

# Electronic Scouting in FRC

Caleb Mech



# Scope of this presentation

## What I *won't* talk about...

- ✘ Strategy
- ✘ How to analyze the data that is collected

## What I *will* talk about...

- ✔ Different methods of collecting data
- ✔ 2056's "Destination: Deep Space" scouting system



# What is scouting?

Collecting data for the purpose  
of informing strategy discussions

Finding which robots to pick  
in order to give your alliance the  
best chance to win a competition



# A Brief History of Scouting on Team 2056

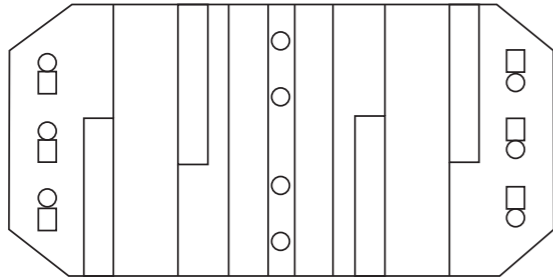


# Pre-2017 ([2056.ca/scouting-sheets/](http://2056.ca/scouting-sheets/))

## 2056 Scouting Sheet 2015

Match: \_\_\_\_\_ Team: \_\_\_\_\_ Scout Initials: \_\_\_\_\_

**Autonomous** X - pickup □ - robot



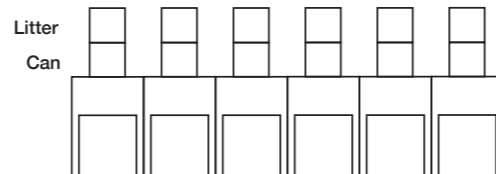
Autozone (AZ): No Yes  
 Cans to AZ: 1 2 3  
 Totes to AZ: 1 2 3  
 AZ Totes Stack: No Yes  
 Step Cans: Fail 1 2 3 4  
 Time to Grab: \_\_\_\_\_

## Teleoperated

### Pickups

Feeder Totes	Feeder Litter
Floor Totes	Floor Cans
	Step Cans

### Stacks on Stacks



### Errors

Tote Drops	Can Drops	Stack Smash

### Coopertatum

Attempted: No Yes  
 Arrival Position: 1 2  
 Totes added: 1 2 3  
 Points: 0 20 40

### Final

#### Fouls

#### Comments

### Human Playa

Own Zone	Own Landfill
Other Zone	Other Landfill

## 2056 Scouting Sheet 2016: FIRST Stronghold

Match: \_\_\_\_\_ Team: \_\_\_\_\_ Scout Initials: \_\_\_\_\_

### Autonomous Period

#### Crosses

Portcullis	Moat	D-bridge	Rock W	Low B
Cheval d F	Ramparts	Sally P	Rough T	

Reached (but NOT Crossed)? Y N  
 Spybot? Y N  
 Start with Ball? Y N

Balls picked up	High goal scores
Drops/missed shots	Low goal scores

Crossed: X

### Teleoperated Period

#### Pickups

Courtyard	Opposing Secret Passage (STEAL)	Neutral Zone	Own Secret Passage	Opposing Courtyard (STEAL)

#### SHOTS

From Outer Works
Mid-Courtyard
Batter
Low Goal

#### Errors

Misses/Drops
Beached Bots
#Team330
FOUL
TECH FOUL

#### Defences Crossed (forward and back)

Portcullis			Cheval d F
Moat			Ramparts
D-bridge	Only One Direction	Also only One Direction	Sally P
Rock W			Rough T
Low Bar			Low Bar

#### Defensive

#### Plays

Shots Prevented
#NotInMyHouse
Secret Passage Blocks
HITS (non-shooting)

### Endgame

Time at batter: \_\_\_\_\_  
 Challenge? N/A Attempted Success  
 Scaled? N/A Attempted Success

#### Comments



# 2017 (FIRST Steamworks)

## 2056 Scouting Sheet 2017: FIRST Steamworks

Match: \_\_\_\_\_ Team: \_\_\_\_\_ Scout Initials: \_\_\_\_\_

### Autonomous

Line crossed: 1  
 RZ gear: 1 2 Did they shoot: 1  
 Middle gear: 1 2 Only Baller: 1  
 Boiler gear: 1 2 Low Goal Score: \_\_\_\_\_  
 Gears dropped: 1 2 High Goal Score: \_\_\_\_\_

### Tele-operated

Errors		Fouls	
Dropped Gears	Lost Comms	Regular	Tech
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Died: 1

Only Baller: 1  
 Low Goal Score: \_\_\_\_\_  
 High Goal Score: \_\_\_\_\_

Cycle	End of Cycle	Got Gear?	Got Balls?	Gear go up?	Defended?
1					
2					
3					
4					
5					
6					
7					
8					

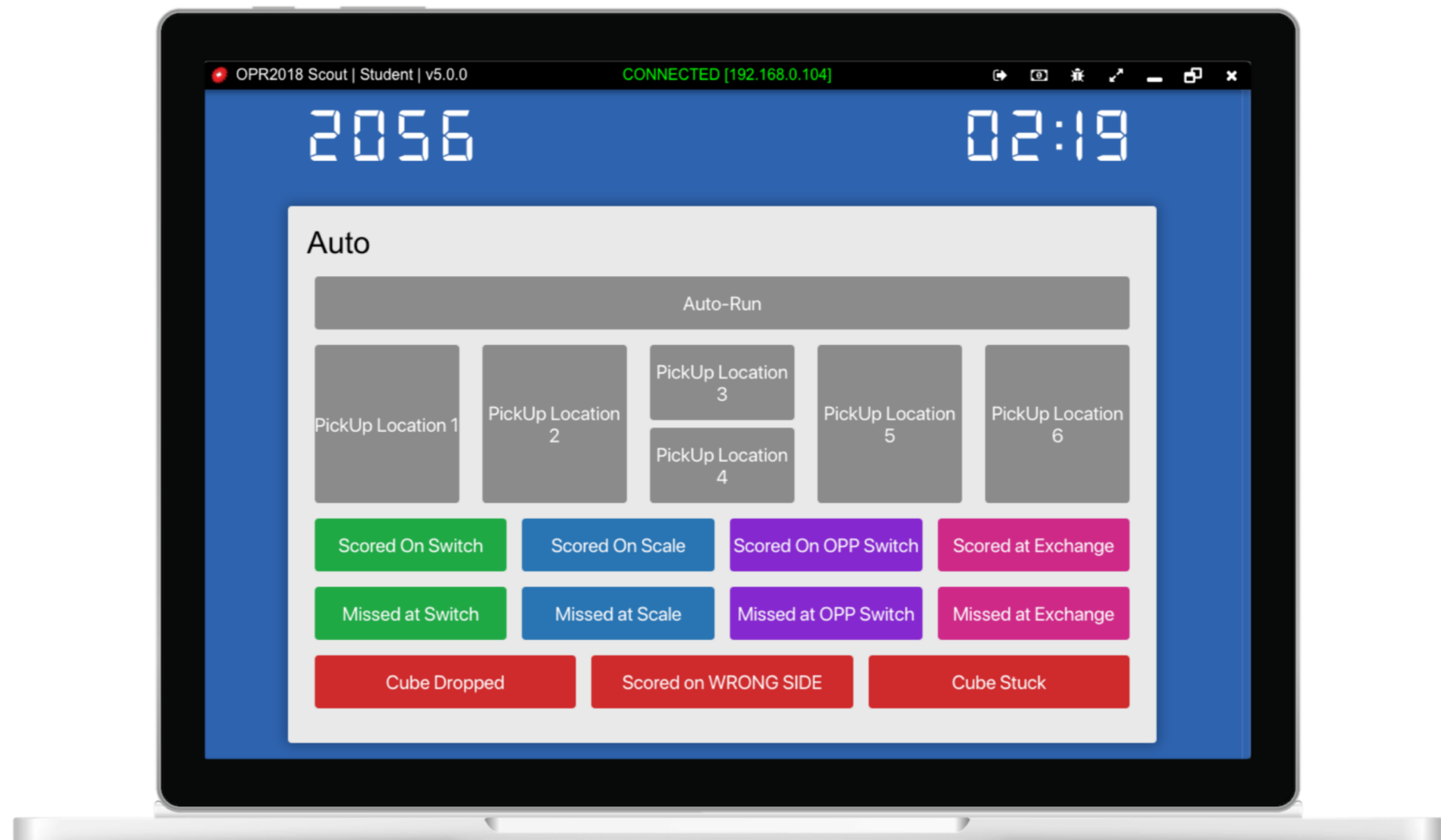
### Endgame

Attempted: 1  
 Time at Rope: \_\_\_\_\_  
 Successful: 1  
 Time after climb: \_\_\_\_\_

### Comments



# 2018 (FIRST Power Up)



# 2018 (FIRST Power Up)





# 2019 (Destination: Deep Space)

2019 150.0

Initials: CM

Match Number: [ ]

Alliance: [ ]

Team Number: 2056

Opposing Alliance

Team 1: 1

Team 2: 2

Team 3: 3

Starting Config

Preload: None

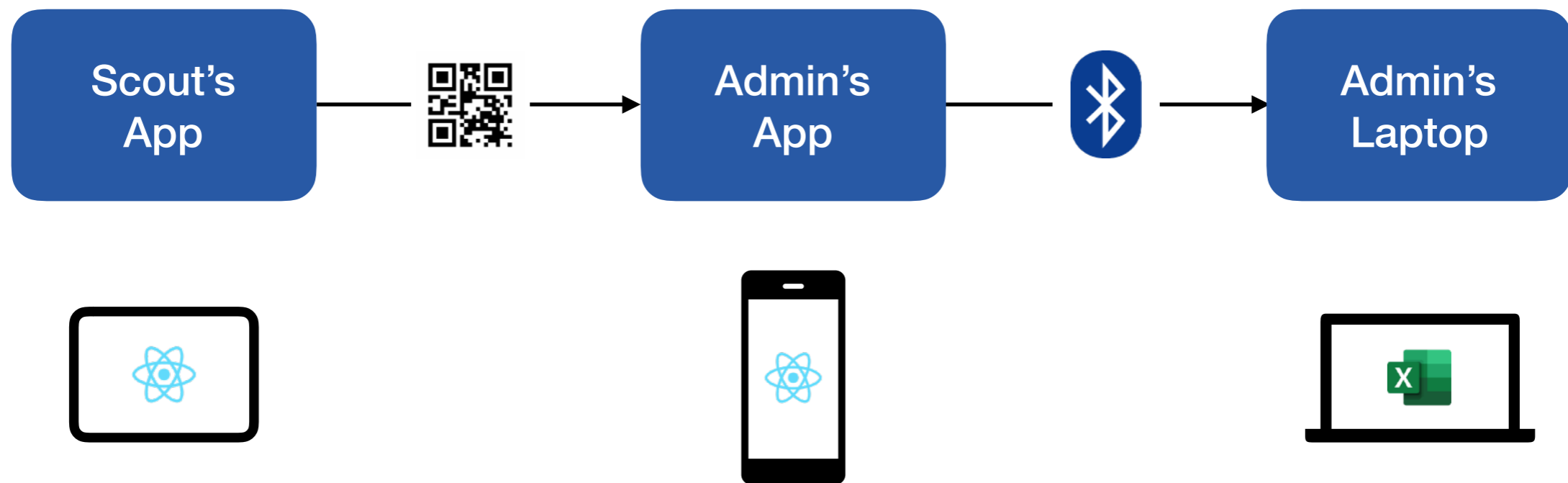
LEFT CENTER RIGHT

LEVEL 1 LEVEL 2

BEGIN MATCH



# 2019 (Destination: Deep Space)



2019 (Destination: Deep Space)

**Demo!**



# What we got right

- Resilient system
- Battery life
- Easy setup and updating
- Useful data



# What we got wrong

- App context changed constantly
- Multiple taps per action
- Quantifying defence data (?)
- Data validation
- Spaghetti code



# Scouting System Options



# Informal System

## Pros

- ✓ Easy to develop
- ✓ Able to collect qualitative data

## Cons

- ✗ Not quantitative
- ✗ Requires experienced scouts

## When to use...

- Few resources for scouting
- To supplement a formal/structured system



# Paper-based System

## Pros

- ✓ Easy to develop
- ✓ Easy to learn
- ✓ Built in fault tolerance

## Cons

- ✗ Tedious data entry
- ✗ Lower data fidelity

## When to use...

- Scouting team of more than 8 people
- Starting to get serious about scouting





# Electronic System

## Pros

- ✓ High data fidelity
- ✓ Easy data entry

## Cons

- ✗ Easy to get wrong
- ✗ Fault tolerance needs to be added manually

## When to use...

- Scouting team of more than 8 people
- Students (and likely mentors) committed to developing
- Experienced and looking for more



# Beyond Match Data

- Pit scouting
- Robot pictures
- Match video



# More Resources

- [citruscircuits.org/scouting](http://citruscircuits.org/scouting)
- [2056.ca/scouting-sheets](http://2056.ca/scouting-sheets)
- [2056.ca/conference](http://2056.ca/conference)
- Chief Delphi

