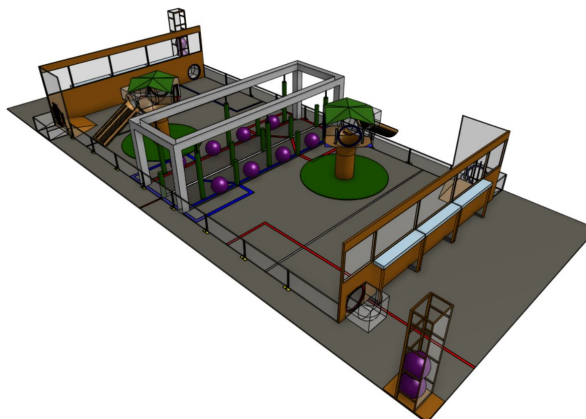




1 Game Overview

In OPERATION OUTPOST, two (2) Alliances work to gather supplies to prepare for an approaching storm. Each Alliance, along with their transport vehicles, race to collect Provisions in order to maximize their supply. To gather the Provisions, transport vehicles must navigate through the Jungle to pick up their supplies and return them back to either the Treehouse or Hollow. Near the end of the match, transport vehicles must get their passengers to the Canopy to escape the storm.



During the 15 second Autonomous Period, transport vehicles follow pre-programmed instructions. Alliances score points by:

1. Storing Provisions in the Treehouse or Hollow
2. Moving from the Perimeter Line

In the final 2 minutes and 15 seconds of the match, drivers take control of the transport vehicles. Alliances score points by:

1. Continuing to place Provisions in the Treehouse or Hollow
2. Completing the Ladder with Provisions
3. Climbing a Vine or parking

The Alliance with the highest score at the end of the match wins.

2 ARENA

The ARENA includes all elements of the game infrastructure that are required to play OPERATION OUTPOST. Content regarding the FIELD and the PROVISIONS is provided below.

2.1 FIELD

Each FIELD is a 25 ft. by 50 ft. carpeted area bound by and including the surfaces of the guardrails and the inward-facing surfaces of the ALLIANCE WALLS. It is populated with the JUNGLE, TREEHOUSES, and HOLLOWs.

The JUNGLE is located in the center of the FIELD. It consists of the structural CANOPY, the hanging VINES, and the BAMBOO posts.

One (1) Red TREEHOUSE and one (1) Blue TREEHOUSE are located near the center of each ALLIANCE'S LAB SECTOR. Each TREEHOUSE contains two (2) potential goals.

One (1) Red HOLLOW and one (1) Blue HOLLOW are located against guardrails near their ALLIANCE WALLS. A ramp allows access to each HOLLOW goal.

2.2 Zones and Markings

Zones and markings of consequence are described below. The tape used to mark lines is 2 in. gaffers tape.

ALLIANCE STATION: a 30 ft. wide by 10 ft. long, infinitely tall volume formed by, and including the ALLIANCE WALL, the edge of the carpet, and ALLIANCE colored tape.

PERIMETER LINE: a white tape line spanning the width of the FIELD and located 8 ft. from the face of the ALLIANCE WALL. An ALLIANCE'S PERIMETER LINE is located in their own LAB SECTOR.

LOADING ZONE: a 5 ft. wide by 14 ft. long, infinitely tall volume bounded by ALLIANCE colored tape opposite to the HOLLOW and against the ALLIANCE WALL. The LOADING ZONE includes the ALLIANCE colored tape.

LAB SECTOR: a 25 ft. wide by 21 ft. long, infinitely tall volume formed by an ALLIANCE'S ALLIANCE WALL and JUNGLE. The LAB SECTOR includes the PERIMETER LINE and the LOADING ZONE.

JUNGLE: a 25 ft. wide by 8 ft. long, infinitely tall volume bounded by ALLIANCE colored tape on either side. It is elevated by $\frac{3}{4}$ in. and includes the ALLIANCE colored tape.

TRAIL: a 2 ft. 6 in. wide by 53 ft. long, infinitely tall pathway that runs with the guardrails, from the edge of the LADDER to the edge of the HOLLOW.

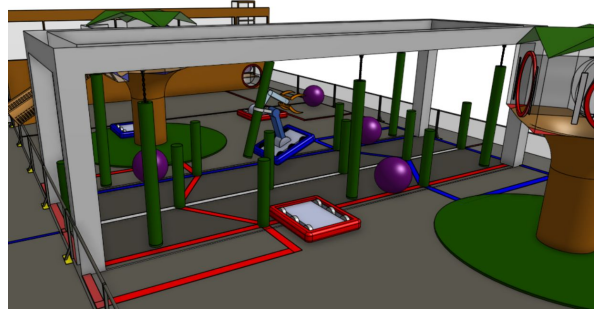
OPERATION OUTPOST

2.3 JUNGLE

The JUNGLE is a 25 ft. wide, 8 ft. long, and 7 ft. 9 in. tall structure located in the center of the FIELD, oriented perpendicular to the guardrails. There are two (2) ALLIANCE-based zones in the JUNGLE where the opposing ALLIANCE is not allowed. The JUNGLE has a CANOPY above its perimeter with a pattern of three (3) VINES alternating with two (2) BAMBOO on either side along the width and six (6) BAMBOO stalks running parallel in the center. Both the VINES and BAMBOO are evenly spaced along both the width and length of the field; across the width, there is a distance of four (4) feet, and along the length there is a distance of five (5) feet between the VINES and/or BAMBOO.

2.3.1 JUNGLE Structure

The structure of the JUNGLE consists of a base of ½ in. plywood boards that cover 25 ft. by 8 ft. Mounted onto this is the BAMBOO, measured with a 6 in. diameter and a height of 3 ft. tall. The CANOPY frames the JUNGLE with 10 in. by 10 in. square trusses. Each of the four (4) vertical truss legs rest on the four (4) corners of the JUNGLE'S plywood base, also measuring 10 in. by 10 in. Hanging from the CANOPY are VINES, reaching down to 6 in. above the plywood board.



2.3.1.1 ALLIANCE JUNGLE Paths

There are two (2) ALLIANCE-only zones in the JUNGLE. Each is located opposite to their ALLIANCE'S TRAIL, and is measured 12 ft. 6 in. wide and 7 ft. 10 in., centered in the JUNGLE.

2.3.2 BAMBOO

There are six (6) BAMBOO stalks placed in the center of the JUNGLE, parallel to the ALLIANCE colored tape. Additionally, there are two (2) BAMBOO stalks alternating with the VINES against the JUNGLE perimeter. BAMBOO stalks are PVC pipes with an outer diameter of 6 in. and an inner diameter of 3 in. They are 3 ft. tall and mount onto the plywood base of the JUNGLE using a metal pole insert which the BAMBOO encircles.

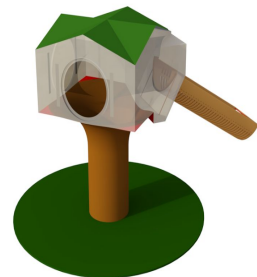
2.3.3 VINES

There are six (6) VINES hanging from the CANOPY, three (3) on each side of the JUNGLE, above the ALLIANCE colored tape line. VINES are rubber tubes, each with an outer diameter of 6 in. and an inner diameter of 3 in.

VINES are suspended from a Grade 30 straight chain with a 3/16 in. trade size and a breaking strength of 1,200 lbs. The chain hangs down 1 ft. from the CANOPY before intersecting with the VINE; the chain continues through the vine and attaches at the base which is 6 in. off the ground, providing more weight to the VINE.

2.4 TREEHOUSE

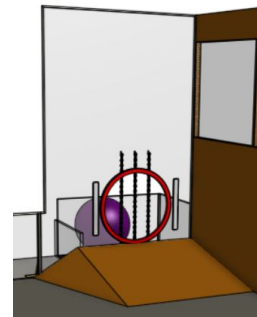
Each ALLIANCE has one (1) TREEHOUSE, a tall scoring structure with two (2) goals, located in their LAB SECTOR. Centered 7 ft. 6 in. away from the guardrails and 14 ft. 2 in. away from the ALLIANCE WALL, the TREEHOUSE is situated on a 1 in. platform with a diameter of 10 ft, known as the TREE BASE. The TREEHOUSE and the platform together are 8 ft. 4 in. tall, and both goals, each having a diameter of 2 ft. 2 in., are centered at 6 ft. 3 in. off the ground.



A 5 ft. 10 in. sloped trough, the ROPE BRIDGE, carries scored PROVISIONS from the TREEHOUSE to the TRAIL. PROVISIONS may rest in the ROPE BRIDGE prior to HUMAN PLAYER interaction.

2.5 HOLLOW

Each ALLIANCE has one (1) HOLLOW, a short scoring goal, located in their LAB SECTOR near the ALLIANCE WALL. The center of the goal is situated 1 ft 11 ½ in. above the floor, and the goal itself has a diameter of 2 ft. 2 in. The ramp facing the goal is 48 in. by 47 in. with an incline of 12°, and the side ramp is 10 in. long at a 30.5° angle.



Three (3) 30 in. medium-duty straight chains are attached to the outside of the HOLLOW above the goal. Because of the weight of the chains, ALLIANCES must climb the ramp to score goals by pushing PROVISIONS in. Outside the goal is the BASKET, a 2 ft. 5 in. wide, 3 ft. 9 in. long, and 2 ft. high container. It's filled by a ramp with an angle of 13.5°. PROVISIONS may rest in the BASKET prior to HUMAN PLAYER interaction.

2.6 ALLIANCE STATION

2.6.1 ALLIANCE WALL

The ALLIANCE WALL is a 8 ft. tall structure that separates ROBOTS from DRIVE TEAMS and consists of three (3) PLAYER STATIONS, and one (1) LADDER. ALLIANCE WALLS define the short edges of the FIELD.

2.6.1.1 PLAYER STATION

A PLAYER STATION is one (1) of three (3) assigned positions in an ALLIANCE WALL from where a DRIVE TEAM operates their ROBOT. Each PLAYER STATION'S window starts 4 ft. 2 in. above the ground and the left and right PLAYER STATIONS start 3ft. 6 in. in from the guardrails. Each window is 5 ft. 9 in. wide by 3 ft. tall with 1 in. spacing between them. A shelf that is 5 ft. 9 in. wide and 1 ft. long is attached to each PLAYER STATION.

2.6.1.2 LOADING STATION

Near the end of each TRAIL in the ALLIANCE WALL, there is a LOADING STATION where HUMAN PLAYERS can feed PROVISIONS back into gameplay. The opening onto the field is centered 1 ft. 3 ½ in. above the ground, and there is a chute that allows PROVISIONS to fall back onto the FIELD easier.

2.6.2 LADDER

Each ALLIANCE STATION has a LADDER within it, facing the TRAIL. A LADDER has a base of 3 ft. 10 in. wide and 2 ft. 2 in. long. The LADDER itself is 2 ft. 2 in. wide, 1 ft. 8 in. long, and 8 ft. 6 in. tall. There are four (4) sections that are each 1 ft. 11 in. tall with a 1 in. rung in between each section to serve as the holder for a PROVISION.

2.7 PROVISION

OPERATION OUTPOST is played with PROVISIONS. A PROVISION is a purple 1 ft. 10 in. (55 cm) diameter medium-sized Trideer Exercise Ball that weighs around 3 lbs.



OPERATION OUTPOST

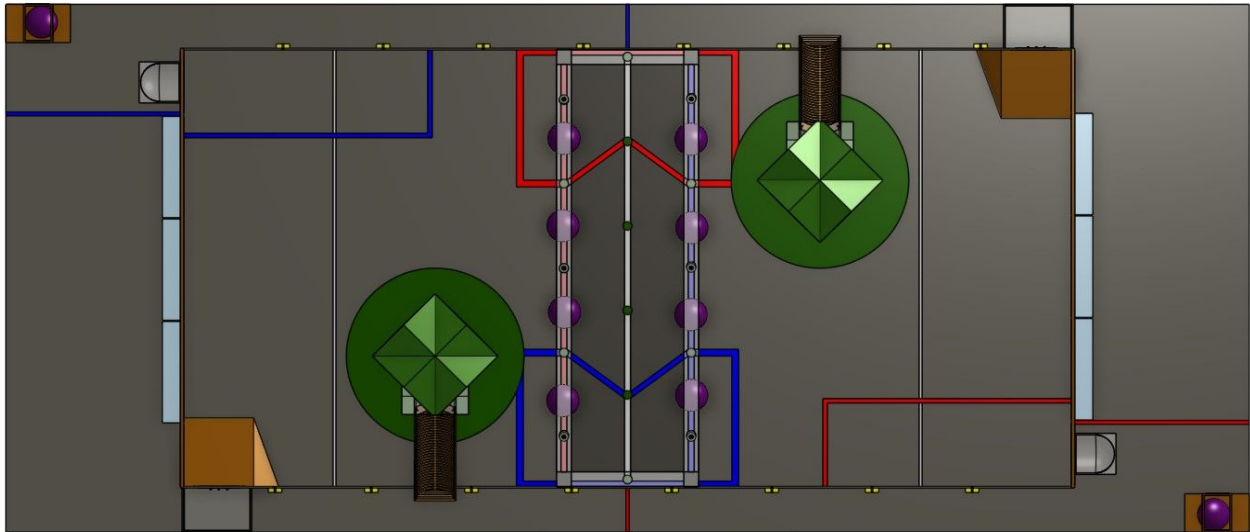
2.8 Vision Targets

Vision Targets made from 2 in. wide strips of reflective material are located on the TREEHOUSE and HOLLOW. On both the TREEHOUSE and HOLLOW, they target the location of the goals by bracketing the circular goals.

3 MATCH Play

During OPERATION OUTPOST, two (2) ALLIANCES play MATCHES, as per the details described below.

3.1 Starting Configuration



3.1.1 PROVISIONS

Eighteen (18) PROVISIONS are staged as follows:

- A. Four (4) on the field between the VINES on each side (eight [8] total)
- B. ROBOTS can control up to one (1) PROVISION (six [6] total)
- C. Two (2) PROVISIONS in each ALLIANCE LADDER (four [4] total)

3.1.2 ROBOTS

Each DRIVE TEAM stages their ROBOT such that at least part of its BUMPERS are touching the ALLIANCE WALL. ROBOTS may have control of one (1) PROVISION.

3.1.3 Humans

DRIVERS and COACHES stage behind the STARTING LINE inside their ALLIANCE STATION. HUMAN PLAYERS stage in their corresponding HUMAN PLAYER ZONE, and cannot interact with PROVISIONS until TELEOP. TECHNICIANS stage in the event-designated area near the FIELD.

3.2 Autonomous Period

The first phase of each MATCH consists of the first fifteen (0:15) seconds, where ROBOTS operate without any DRIVE TEAM control or input. Robots start against the ALLIANCE WALL, and may begin in the opposing ALLIANCE'S LOADING ZONE. ROBOTS attempt to score PROVISIONS in the HOLLOW or the TREEHOUSE, retrieve additional PROVISIONS from the JUNGLE, and exit the infinite vertical volume created by the corresponding ALLIANCE'S PERIMETER LINE any time before the end of the phase.

3.3 Teleoperated Period

The second phase of each MATCH consists of the remaining two minutes and fifteen seconds (2:15). During this phase, DRIVERS remotely operate ROBOTS to retrieve and score PROVISIONS in the HOLLOW and TREEHOUSE. HUMAN PLAYERS can either recycle PROVISIONS back onto the field or place them into the LADDER for storage.

The final thirty (0:30) seconds of TELEOP is the ENDGAME, during which ROBOTS attempt to CLIMB the VINES or complete the LADDER and park at the TREE BASE of their ALLIANCE'S TREEHOUSE.

3.4 Scoring

ALLIANCES are rewarded for accomplishing various actions through the course of a MATCH, including ROBOT movement during AUTO, scoring PROVISIONS in the TREEHOUSE or HOLLOW, climbing a VINE or filling the LADDER, and winning or tying MATCHES. Rewards are granted via either MATCH points or Ranking Points. All scores, except ENDGAME bonuses, are assessed and updated throughout the MATCH.

3.4.1 TREEHOUSE Scoring

ALLIANCES collect PROVISIONS by scoring into the TREEHOUSE. The two (2) TREEHOUSE goals are stationed at a 45 degree angle, which deposit into the ROPE BRIDGE. The final assessment of PROVISIONS scored in the TREEHOUSE is made five (5) seconds after the ARENA timer displays zero (0) following AUTO and TELEOP, respectively.

3.4.2 HOLLOW Scoring

ALLIANCES collect PROVISIONS by scoring into the HOLLOW. The HOLLOW is aligned on the ALLIANCE WALL of the opposing ALLIANCE, and deposits into a HUMAN PLAYER ZONE. The final assessment of PROVISIONS scored in the HOLLOW is made five (5) seconds after the ARENA timer displays zero (0) following AUTO and TELEOP, respectively.

OPERATION OUTPOST

3.4.3 LADDER Scoring

ALLIANCES can collect PROVISIONS from the TRAIL, and either put them back into play or place them in the LADDER. The LADDER is located in each ALLIANCE STATION, and only the PROVISIONS in the LADDER at the end of the game are factored into the total score.

3.4.3 Point Values

Point values for tasks detailed in OPERATION OUTPOST are detailed below.

Award	Awarded for...	AUTO	TELEOP	Qual.
PERIMETER LINE	Cross the PERIMETER LINE before the end of AUTO (per ROBOT)	3	-	-
PROVISIONS (HOLLOW)	SCORED in HOLLOW	5	3	-
PROVISIONS (TREEHOUSE)	SCORED in TREEHOUSE	8	5	-
PROVISIONS (LADDER)	SCORED in LADDER (at the end of the MATCH)	-	2	-
CLIMB	CLIMB the VINE (singular ROBOT); ROBOT not touching the floor	-	15	-
PARK	Parking with all four (4) wheels on the TREE BASE	-	5	-
FULL ALLIANCE AUTO	Thirty (30) AUTO points scored as an ALLIANCE	-	-	1 RP
FULL ALLIANCE ENDGAME	Forty-two (42) ENDGAME points (3 ROBOT CLIMBS, or 2 ROBOT CLIMBS, a COMPLETED LADDER, and a ROBOT PARKED)	-	-	1 RP
TIE	Completing a MATCH with the same amount of POINTS as the opposing ALLIANCE	-	-	1 RP
WIN	Completing a MATCH with more POINTS than the opposing ALLIANCE	-	-	2 RP

4 Game Rules: ROBOTS

4.1 During the MATCH

- G1. During autonomous, no crossing past the centerline of the JUNGLE.
- G2. No more than one (1) PROVISION in ROBOT possession at a time.
- G3. No extending any part of the ROBOT into the HOLLOW goal.

4.2 Zone Specific Restrictions

- G4. ROBOTS may only shoot into a TREEHOUSE when they are on the same side as their intended goal. ROBOTS may not shoot into a TREEHOUSE from the JUNGLE. This results in a FOUL, and repeated violations result in a TECH FOUL.
- G5. No defense within the LOADING ZONE. This results in a FOUL, and repeated violations result in a TECH FOUL.
- G6. No Blue ALLIANCE ROBOTS allowed in the Red Jungle zone. No Red ALLIANCE ROBOTS allowed in the Blue Jungle zone. This results in a FOUL, and repeated violations result in a TECH FOUL.
- G7. ROBOTS cannot interact with a climbing ROBOT of the opposing ALLIANCE. This results in a climb awarded to the other ALLIANCE as well as a TECH FOUL.
- G8. No climbing with PROVISIONS. This results in a FOUL.

5 Game Rules: Humans

5.1 Before the MATCH

- H1. Leave the PROVISIONS alone outside of a MATCH.

5.2 During the MATCH

- H2. PROVISIONS enter the field through the LOADING STATION only. PROVISIONS may only be introduced to the FIELD during TELEOP and by a HUMAN PLAYER.
- H3. Once Provision contacts HUMAN PLAYERS, it cannot be put back into the ROPE BRIDGE or BASKET.
- H4. During TELEOP, an ALLIANCE may not have more than six (6) PROVISIONS outside the FIELD at once. This results in a FOUL every five (5) seconds the situation is not corrected.
- H5. PROVISIONS must be handed off or rolled by the HUMAN PLAYERS during a MATCH on the TRAIL.
- H6. HUMAN PLAYERS can only hold one (1) PROVISION at a time.

5.3 In the ARENA

- H7. Teams may not permanently modify PROVISIONS in any way.
- H8. DRIVE TEAMS are prohibited from interacting with ARENA elements through climbing, hanging, deforming, and/or damaging.

