ALLIANCE SELECTION STRATEGY & DATA ANALYSIS

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OUTLINE

Introduction

Quick Review of Alliance Selection System

Data Collection & Scouting

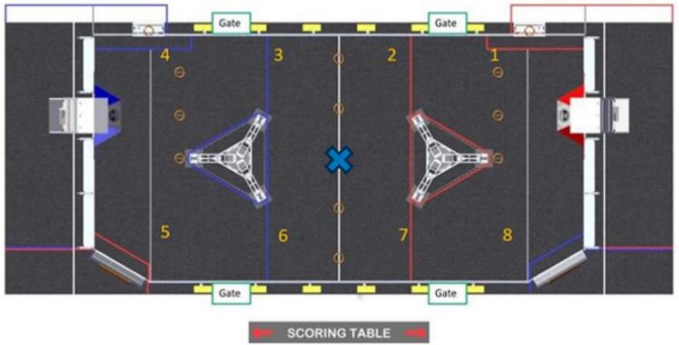
Pick List Crafting

Strategies & Tips

ALLIANCE SELECTION REVIEW

THE SHOW

- Centralized Emcee
- Order Of The Show
  - Alliance Captain 1 starts



- First round selection is done with all alliance selection team members
- Second round selection is made by one student from the alliance captain
  - Allows the alliance captain to make THEIR pick

THE TIME

- Alliance Selection will begin 8 minutes after scores are posted from the last qual match
- Time Limits
  - Round 1: 0:45
  - Round 2: 1:30
- If the selection is declined, the timer will restart
- 2 minute break between rounds

THE TEAM

- Alliance Selection Team is made up of up to 3 members
- Selection Team Options
  - 1 student
  - 2 students
  - 3 students
  - 2 students & 1 mentor
- Multiple students or single mentor are there to reduce pressure on a single student
- Mentors are there for support and not to lead or pressure

COLLECTING DATA

IMPORTANT DATA TO COLLECT

- **(Goal) RPs**
  - What can a team contribute to gain RPs?
- **Robot**
  - Size/physical qualities (pit scouting)
  - Tasks it is able to complete
  - Speed in completing those tasks
- **Autonomous**
  - Completion & accuracy of tasks
  - Record info on its route to ensure no collisions and track flexibility

IMPORTANT DATA TO COLLECT

- **Driver Ability/Style**
  - Scoring locations
  - Ease of driving (crashes, tips)
  - Style (defense, offense, mix)
  - Collaboration with alliance partners (ask your drive team for insight)
- **Scoring**
  - Many data points: shots, misses, locations, passing, out of bounds
- Pick data that covers most of the information you need for a successful pick and for successful match strategies

TYPES OF DATA TO RECORD

QUALITATIVE DATA DURING MATCHES

Qualitative data includes...

- **Driving skill** (ability, confidence, coordination, collaboration, adaptability)
- **Subjective opinions** not just measurable by numbers (strategy, sped, abillity to move efficiently)
- Identifying the **strengths** and **weaknesses** of robots
  - Is there a better strategy for the robot?
- Effectiveness of the execution of strategy; alternative executions that are more efficient

QUALITATIVE DATA DURING MATCHES

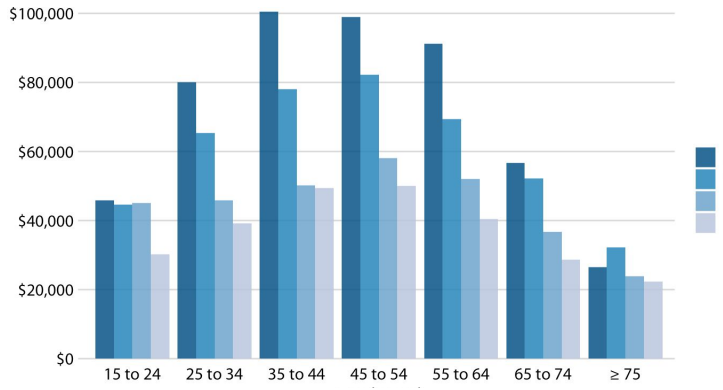
Qualitative data helps us...

- Fill in the **blanks** for information quantitative data can't provide us
- Find the **disparity** between teams with very **similar statistics**
- Dig deeper into the performance of robots
    - Gives us a more **well-rounded understanding** of a match/robot (ex: the quantitative data shows that a robot broke and stopped scoring, but qual data shows that the robot played very good defense afterwards)

QUANTITATIVE DATA DURING MATCHES

Quantitative data includes...

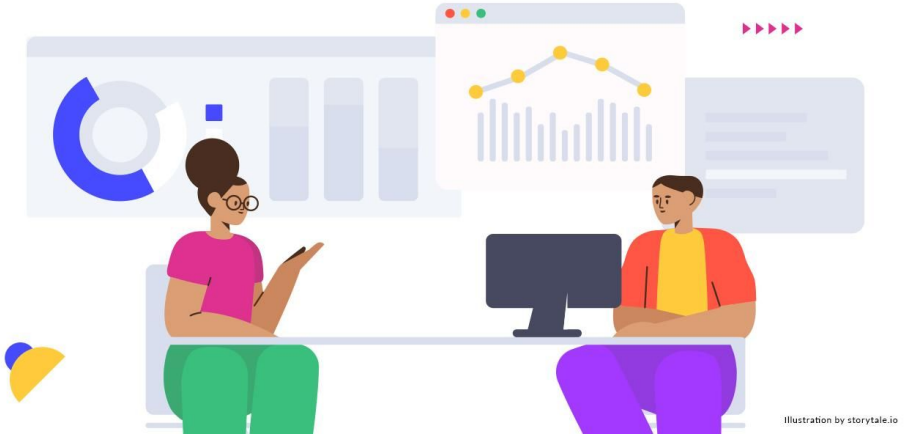
- **Tasks achieved**
  - RP tasks (hanging, parking, achieving a certain threshold of game pieces)
  - Activating coopertition
  - Achieving a bonus
- **Pieces scored**
  - Amount
  - Specific game pieces
- **Timing**
  - Cycle time
  - Time to complete endgame task



QUANTITATIVE DATA DURING MATCHES

Quantitative data helps us...

- Tell objective information about a team's capabilities
  - Can show us where a team's skill is concentrated
  - Outliers
- Create visualizations of team performance to track effectiveness over time
- Calculate accuracy, cycle time, etc.



GATHERING INSIGHTS FROM DIFFERENT PERSPECTIVES

Scouters/Stands

- Look for...
  - Driver ability
  - Style of driving
  - Synchronicity with alliance
- Can conduct postmortem analyses of matches

Human Player/Ground

- Communicate heavily with scouters about all teams in alliance
- Look at quantitative data in spreadsheet
- Talk strategy with alliance partners in upcoming matches; provide feedback, alternate strategies, etc.

COLLECTING DATA

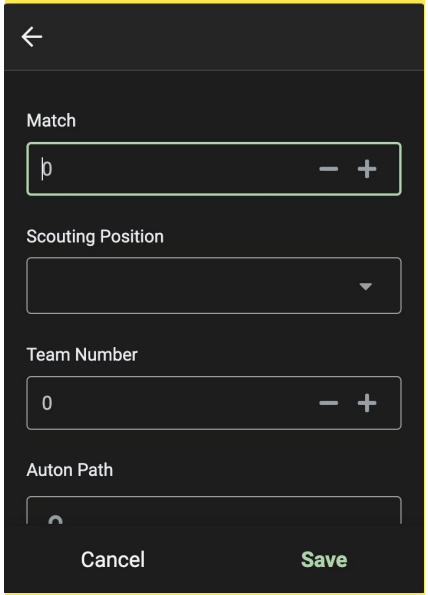
PAPER SCOUTING

- (+) “Worksheet” to record data on each observed match for a team; easily separates data by team
- (+) Minimal knowledge of application development necessary
- (+) Useful as a backup if cloud-based/electronic scouting methods fail at competition
- (-) Data needs to be manually input into a database for analysis & visualizations to be generated
- (-) May be inconvenient to some scouters

Team #	Match #	Auto													
		Mobility	L1	L2	L3	L4	Coral Missed	Algae Processed	Algae Net	Algae Missed (Net)	Algae Harvested	L1	L2	L3	L4

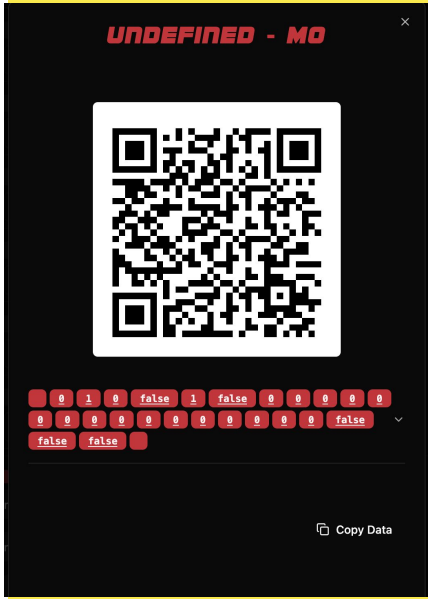
CLOUD BASED/APPLICATION

- (+) Application such as Appsheet/Google Sheets on scouters' devices to fill out a form
- (+) Sent to a database with preloaded formulas to output visualizations
- (-) Requires an internet connection to submit data; can cause data loss of wifi is poor or unavailable at the event



SCANNER/CODE BASED

- (+) Uses an application that generates a QR code and is uploaded to a spreadsheet database via a scanner connected to a computer
- (+) Doesn't require a connection, as data can be accessed and directly uploaded to the database
- (-) Data requires routine backups since offline use of Sheets or other applications can occasionally cause data loss (still a best practice regardless of which method is used)
- What 1403 currently uses!



DATA VISUALIZATIONS

OVERALL DATA

Autonomous						
Move from community	Bridge (point value)	Cube			C	
		Low	Mid	High	Low	M
1.00		0.00	0.00	0.00	1.00	0
1.00		0.00	0.00	1.00	0.00	0
1.00		0.00	0.00	0.00	0.00	0
1.00		0.00	0.00	1.00	0.00	0
1.00		0.00	0.00	0.00	0.00	0
1.00	12.00	0.00	0.00	0.00	0.00	0
1.00	12.00	0.00	0.00	0.00	0.00	0
1.00		0.00	0.00	0.00	0.00	0
1.00		0.00	0.00	1.00	0.00	0
1.00	12.00	0.00	0.00	0.00	0.00	0
1.00		0.00	0.00	0.00	0.00	0

Look at the data that was input for a specific team.

AGGREGATES

Autonomous										Teleoperated						Endg	Qua
Community	Bridge (point)	Cube			Cone			Cube			Cone			Bridge (point)	Matc Qua (0-5
		Low	Mid	High	Low	Mid	High	Low	Mid	High	Low	Mid	High		
1.00	12.00	0.20	0.10	0.40	0.10	0.00	0.90	0.90	1.40	1.50	0.50	2.40	1.50	2.86	4.22
1.00	#DIV/0!	0.00	0.00	0.88	0.22	0.00	0.67	0.67	1.11	0.44	1.22	2.00	2.11	7.78	3.13
1.00	10.40	0.00	0.00	0.40	0.00	0.00	0.90	0.89	0.22	1.67	1.11	0.56	2.89	5.75	3.93
1.00	12.00	0.22	0.00	0.00	0.00	0.00	0.89	3.67	0.44	0.78	0.00	0.67	1.67	6.25	3.69
1.00	11.11	0.89	0.00	0.00	0.00	0.00	0.00	4.78	0.78	1.89	0.00	0.00	0.00	7.78	3.63
1.00	10.67	0.00	0.11	0.33	0.00	0.00	1.00	1.78	0.56	1.00	0.44	0.78	2.11	7.33	2.96
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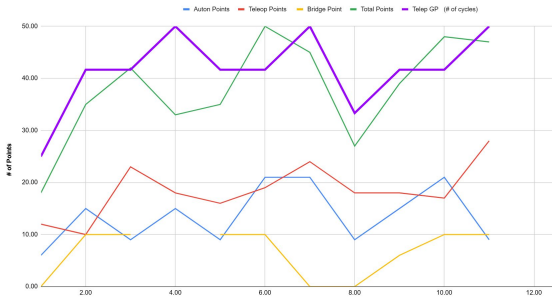
1.00	#DIV/0!	0.00	0.00	0.22	0.89	0.00	0.11	0.00	0.33	1.22	1.44	0.78	2.67	7.00	3.15

Compare teams to each other using standard deviations & Z-scores.

GRAPHS



Trends that could show outliers & performance history.

WHAT TO IMPLEMENT IN YOUR DATA SYSTEM

- **Tools**
  - By keeping your database in Google Sheets, you can connect it with input methods like Appsheet and use its built-in tools to create data
  - Softwares such as Tableau can create more advanced and specific data visualizations

- **Visualizations**
  - Create ways to **compare** teams
    - Use conditional formatting with colors to easily show how well teams are **performing** in each category
    - Implement a way to compare teams through their standard deviations from the mean in each category of scoring in order to **evaulate** their qualities relative to others at the event
    - Create **filters** in your database to rank teams from **highest** to **lowest** or vice versa in a certain category
  - Keep it simple: make it easy to understand if someone unfamiliar with the data looks at it, such as showing to drivers or alliance partners

	B	C	D	E	F	G
	Jan	Feb	Mar	Apr	May	Jun
	80	84	84	97	95	98
	78	86	84	96	98	102
	83	86	86	97	95	103
	78	85	87	98	97	102
	78	85	86	99	95	101
	82	85	86	98	96	99
	81	84	85	97	95	101
	81	87	87	97	96	98
	82	86	88	99	97	101
	79	85	87	95	96	103

CRAFTING THE PICK LIST

PICK LIST PROCESS

FIRST PICK:

Sort top robots based on how well they would best complement your team in an ideal match strategy.

Things to consider

- Improvement over the competition
  - A robot that may have gotten off to a rocky start but improved over the competition should be compared with robots it has recently been performing similarly to.
- Versatility
  - A robot that can serve many functions well is great to work alongside especially when different strategies are implemented or the situation on the field changes.

PICK LIST PROCESS

SECOND PICK:

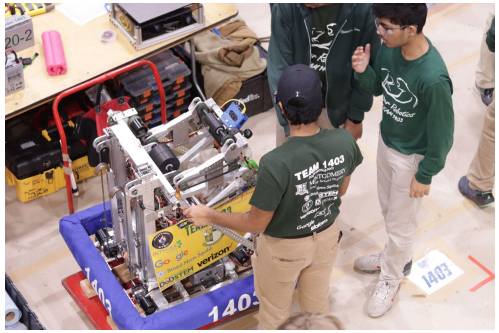
Teams that are ideal as alliance members, and could potentially complement both us and another robot

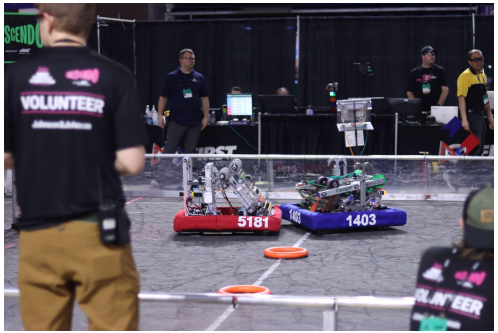
Things to consider:

- Gaps to fill
  - Robots that can fill in gaps such as better auton routes
- Non-scoring Robots
  - Defense bots can add depth to your strategy and slow down the other teams from scoring, but be sure that the team you are selecting has performed well in defense (look at qualitative data)
- Versatility
  - Being versatile helps when strategies change, malfunctions happen, etc.

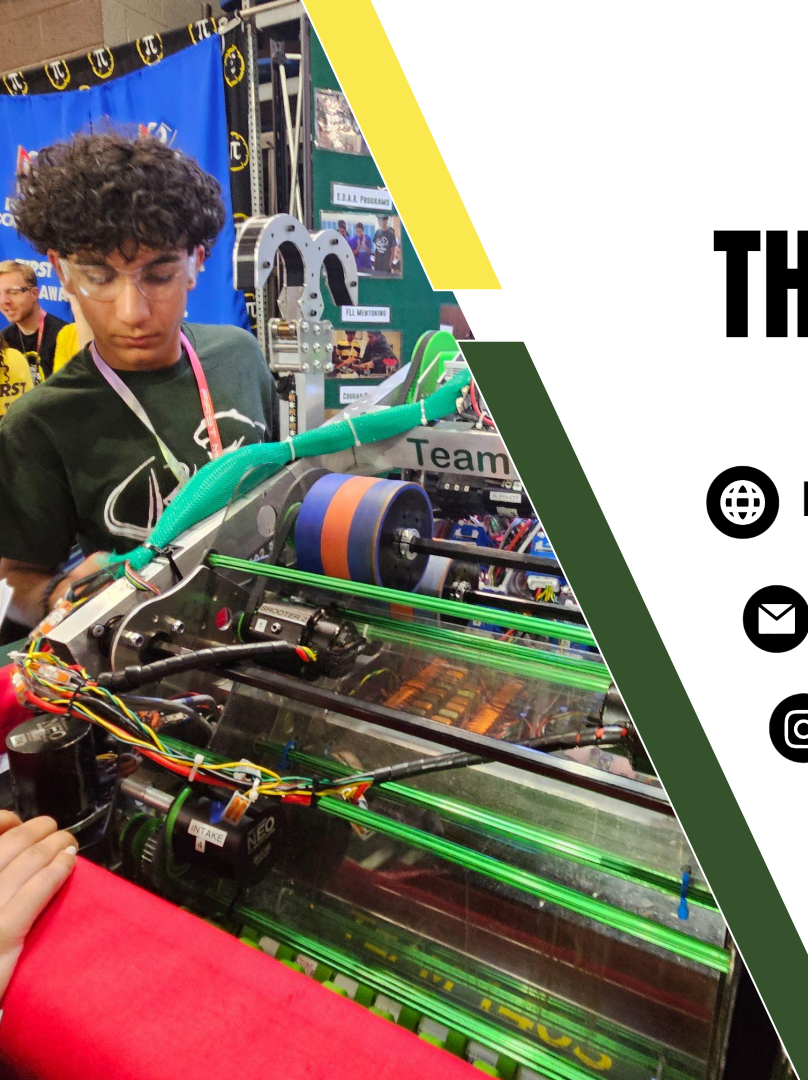
QUESTIONS?


1403


TEAM 1403
verizon
1403


VOLUNTEER
5181
1403


Johnson&Johnson
TEAM 1403
slalom
Bristol-Myers Squibb
verizon



THANK YOU

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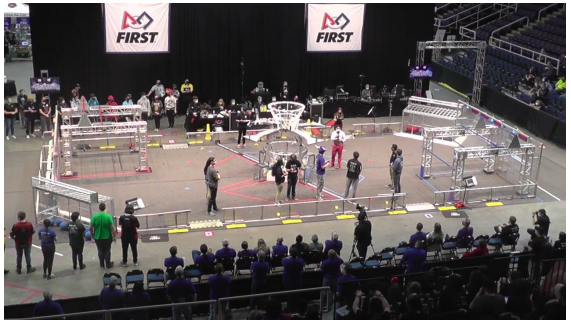
ignore everything below this thats the old slideshow from last year

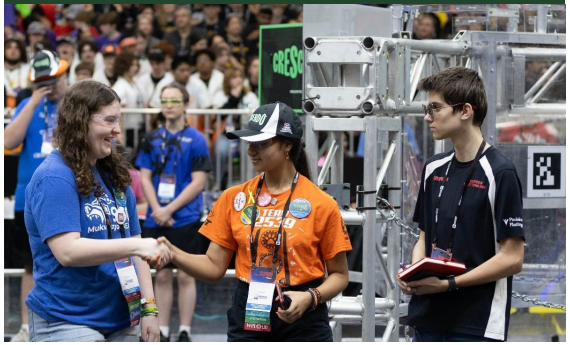
Alliance selection Changes

Timing



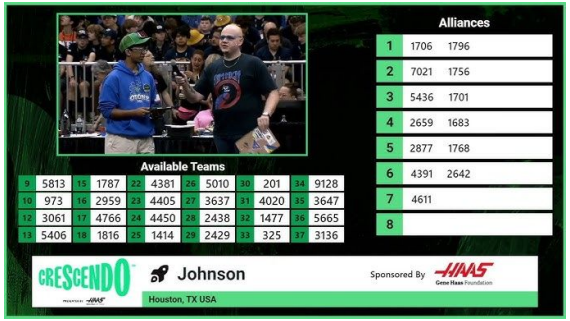
Speeding up the alliance for timing for both teams and volunteers

Team



Allowing more team members on the field & a mentor.

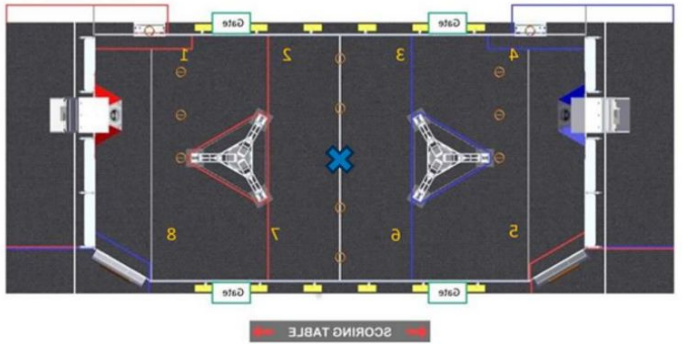
The show



Changes to the show flow of alliance selection

The Show

- Centralized Emcee
- Order of the show
  - Alliance Captain 1 starts
  - Removing the shuffling of the top 8
- First round selection is done with all team members
- Second round selection is made by one student from the alliance captain
  - This allows the alliance captain to make THEIR pick



The Time

- Alliance Selection will begin 8 minutes after scores are posted from the last qual match
- Time Limits
  - Round 1: 0:45
  - Round 2: 1:30
- If the selection is declined, the timer will restart
- 2 minute break between rounds

The Team

- Alliance Selection Team is made up of 3 members

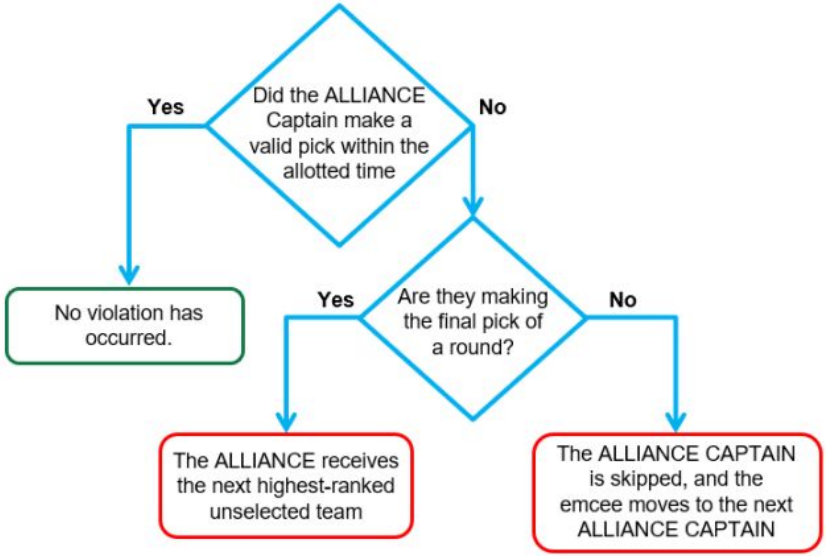
- Selection Team options
  - 1 student
  - 2 students
  - 3 students
  - 2 students & 1 mentor

- Multiple students & or single mentor are to reduce pressure on a single student

- Mentors are their for support and not to lead or pressure teams*

The Process

- Did you take too long?
  - What now?
- First round is center stage
- Second round is based on good faith of your team walking to the Emcee
  - Use a student or mentor to keep track of time
- End of the round with no selection?
  - Alliance receives the next highest-ranked unselected team



Data & Selection

- Methods of Collection
- Data That is Important
- Data Prior to Matches (Pit & Practice Matches)
- Data During Matches (Eyes in the Sky)
- Data Visualizations
- Pick List

Methods of Collection

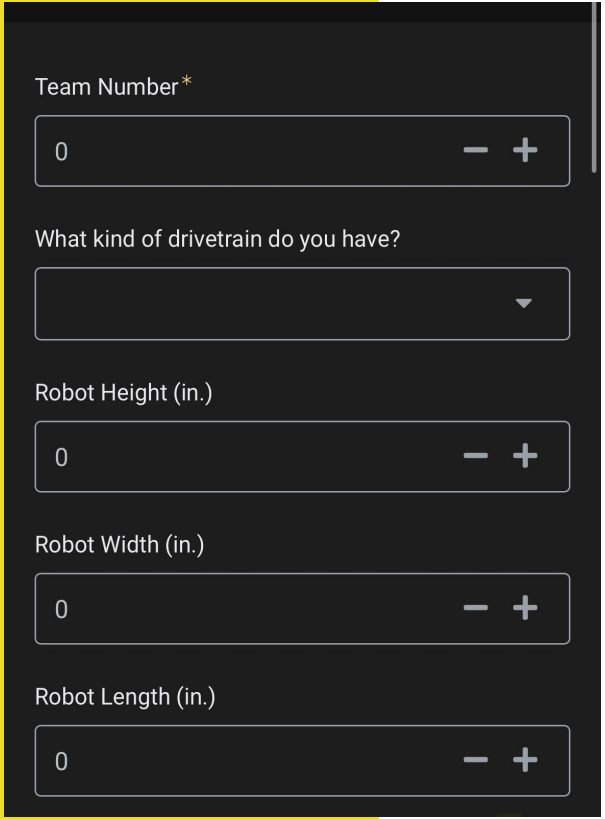
- **Paper:**
  - “Worksheet” to record matches
  - Need designated person to input data into excel spreadsheet.
  - Allows for more freedom in how scouters take data, but may be difficult to record data and organize it later.
  - Useful as a backup when using the below methods.
- **Device/Cloud Based:**
  - Application such as Appsheet to fill out a form
  - Sent to a database with preloaded formulas to output visualizations.
  - Requires an internet connection to submit data.
- **Scanner Based:**
  - Uses an application that generates a QR code.
  - Upload to a spreadsheet database.
  - Doesn’t require a connection, as data can be scanned and directly uploaded to the database.
  - What 1403 currently uses!

Data That is Important

- **(GOAL) RPs**
  - What can teams contribute to gain RPs?
- **Robot**
  - Size of robot
  - Tasks that can complete
  - Speed to complete the tasks
- **Autonomous**
  - Completion of tasks
  - Accuracy of tasks
  - Outline the path to ensure no collisions and track flexibility
- **Driver Ability:**
  - Scoring Locations
  - Ease of driving (crashes)
  - Style (defense, offence, mix)
  - Collaboration with alliance partners (taken from drive team)
- **Scoring:**
  - Many data points
    - Shots, misses, locations, passes, out of bound, amp/speaker
  - Pick data that covers most information

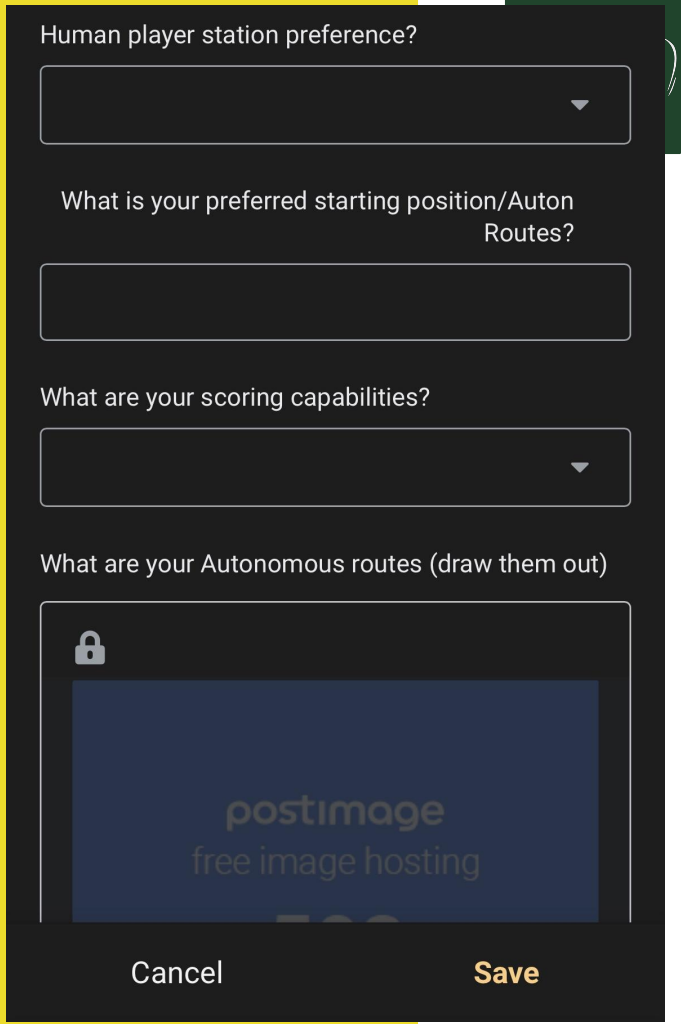
Data Pre-Matches (Pit)

- **Questions to Ask:**
  - Drivetrain (swerve, mecanum, tank, other).
  - Dimensions (LxW, height)
    - We ask this to evaluate if it can work with our robot (ex: can 3 robots fit on charge station) and for capabilities (ex: can it go under the barge?)
  - Pre-Game: Starting position (near coral station, center, opposite side), Human player strategy (source of coral, algae handling), How many game pieces they score per match on average
  - Autonomous: Scoring capabilities, leaves starting zone, coral/algae pieces scored
  - Teleop: Coral Scoring (which levels, cycle time, preferred scoring level), Algae (harvest y/n, processor y/n, net y/n, cycle time)
  - Endgame: Cage climb (shallow/deep), climb time, parking (y/n)
- **Validate** by watching matches (pieces score, autonomous, etc…)



Data Pre-Matches (Practice)

- **Practice Matches:**
  - Purpose of Watching Matches
    - Validate data collected during pit scouting and assess consistency in performance.
  - Focus Areas
    - Check autonomous scoring capabilities (e.g., consistency in scoring 3 notes).
    - Evaluate shooting consistency (e.g., accuracy and range for speaker shots).
    - Check to make sure that a robot is functioning and not having any issues.
  - Strategic Application
    - Use data to optimize game strategy and maximize scoring efficiency.



Data During Matches (Quant.)

Quantitative Data Includes:

- Pieces scored
- Tasks Achieved

Quantitative Data Helps Us:

- Tell us objective information about a team's capabilities
  - Can show us where a team's skill is concentrated
  - Outliers (3637)
    - Last year a team fed 13 cycles for one match
- Create visualizations of team performance to track effectiveness over time
  - Brown Out? Break?
- Calculate things like accuracy and cycle time

Data Visualizations

Overall Data

Autonomous							
Move from community	Bridge (point value)	Cube			Cone		
		Low	Mid	High	Low	Mid	High
1.00		0.00	0.00	0.00	1.00	0.00	0.00
1.00		0.00	0.00	1.00	0.00	0.00	1.00
1.00		0.00	0.00	0.00	0.00	0.00	1.00
1.00		0.00	0.00	1.00	0.00	0.00	1.00
1.00		0.00	0.00	0.00	0.00	0.00	1.00
1.00	12.00	0.00	0.00	0.00	0.00	0.00	1.00
1.00	12.00	0.00	0.00	0.00	0.00	0.00	1.00
1.00		0.00	0.00	0.00	0.00	0.00	1.00
1.00		0.00	0.00	1.00	0.00	0.00	1.00
1.00	12.00	0.00	0.00	0.00	0.00	0.00	1.00
1.00		0.00	0.00	0.00	0.00	0.00	1.00

Look at the data that was input for a specific team

Aggregates

Autonomous								Teleoperated						Endg	Quali
Community	Bridge (point)	Cube			Cone			Cube			Cone			Bridge (point)	Match Qual (0-5)
		Low	Mid	High	Low	Mid	High	Low	Mid	High	Low	Mid	High		
1.00	12.00	0.20	0.10	0.40	0.10	0.00	0.90	0.90	1.40	1.50	0.50	2.40	1.50	2.86	4.22
1.00	#DIV/0!	0.00	0.00	0.88	0.22	0.00	0.67	0.67	1.11	0.44	1.22	2.00	2.11	7.78	3.13
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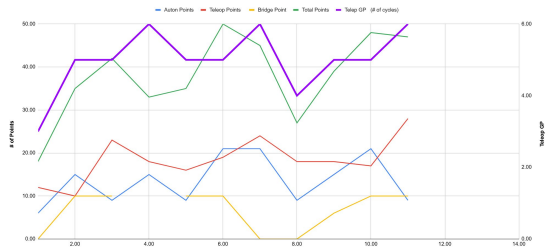
1.00	5.00	1.22	0.00	0.00	0.00	0.00	0.00	1.33	0.44	1.11	0.56	1.00	2.11	6.89	3.34
1.00	#DIV/0!	0.00	0.00	0.22	0.89	0.00	0.11	0.00	0.33	1.22	1.44	0.78	2.67	7.00	3.15

Compares each robot to other team's ability using standard deviations.

GRAPHS



Trends that could show outliers and performance history.

Data During Matches

Head scouter

- Looks for:
  - Driver ability (crashes, avoid defense, & use of whole field)
  - Style of driver - if they are a defensive opportunist
  - Synchronicity with alliance
  - Driver flip flops between strategies
- Goal: find counters or give advice to alliances.

Human Player

- Communicate heavily with Head Scouter about all teams in alliance.
- Look at quantitative data in spreadsheet
- Talk strategy with our alliance partners in upcoming matches

Data During Matches (Qual.)

Qualitative Data Includes:

- **Driving skill** (ability, coordination, collaboration, adaptability)
- **Subjective opinions** not measurable by numbers (strategy, speed, ability to move efficiently)
- Identifying the **strengths** and **weaknesses** of robots
  - Is there a better strategy for the alliance robot?
- Effectiveness of the execution of strategy as well as alternative executions

Qualitative Data Helps Us:

- Fill in the **blanks** for any **information** quantitative data can't provide us
- Find the **disparity** between teams with very **similar statistics**
- Dig deeper into the performance of robots
  - Gives us a more **well-rounded understanding** of a match/robot (ex: the quantitative data shows that a robot broke and stopped scoring, but qual data shows that the robot played very good defense afterwards)

Pick List Process (Part 1)

FIRST PICK:

- Sort top robots based on how they would best complement us in an ideal match strategy

Things to consider:

- Improvement over the competition
  - A robot that may have gotten off to a rocky start but improved over the competition should be compared with robots it has recently been performing similarly to.
- Versatility
  - A robot that can serve many functions well is great to work alongside especially when different strategies are implemented.

Pick List Process (Part 2)

SECOND PICK:

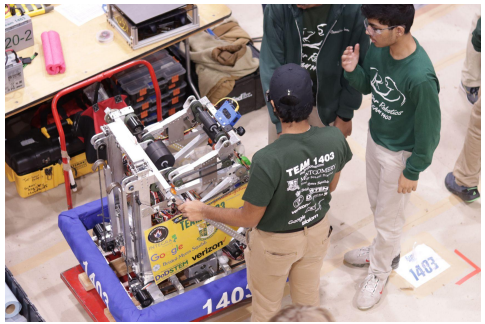
- Teams that are ideal as alliance members, and could potentially complement both us and another robot

Things to consider:

- Gaps to fill
  - Robots that can fill in gaps such as better auton routes
- Non-scoring Robots
  - Defense bots can add depth to your strategy and slow down the other teams from scoring, but be sure that the team you are selecting is good at defense
- Versatility
  - Once again, being versatile helps when strategies change

QUESTIONS?


1403


TEAM 1403
verizon
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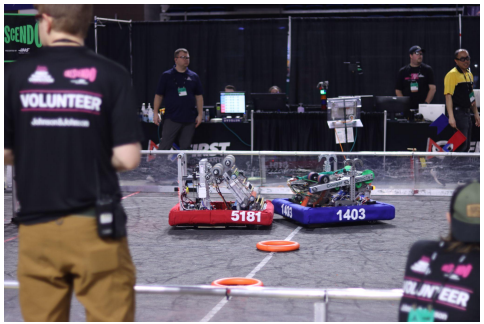
Johnson&Johnson
TEAM 1403
slalom
Bristol-Myers Squibb
DoDSTEM
verizon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outline

part two: alliance selection & strategy

- talk abt alliance selection and ways to prepare
- discuss how to work with other teams etc

part one: data (i mixed them up but i was too lazy to move them help)

- scouting
- collection methods
- analysis methods
- basically use this to set up explanations for how to use it for effective alliance selection strategy