This Year’s Game

"Lunar Odyssey: Building the Future"

Botguy embarks on an ambitious journey to establish a sustainable human habitation on the Moon. Botguy is tasked with aiding astronauts in searching for resources and building infrastructure to unlock the Moon's potential for human settlement.

The mission is to traverse the lunar surface, sort and collect resources, move moon rocks out of the way, receive critical equipment from the space dock, build habitats connected to the already established moon base, and add surface habitats to as many areas as possible. Astronauts need to be inside the airlock, on the platforms of the moon base, at the solar panel, and to raise the flag.

To establish a sustainable presence on the Moon, rovers must locate water ice deposits possibly hidden on and beneath the lunar surface. These ice deposits could serve as a vital resource for generating water and oxygen essential for the survival of future astronauts living on the moon base. Successful extraction of water ice from the lava tube area near the south pole and bringing it to the moon base through the airlock can become a pivotal achievement, ensuring the development of a self-sustaining ecosystem.

Strategic planning is essential as teams must leverage their two rovers to complete as many tasks as possible. The game introduces a dynamic aspect of resource management, where players must balance their habitat-building endeavors by sorting food, fertilizer, and fuel into areas so that surface stations can have Lunar farms capable of growing crops essential for sustaining the lunar population and fuel storage facilities that store the energy harvested by the solar panel.

Rover bays become pivotal structures in the game, serving as starting points for lunar exploration and associated tasks and maintenance and charging hubs for the rovers. Players must carefully plan rover deployments, considering each rover's range, capabilities, and specific functions, as they only have a two-minute operating window. Upgrading rovers with sensors and unique effectors will enhance resource gathering and exploration efficiency.

The challenge unfolds as a riveting saga of ingenuity, perseverance, and rover cooperation, echoing the spirit of exploration that has driven humanity throughout history. "Lunar Odyssey: Building the Future" invites teams to embark on a thrilling adventure, bridging the gap between imagination and reality as they pioneer the next frontier of human habitation on the Moon.

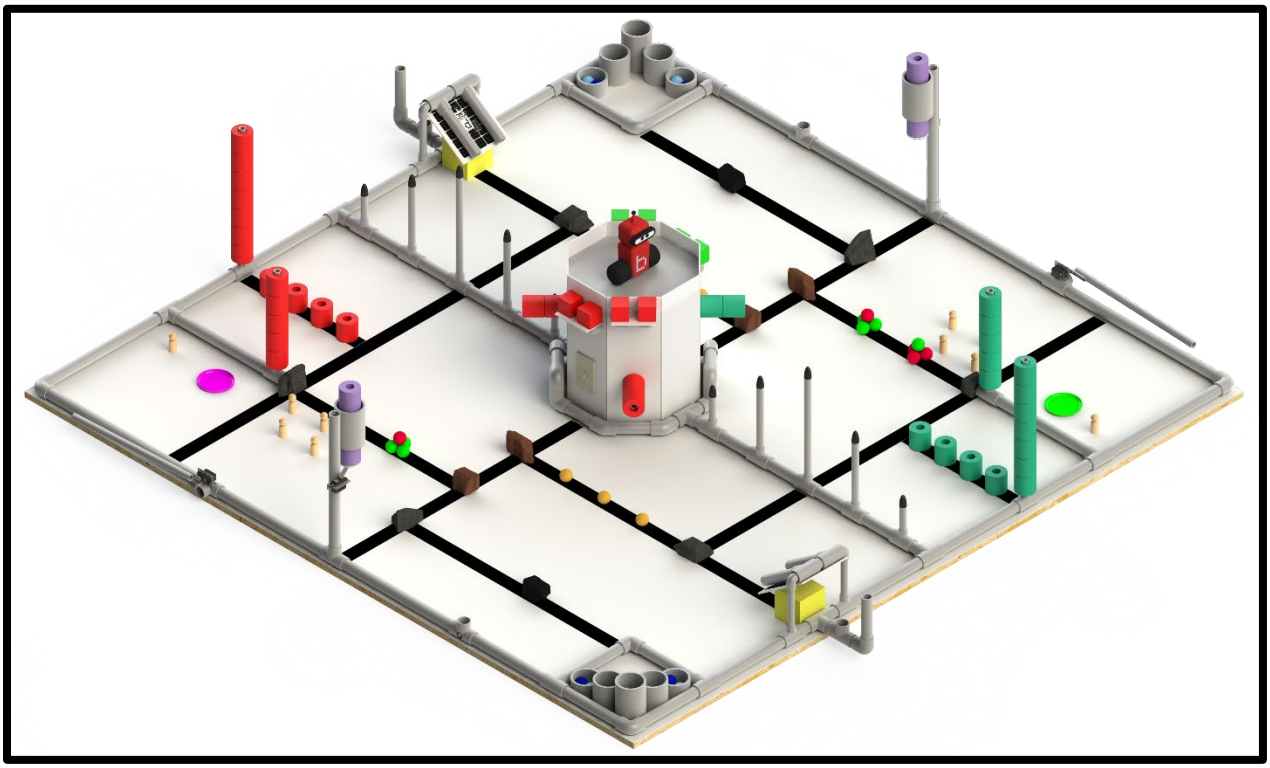

Figure 1 - Game Overview

Game Board Areas

Official game board specifications are on the Team Homebase. All tournament boards and game pieces will fulfill the following specifications within +/- 0.25” or up to 1% of the specification.

The fall game board is played on an 8’ X 4’ field, which is half of an official Botball game table. The game board is composed of two 4’ x 4’, reusable modules whose surfaces are pebble grain white fiberglass reinforced plastic panel (FRP). A fully assembled fall game board will be ~4’ x 8’. A panel channel or black or white duct tape is used to close exposed seams where modules abut.

The game board is separated into defined areas for each team. Teams competing in the virtual tournament can run on the same 4” x 8’ board or they can build two half boards and overlap them in the middle.

- Area 1
- Small Rover Bay (small starting box)
- Large Rover Bay (large starting box)
- Storage Docks (upright ½" PVC posts)
- Area 2
- Area 3
- Area 4
- Area 5
- Area 6
- Rock Heap
- Lava Tube Area
- Lava Tubes
- Solar Panel
- Moon Base
- Air Lock
- Habitat Construction (center line upright ½" PVC posts)
- Space Dock
- Space Dock Switch
- Moon Base Platforms
- Moon Base Storage Docks
- Roads
- Astronaut Stations
  - Flag Station
  - Solar Panel Station
  - Moon Base Platforms
  - Air Lock

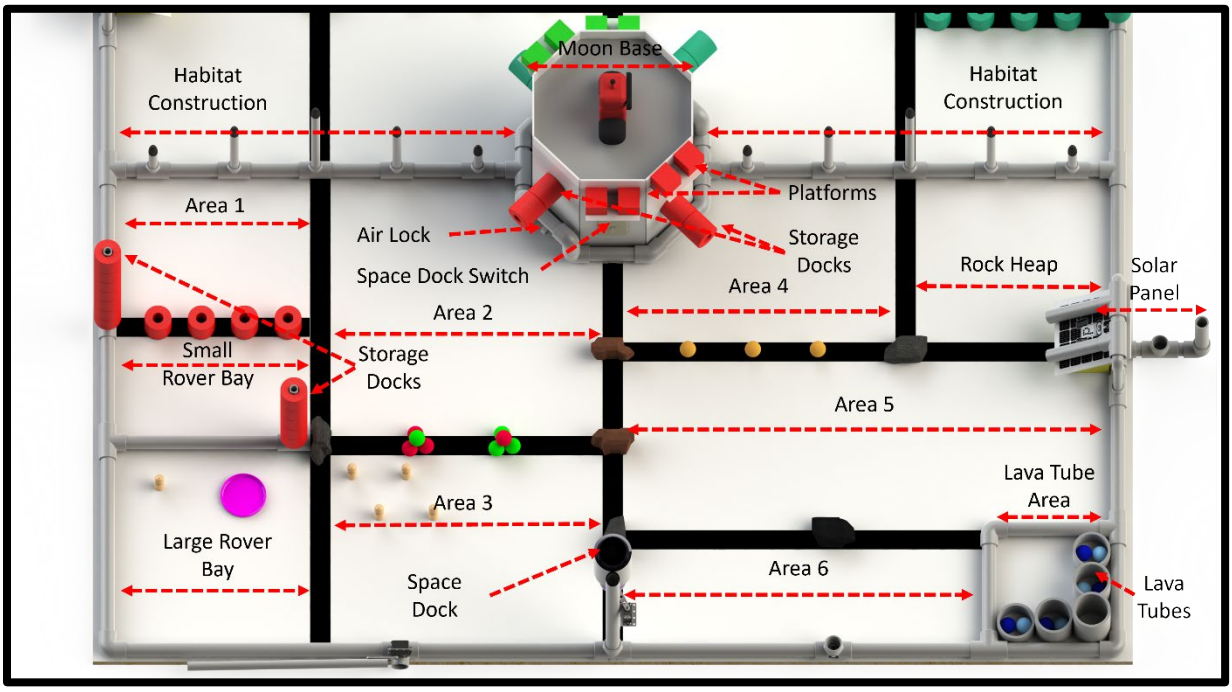

Figure 2 - Game Areas

Area 1 – A team's *Area 1* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and tape and is situated above the *Small Rover Bay*.

Small Rover Bay – A team's *Small Starting Box* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and tape with a virtual height of 20" and is situated above the *Large Rover Bay*.

Large Rover Bay – A team's *Large Rover Bay* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and tape with a virtual height of 15" and is in the bottom left corner of the board.

Storage Dock – The two upright ½" PVC pipes that sit on the top left and bottom right corner of the *Small Rover Bay*.

Area 2 – A team's *Area 2* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and tape and is situated to the right of the *Small Rover Bay* and *Area 1*.

Area 3 – A team's *Area 3* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and tape and is situated to the right of the *Large Rover Bay* and below *Area 2*.

Area 4 – A team's *Area 4* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and tape and is situated to the right of the *Moon Base* and *Area 2*.

Area 5 – A team's *Area 5* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and tape and is situated below *Area 5* and the *Rock Heap*.

Area 6 – A team's *Area 6* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and tape and is situated below *Area 5*.

Rock Heap – A team's *Rock Heap* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and tape and is situated to the right *Area 4*.

Lava Tube Area – A team's *Lava Tube Area* is the surface of the game table as delineated by the **inside edges** of the surrounding PVC and is situated below *Zone F* and right of *Area 6*. This does not include the surface of the game table that is covered by the *Lava Tubes*.

Lave Tubes – The volumes of the five 3" PVC pipes that sit in the *Lava Tube Area.*

Solar Panel – A team's *Solar Panel* are the PVC on the edge of the board and the attached foam core. It sits at the end of the black tape line between *Zones E* and *F.*

Moon Base – The *Moon Base* is the octagonal structure that sits in the center of the table.

Air Lock – The cardboard drawer (box) that starts on the surface, flush with and inside the *Moon Base* on the side of the *Moon Base* next to *Area 2*.

Habitat Construction – The ten upright ½" PVC pipes that sit along the dividing line between each side.

Space Dock – The *Space Dock* is the elevated 3" PVC pipe on the center of the long outside boundary on each side. The noodles in it can be triggered to drop using the *Space Dock Switch.*

Space Dock Switch – The *Space Dock Switch* is located on the *Moon Base* that sits over the center dividing line on a team's side.

Moon Base Platforms – The *Moon Base Platforms* are the two platforms on each side on the panel of the *Moon Base* on the side over the center black tape and the side to the right of that one that is adjacent to *Area 1*.

Moon Base Storage Docks – *The Moon Base Storage Docks* are the horizontal ½" pipe that protrudes from the *Moon Base* side above the *Air Lock* and the *Moon Base* above *Area 4*.

Roads – Any black tape on the surface of the game table.

Astronaut Stations – Areas where astronauts may score more points

– *Flag Station* – Inside the upright tee coupler that sits between the *Space Dock* and the *Lava Tube Area*. The coupler contains a switch that raises the *Flag* that sits on the PVC on the edge of *Area 3*.

– *Solar Panel Station* – Inside the upright tee coupler that sits behind the solar panel off the edge of the game table.

– *Moon Base Platforms* – The top surface of the *Moon Base Platforms*.

– *Airlock* – The volume of the *Air Lock* box.

Game Piece

Scoring Pieces

- 1 – *Botguy*
- 2 – *Large Surface Stations* (4" Yellow Cubes)
- 2 – *Lava Tube Caps* (Green or Pink Disk depending on side of the board)
- 2 – *Space Dock Switches*
- *2 – Solar Panels*
- *2 – Flags (students provide flag to meet rule requirements)*
- 4 – *Equipment (*5" Purple Noodles)
- 6 – *Fuel* (Orange Poms)
- 8 – *Fertilizer* (Red Poms)
- 8 – *Food* (Green Poms)
- 8 – *Mixed Ice* (Royal Blue Poms)
- 8 – *Small Surface Stations* (2" Red or Green Cubes depending on side of the board)
- 10 – *Water Ice* (Sky Blue Poms)
- 10 – *Astronauts* (Wooden People)
- 12 – *Lunar Rocks* (varied color and textures)
- 40 – *Habitats* (2.5" Red or Green Pool Noodles - Red or Green depending on side of the board)

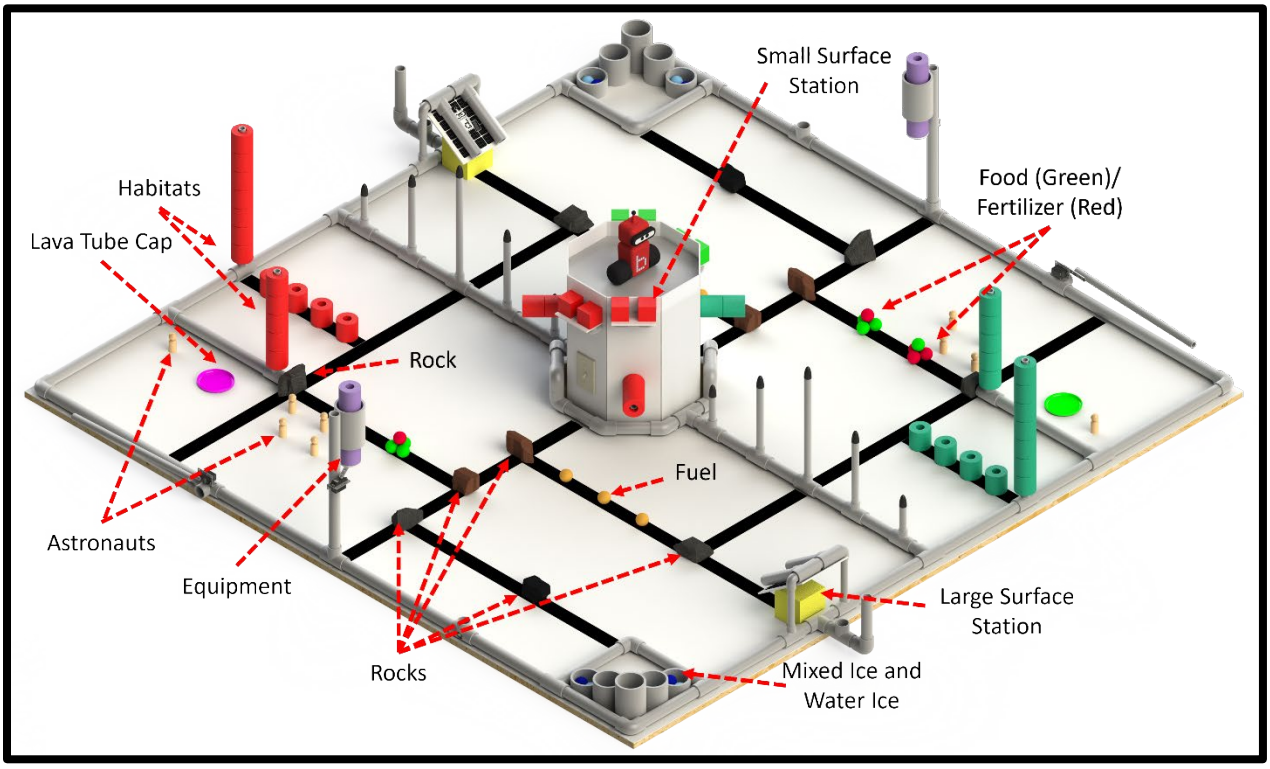

Figure 3 - Game Pieces

Starting Positions

- *Botguy* – Will be placed roughly centered on the top of the *Moon Base* facing the audience
- *Large Surface Stations* – Each *Large Surface Station* will start under the *Solar Panel*, flush with the PVC boundary and centered on the black tape.
- *Lava Tube Caps* – Must start in either of your starting boxes (*Small and Large Rover Bays*) and may be on or held in an effector or similar on the robot.
- *Space Dock Switches* – Will start in the down position.
- *Solar Panels* – Will start in the down position (Panel sits atop the *Large Surface Station*).
- *Flags* – Provided by team. Will attach to the game table flagpole with Velcro (KIPR will provide Velcro) and start in the down position. *Equipment* – Will start inside the *Space Dock.*
- *Fuel* – Will be placed every 6" from the center black tape line on the black tape line that sits between *Area 4* and *Area 5*.
- *Food and Fertilizer* – Will start in two stacks on the tape line between *Area 2* and *Area 3*, every 8" from the black tape line that makes up the left boundary of both areas. The first stack is 3 red poms with a green on top and the second stack is 3 green poms with a red on top.
- *Mixed Ice* – Will start one a piece in each of the small and medium *Lava Tubes*.
- *Small Surface Stations* – Will start on top of the *Moon Base Platforms*, touching the *Moon Base* in the back and the outer edge of the *Moon Base Platforms* on the side.
- *Water Ice* – Will start one a piece in each of the small and medium *Lava Tubes*.
- *Astronauts* – Up to five and at least four *Astronauts* may start anywhere in *Area 3* as long as they are touching the surface, not touching black tape and are set upright. One *Astronaut* may start anywhere in either of your starting boxes.
- *Lunar Rock*s - (all rocks regardless of color or texture) – Will be randomly assigned a location and orientation and placed by judges on all intersections of black tape excluding the intersection that sits between *Area 1*, the *Small Rover Bay*, and *Area 2.* One will also be placed on the black line in *Area 6* directly in front of the *Flag Station* (refer to diagram), centered on the black tape.
- *Habitats* – Will be placed in 3 locations
    - *Storage Docks* – Will be placed on the PVC uprights, 7 on the taller one and 5 on the shorter one.
    - *Moone Base Storage Docks* – Will be placed on the horizontal pipes protruding from the *Moon Base*, two per pipe.
    - *Small Rover Bay* – Will be placed on the black tape line that forms the boundary between *Area 1* and the *Small Rover Bay*. They will be placed 4" apart starting 4" from the PVC boundary on the left. They will not enter the area of the *Small Rover Bay*.