



Power Flash

Spring 2026
Competition Rules

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ou.edu/scr/storm



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1. Introduction

1.1 *STORM* - The Student Tele-Operated Robotics Mission

STORM is an interscholastic robotics competition designed for university students. In this competition, teams build a teleoperated robot capable of interacting with a real-world environment. However, the operator will not be able to see what the robot is doing and instead will operate from a separate location. Teams must consider how to maximize their robot's mechanical design, sensors, and operator control to win.

The mission of *STORM* is to be accessible for all university-level students or educators interested in robotics as a way to teach real-world engineering. When compared to many other university-level robotics competitions, *STORM* is of the lowest in both cost to compete and barrier to entry. This makes this competition ideal for student organizations and for capstone design courses. By competing at *STORM*, students will learn robot design, mechanical mechanisms, electrical sensors, human machine interface (HMI) design, control theory, and more. These skills are directly applicable to the real-world engineering challenges the students will encounter in their futures.

Join the *STORM* Discord server for updates and questions at <https://storm.soonerrobotics.org/discord>
Questions? Email the *STORM* committee at storm@ou.edu

1.2 *Power Flash*

Power Flash is the 2026 *STORM* challenge. A common result of severe weather is the failure of local power infrastructure. For this mission, two robots will have to navigate a busy environment, install batteries, and generate electricity to restore power to a damaged location. As the robots rush to restore power, meteorologists monitoring the area notice that there is a high risk of flash flooding and the robots must climb to safety!

1.3 Registration

STORM 2026 is scheduled to take place during **Spring 2026**. Registration is free and open to teams associated with a university¹. There is no limit to the number of teams from each university, but each team must register separately. Each team is only allowed one robot. Teams must be entirely composed of students currently registered in at least one course during the Fall 2025 or Spring 2026 semester.

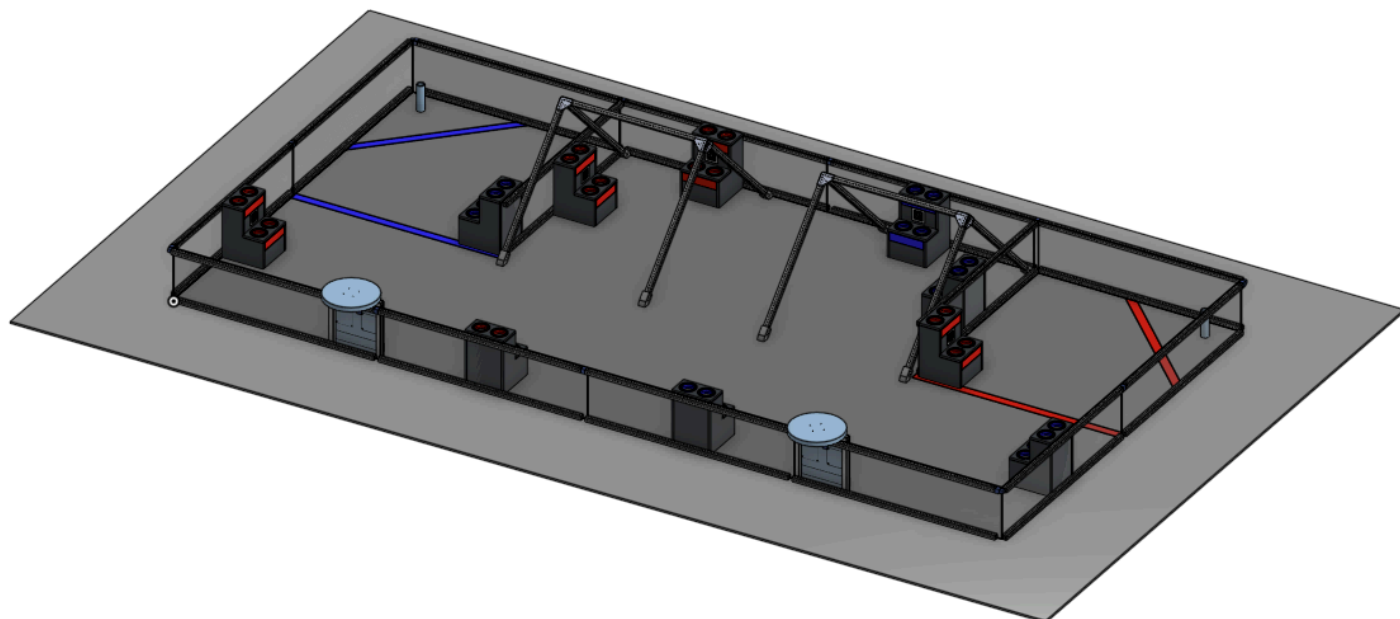
Registration requires a team captain, an advisor, and a robot. The team captain must be 18 years or older. The advisor may be any staff or faculty associated with the team's university.

Register at <https://storm.soonerrobotics.org/>

¹ Or any post-secondary institution



2. The Field



The Field for *Power Flash* is defined by a 16' (foot) x 8' (foot) rectangular area. The surface of the Field consists of interconnected foam mats. 12" (inch) tall polycarbonate walls form the perimeter of the Field. Field dimensions are available in the [8. Appendix](#).

2.1 Zones

In the back corner of each side of the Field is two overlapping zones for each team. The Starting Zone consists of the triangular area marked off by diagonal colored tape and includes the tape. The Team Zone consists of the square area marked off by the horizontal colored tape and includes the tape and the Starting Zone.

2.2 Battery Bank

In various locations across the Field are ten (10) Battery Banks. Five (5) Battery Banks will belong to each team and be colored accordingly. Each Battery Bank will have four (4) Battery slots that a Battery can be placed in to score points. Each slot may only hold one (1) Battery.

2.2.1 Battery

Batteries are six inch long hollow 1-¼" PVC pipes (1.660" OD).



2.3 Charging Station

Two Charging Stations are placed on the front wall of the Field. Each Charging Station belongs to the team of the closest Starting Zone. The Charging Station consists of two scoring-related elements - a Charging Pad and a Charging Wheel.

2.3.1 Charging Pad

On the front face of the Charging Station is a pair of copper pads that define the Charging Pad. Robots may apply a voltage across the copper pads.

2.3.2 Charging Wheel

On the top of the Charging Station is a large wheel that may be spun by Robots.

2.4 Utility Line

In the center of the Field is a horizontal aluminum 1" square tube called the Utility Line. The Utility Line consists only of the horizontal tube and does not include the supporting structure.

3. Playing a Match

3.1 Match Overview

A *Power Flash* Match is played on a Field and consists of two Teams each with one Robot. During a Match, Teams have four minutes to earn as many points as they can. The team with the most points at the end wins the Match.

3.1.1 Autonomous Period

During the first 30 seconds of each Match, Robots may only be operated autonomously (Operators will not be allowed to control their Robot). The only exception is Operators may start their Robot's autonomous routine through a short, single action.

Examples of legal autonomous starting actions include pressing a single keyboard button or pressing a single button on a GUI.

3.1.2 Teleop Period

After the Autonomous period ends, the Teleop period begins and lasts 3 minutes and 30 seconds. Operators may control their Robots during this period. During the Teleop period, Technicians may place Batteries into their Starting Zone. Technicians may not place Batteries if a Robot is inside the Starting Zone.



3.2 Match Setup

Before each Match, each Technician will place their Robot inside their Starting Zone and touching a wall. Robots may be loaded with one (1) Battery before the start of a Match. Operators will move to the Operation Center room where they can connect to the *STORM* network and control their Robots. The Match will begin after all Referees, Technicians, and Operators indicate they are ready.

3.3 Scoring

3.3.1 Autonomous Control

During the Autonomous period of each Match, installing Batteries is worth eight (8) points and Kilojoules earned are doubled. Additionally, Robots which completely leave the Team Zone during the Autonomous period earn three (3) points.

3.3.2 Install Batteries

Robots may insert Batteries inside Battery Banks to earn five (5) points for each Battery. A Battery earns points if it is at least partially contained within the volume of one of the four slots of a Battery Bank. Batteries will be scored at the end of the Match.

Batteries which score points also increase the team's Capacity. Each one (1) point that a Battery earns to a team also adds one (1) unit of Capacity to the team.

Robots may possess only one (1) Battery at a time.

3.3.3 Charge the Batteries

Robots which perform the Generate Electricity or Jumpstart the Grid tasks will earn Kilojoules towards the Match. At the end of the Match, teams will be awarded points based on the number of Kilojoules earned but are limited by the team's Capacity. The points earned is calculated by

$$\text{Points Earned} = \min(\text{Kilojoules}, \text{Capacity})$$

Because Kilojoules are converted to points only at the end of the Match, the order in which Kilojoules and Capacity are earned does not matter.

3.3.4 Generate Electricity

Robots may spin the Charging Wheel to generate Kilojoules. For every two seconds the Charging Wheel is spinning at the Grid Frequency (within +/- 5 RPM), the team will generate one (1) Kilojoule.

Before each Match, the Grid Frequency will be chosen randomly between 20, 30, 40, and 50 RPM. The Grid Frequency will be provided to the Operators in the Operation Center before and during each Match.



3.3.5 Jumpstart the Grid

Robots may apply a voltage to the Charging Pad to generate Kilojoules. If a Robot applies the correct Grid Voltage (within +/- 0.5V) to the pads, the team will generate five (5) Kilojoules. A team may only Jumpstart the Grid once every thirty (30) seconds. The cooldown timer will start whenever the Charging Pad detects the correct voltage and awards the Kilojoules.

Before each Match, the Grid Voltage will be chosen randomly between 2, 4, 6, 8, and 10 volts. The Grid Voltage will be provided to the Operators in the Operation Center before and during each Match.

See rule [4.4 Robot Rules](#) for Robot construction requirements related to this task.

3.3.6 Avoid the Floodwater

Robots may climb the Utility Line at the end of a Match to earn points. A Robot entirely supported by only the Utility Line and not touching any other field elements will earn 20 points. A Robot that is also at least twelve (12) inches off the Field floor earns an additional 20 points.

4. Rules

4.1 Event Rules

- 4.1.1 Teams should be quick in preparing their Robot for a Match. Teams should ensure their Robot can communicate with their Operator before each Match. Teams will have five (5) minutes before a Match is scheduled to place and prepare their Robot. Teams who do not have their Robot ready three (3) minutes after a Match is scheduled will be Disqualified for the Match and must remove their Robot from the Field if it is on it.
- 4.1.2 During the Playoffs period, each Team will receive one (1) Timeout that they can redeem for an extra fifteen (15) minutes before a Match with their Team starts.
- 4.1.3 There will be two or more Referees who will oversee each Match for fairness and adherence to the Rules.
- 4.1.4 A Referee may require a Team to present their Robot for inspection if a Referee believes it is violating a Rule.

4.2 Team Rules

- 4.2.1 A Team may consist of any number of Team Members. Each Team must have one Team Technician and one or more Team Operators. Team roles may change between Matches.



4.3 Match Rules

4.3.1 Match

- 4.3.1.1 Each Match is four minutes long. A Match begins on the Referee's signal.
- 4.3.1.2 Robots are allowed to move before a Match begins to test teleoperation, but Robots must stay within the starting area (as defined in [3.2 Match Setup](#)) until the Match begins. A Robot which leaves this area after being placed on the Field, but before the Match begins, will receive a Minor Penalty towards the Match and must be manually placed again. The Match will not begin until both Robots are within the Starting Zone and touching a wall.
- 4.3.1.3 A Disqualification towards a Match will cause the final score of the Team to be 0 points for the Match.

4.3.2 During a Match

- 4.3.2.1 Egregious or excessively repeated Penalties will cause the Team to be Disqualified from this Match. Do not intentionally break rules to gain advantage.
- 4.3.2.2 Robots earn points as described in [3. Playing a Match](#). The final accumulated number of points earned during the Match is the Team's final score for the Match.
- 4.3.2.3 Teams may be issued Penalties for violating rules. Each Minor Penalty will deduct (3) points from the final score. Each Major Penalty will deduct (8) points from the final score. If a final score is less than 0 points after all Penalties are applied, the final score becomes 0 points.
- 4.3.2.4 Team Technicians must be at their Match's Field.
- 4.3.2.5 Team Operators must be at the Operation Center.
- 4.3.2.6 Team Operators may not communicate with any other Team Members.
- 4.3.2.7 Each time a part of a Robot falls off, the Team will receive a Minor Penalty. Each time a fallen part is used to gain an advantage in scoring, the Team will receive a Major Penalty.
- 4.3.2.8 Robots must not damage the Field or Batteries. The Team will receive a Minor Penalty for each instance of excessive damage to a Battery and a Major Penalty for instance of excessive damage to the Field.
- 4.3.2.9 Robots may not extend outside of the Field during a Match. Each time a Team's Robot extends outside of the Field, the Team will receive a Minor Penalty.
- 4.3.2.10 Robots may not possess more than one (1) Battery at a time. If a Robot has possession of more than one (1) Battery for more than momentarily, the Robot will receive a Major Penalty for each Battery beyond the first.
- 4.3.2.11 Robots may not intentionally remove Batteries from the opposing team's Battery Banks. The Team will receive a Major Penalty for each instance.
- 4.3.2.12 Robots may not enter the opponent's Team Zone. The Team will receive a Major penalty for each instance of the Robot being entirely within the opponent's Team Zone.



4.3.3 Robot Interaction

- 4.3.3.1 Do not use your Robot to collide with another Robot with the intent to cause damage. Robot contact is expected but should only be incidental. Teams violating this rule will be Disqualified from this Match.
- 4.3.3.2 Do not force the opposing Robot to cause penalties. Teams violating this rule will receive a Minor Penalty and the opposing Robot will receive no penalty.
- 4.3.3.3 Do not pin the opposing Robot into a position where it can no longer move. Robots performing sustained and intentional pins will receive a Major penalty.
- 4.3.3.4 Do not use your Robot to make contact with an opposing Robot while it is in contact (climbing or hanging) with a Utility Line. Teams violating this rule will receive a Major Penalty.

4.4 Robot Rules

- 4.4.1 Robots must fit within an 18" x 18" x 18" cube. After a Match begins, robots may expand and this restriction instead becomes a 24" x 24" x 36" rectangular prism (36" being the height limit).
- 4.4.2 Robots must weigh no more than 50 pounds.
- 4.4.3 Robots must be ground vehicles, drones and other air-propelled robots are not allowed.
- 4.4.4 Robots must be battery powered.
- 4.4.6 Robots may only communicate from the field using the provided WiFi network and credentials.
- 4.4.7 Loss of Signal - When a Robot is no longer able to communicate with its Operator, the robot is considered to have Loss of Signal. Robots must be able to detect Loss of Signal and must immediately halt all motion within one (1) second.
- 4.4.8 Signal Light - Robots must include one clearly visible light that indicates Loss of Signal. The Signal Light should blink approximately once per second while the robot has a signal. The Signal Light should be solid when there is Loss of Signal.
- 4.4.9 Robots that implement a mechanism to score task 3.3.5 must limit the max amount of current able to be drawn by their voltage provider to 20 mA. The mechanism must also be able to disable voltage output remotely by an Operator.
- 4.4.10 Inspection - Before a Robot may compete in any Matches, it must be inspected by a *STORM* referee. Inspection will consist of a size test (4.4.1), a weight test (4.4.2), a Loss of Signal test (4.4.7, 4.4.8), and a current test (4.4.9). The Loss of Signal test will be performed by a referee cutting off WiFi while the Robot's Operator continuously drives the Robot around.

4.5 Robot-Operator Communication

- 4.5.1 The Robot and the Operator will be in separate rooms during a match.
- 4.5.2 The Robot and the Operator may only communicate through the provided network. No external communication such as cellular networks or radio are allowed. Internet access will be available on the network for convenience, but it is against the rules for anyone other than the Operator to have any connection to the Robot at any time. Teams breaking this rule may be disqualified from all remaining Matches.
- 4.5.3 The Robot may only connect to the provided network through the competition WiFi access point.
- 4.5.4 The Operator may connect to the provided network either using WiFi or ethernet available in the Operation Center.



- 4.5.5 The provided network will reside on the 10.10.x.0/24 subnet. DHCP will be available for automatic IP address assignment. Teams will be allowed to choose an available subnet at registration.
- 4.5.6 Teams will be provided a username and password for the WiFi within one month of the event. These will be unique to each team and should not be shared.
- 4.5.7 Networking speeds will be limited to 10mbit/s.
- 4.5.8 Any ports may be used.



5. Design Challenge

In addition to building a Robot, Teams will be required to submit a Design Report describing the design process of their *STORM* 2026 robot. Design Reports should be no longer than 5 pages not including title pages or appendices. Teams should include the following information at a minimum:

- Team Organization and Team Members
- High-level Block Diagram(s) of the Robot
- Mechanical Design
 - Drivetrain Configuration
 - Mechanisms
- Electrical Design
 - Single-board Computer or Microcontrollers
 - Sensors
- Software Design
 - Operator Interface
- Safety and Reliability
- Bill of Materials

Design Reports are due two weeks before the competition date with a ten (10) point penalty applied for each day late. The reports should be submitted in PDF format on each Team's dashboard on the *STORM* website. Each report will be judged by a committee consisting of faculty and industry professionals. The scoring rubric is described in the table below. Reports should be written to emphasize the engineering process and decisions made while creating the robot. Design reports from *STORM* 2025 are available on the *STORM* website.

Criteria	Maximum Points
Description of Team and Robot	30
Description of Mechanical Design	40
Description of Electrical Design	40
Description of Software Design	40
Description of User Operation	30
Novelty	10
Organization and Style	10
Total Points	200



6. Competition Format

6.1 Tournament

The 2026 *STORM* competition will be split into two periods: Ranking and Playoff. During the Ranking period, teams will play several scheduled Matches. After the Ranking period concludes, teams will be seeded into a double elimination Playoff bracket based on the win/loss record and their average points scored. The final Match will determine the First and Second Place winners.

6.2 Awards

Four awards will be presented at *STORM* 2026:

- First Place
 - Award for the team that wins the finals in the Playoff Matches
- Second Place
 - Award for the team that loses the finals in the Playoff Matches
- Highest Score
 - Award for the team that achieves the highest final score for a Ranking or Playoff Match
- Best Design
 - Award for the team with the design report that earns the most points



7. Updates and FAQs

7.1 Updates

Version 1 - August 25th, 2025

- First release

7.2 FAQs

Q. How final are the rules? Are there any planned updates to the rules?

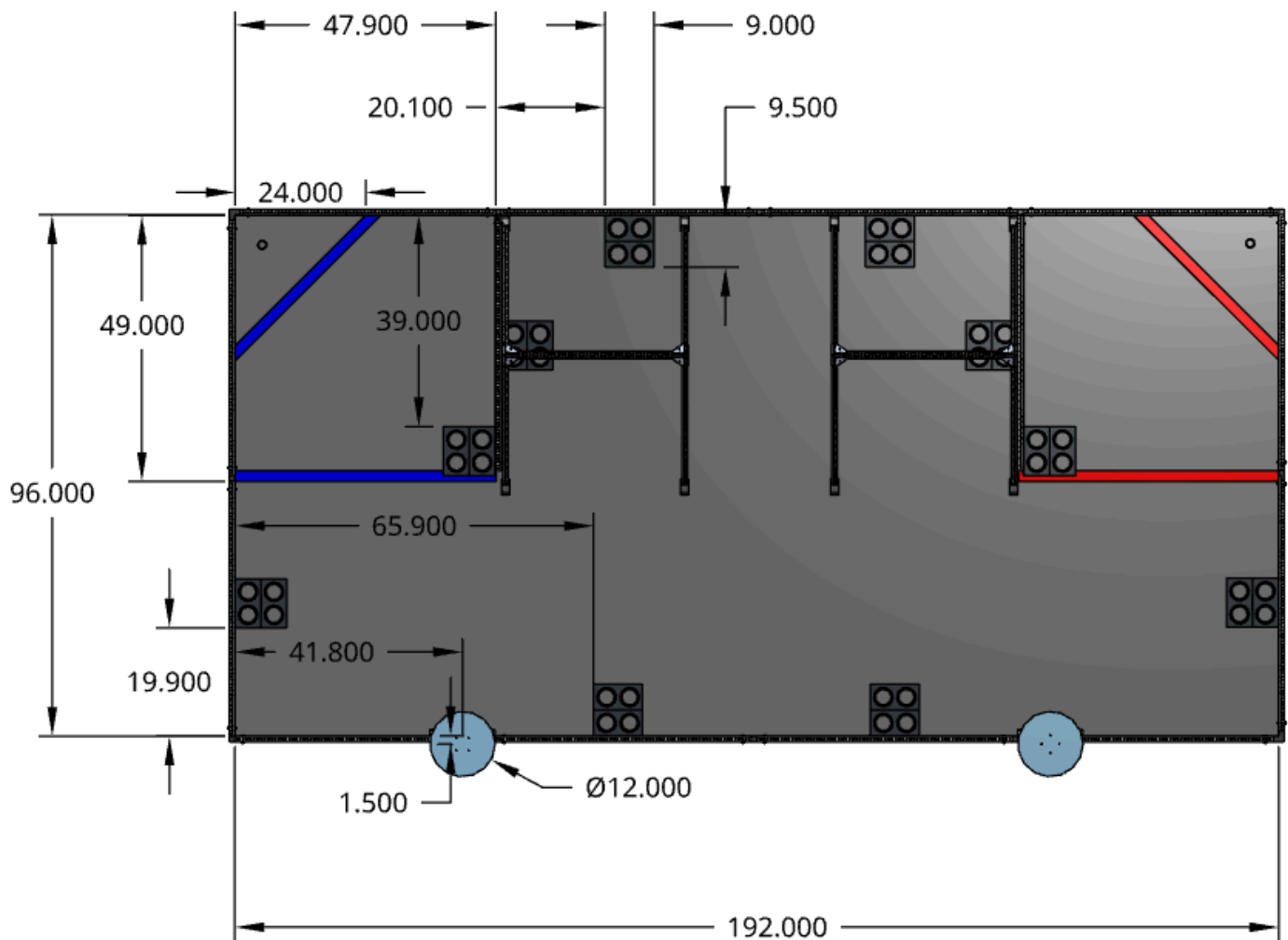
- A. The large majority of these rules are final. We hope to keep almost everything the same, but we may add or adjust rules if we find problems that would make the game not fun to play or build robots for. We will likely make small changes to the Field to add things such as more indicators for Field status and cleaning up some of the measurements. If you see any major inconsistencies or problems, please let us know! The earlier we can fix issues, the better the competition will be for everyone.



8. Appendix

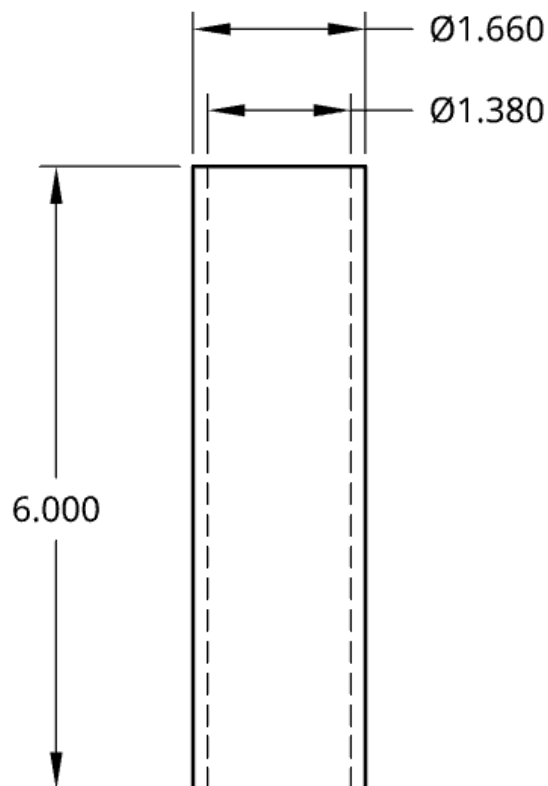
All drawings are in inches unless specified otherwise.

8.1 Field Drawing





8.2 Battery Drawing



8.3 AprilTags

On each Battery Bank and Charging Station is an AprilTag (36h11 family) to help teams with robot localization. Each AprilTag on the field has a unique id as shown below. The AprilTags are all 2 inches by 2 inches.

AprilTag IDs will be released in the Version 2 rules.