'Snow Problem Approach to Scouting for FIRST Power Up

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Abstract—This white paper highlights key parts of scouting for the 2018 FRC season, as discussed by former FRC team head scouts. This discussion was heavily influenced by members' own experiences and the ideas explored during the 'Snow Problem team strategy discussion.

1 INTRODUCTION

One part of competitive robotics is oft overlooked in the pursuit for team success, but it can also be one of the easiest ways to improve team performance: scouting. Robotics as a competitive activity requires teams to determine which team is the best choice for an alliance mate, but the criteria by which the best choice is decided can be hard to determine, especially for a team new to scouting. With this document, 'Snow Problem hopes to assist teams in putting greater emphasis on the shooting.

2 SCOUTING METHODOLOGY

With this document we are not proposing an end-all, be-all solution scouting. Rather, we propose our thoughts on important facets of scouting for FIRST Power Up. At the end of the day, teams should consider their own situation and create a system which works best for them. Scouting systems work best when they are easy to understand and easy to use.

2.1 Scouting style

Based on our experiences in scouting tournaments ourselves, we agreed that our primary focuses in scouting centered around what a team could do, as defined by their robot design, the team themselves, and game strategy, which was determined by drive team strategy and robot design.

2.1.1 Scouting a Robot

Robot ability is the simplest of our scouting focuses to understand and implement; it is what most teams think of when they hear the word: "scouting." Robot ability is determined through scouting by talking to the teams themselves and asking them direct questions about their robot, then comparing responses to data collected by team members scouting matches from up in the stands. This scouting data gives a team an idea of how a robot should be able to perform based on its design and implementation.

2.1.2 Scouting a Team

Of the three scouting focuses which we highlighted, this is arguably the most abstract focus of the bunch. When scouting a team as a whole, it is important to take into effect what is going on outside of the field. When an alliance is being chosen, the captain is not choosing just a robot, they are choosing a team; outside of autonomous, there is a group of people behind the robot telling it what to do, and a group of people behind them telling them what they want the robot to do. The scouting for this focus is done face-to-face with the team, with feedback from your own drive team, and from whatever can be gleaned from up in the stands.

2.1.3 Scouting a Strategy

Scouting a strategy can be one of the most difficult, but most rewarding, parts of scouting. It can be hard to pick out pieces of a team's overall game strategy from the stands, the pit, and the field, but if a team does it enough, then they have a very valuable resource any time they play with or against a team. If a teams strategy gets figured out, it can be very hard for a drive team to adjust, causing a huge impact on team performance.

3 WHAT TO LOOK FOR

In this section we will discuss the different things we highlighted for importance for scouting from the stands, the pits, and from the field.

3.1 Match Scouting

When match scouting, most information collected is raw numbers, with the rare qualitative comment. We discussed what data would be important for the team members in the stands to look for:

- Starting Position
- Cubes in scale (attempts and successes)
- Cubes in own switch (attempts and successes)
- Cubes in opponent switch (attempts and successes)
- Main Cube Retrieval Method
- Cubes in the Exchange
- Additional Comments
- Map of Robot Movement (Hard, but can be valuable)
- Cycle Times

3.1.1 Alliance Match Scouting

We additionally identified some parts of match scouting, which are more important to know about your qualification partners and potential alliance members than other teams.

- Auto Run
- Auto Quest (Attempt/Success)
- Park endgame?
- Attempted/Successful Climb
- Attempted/Successful Climb Assist
- Foul/Tech Fouls

3.2 Pit Scouting

While pit scouting, most important data is qualitative. This data is either used to scout a team/strategy or is used along with match data to scout a robot. We thought of some useful data to be collected while making rounds of the pits:

- Dimensions
- Robot Speed
- Preferred Power Cube Retrieval Method
- Auto Description
- Scale?
- Switch
- Climb?
- Climb Assist?
- A picture of the team you're scouting

3.3 Miscellaneous Scouting

Our discussion also yielded some other things to look for which didn't fall in either of the other categories of scouting, these are mostly things to passively watch for for the entire competition. All of these parts are of greatest importance if your team is in a position to choose teams for an alliance.

- Overall Team/Drive Team "Nice-ness"
- Team level of cooperation with alliance mates
- Team level of cooperation within their team
- Do the student members know what they're talking about
- Drive Team Quality
- Overall movement and team strategy

4 FINAL WORDS

Scouting is something which can make or break your alliance come playoffs, so it is certainly important. It is also important to get people excited to scout, so that the data you get is high quality. With that in mind, we reccomend that you try to find ways to make scouting more exciting, potentially a competition of its own: anything to get the scouting that your team needs to make it to champs, whether you are picking a winning alliance, or figuring out your place on the winning alliance.

5 CONTACTING THE AUTHORS

Team 'Snow Problem may be reached in order to ask questions on our Chief Delphi thread, on Twitter (@SnowProblemz), or via our Twitch stream during the three day build. After the build, we will still be answering questions on the thread and via email (at gofirst@umn.edu). We are doing this for you, the FRC community, and are happy to answer questions and discuss our designs with you.