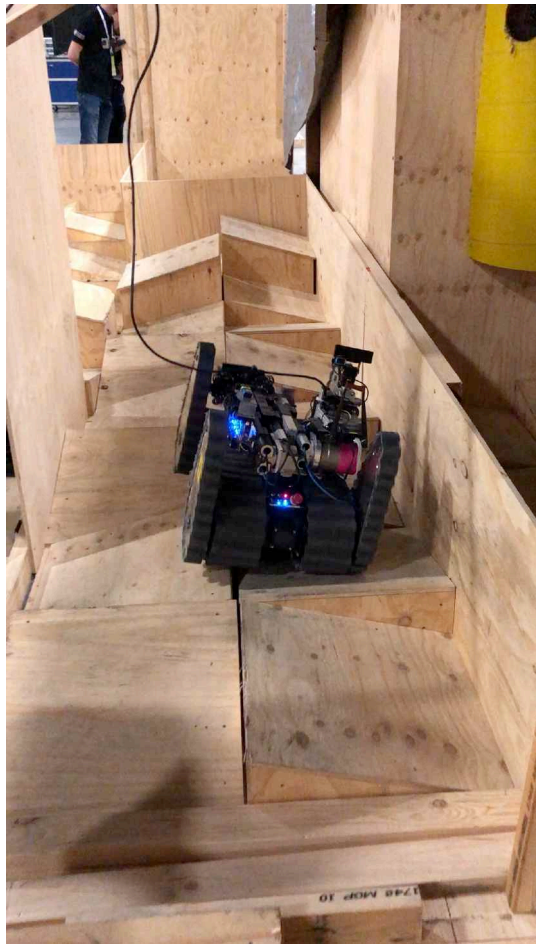
ASTM E2826 or ASTM E2627



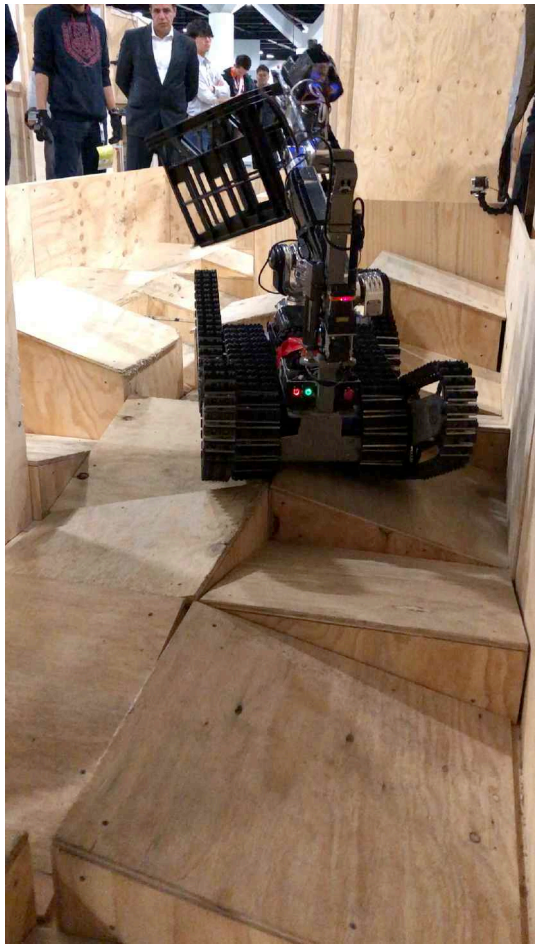
Mobility: Elevated Crossing Ramp Terrain

ASTM WK_____

MOBILITY CONFIGURATION



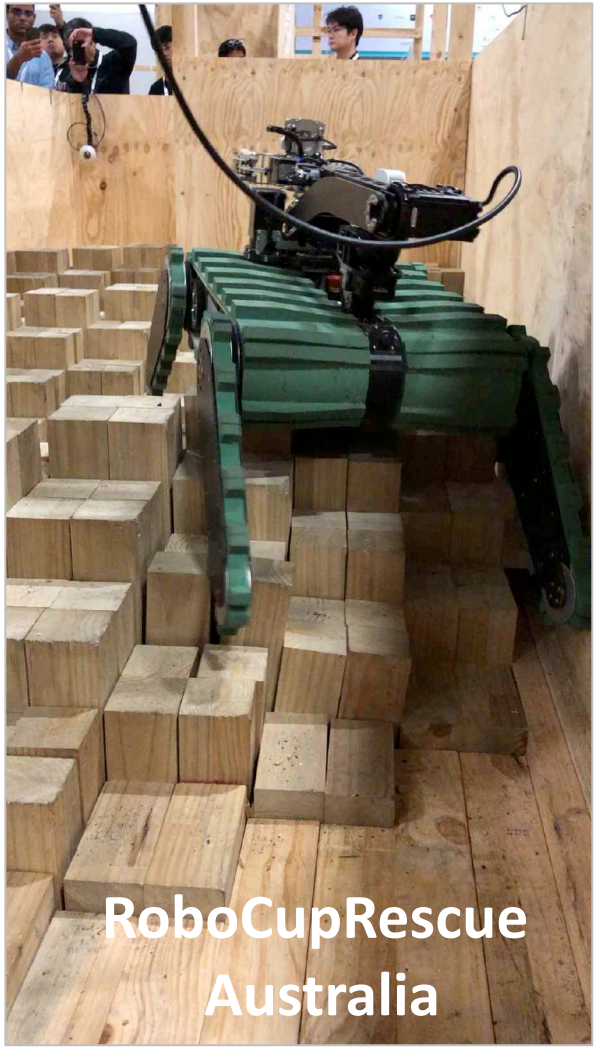
CARRYING WEIGHTED CRATE



Mobility: Symmetric Stepfield Terrain

ASTM E2828

ORIGINAL CONTINUOUS FIGURE-8 PATH



REVISED FORWARD/REVERSE ZIGZAG PATH

Mobility: New Crate Terrains (for Legged Robots)

ASTM WK_____

Originally designed for the DARPA Robotics Challenge for Disaster Response (2012-2015). But the Robots were too big and heavy, so we used cinder blocks.

These pop-up terrains are easy to purchase, set up, and stow. Very reconfigurable.

Diagonal Hill – Solid Surfaces
(all crate stacks upside-down)

Pyramid Hill – Checkered Surfaces
(every other crate stack upside-down)

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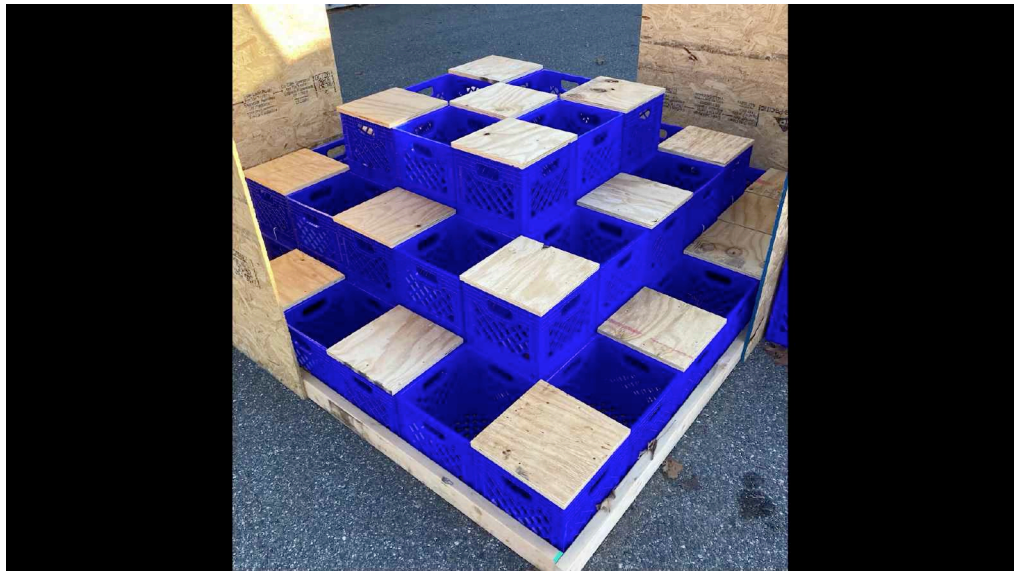
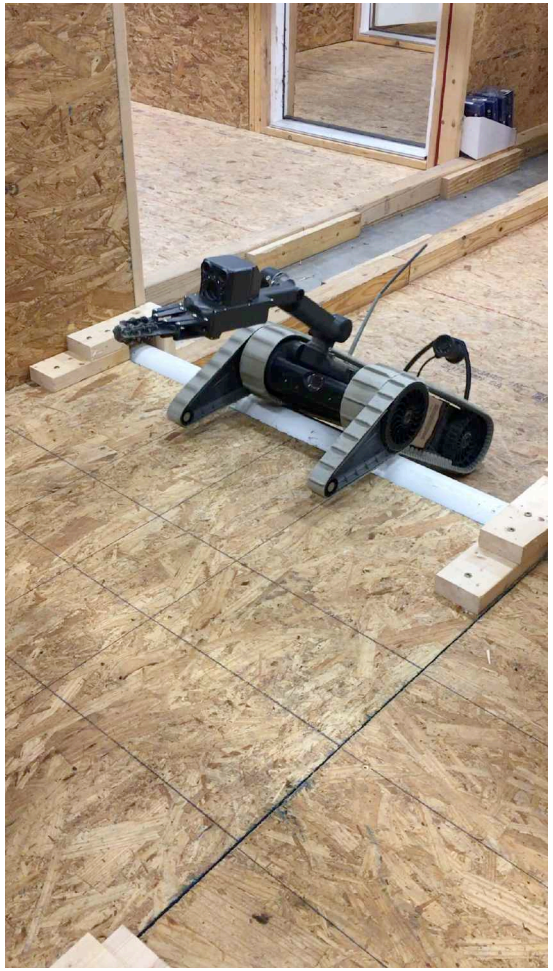
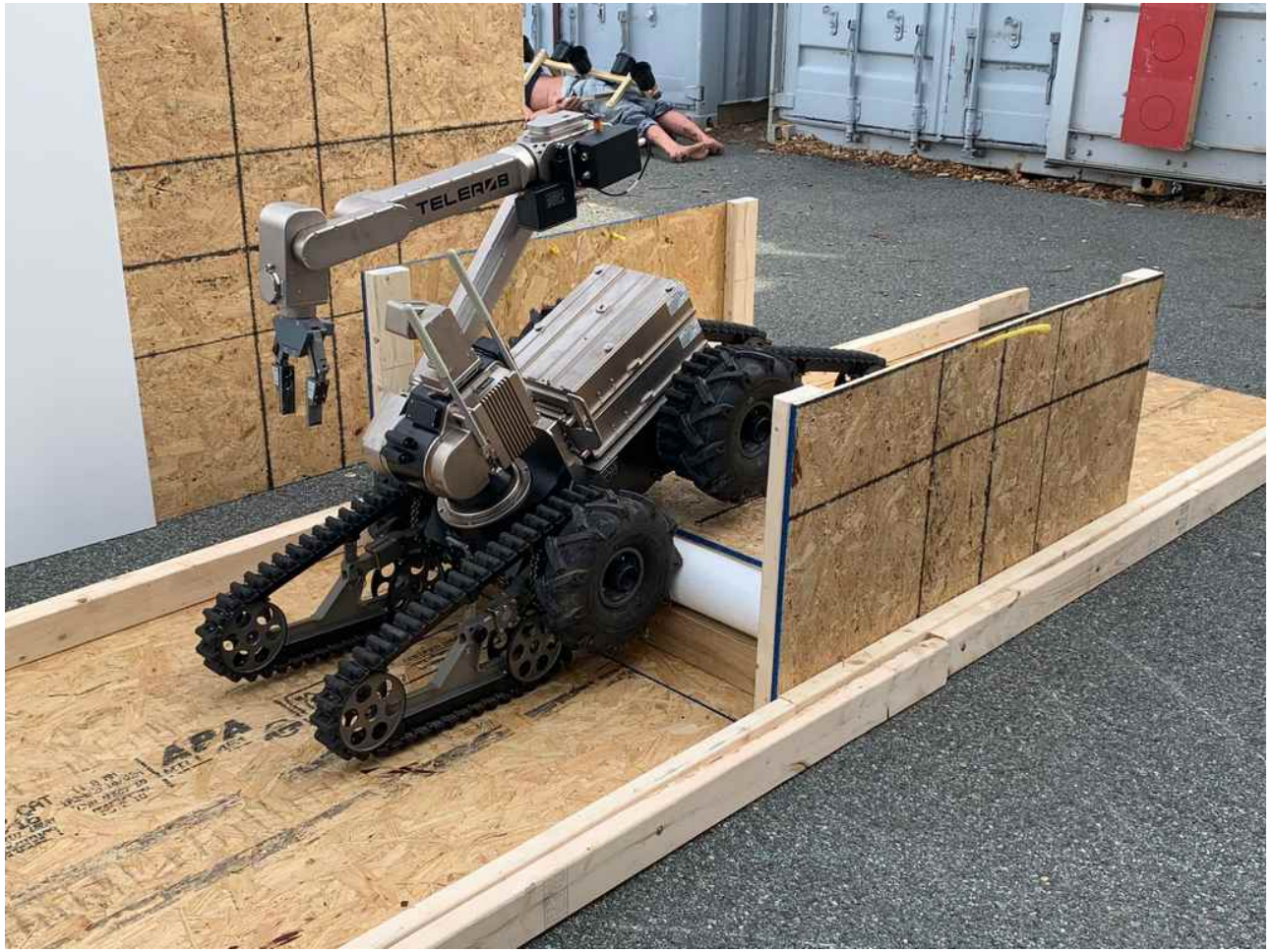


Pyramid Hill – Checkered Surfaces
(every other crate stack upside-down)

Mobility: Variable Hurdle Obstacle

ASTM E2802



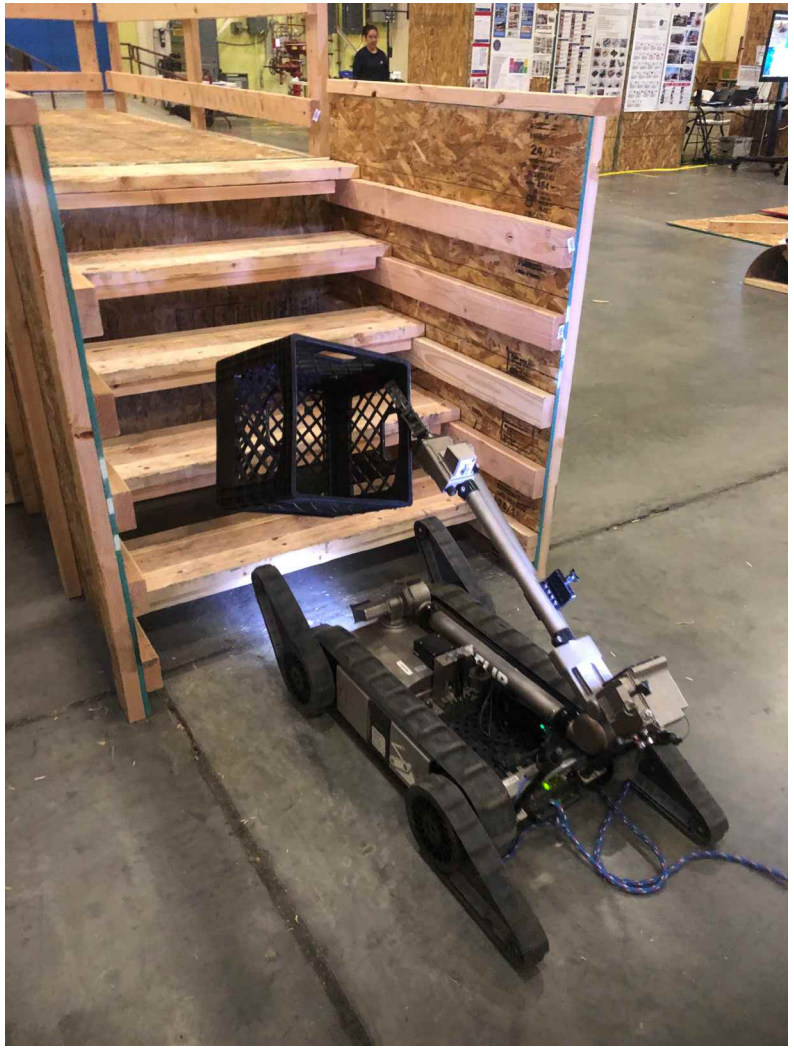


Mobility: Variable Stair Obstacle

ASTM E2804

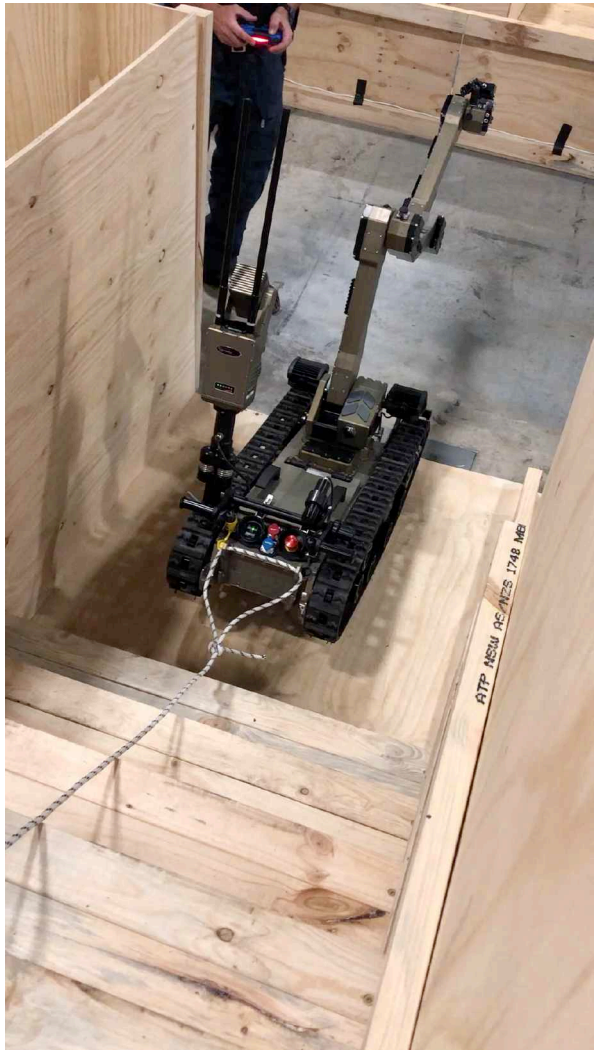
Mobility: Variable Stair Obstacle

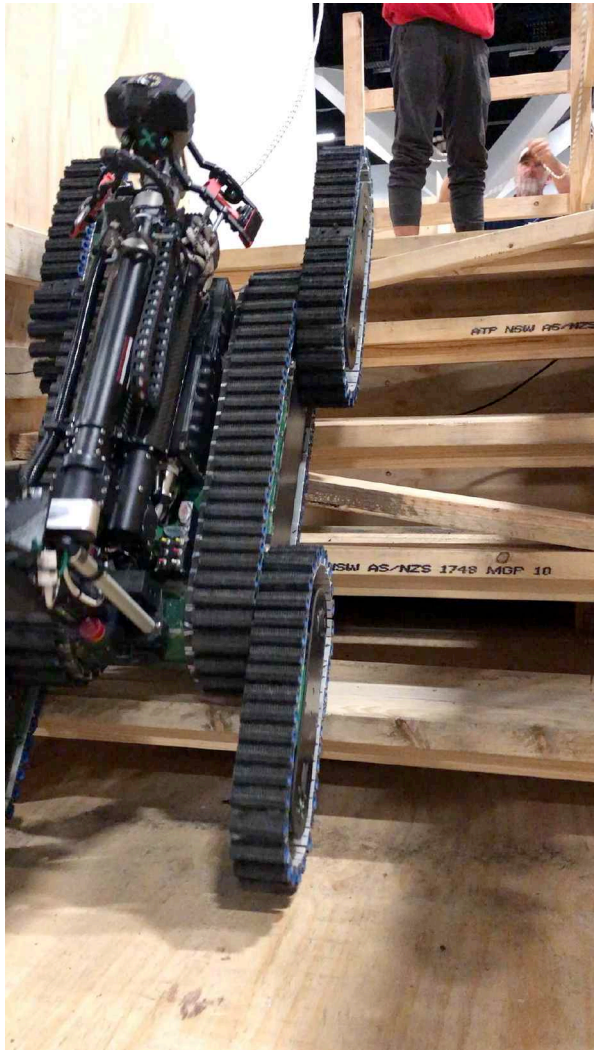
ASTM E2804

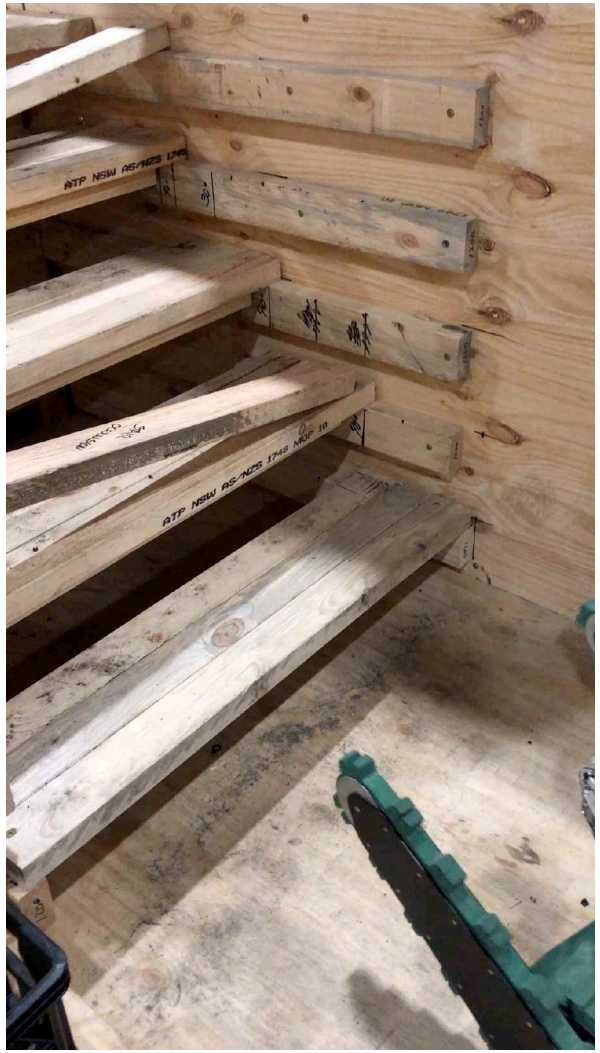


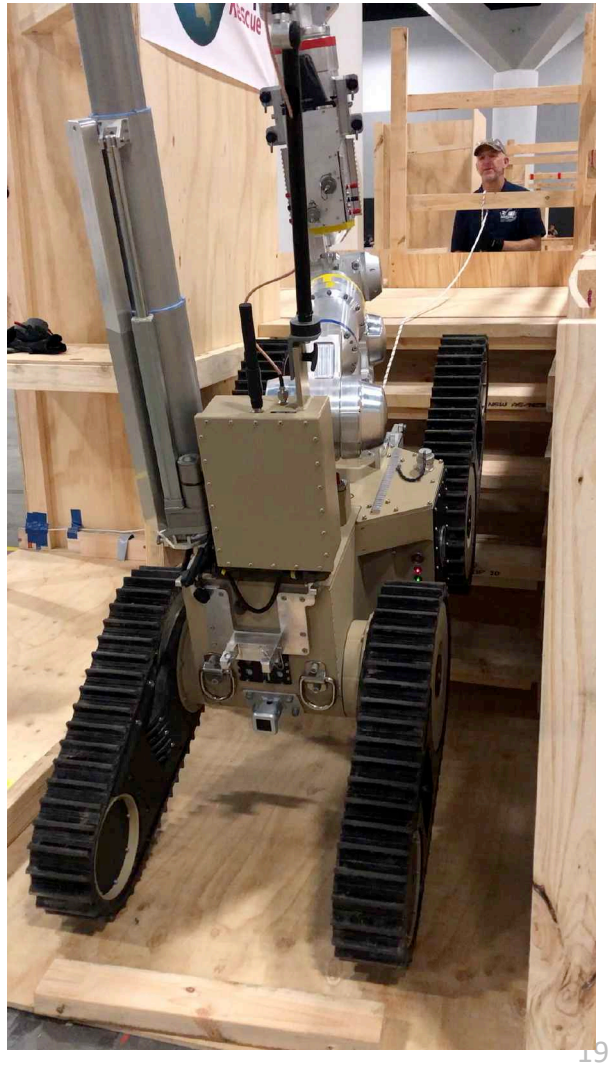
Mobility: Variable Stair Obstacle with Debris

ASTM E2804



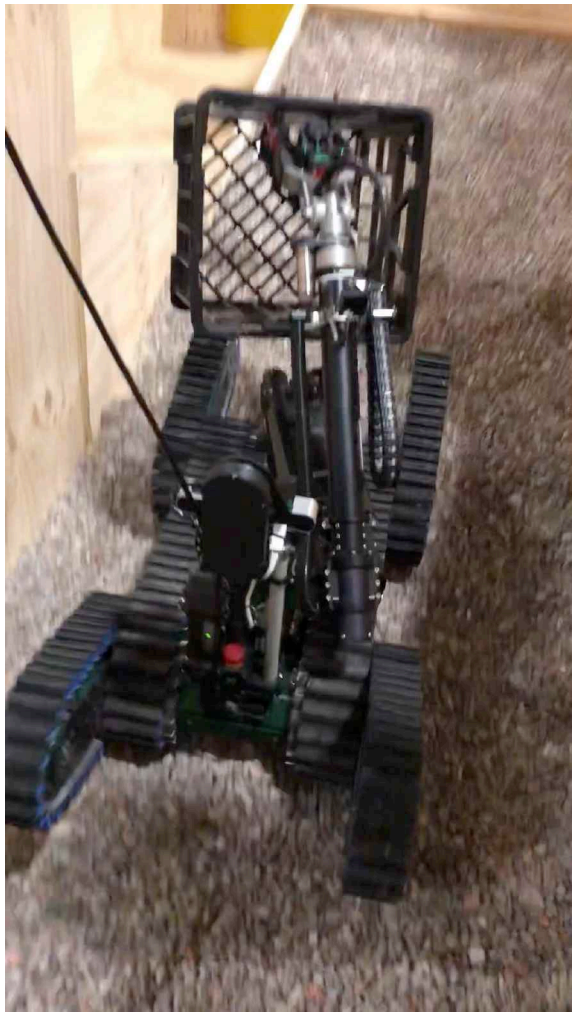






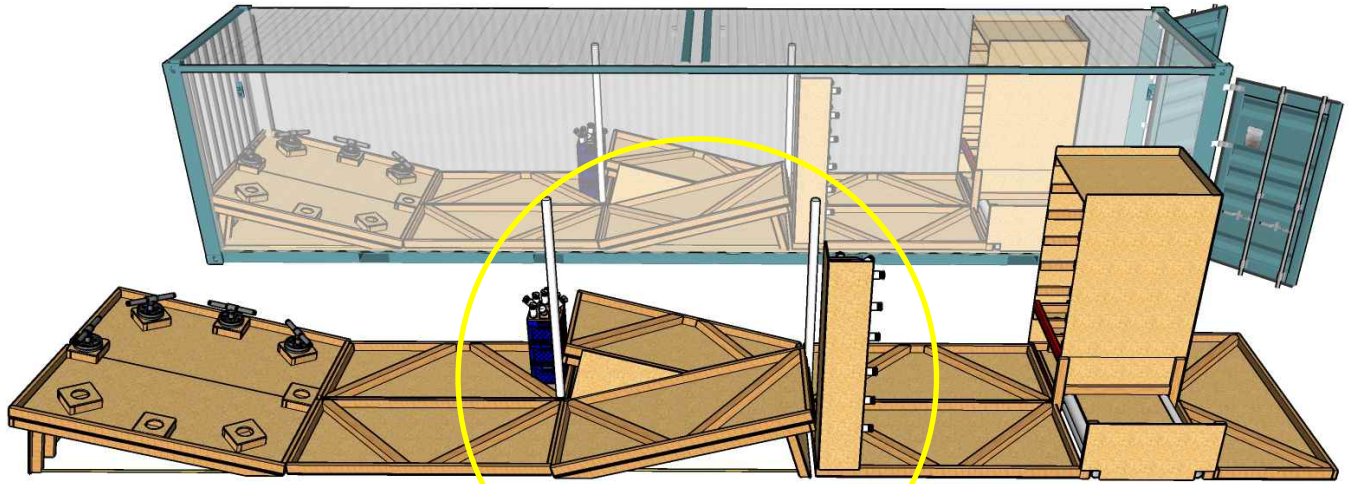
Mobility: Crossover Slopes (Sand, Gravel, or Low Friction OSB)

ASTM E2991, E2992

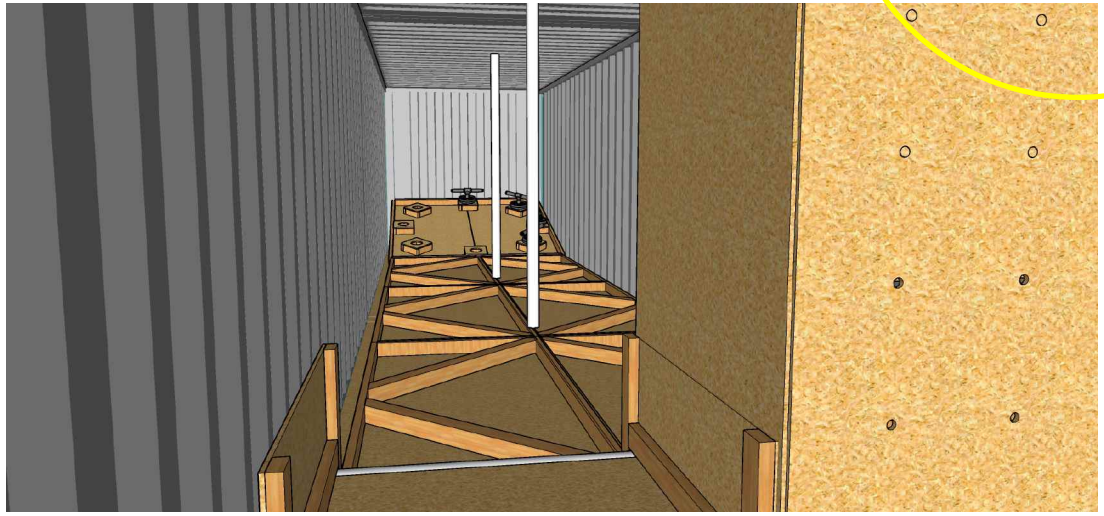


Shipping Container Facilities (Buy or Rent)

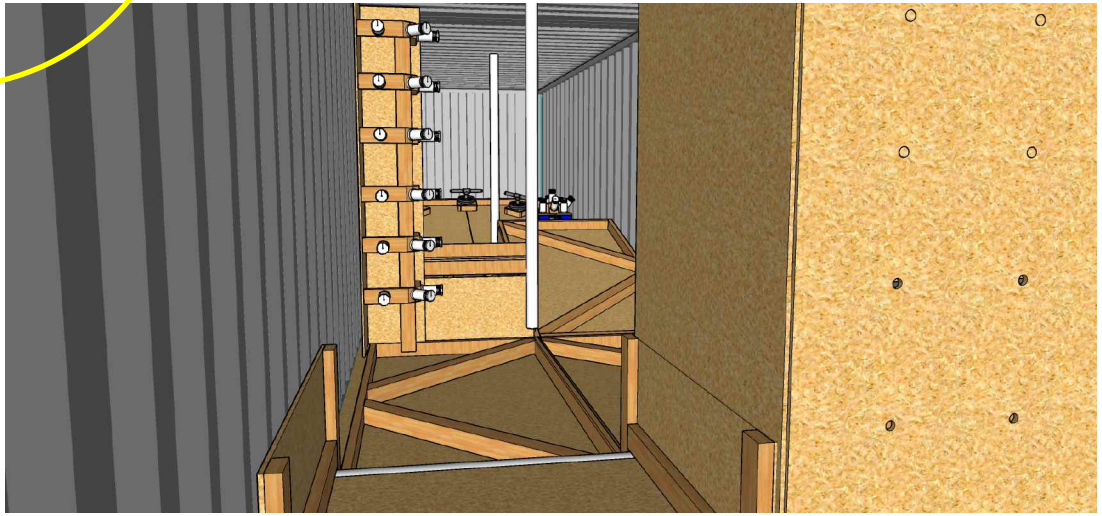
Maneuvering and Dexterity



FLAT FIGURE-8



CROSSOVER SLOPES



Mission Essential Tasks

C-IED/EOD

Open Doors

Surmount Hurdle

Ascend/Descend Stairs

Entangle Obstacles

Negotiate Hallways

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