

Game Design Challenge Finalist Team 2168

Team Name: Aluminum Falcons

Location: Groton, Connecticut USA

Game Name: FIRST Thunderation

Game Overview:

FIRST THUNDERATION is played on a 54' x 27' carpeted field, and requires two Miner-drone squads to explore an ancient space mine; to complete their mission, drones Extract Energy from the Debris Meteors and collect key minerals necessary for repairing their exploration craft.

Each three team alliance explores in three ways:

Collect/Deliver Debris Meteors:

Teams deliver Debris Meteors to the Energy Extractor located at either end of the Mine. Teams can score directly in the Extractor or they can fill up the Preprocessor first, which when full will empty into the Extractor and provide a boost of efficiency to the entire mining operation for a limited amount of time.

Collect/Deliver Cosmic Minerals:

Teams deliver Cosmic Minerals to the alliance's mine-cart located in each alliance's mining zone. They must be transported out of the mine via the Mineral Cart to the Collection Bin.

Prepare to return to their exploration craft:

Miner-drones must balance themselves onto their Return Platform to prepare for final extraction.

Efficiency Boost Period:

A team enters the efficiency boost period each time the Preprocessor is filled and then emptied into the Extractor from the average weight of 40 Meteors. Each boost period lasts 20 seconds and during that time Meteors scored in the Extractor (including the Meteors that were just emptied from the Preprocessor) and Minerals scored in the Collector Bin will be worth 2X value. During this period the Preprocessor remains in the downward empty position and the pipe light bulbs will flash.

During the 15 second Autonomous Period, Alliances score points by:

Move from the Landing Zone: 5 points

Each Meteor in Extractor: (1 match point) 1lb

Each Mineral in the Mineral Cart: (15 points)

During the 2 minutes and 15 second Teleoperated Period, Alliances score points by:

[Normal Period Actions]

Every 2 Meteors in the Extractor: (1 match point) 1lb

Each Mineral delivered to Collector Bin: (10 match points)

[During Efficiency Boost Period Actions]

Each Meteor in the Extractor: (1 match point) 1lb

Each Mineral delivered to Collector Bin: (20 match points)



[Ranking Point Actions]

100lbs of Meteors in the Extractor:

1RP (Qualification Matches) 100lbs

100 points (Elimination Matches) 100lbs

14 Minerals Delivered to Collector Bin:

1RP (Qualification Matches)

100 Points (Elimination Matches)

During the last 30 seconds of the match, Alliances score additional points by:

[Action]

Park: 5 points each

Each robot fully within the vertical projection outlined by the taped zone which has its weight partially or fully supported by a structure other than the Return Platform.

Return Platform Accessed: 20 points each

Each robot which has its weight fully supported by the swinging Return Platform and is not in direct contact with other field elements (floor or Platform frame).

Return Platform Centered: 30 points each

A swinging platform that with at least (1) robot on it that qualifies as Accessing the Platform, that is not in contact with or stabilized by anything, and is solely supported by the chains.

Describe Notable Field Elements:

Debris Meteors

The Debris Meteor is a 5 inch diameter foam GOPHER ball. There are 100 Meteors available in each Meteor pod. The field contains 500 Meteors.

Cosmic Minerals

The Cosmic Mineral is a 6" x 12" hard foam cylinder. There are 3 Minerals available in each alliance's mining zone at the start of the match. The field contains 40 Minerals inclusive of 17 Minerals located behind each alliance's driver station.

The Meteor Deposit Pods

Driving into the deposit pod trip gate will cause the pod to empty its contents.

The Meteor Retrieval Zone

Meteors are placed back on the field from a human player from meteors retrieved from the opponents extractor.

The Mineral Retrieval Zone

Human players pass the minerals onto the field. Vision targets at openings.

The Extractor & Pre-Processor



The Preprocessor is 78" high and the Extractor is 36" high. Lights are used to indicate when a ranking point is scored from Meteors and Minerals. An Efficiency Boost period happens each time the Preprocessor dumps. Meteors will be counted as they pass through the extractor and collected in a bin where they can be deposited back on the field.

The Rail-Way and Crossing

At one end is a crossing that allows robots to easily cross the tracks. The track rail is 1.5" high

The Mineral Cart

The Mineral Cart is pushed up a sloped rail-way to score minerals in the collector bin. When the cart is pushed over the collector bin it will automatically empty its contents. The mineral cart has two rows of scoring openings on each side 25" and 36" with vision targets at lower openings.

The Collector Bin

Located on the perimeter of the field at the end of the mineral carts travel, receives Cosmic Minerals for a potential Ranking Point or Bonus.

What are robots expected to do?

Robots will start the game touching their alliance wall with 10 Meteors and/or 1 Mineral. During Autonomous Period, they will score either in the Extractor or in their Minecart, or both. Offensive robots will then begin cycling between human player stations and scoring locations. Any robot unable to cross the 1.5" tall tracks will be forced over the railway crossing, slowing them down and opening them up for defensive play. Defensive robots will try to interfere with these cycles by positioning themselves within the neutral zone, defending the opposing alliances' scoring locations or access routes to human loading stations.

Alliances will try to maximize scoring potential by staging as many balls in a position to be scored as possible once the Pre-Processor dumps into the Extractor and activates the bonus period. Teams that chose to focus on Debris Meteors will spend a lot of time making sure that when the bucket dumps, they are ready to score the maximum number of points.

Alliances will have to determine when and how many times they wish to deliver the Cosmic Minerals to the Collector Bin. Doing so too early may result in limiting the number of game pieces that can be scored each push but doing so too late could prevent other endgame actions that are worth more points. Timing the dump so it coincides with a bonus point period will be essential for any robot looking to maximize their score.

During endgame robots will cease their cycles and attempt to climb onto the Return Platform. Each alliance will try to balance as many robots onto the platform as possible. The first robot can just drive up onto the platform but the next two will require either great communication or specific mechanisms to bring the platform within reach and balance.

Did you use the Game Design Challenge Element in your concept?

Yes

If yes, how?

The Return Platform (Element usage)

The return platform hangs from chains (The Element) which allows it to swing laterally and tip as robots try to drive on. Certain weight distributions could cause the chains to go slack, which allows the platform to tip as well as swing. There are short guardrails along the sides of the platform to protect the support

beams and keep robots from falling off the platform. The gap between the ramps and the platform are 14 inches, but the geometry of the platform allows it to close that gap when force is applied. This allows robots to strategically position the platform to get as many of their alliance robots on as possible in order to maximize their endgame score. The length of the bridge has been optimized to fit two robots easily but will require careful communication and teamwork to fit three. The bridges are designed to be robust enough to withstand collisions but be flexible enough to provide challenge for robots attempting to board.