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CPR *ISS Division* 2023 Documentation

Cedar Park Robotics - Team 3663



CPR Informatics & Scouting/Strategy
A Division of Cedar Park Robotics Team 3663

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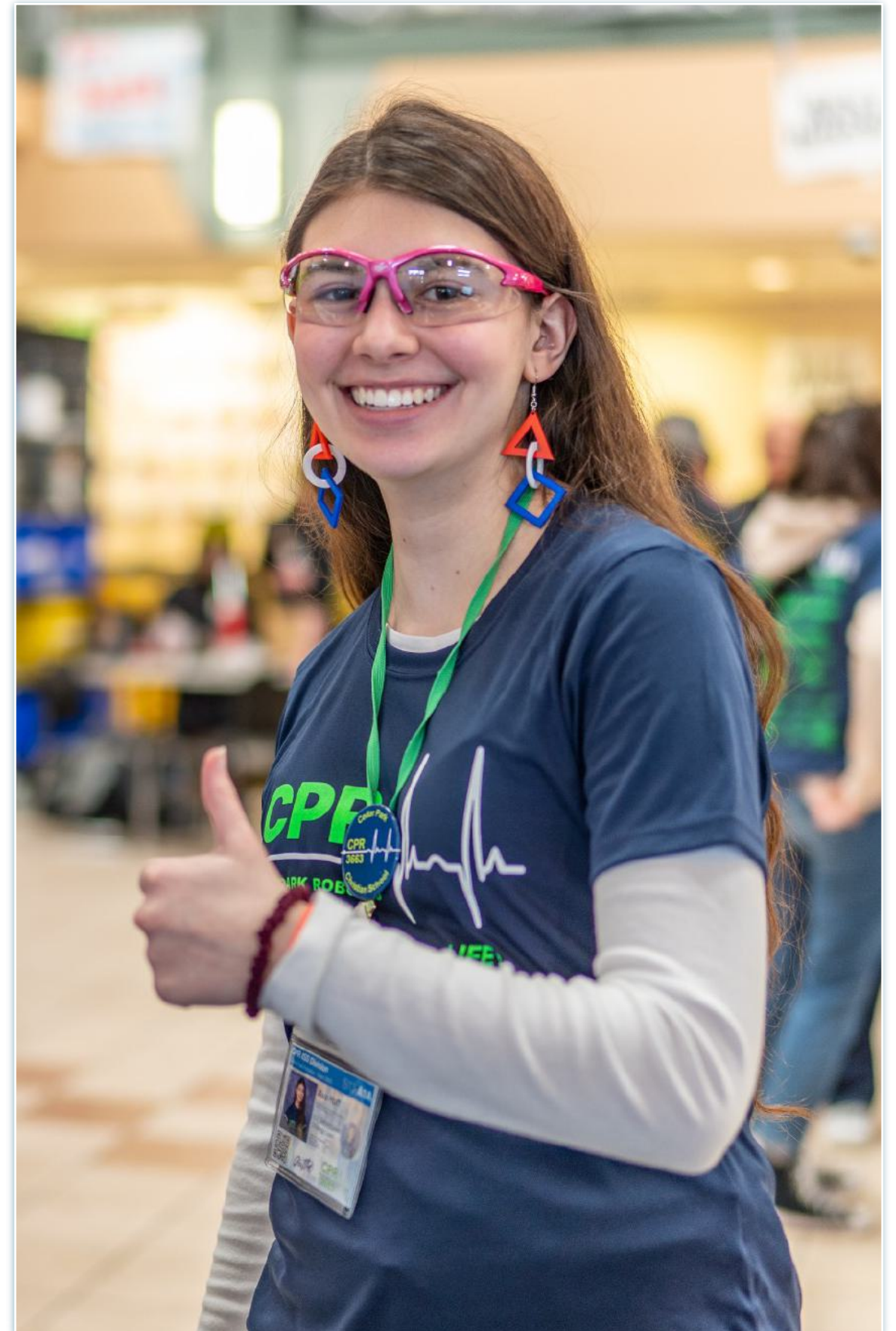
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Informatics Strategy Outreach

More Than Robots

ISS (Informatics Scouting & Strategy) Division is a crucial part of team CPR. We use state of the art software such as Scantron, R-Script, and Tableau Desktop program to process and visualize data. This information is valuable when creating strategies during competition and especially helpful during alliance selection. ISS Division is very proud of our data accuracy and availability, and endeavors to raise the level of play for everyone.

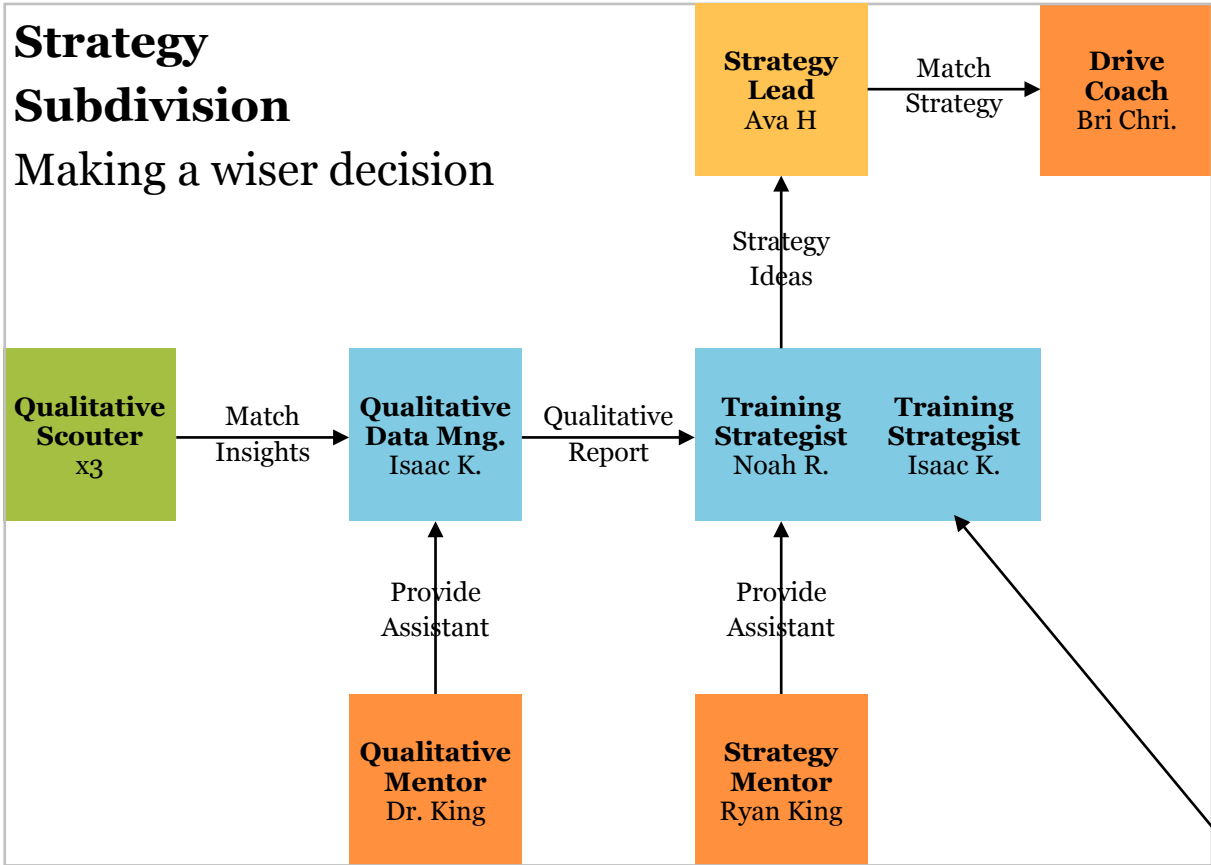


CPR winning Gracious Professionalism Award thanks to its scouting & outreach effort.

CPR ISS Division

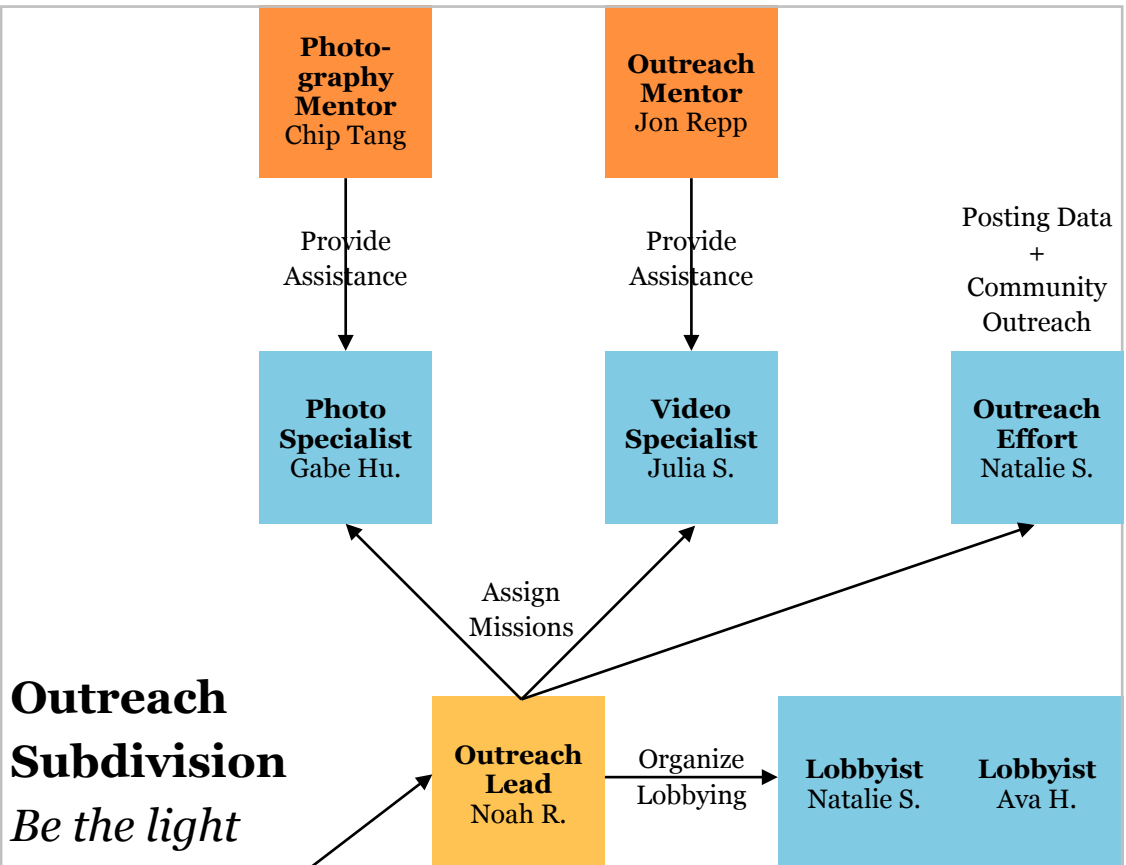
Strategy Subdivision

Making a wiser decision



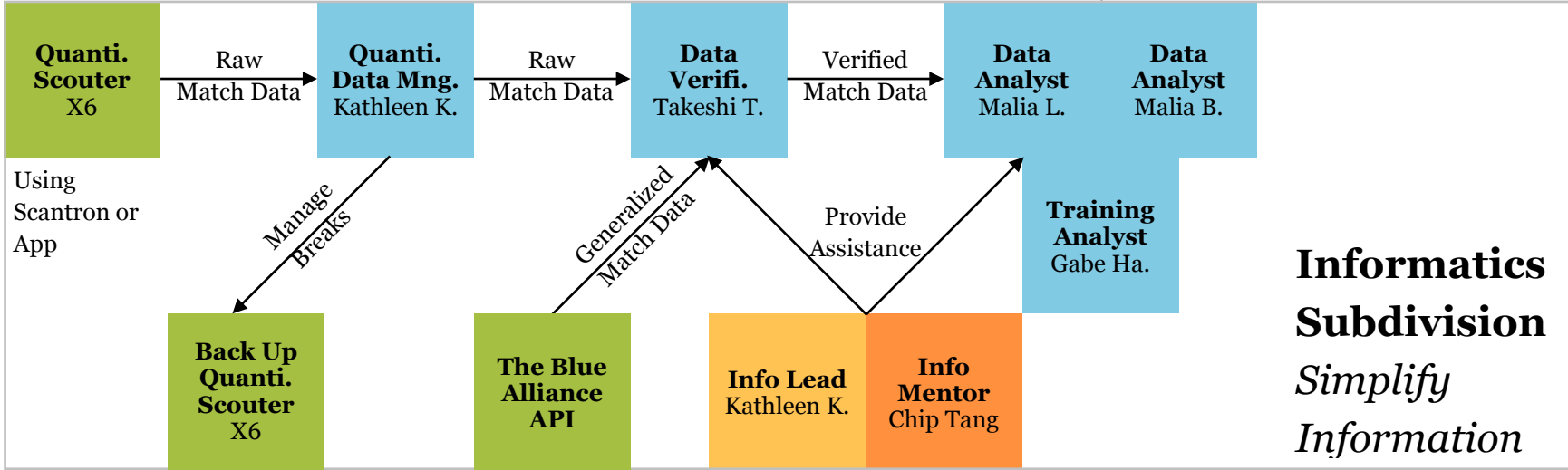
Outreach Subdivision

Be the light



Informatics Subdivision

Simplify Information





Outreach & Learning

CPR ISS Division is passionate about inspiring the next generation of innovators. We share our knowledge in informatics and scouting strategy with other teams to showcase coopertition and contribute to the wider community. We believe that by learning from one another, we can create a brighter future for all.

Start Scouting

Scale Scouting to the Size of Your Team

Scouting is an essential part of our team's scouting as it allows us to study and use information collected from previous matches to improve our success. While we are fortunate to have many dedicated scouters, we understand that some teams many not have enough resources to focus on scouting full-time. To address this, we have created a template that outlines how a team of scouters can be effective with as few as two or as many as twelve members.

Want to start scouting but don't know how? CPR has a comprehensive scouting tips and video tutorials. Visit our website at www.cpr3663.com/start-scouting for more content.

Silver Level

1-2 Students

If your team has only 1-2 members available, prioritize qualitative scouting. Your Qualitative Scout(s) should use Excel or Google Sheets to provide gradings of each team's performance during matches. Online resources such as statbotics.io and tutorials on our website can also be helpful for teams with limited members.

Gold Level

3-4 Students

Teams with 3-4 students available can expand a little beyond qualitative. One member will have a job alternating between being a Lobbyist and Strategist. The other members should focus on qualitative scouting. The Scouters should devote themselves to one half of the field, and provide in depth data.

Platinum Level

5-6 Students

Teams with 5-6 students can have their 3 Scouters focus on both qualitative and quantitative scouting, still specializing in one side of the field. Partnering with another team to donate Scouters is also an option. One member will still do double duty as a Lobbyist and Strategist, while another member will work as an Analyst with the Strategist to create a match strategy.

Titanium Level

7-9 Students

Teams with 7-9 students can assign 6 students as Quantitative Scouters and should consider having a dedicated Scout Manager. One member will do double duty as a Lobbyist and Strategist, and one as a Qualitative Scouter. Another member will do double duty as an Analyst and Database Technician, with a focus on providing data visualizations and ensuring data integrity.

Diamond Level

10 Students or More

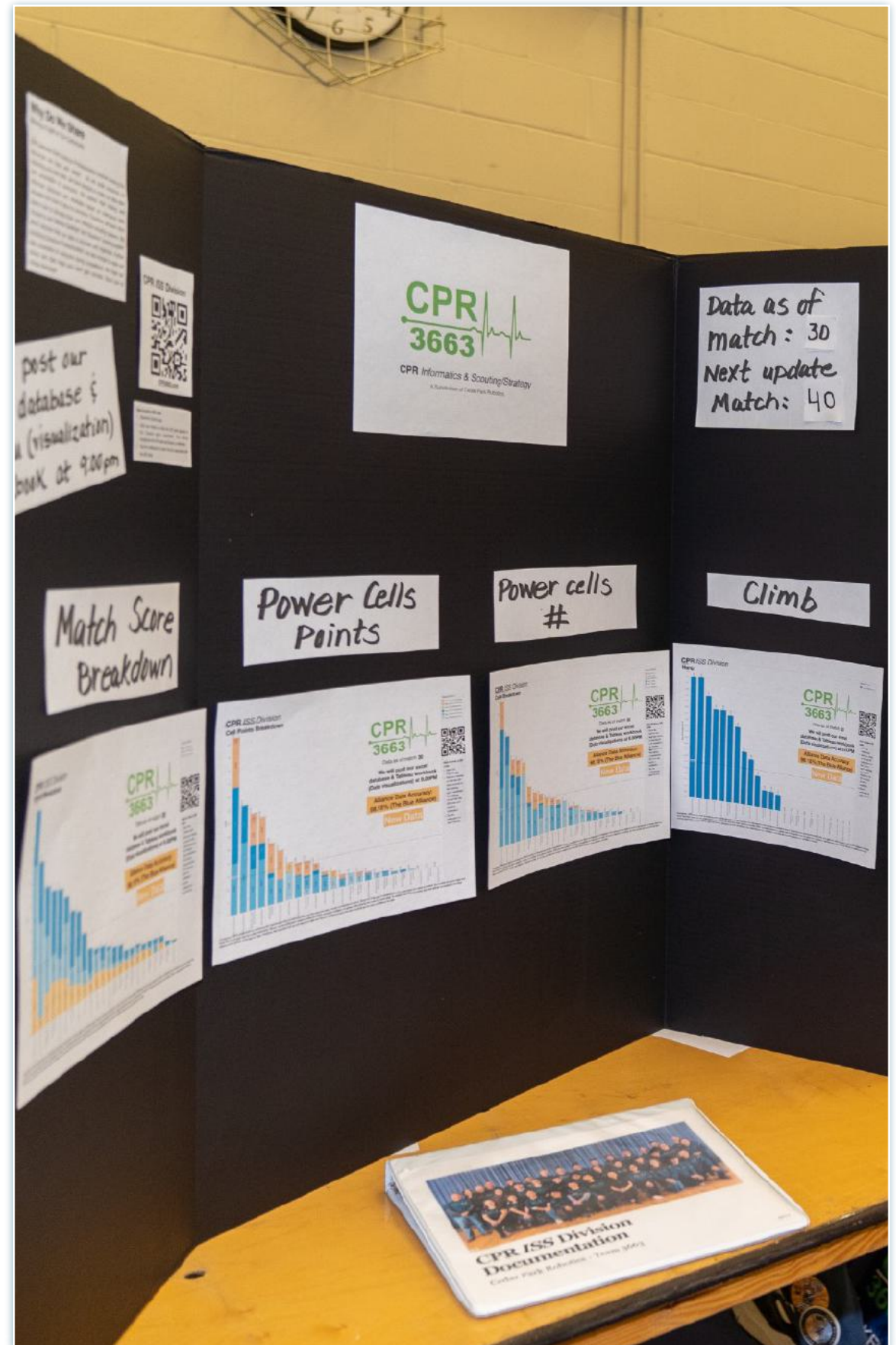
Teams with 10+ students can have a dedicated quantitative scouting team with a few additional members for rotations, as well as a Scout Manager. They can also have 2-3 qualitative Scouters with 1 lead, 1 member as a Lobbyist to handle public relations, and 1 dedicated Strategist to communicate with the Drive Coach. Another member should be assigned as a Database Technician to ensure data integrity, while a member is dedicated to providing data analysis and lobbying materials as an Analyst.



Sharing Match Statistics

Shining a Light in Our Community

At CPR ISS Division, we strongly believe in the principle of Gracious Professionalism and coopertition, which means sharing our resources with others in order to elevates the level of play for everyone. As part of this commitment, we take pride in collecting thorough and accurate data, and we have made it easily accessible to all. We believe that access to quality data empowers teams to make informed decisions and develop effective strategies, ultimately improving the level of play for everyone.



Sharing Data

ISS Division has an extensive scouting team that watches matches live from the stands and collects quantitative data using a student designed scantron system. In addition, *ISS* is exploring the opportunity of collecting data with a scouting app as well. These make our data clear and easy to transfer into other processing systems. This year, *ISS* is using R-Script, a statistical programming language, for mission control. It allows us to clean and check the data for errors. The data that *ISS* collects and processes lets CPR team 3663 make informed decisions. As a team that values coopertition, we have decided to make our data open and accessible to everyone. Throughout the competition, we post data graphs at regular intervals so that they are convenient and relevant for all teams.

Our team offers physical data access at competitions, but we also provide shared statistics on our website. Visitors can access our full database, Tableau® workbook, shared graphs, and match insights by simply scanning the QR codes posted at events. In addition to game statistics, visitors can also find helpful scouting and outreach information. In the last three seasons, we have accumulated more than 7,200 visits and 18,000 page views. By reaching more people, we aim to advance the level of play for everyone.

CPR 3663 ISS Mechanical Programming Community Resources
Team Resources About Us

Match Data

PNW District Championships Event 2023

Presented by CPR /ISS Division

[How We Scout](#) [Scouting Tips](#) [Data Integrity](#)

Data Updated as of Match: 96

CPR ISS Division Cedar Park Robotics Team 3663
Data as of Match 96

Total Score Breakdown

Measure Names
■ Avg. EG TotalPoints
■ Avg. EG TotalPoints
■ Avg. AUTO TotalPoints

CPR believes that Gracious Professionalism involves sharing the resources we have with others. As we pride ourselves on collecting accurate data, we have decided to make our data open and accessible to everyone. We believe that making well informed decisions and strategies based on meticulous data elevates the level of play for everyone. We hope our advice and data helps your team gain success.

QR Code: <https://www.cpr-3663.com/match-data>
Visit our website for the latest match data

Disclaimer: CPR prides itself on achieving the highest accuracy of data possible, but like everyone else, we are susceptible to errors. Rest assured that we will only post data that we are confident is and that will hopefully garner your confidence as well.

CPR ISS Division Cedar Park Robotics Team 3663
Data as of Match 96

Total Grid Count

Measure Names
■ Avg. TOTA-HighGrid
■ Avg. TOTA-MidGrid
■ Avg. TOTA-LowGrid

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CPR 3663 ISS Mechanical Programming Community Resources Team Resources About Us

Start Scouting

Subtitles available in English, Spanish, and Simplified Chinese

CPR ISS Division - Scouting Structure

Start Scouting - Strategy

Start Scouting - Learning

Scouting Tutorials

CPR ISS Division Cedar Park Robotics Team 3663
Data as of Match 96

Total Score Breakdown

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Upper Quartile
Median Avg. 38.25
Lower Quartile

Measure Names
■ Avg. EG-TotalPoints
■ Avg. TELE-TotalPoints
■ Avg. AUTO-TotalPoints

<https://www.cpr3663.com/match-data>
Visit our website for the latest match data

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Game Statistics

CPR ISS Division Match: _____

Blue

4089

4692

3663

Red

2910

2605

4061

Team	Move	Autonomous			Tele-Operated				End Game			
		Bottom	Outer	Inner	Bottom	Outer	Inner	Rotate	Position	Park	Hang	Defense
4089	✓		+	✓		+	+				+	
			2.27	0.18		5.27	0.55					
4692	+					-						x
						2						
3663	+		+	+		+	+				+	
			2.18	0.64		7.91	3.36					

Stage 1	✓	AUTO
Stage 2		3663 -> Sit in front of goal; move off line forward to stay out of 4089's way.
Stage 3		4089 -> Sit in front of trench, shoot, + grab + trench balls.
Cell R.P.		4692 -> Position away from 4980 + 3663, move off line.
Hang R.P.	✓	TELE

3663 → Run trench. Shoot from initiation line if clear (we're most accurate here.) if under defense, shoot from triangle + attract defender here to gain penalty points.

4089 → Run trench, shoot from initiation (most accurate spot) if under defense, stay in trench & shoot → don't bother w/ initiation line.

4692 -> Defend near opponent goal; move along initiation line, do not move off it (we don't want penalties). Stall 2910's shooting → don't let them shoot from initiation line (They are most accurate there)

ENDGAME

3663 + 4089 Double climb w/ 30s. → NEED R.P.

4692 → stop 4061 from reaching rendezvous; cannot let opponen

Match Strategy Tips

Inspiring Others

Bringing Strategic Scouting to *FIRST* Community

Cedar Park Robotics not only focuses on creating an excellent robot but also aims to encourage others to push the limits of possibility for their robot. As the result, CPR is known for its accurate & accessible match data in the Pacific Northwest.

Scouting Outreach at 2023 PNW District Glacier Peak Event

Even though we didn't attend Glacier Peak in a competitive manner, our scouting team did show up in order to collect data both for our team, and other teams in attendance. We also used this as a training opportunity in order to get our scouting interns used to the competition environment. However, we did later go over all of the data



using video scouting (rewatching the matches from The Blue Alliance) to verify their accuracy. Overall, this was a very fun experience for our team. We had over 250 unique visits to our data webpage and provided 2 teams full set of our scouting data.

Strategy Outreach - YouTube Video

To continue our efforts in sharing with others the advantages of a good match strategy, CPR's *ISS Division* collaborated this year in order to fully storyboard and script a 20~ minute video regarding Match Strategy in 2023. This video contains an overview on every aspect of the 2023 game along with in depth explanations on each portion.

FRC Team 2557 - SOTAbots

Our scouting team was invited to speak at Sotabots' Robotics Workshop during this past off-season. Excited to share, five CPR Informatics & Scouting/Strategy Division members prepared to give extensive presentations on all things scouting: quantitative data, qualitative data, Tableau, match scouting, and lobbying. Our team is fortunate to have a scouting team comprised of highly capable students; however, we understand that not every team has the man-power and resources needed to integrate every aspect of our extensive scouting system. Therefore, we explained how to integrate scouting even if only two students were available for scouting. Anticipating



CPR Outreach Lead presenting at Team 2557, SOTAbots' Workshop

an increase in scouting, we hope the insight we provided is helpful to all teams this year.

Lobbying *FIRST* Washington on Scouting

One of the *ISS Division's* primary goals is to promote scouting efforts throughout the world of *FIRST*. To carry out this goal, we met with *FIRST WA* President Erin McCallum to present how much the scouting world has grown and changed in hopes of establishing a scouting award. With this award, incentives to create smart scouting systems become even more enticing. Furthermore, we requested to establish the “Scouting Pits” at every PNW district competition. This dedicated location for scouting promotes communication between teams and brings the *FIRST* community even closer.

Expanding Scouting

CPR ISS Division is known for bring strategic scouting to more than a dozen FTC and FRC team through the Pacific Northwest District.

Training Our Own

Along with our efforts to train other teams how to scout and collect data, we put significant time into training up our team's so the can understand the concept of strategic scouting, and importance of gracious professionalism and coopertition



ISS Students being interviewed at PNW District Championship on their scouting & outreach Effort



Informatics & Scouting

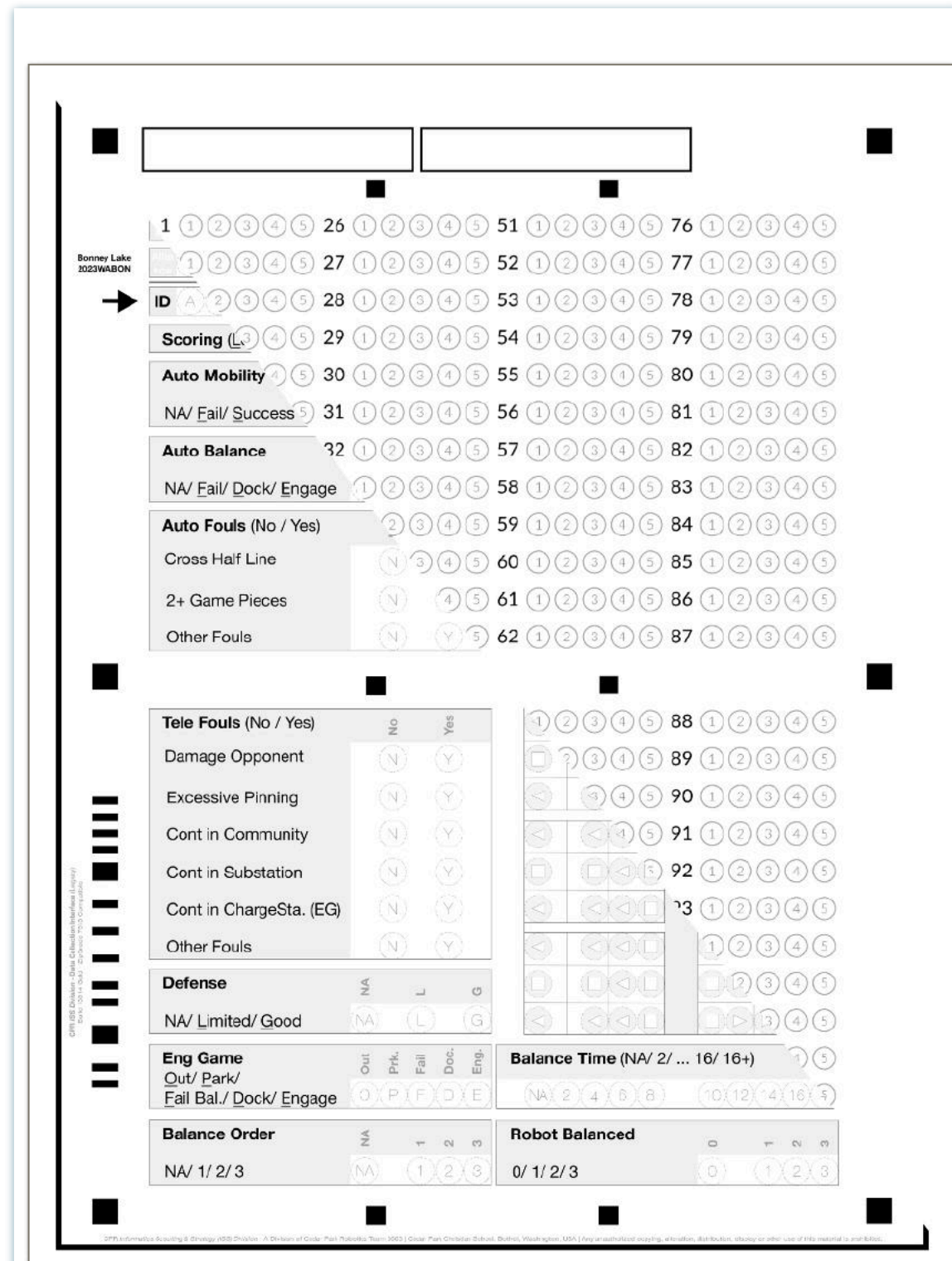
Informatics is a perfect cross-section between technology and humanity. At CPR, informatics helps us see hidden patterns and qualities that might not have been noticed.

We created a scantron-like Interface that enables us to utilize an accurate, and tangible data workflow. To fully utilize the data, we use Tableau software to create elaborate visualizations. Our Match Rubric and Match Strategy Sheet display an organized presentation of the match stats and enable us to better communicate with our robot operators and alliance members. Our utilizations of informatics techniques give us a broader perspective and are imperative to our success at competition.

Data Collection Interface & Mission Control

Advanced Data Workflow

Collecting accurate and efficient data is crucial to any strategy. Our team started scouting with paper scouting sheets since mistakes were easily corrected. We then developed a scantron-like “Data Collection Interface (DCI)” system to integrate different aspects of paper and digitalized scouting. Our DCI scouting system works by having scouters fill in answer bubbles on paper, which are then quickly turned digital by scanning them with a modified scanning app called ZipGrade. This allowed us to easily rectify the mistake by pulling out the physical scouting sheet for correction. Moreover, we would no longer need to painfully upload data inputs by hand. This year, while we are exploring the possibility of app scouting, we used DCI Scantron system as the backup.



2023 Data Collection Interface (Legacy) vs. Zipgrade marking arrays

Match - Alliance - Team

Scouter Name



CPR Informatics & Scouting/Strategy
A Division of Cedar Park Robotics Team 3663

Ev-ent: A B C Mat ch H 0 1X 2X 3X 4X 5X 6X 7X 8X 9X A B C D E
 Alliance: R B 1 2 3 0 1 2 3 4 5 6 7 8 9 1 2 3 4 5 A B C D E
 ID: A B C D E 1 2 3 4 5 A B C D E

One side

Bonney Lake
2023WABON



Scoring (Left/ Right) L R

Auto Mobility NS T S

NA/ Fail/ Success NA F S

Auto Balance NA Fail Doc. Eng.

NA/ Fail/ Dock/ Engage NA F D E

Auto Fouls (No / Yes) No Yes

Cross Half Line N Y

2+ Game Pieces N Y

Other Fouls N Y

Auto

△	△	△	△	△	△	△	△	△	△
□	□	□	□	□	□	□	□	□	□
▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
△	△	△	△	△	△	△	△	△	△
□	□	□	□	□	□	□	□	□	□
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□	□	□	□	□	□	□	□	□	□
▽	▽	▽	▽	▽	▽	▽	▽	▽	▽

Tele Fouls (No / Yes) No Yes

Damage Opponent N Y

Excessive Pinning N Y

Cont in Community N Y

Cont in Substation N Y

Cont in ChargeSta. (EG) N Y

Other Fouls N Y

Defense NA L G

NA/ Limited/ Good NA L G

Tele

△	△	△	△	△	△	△	△	△	△
□	□	□	□	□	□	□	□	□	□
▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
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▽	▽	▽	▽	▽	▽	▽	▽	▽	▽

Eng Game Out/ Park/ Fail Bal./ Dock/ Engage O P F D E

Balance Time (NA/ 2/ ... 16/ 16+)

NA 2 4 6 8 10 12 14 16 +

Balance Order NS 1 2 3

NA/ 1/ 2/ 3 NA 1 2 3

Robot Balanced O 1 2 3

0/ 1/ 2/ 3 0 1 2 3

The experience we've gained with creating our DCI "Scantron" scouting system has motivated us to develop our own scouting app. While our legacy DCI "scantron" scouting system provides a foundation for accurate and efficient data collection, and the app would build upon this foundation to create an efficient scouting tool for teams in the *FIRST* Robotics Competition. Initially we drew out a paper layout of the app we hoped to build. Then we looked at college level courses to learn what to incorporate to build a User Friendly Interface. We focused on making it easy to navigate and accessible to everyone because scouter are under a time pressure. Consistency is another key feature for a smoother process. We are looking to further develop our system so we can streamline the scouting process by automating data collection, also reducing the time delays to produce Tableau data visualizations.

After raw data is collected, our Mission Control System coded in R-script processes the data input from the app or paper "scantron", and automatically transformed them into readable numbers, making data visualization easier. Furthermore, data integrity very crucial to us, that is why we incorporate data verification to compare scouting results against the generalized data on The Blue Alliance using its API system. This ensures trustworthy data for us, our alliances, and community.

The screenshot displays two screens from the 2023 App Data Collection Interface for Team 3663.

Tele-Op Screen:

- Buttons: Back, Tele-Op Team 3663, + 90 -, End Game
- Feeder Station: A 3x9 grid of icons representing different piece orientations and colors (yellow triangles, blue squares).
- Void: A vertical label on the right side of the Feeder Station grid.
- Current Cycle: Dropped, Launched
- Cycle History Table:

#	Time	Piece
1	22	cone
2	6	cube
3	2	cube
4	2	cone
5	0	cone

Endgame Screen:

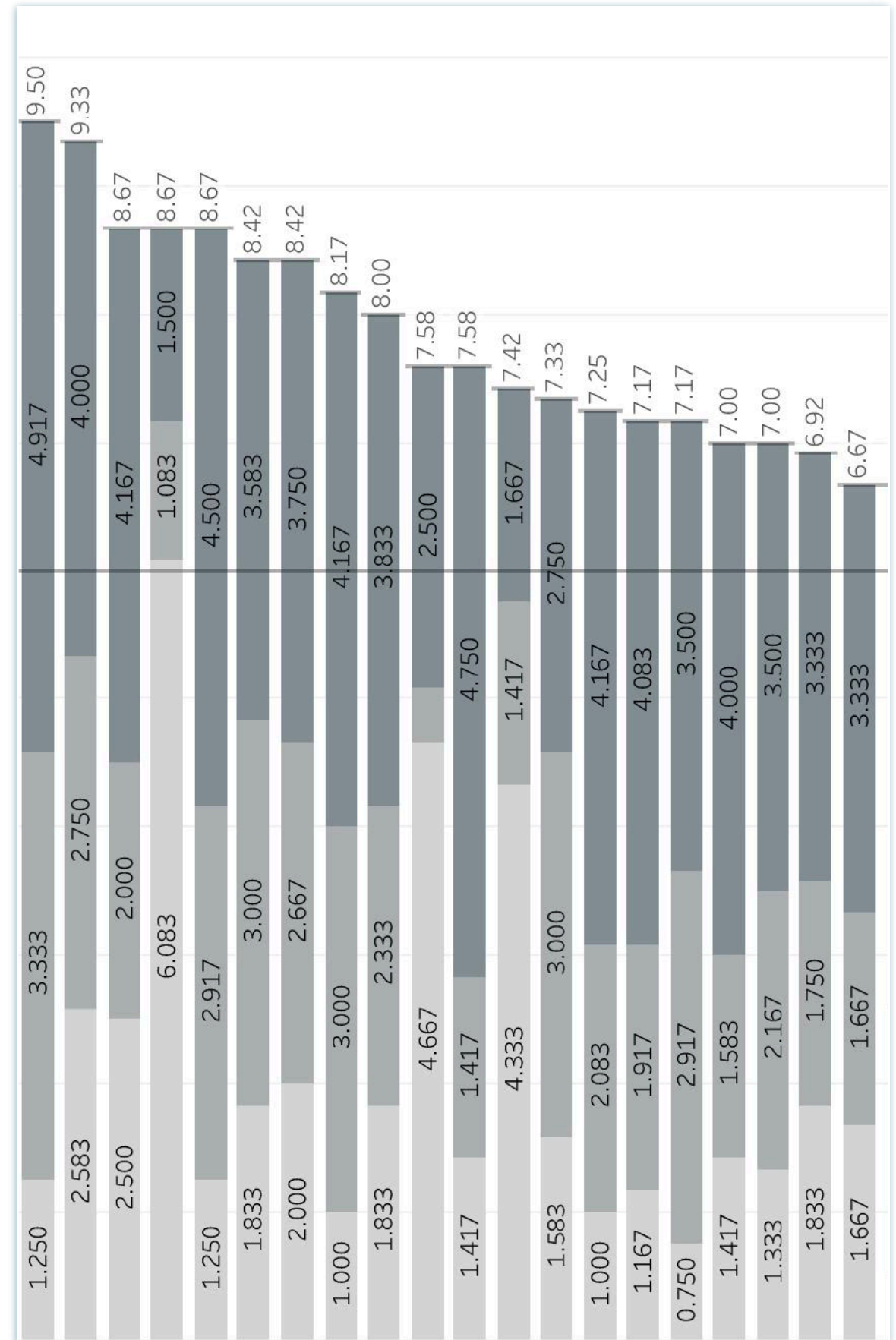
- Buttons: Back, Endgame Team 3663, + In Auto -, Submit
- Start Position: A diagram showing a robot's position relative to a field with "Middle" and "Community" zones.
- Balance: Number (Solo, Double, Triple), Order (1st, 2nd, 3rd), Result (Balance, Dock, Fail)
- Dead Robot: A button to indicate robot status.
- Feedback: A text input field labeled "Your Message".

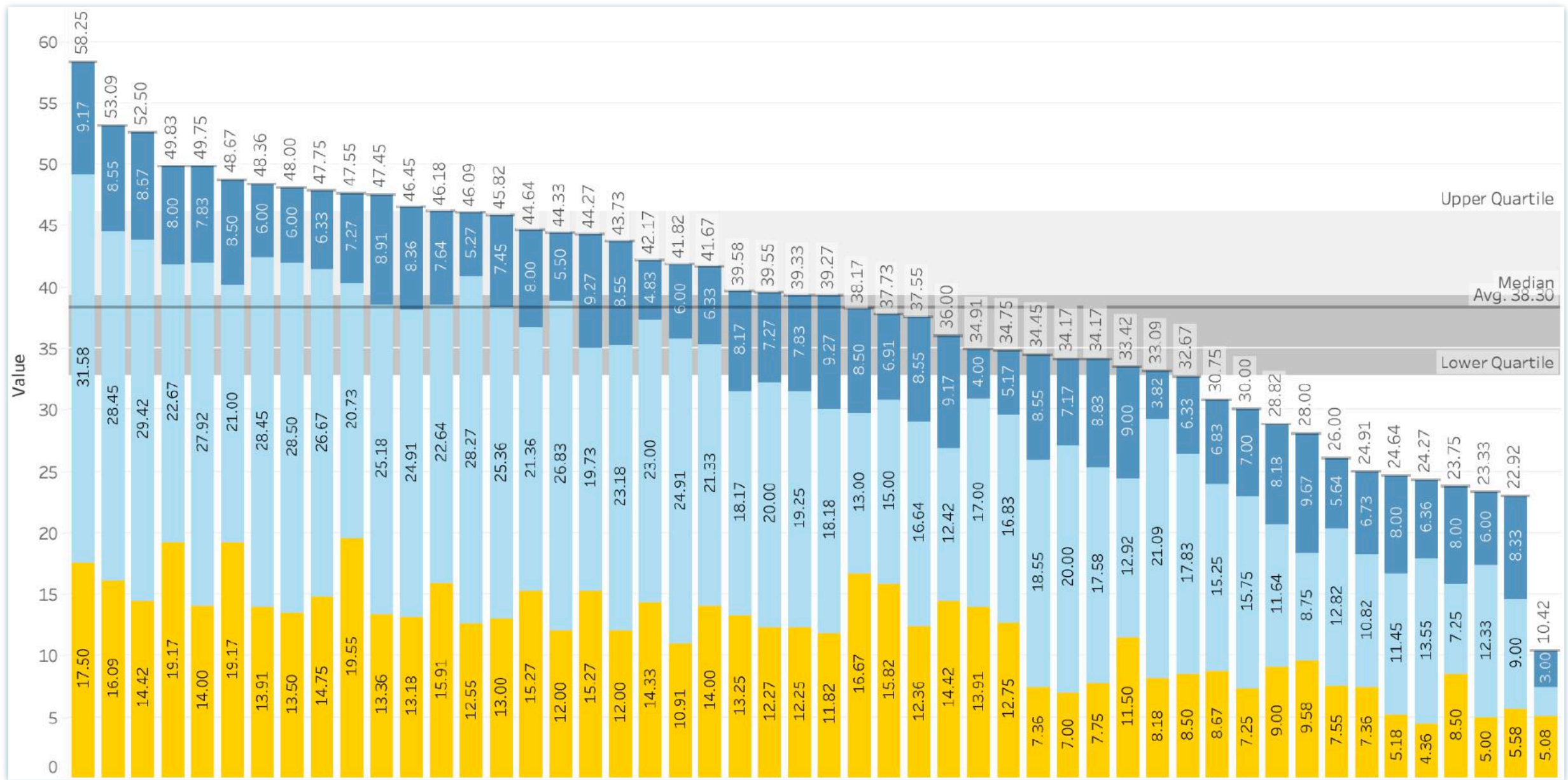
2023 App Data Collection Interface

Tableau® and Data Visualization

Professional Data Analysis

To fully utilize the data we collect, we use Tableau Desktop® Software to organize it into elaborate visualizations. Tableau Desktop® helps our analysts see hidden patterns or robot qualities that might not have been noticed in the never-ending, black and white numbers of an excel sheet. The visuals we create in Tableau® are imperative to our success in matches, lobbying, and alliance selections. To accomplish all these tasks, we use stacked graphs, scatterplots, and match rubric dashboards.



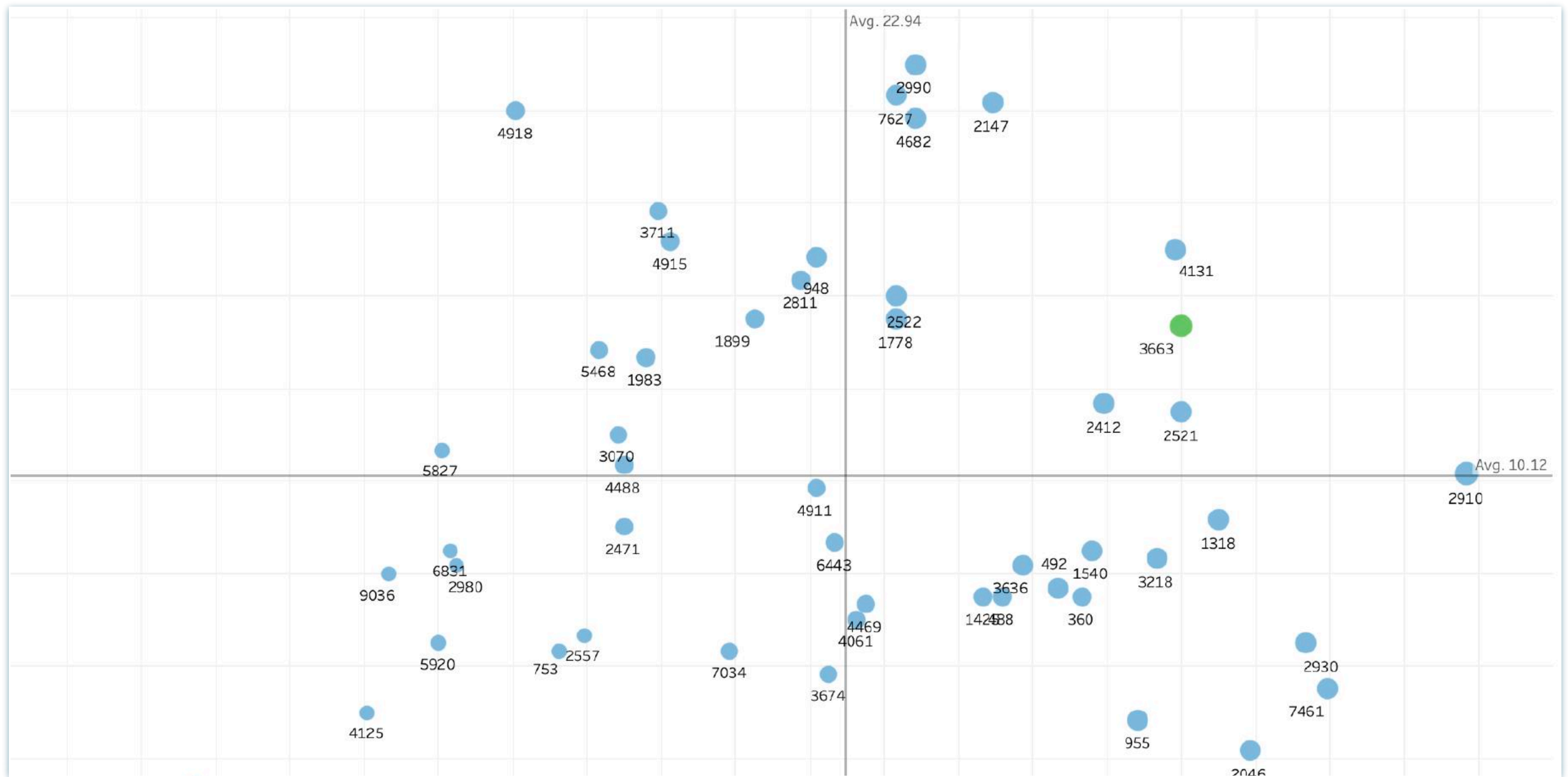


Score breakdown - Yellow-> Avg. Auto. Light blue-> Avg. TeleOp. Dark blue-> Avg. EndGame.

Stacked Graphs

One visual we like to create in Tableau is the stacked bar graph. This graph allows us to see many variables of data on only one sheet, enabling us to see what a robot is capable of during a match. When making stacked bar graphs, we can also weight the variables, which highlights the qualities we value the most; this is similar to how a

teacher may weight the test category at 50%, trumping the homework and classwork categories which could be set at 25% each.



2023 PNW District Championship

X axis - Avg. Grid Points Y axis - Avg. Charge Station Points Circle Size - Overall Points

Scatterplot Charts

Scatterplot Charts play a key role in preparing for alliance selections in the most logical manner possible. Scatterplots are one of the best ways to view many components of data on a single sheet. We use them to compare 2-4 robot qualities, helping us discover the most

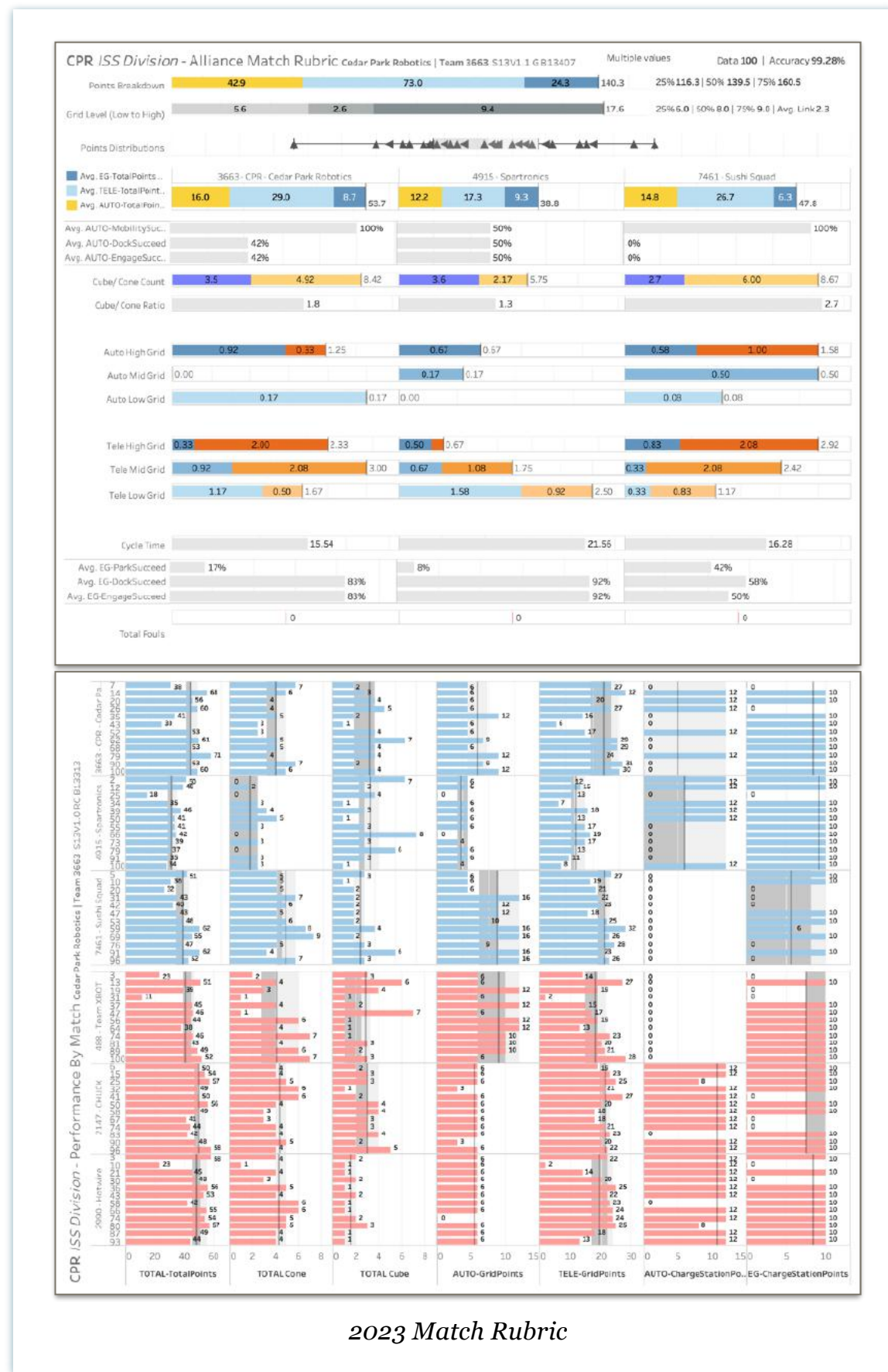
versatile robots in play. This season, we valued robots who were strong in both the auto score and hang succeed rate; using scatterplots we could quickly discover which teams were excellent in both qualities.

Match Rubric Dashboards

Match rubrics are dashboards that we specially format to display nearly all the information that a match strategist needs to create smart strategies. Concisely displaying information on all three teams of both our own alliance and the opponent's, a strategist can easily determine the most effective roles for our alliance partners by examining our team's strengths and anticipating what our opponents' aims are. Each match we play, we print out match rubrics customized to each new alliance that are given to our strategist and drive team. Having printed, trustworthy data on the spot helps the drive team build trust between the aligned teams as they prepare to work together.

Score predictions

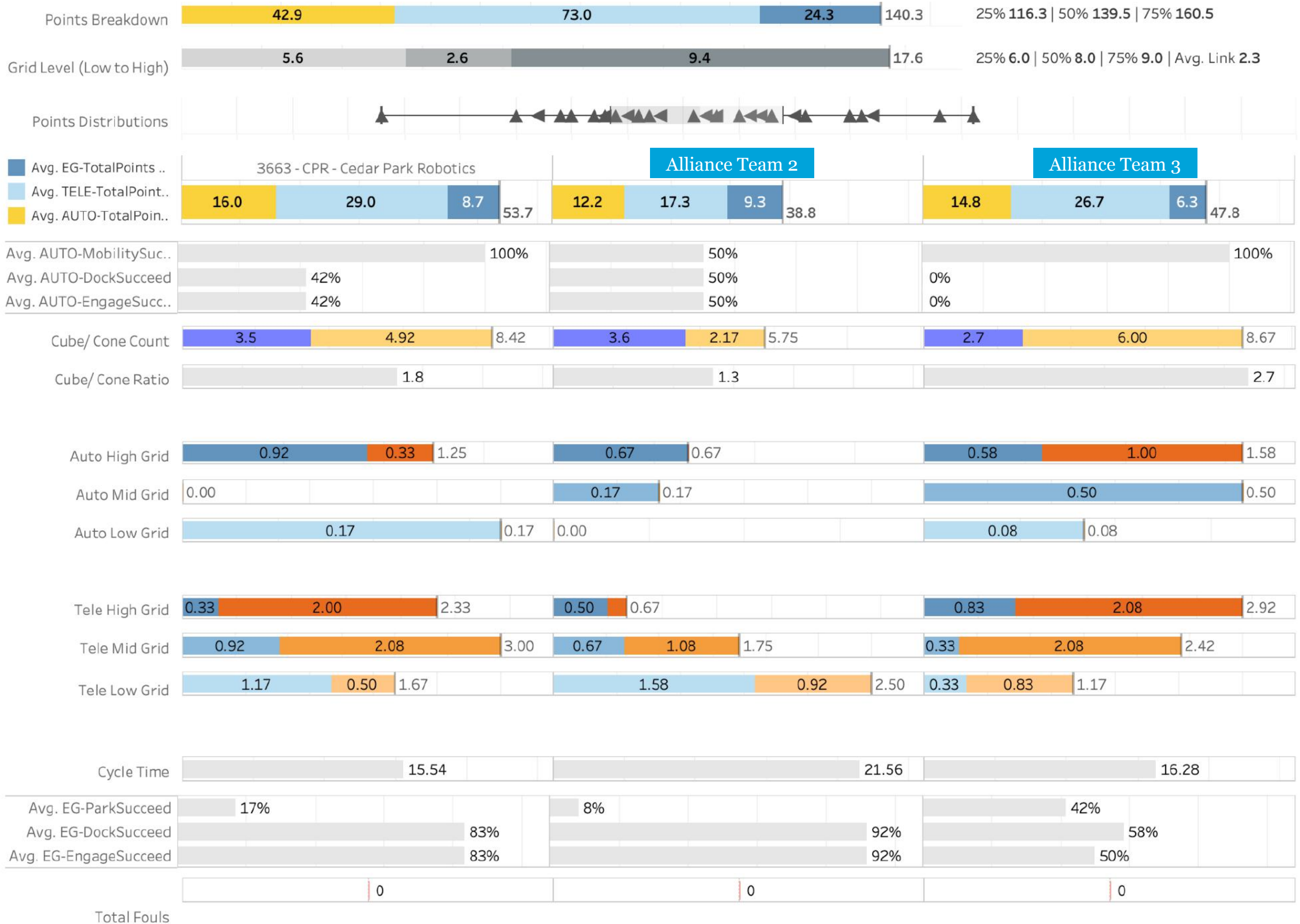
In our Match Rubrics, we created a new graph that analyzes the alliance teams' past performances and then adds the three teams' potential together to estimate the number of points they could earn in a particular match. Having this estimation set as a goal, our alliance can maximize their potential. We are excited to see how our strategist and drive team utilize this new tool.



CPR ISS Division - Alliance Match Rubric Cedar Park Robotics | Team 3663 S13V1.1 G B13407

Multiple values

Data 100 | Accuracy 99.28%



Qualitative Data Insight

The Second Lens to Analysis

Our team is committed to accurate and precise data; therefore, we use qualitative scouting to double check our data and observe robot qualities that aren't caught by our quantitative data system. Qualitative data is essential to our team's match strategies because it helps us better understand the strengths and weaknesses of alliance partners and opponents. For example, qualitative scouts can rate a robot's aggressiveness to use them as a defensive bot, we would consider placing them in a more fruitful position for points instead of penalties.

We recommend for smaller teams to focus on scouting qualitative, because quantitative data is difficult without a complete data set. Our team uses a grading scale in any subjective category that we think is valuable information. Such as robot speed and driver skill. It is important to know that qual is almost entirely subjective. In larger

groups know that qualitative is almost entirely subjective. In larger groups of qualitative scouts, there will be variations in interpretation of the grade scale. We suggest establishing a baseline for what constitutes an A, or B, and so on.

In the 2023 game, qualitative scouting is especially important. Qualitative is used to judge whether any robot is aggressive, resulting in possible defensive fouls, or durable, which would prevent it from breaking mid-competition. Whether a robot should play defense is almost completely determined by qualitative. Qualitative will tell you if a robot is aggressive, fast, or foul-prone, which are all important for a defensive robot to have. Qualitative can explain the underlying cause of a robot's quantitative results. Since qualitative isn't restricted to numbers like quantitative, there are more possibilities in what kind of data qualitative can collect.

Auto/start pos(o, cti	Tele Notes	Endgame Balance	Weakness (DO NOT JUS
Ctr hi co mob bal	6 - 3 hi,2 mid, 1 lo	2x	Slow deploy
open hico hico puco	5 co hi/mid	3x	gr pu co only but slow
Ctr hi co mob bal	3-4 mix	2x	mid range
3 M hi co, mid cu, mob			died on bump
NA	NA		
hi co mid cu, m cu; mob	8 - mix of hi co hi cu; slow co dep	NA	lost part of bumper, was c
did not move	3 pcs mix, slow, can do some defense	2x	
o 3 co auto, mob , bal	Amazing - 11 pc; def and ff	NA	sign fell off when hit; som
mid co			imited
ctr hi co; fail bal			eg bal; sf pu or
ctr,conehi,fail en			e going over ch
o hi co mid cu lo			r and pu, not off
bump hi cu + mo			in comm; runs





Lobbying & Strategy

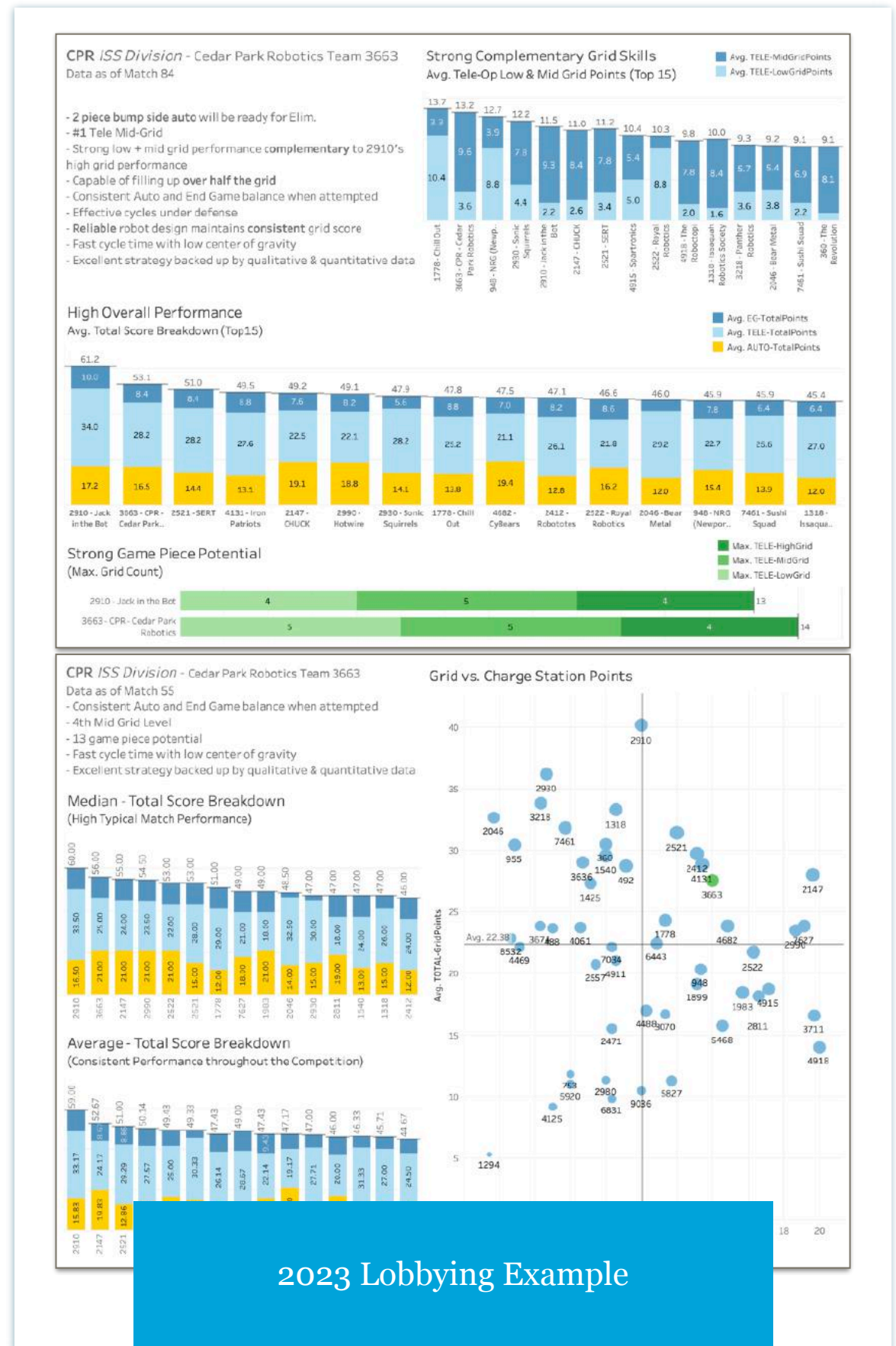
An excellent robot is not the sole ingredient needed to form an excellent team. With this understanding, we maximize our alliance members' strengths by using an elaborate quantitative data and qualitative insights to formulate smart strategies.

Lobbying

Networking to Promote Fruitful Alliance

Our lobbying team creates the best environment for all teams by putting them in the best position for the competition. Our lobbyists first write reports on the teams we plan to lobby to, highlighting both strengths and weaknesses. This data will be useful during strategy sessions for both teams before each match. Using Tableau data visualizations, we can demonstrate how our robot will cooperate with others.

Respect is one of the most important aspects of fair play. We show this value in the way we talk to our competitors. We always enter a conversation with utmost respect, and we guarantee that our entire team will show respect to any team we associate with.

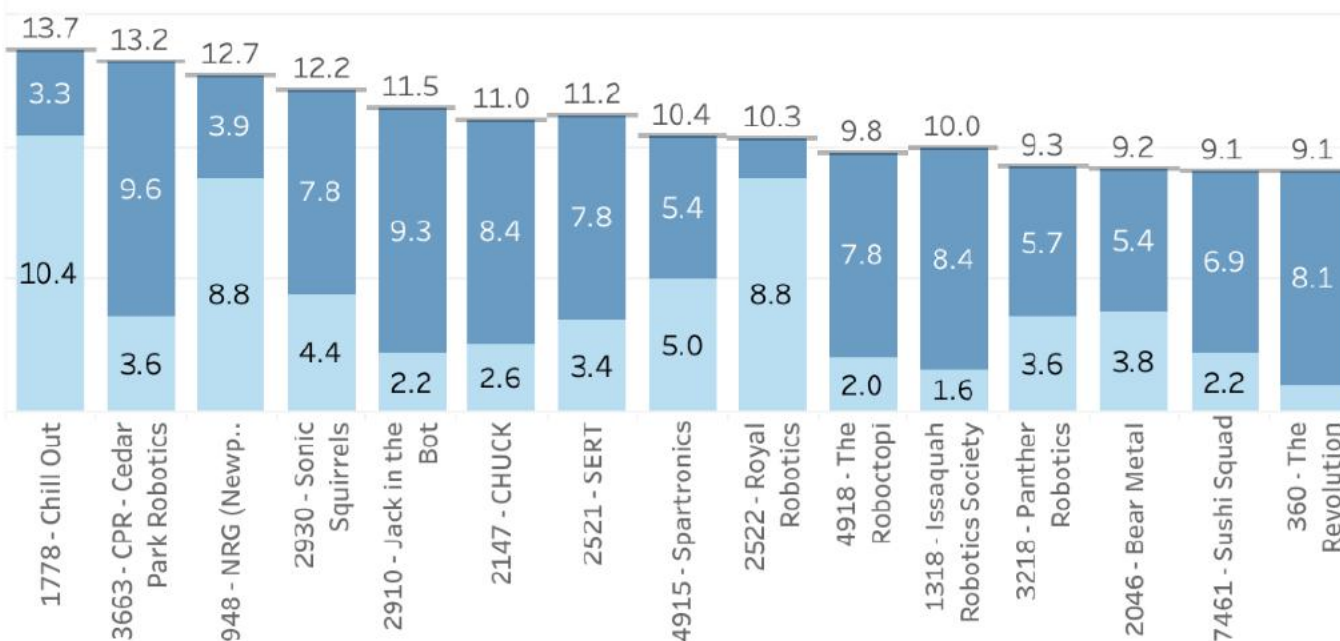


CPR ISS Division - Cedar Park Robotics Team 3663

Data as of Match 84

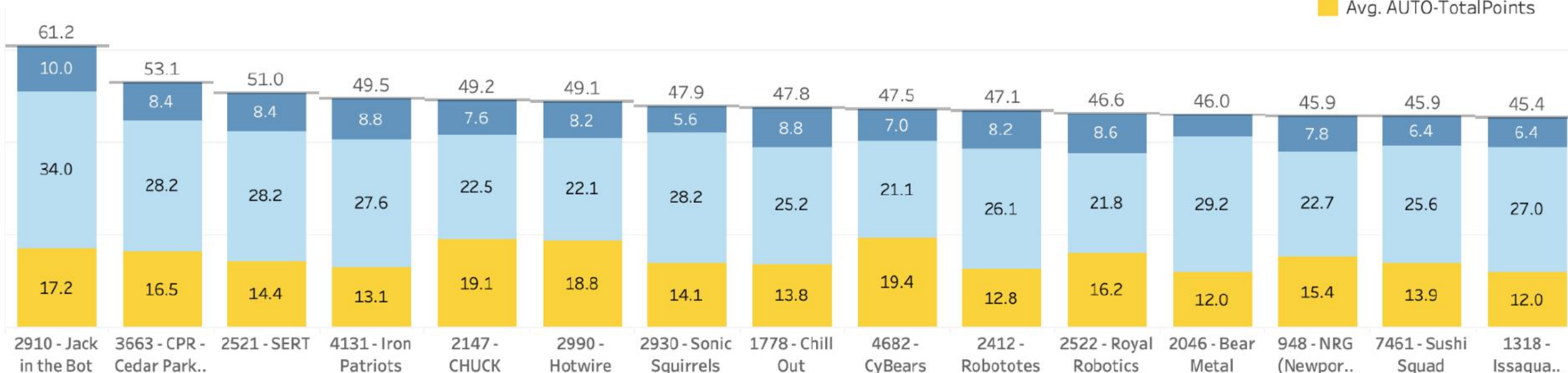
- **2 piece bump side auto** will be ready for Elim.
- **#1 Tele Mid-Grid**
- Strong low + mid grid performance **complementary** to 2910's high grid performance
- Capable of filling up **over half the grid**
- Consistent Auto and End Game balance when attempted
- Effective cycles under defense
- **Reliable** robot design maintains **consistent** grid score
- Fast cycle time with low center of gravity
- Excellent strategy backed up by qualitative & quantitative data

Strong Complementary Grid Skills Avg. Tele-Op Low & Mid Grid Points (Top 15)

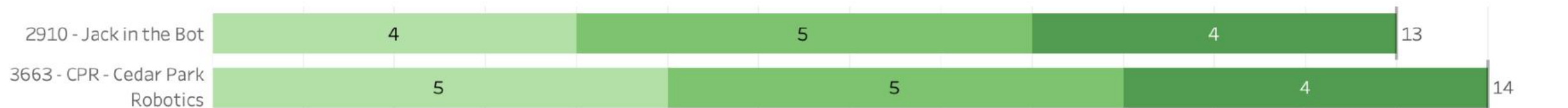


High Overall Performance

Avg. Total Score Breakdown (Top15)



Strong Game Piece Potential (Max. Grid Count)



Incorporate Scouting & Strategy

Driven by Strategy

CPR ISS Division works hand-in-hand with our drive and build teams – it requires frequent communication in the design, build, drive practice, and competition phases of the season. This is more likely to what students will find in the workplace – program management, strategy, and teamwork.

Kick-off

We emphasize that our goal each season is to get to Houston *FIRST* Championship and to compete well there. To do that, we need to get District Points.

We look at what elements give us the RP needed to get the highest seeding and therefore the highest district points.

2020 Season

From day one we quickly established that climbing was our first priority. Of course our team members wanted a perfect shooter, but scouting reiterated multiple times that the climber had to be ready and tested for our first competition in order to increase our chances of earning an extra ranking point.

Beyond climbing, our second priority was auto. This meant finishing the robot in a timely manner so that our software division had the time they needed to program. Guiding priorities as a scouting team helped us reach these goals.

Build Season– The list of scouting features on the wish list typically exceeds the build team’s ability to create them. This requires frequent communication between us and our Build team to clarify the priorities list.

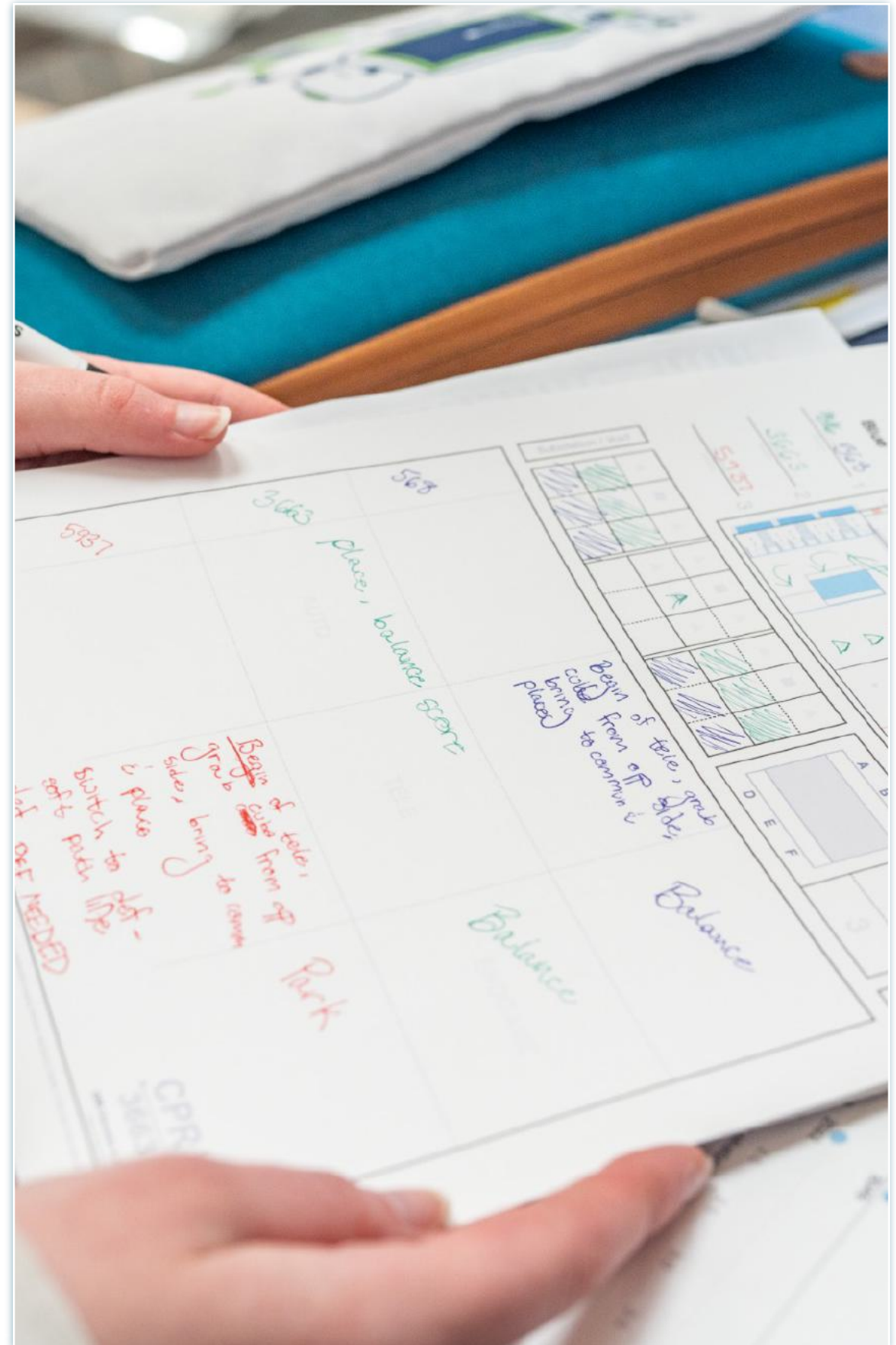
Drive Practice – Focus on RP priorities. We find we need to remind the engineering teams frequently about what is important in matches.

Match Strategies

Making a Wiser Decision

The team's strategists use both quantitative and qualitative data to create well-informed plans for successful matches. The strategists use Tableau match rubrics and data visualizations to determine what each alliance partner excels in and learn about subtle robot qualities to create a more refined strategy. This includes assigning roles based on individual strengths and utilizing match strategy sheets to outline a plan for both alliance partners and opponents.

In 2023 season, our strategists recognized that a determining factor for a majority of the matches was the penalties. Robots had a tendency to make illegal contact with opponents in their protected zone. By the time the match ended they accumulated enough penalties to cause them to lose by just a few points.

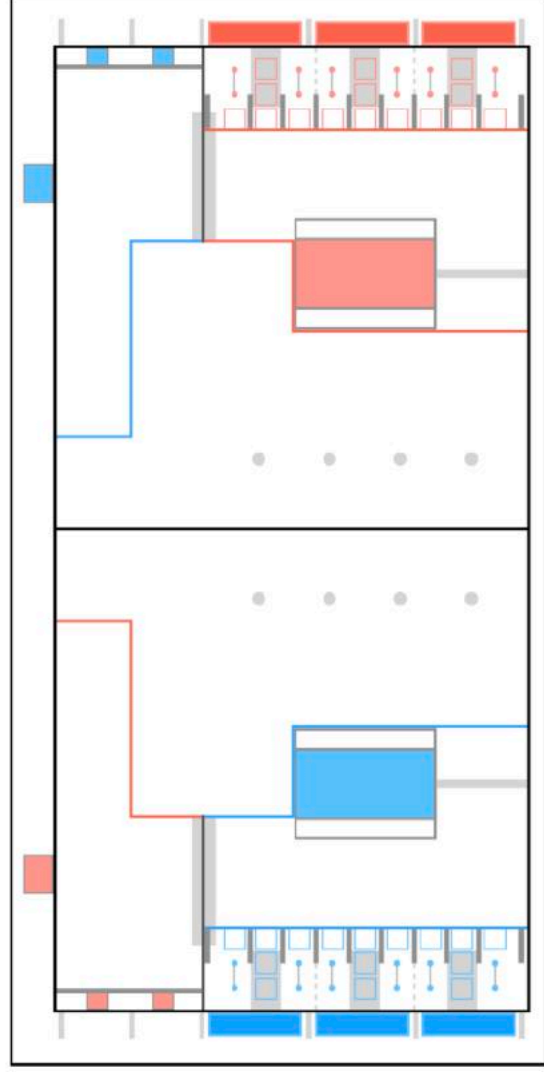


Blue

Number _____ 1
Name _____

Number _____ 2
Name _____

Number _____ 3
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Red

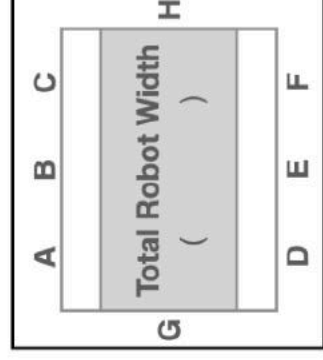
Number _____ 3
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Substation / Void

▲	■	▲	■	▲	■	▲	■	▲	■	▲	■
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Score Diff.
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Total Cycles
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Bonus R.P.
Link / Balance

Substation / Void

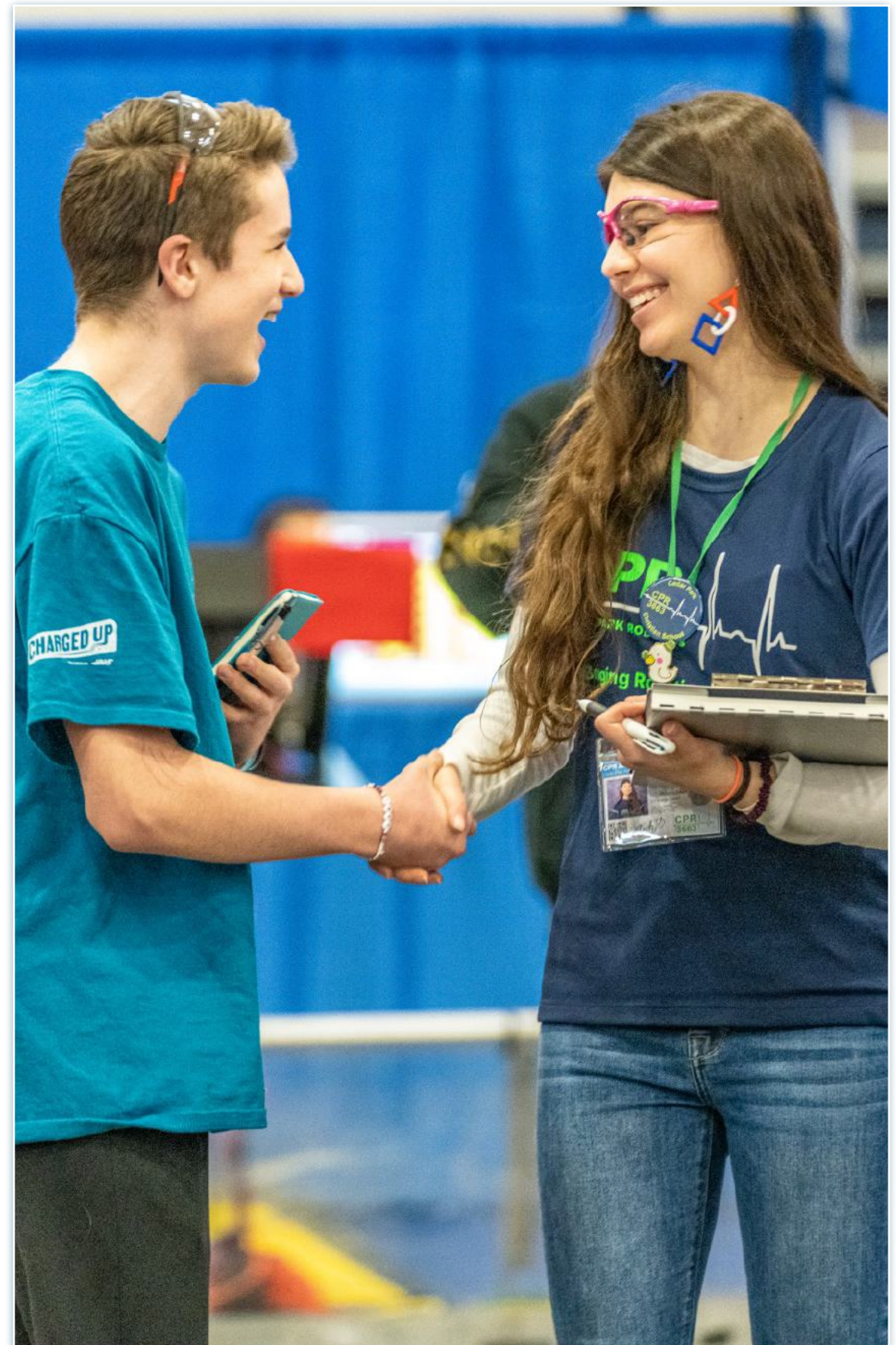
1	Auto Balance (%)	Total Cycle ()	EG Balance (%)	Robot 1 Dimension Δ() Balance Priority ()
	Auto Balance (%)	Total Cycle ()	EG Balance (%)	Robot 2 Dimension Δ() Balance Priority ()
	Auto Balance (%)	Total Cycle ()	EG Balance (%)	Robot 3 Dimension Δ() Balance Priority ()
2	Auto Balance (%)	Total Cycle ()	EG Balance (%)	Robot 1 Dimension Δ() Balance Priority ()
	Auto Balance (%)	Total Cycle ()	EG Balance (%)	Robot 2 Dimension Δ() Balance Priority ()
	Auto Balance (%)	Total Cycle ()	EG Balance (%)	Robot 3 Dimension Δ() Balance Priority ()
3	Auto Balance (%)	Total Cycle ()	EG Balance (%)	Robot 1 Dimension Δ() Balance Priority ()
	Auto Balance (%)	Total Cycle ()	EG Balance (%)	Robot 2 Dimension Δ() Balance Priority ()
	Auto Balance (%)	Total Cycle ()	EG Balance (%)	Robot 3 Dimension Δ() Balance Priority ()



Alliance Selection

Creating a Stronger Alliance

Alliance selection is complex and requires a synthesis of every Informatics and Strategy skill that students have previously used for match strategy. What makes this task so complex is that you are no longer looking at the abilities and performance of six robots. You are looking at ALL of them, ranking them both in overall ability and also regarding specific skills. You are then predicting what the final seeding will be based on who you think will win the next day's matches and determining who is likely to pick whom. After you ascertain this information, you can then determine likely places where your team might land and determine if you would like to tweak your seeding (see below). Then and only then can you determine whom you would like to pick for your alliance or recommend to your captain whom you would like to select if you are chosen by another alliance. Specific strategies for upcoming elimination matches can be made after all alliances have been formed.



Alliance Selection Procedures

1. Organize your data.
2. Determine what variables are important. In the 2023 Charged Up Game, this includes:
 - **Auto:** game pieces scored, mobility, charging station – docked and engaged
 - **Tele-Op:** Game pieces scored, including scoring location, where pick up game pieces, defensive ability
 - **Endgame:** Parking, Docking, and Engaged points. Ability to double and triple balance. Success rate.
3. Rank robots on overall ability and on each of the variables in #2.
4. Determine what your robot's needs are – what are you not as strong in or are unable to do (e.g. you may not do defense because you are scoring).
5. Make a pick list of 24 robots based on your team's needs (32 at Houston Championship).
6. Make a Do Not Pick list. Robots on this list are robots that are low in ability, those that break often, those that commit many fouls, and those that are very difficult to work with.
7. Make 2 or 3 Mock Drafts. Mock Drafts are an incredibly powerful tool for understanding how elimination matches will look. For Mock Draft 1:
 - List the seeds 1-8 and leave two spaces beside each one. (We often do alliance selections at the end of the first day of competition in which only 9 of 12 matches have been completed. If qualification matches are not finished, make your best guess on what the seeding will be at the end of qualifications. This can be a somewhat involved process. You need to look at the remaining matches for each of the 12 or so top seeds and predict how many ranking points they will get in each of their last three matches. Then list the final ranking.)

- Do Alliance Selections for each alliance, picking the best possible robot for each alliance based on your data. We can't know what other teams will choose for their partners, but we can look at each team's strengths and weaknesses and assign them a robot that we believe will maximize their chances for success.
 - Why do a Mock Draft? Doing this process for other robots can help give greater insight into specific robots and an overall picture of how eliminations will play out. When we do Mock Drafts, we are often able to predict which alliance will win a match. We also get an idea of which robots will be available for each alliance. This is particularly important for the vital third robot – being able to have one's pick of the best defensive bots can change the outcome of close matches.
 - After doing the time-consuming first Mock Draft, the next ones should go more quickly. For subsequent Mock Drafts, change the seeding a bit or have the top one or two seeds pick a different robot than you did originally.
8. After doing the Mock Drafts, go back to your Alliance Selection list and see if you want to make any changes. There may be the case in which you may want to snap up a robot before a higher seed can get them.
 9. Determine where you think you will seed. If you think you will be a captain, use the information from the Mock Draft to determine if you would like to accept an invitation to join a higher alliance or if you would prefer to remain the captain of your own. The Mock Draft will help you see which robots will be available to you at your seed and whether you are likely to win in your first match.
 10. It's important in the double-elimination scenario to win your first match. Try to maximize your chances of this when considering whether to accept an invitation from another alliance.
 11. During the actual Alliance selections, keep a list of your teams on the list that have been picked and those that are still available. Make sure your Alliance Selections representative can receive texts.

