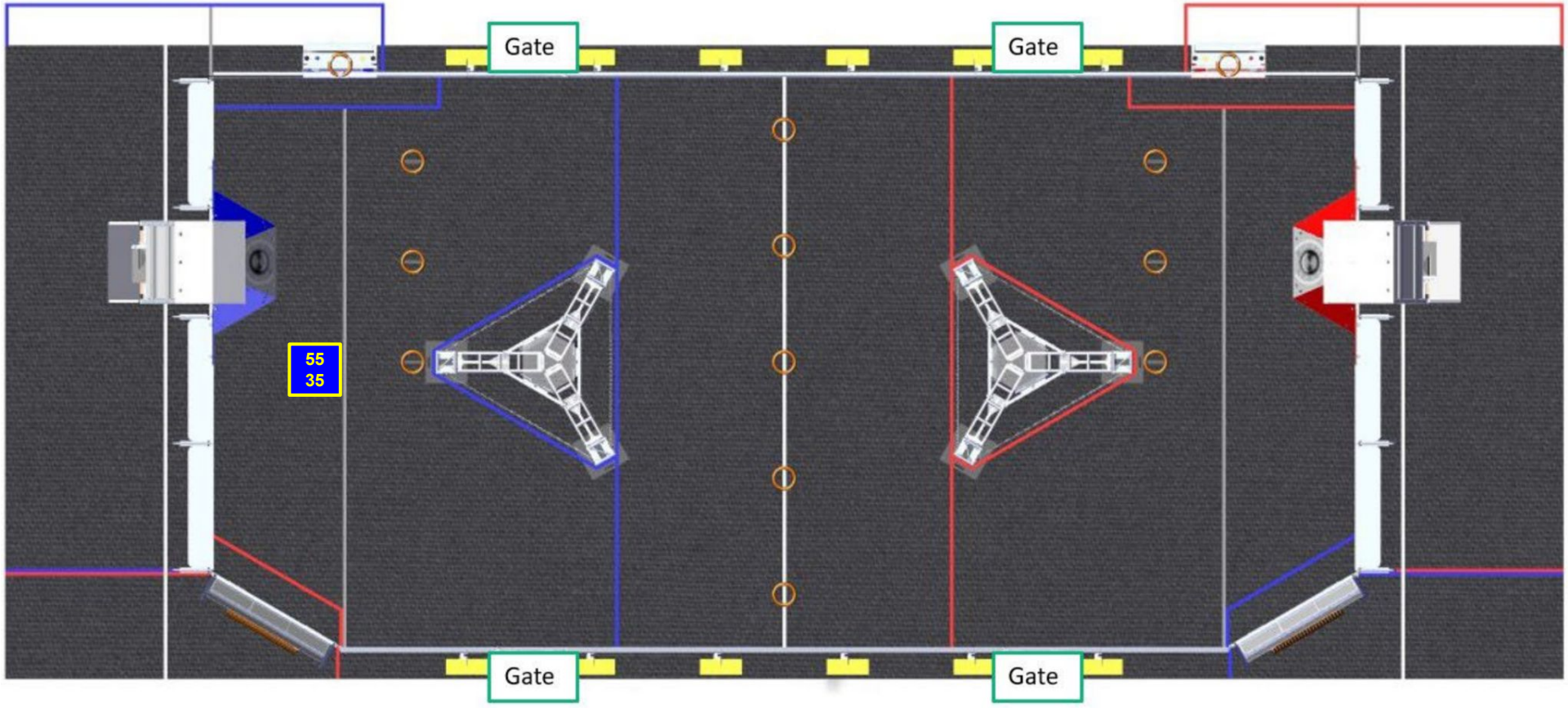
ROBOTICS 2024 CRESCENDO COMPETITION PROGRAMMING PLAN
TEAM 5535



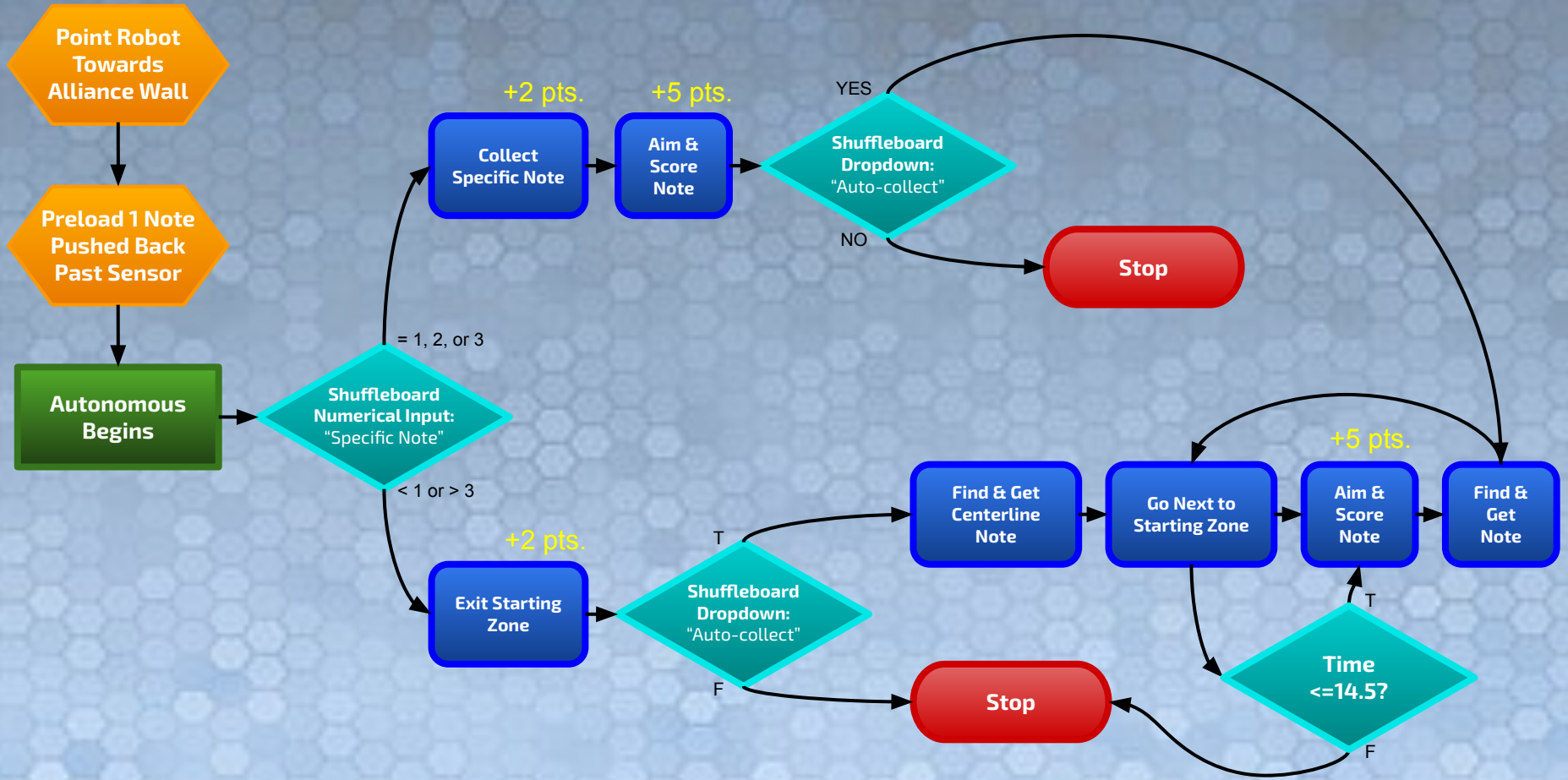
Points Chart

		MATCH points		Ranking Points	*Coopertition* Points
		AUTO	TELEOP		
LEAVE		2			
NOTES	AMP NOTE	2	1		
	SPEAKER NOTE (not AMPLIFIED)	5	2		
	SPEAKER NOTE (AMPLIFIED)		5		
STAGE	PARK		1		
	ONSTAGE (not SPOTLIT)		3		
	ONSTAGE (SPOTLIT)		4		
	HARMONY		2		
	NOTE in TRAP (max. 1/TRAP)		5		
***Coopertition* Bonus**					1
MELODY	At least 18 (15 if *Coopertition* Bonus) AMP & SPEAKER NOTES*			1	
ENSEMBLE	At least 10 STAGE points and at least 2 ONSTAGE ROBOTS*			1	
Tie	completing a MATCH with the same number of MATCH points as your opponent			1	
Win	completing a MATCH with more MATCH points than your opponent			2	

Autonomous Plan Summary

Robot can be placed in any position within the starting zone. While the robot is disabled, it will compute its orientation by using the nearest AprilTag in view. A note should be preloaded into the launcher, pushed back slightly past the sensor. When the match starts, the robot will "swallow" the note (put it into launch position), aim at the speaker and then launch the note. If Shuffleboard says to not grab any specific notes, the robot will simply exit the starting zone; otherwise, if it is configured to get note 1, 2, or 3 it will get the selected note and promptly score it. After either that or simply exiting the starting zone, if Shuffleboard says to go get more notes, it will drive around the alliance's half of the field collecting and scoring any remaining notes, including positioned notes that were missed, notes that missed the speaker, and notes on the centerline. The robot will not launch a note during the last half second of autonomous. When teleop begins, the robot will automatically enable "teleauto", resuming it's previous task at full speed until the driver tries to drive or cancels teleauto with "X" on the primary controller.

Autonomous Plan Diagram



Controllers 1 & 2

Default Controls

Definitions:

- ➔ **Point in Direction** Points in the selected direction, down being towards the local alliance
- ➔ **Launch Sequence** Searches for april tags and aims at alliance speaker while rotating to point robot towards it and firing up the thrusters. Continues adjusting, even if moving. When at least 0.7 second has passed, launches note when close enough to be sure of hit. Useful for quickly launching while zooming by speaker.
- ➔ **Start Intake** Will most likely not have to be used as the robot will automatically run the intake when necessary, but can be used to manually run the intake system until canceled with “B” or detection of received note. Will put launcher into intake position.
- ➔ **Score In Amp** Go to alliance’s amp and align with it, then score into amp
- ➔ **Teleauto** Super-smart super-fast super auto mode; see slide 3. Robot LEDs will light up orange when in teleauto or autonomous.

Controllers 1 & 2

Raw Mode

Definitions:

- ➔ **Raw Launch Sequence** Fires up thrusters and then launches note
- ➔ **Start Intake** Runs the intake system until canceled with “B” or detection of received note. Will put launcher into intake position. If note already detected, assumes sensor error and runs intake until “B” pressed.
- ➔ **Score In Amp** Tilt launcher down and immediately fire note into amp.
- ➔ **Go to Closeup Launch Position** Puts the launcher to the angle at which it should fire should it be directly pressed up against the subwoofer.

Robot LED Color Meanings

What it means when the robot's LED strip is lighting up a certain color

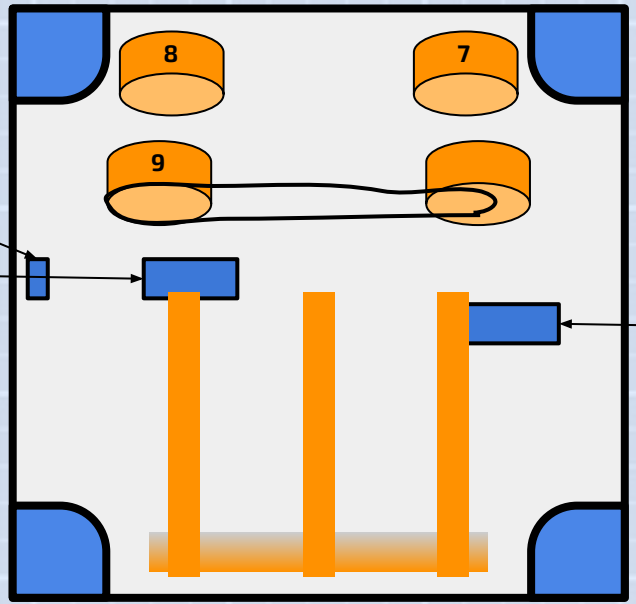
LED Color	Meaning
Orange	*Robot is in **autonomous** mode or running teleauto*
Green	*Robot is disabled and **safe***
Blue	*Robot is in teleop mode while on the **blue alliance***
Red	*Robot is in teleop mode while on the **red alliance***
Turquoise	*Robot is in **final 20 seconds** of match and wants to climb*
Yellow	*Robot is **intaking** a note*
Magenta	*Robot is **E-Stopped** or **A-Stopped***
White	*Robot is in **test mode***

Robot CAN IDs

CAN Coder: 10
Steering: 14
Drive: 20

Front (Launch Side)

CAN Coder: 11
Steering: 15
Drive: 21



CAN Coder for Launch Aim: 25
Motor for Launch Aim: 24

Intake Motor: 5

Robot LED Strip: 30

CAN Coder: 13
Steering: 17
Drive: 23

Back (Intake Side)

CAN Coder: 12
Steering: 16
Drive: 22

Limelight Pipelines

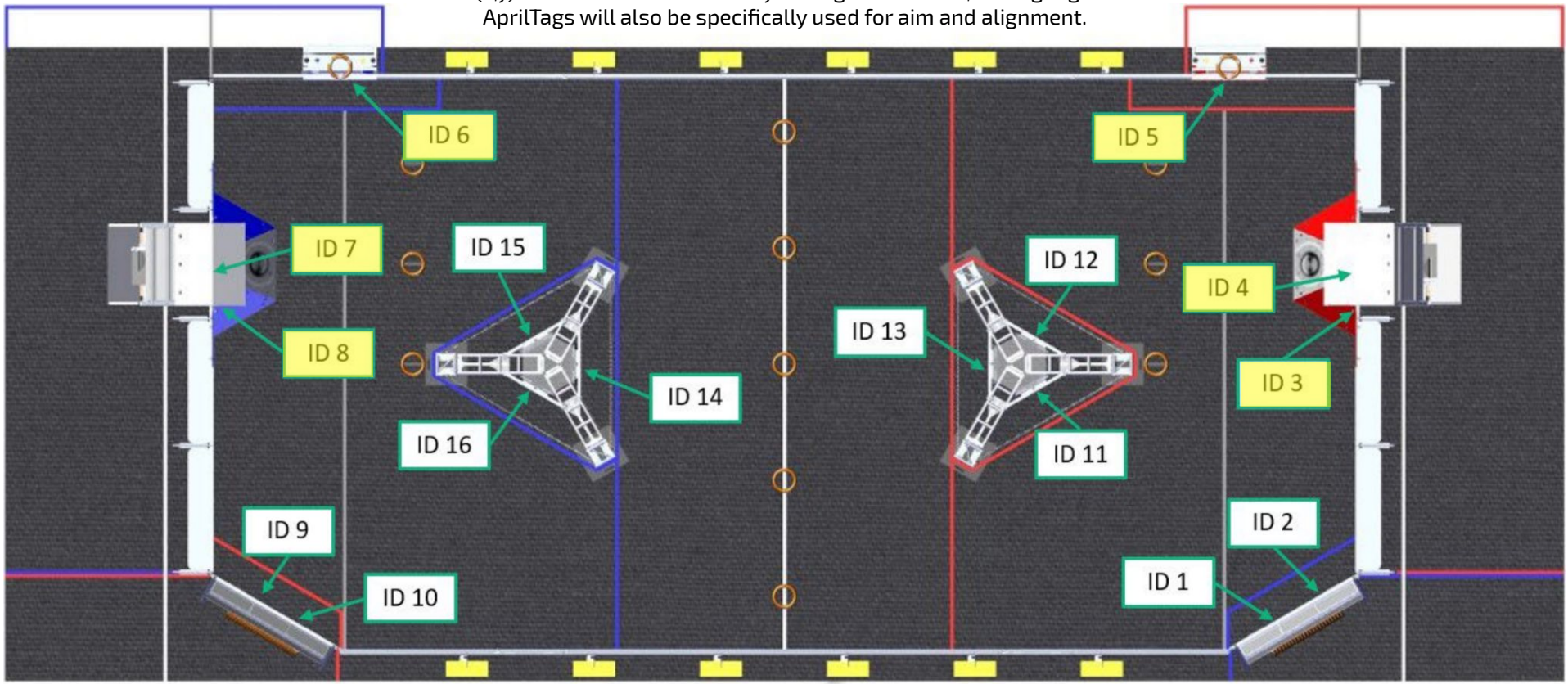
LIMELIGHT

#	Name	Purpose
0	View	For livestreaming the robot's view to the driver; optimal viewing settings
1	General AprilTag	Detects closest AprilTag and returns the ID; to help with location detection
2	Note Detector	Detects the orange notes for autonomous collection purposes
3	Blue Speaker	Detects point to aim at in blue speaker based on AprilTag 7
4	Red Speaker	Detects point to aim at in red speaker based on AprilTag 4
5	Blue Speaker Side	Detects AprilTag on left side of blue speaker (ID 8) for more accurate calculation of robot position relative to speaker
6	Red Speaker Side	Detect AprilTag on right side of red speaker (ID 3) for more accurate calculation of robot position relative to speaker
7	Blue Amp	Detects AprilTag 6 (above blue amp)
8	Red Amp	Detects AprilTag 5 (above red amp)
9	Lighted View	For livestreaming the robot's view to the driver with the limelight headlights on

AprilTag Locations

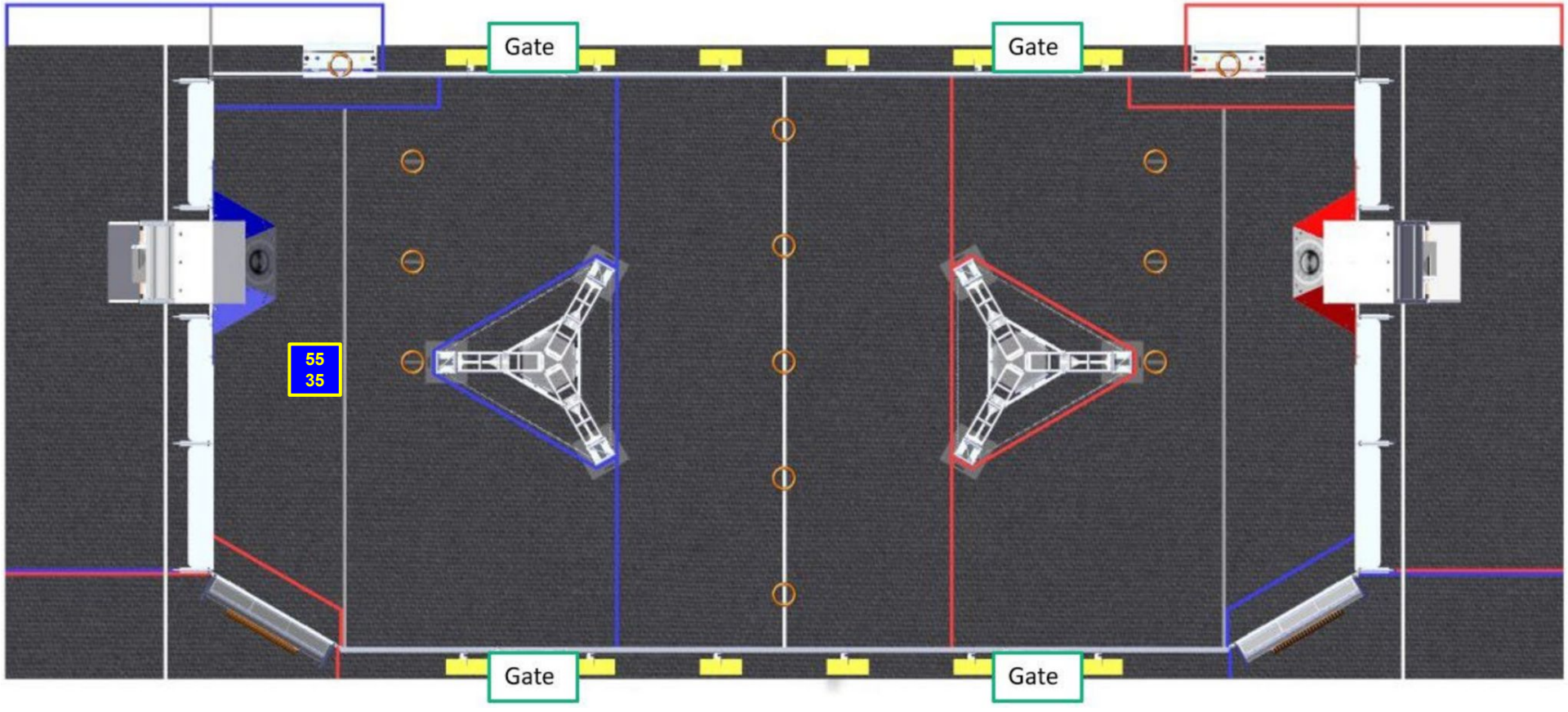
(Most Important Tags Highlighted)

All AprilTags on the field will be utilised by the robot to perpetuously detect its (x,y) location on the field and yaw angle. However, the highlighted AprilTags will also be specifically used for aim and alignment.



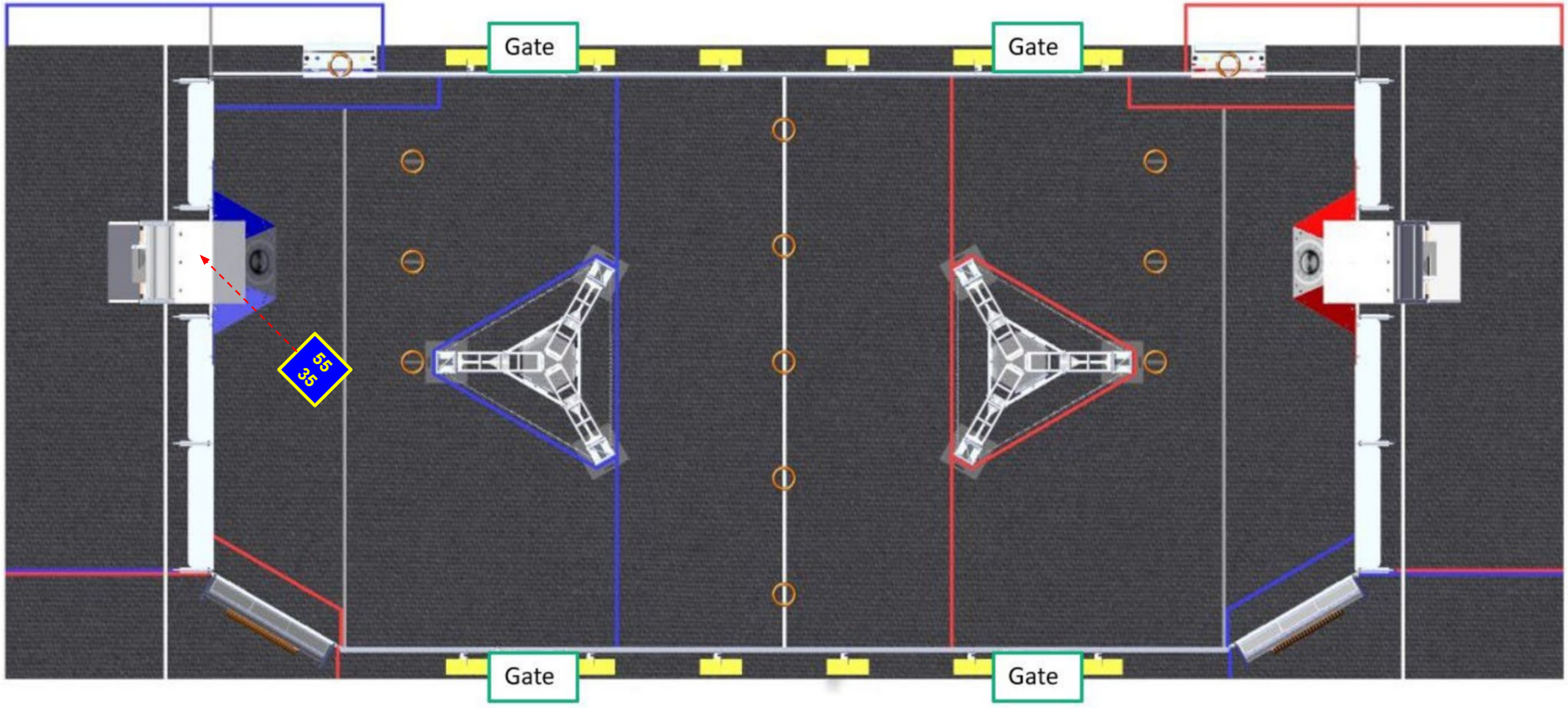
A Typical Autonomous Map

(Example below for if on blue alliance with Shuffleboard saying to get note 3 and continue collecting) (Step 0) 0:00



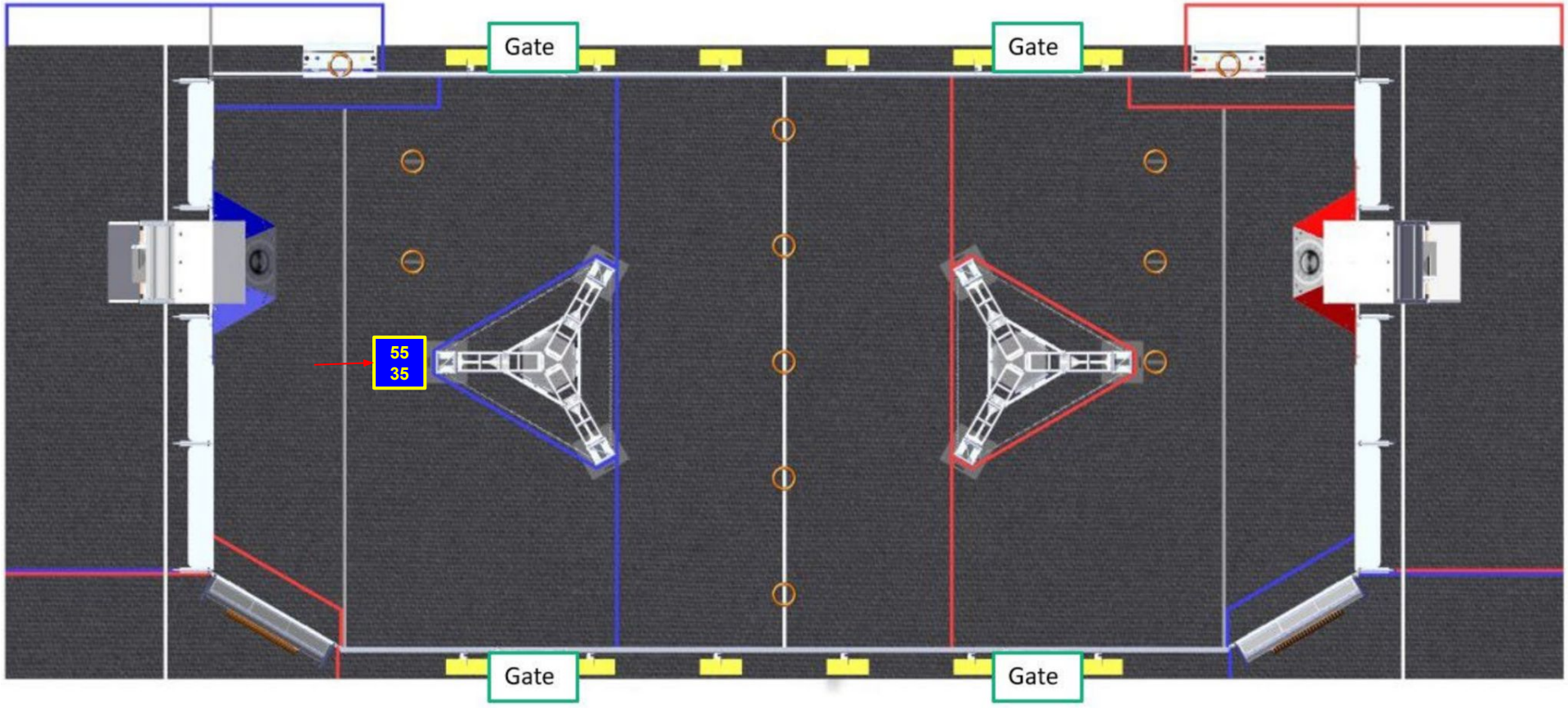
A Typical Autonomous Map

(Example below for if on blue alliance with Shuffleboard saying to get note 3 and continue collecting) (Step 1) 0:02



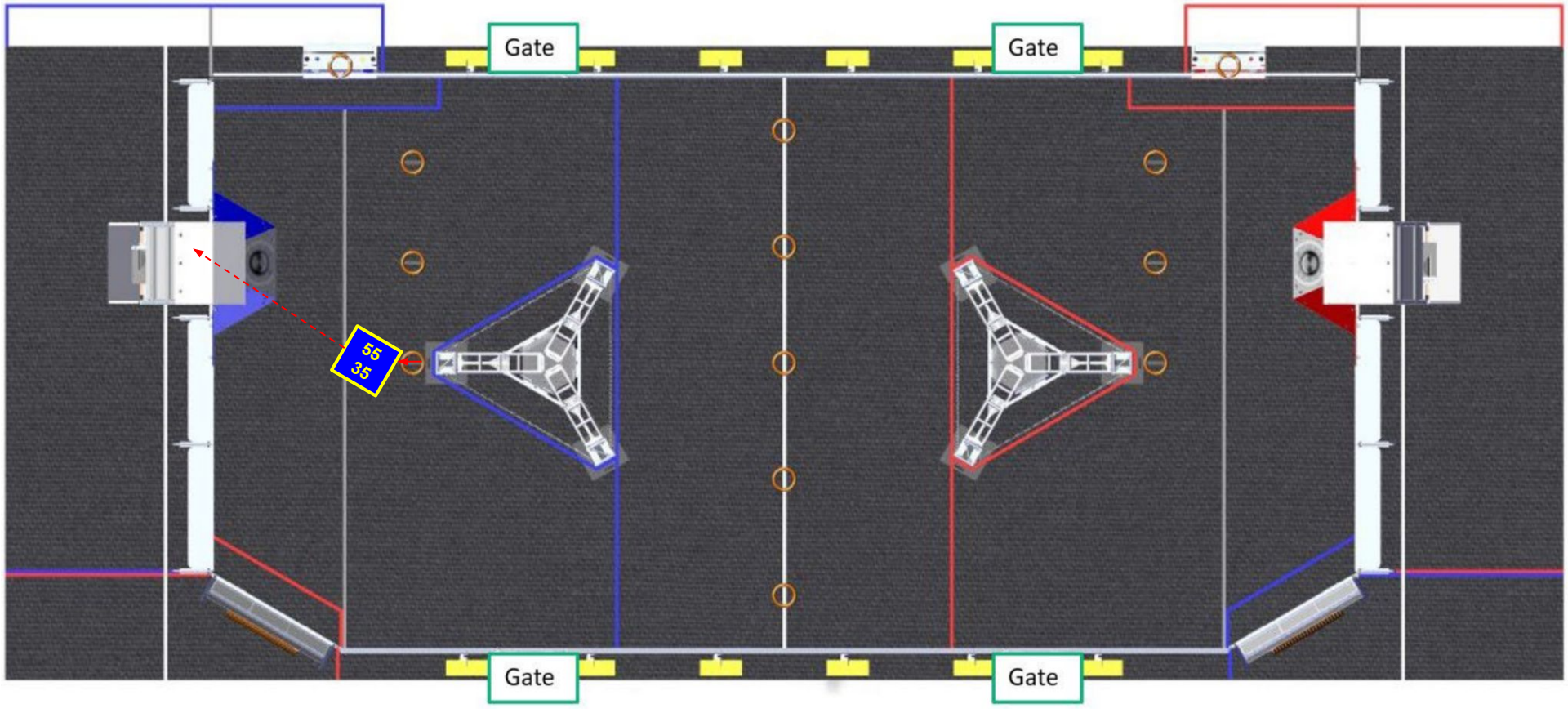
A Typical Autonomous Map

(Example below for if on blue alliance with Shuffleboard saying to get note 3 and continue collecting) (Step 2) 0:04



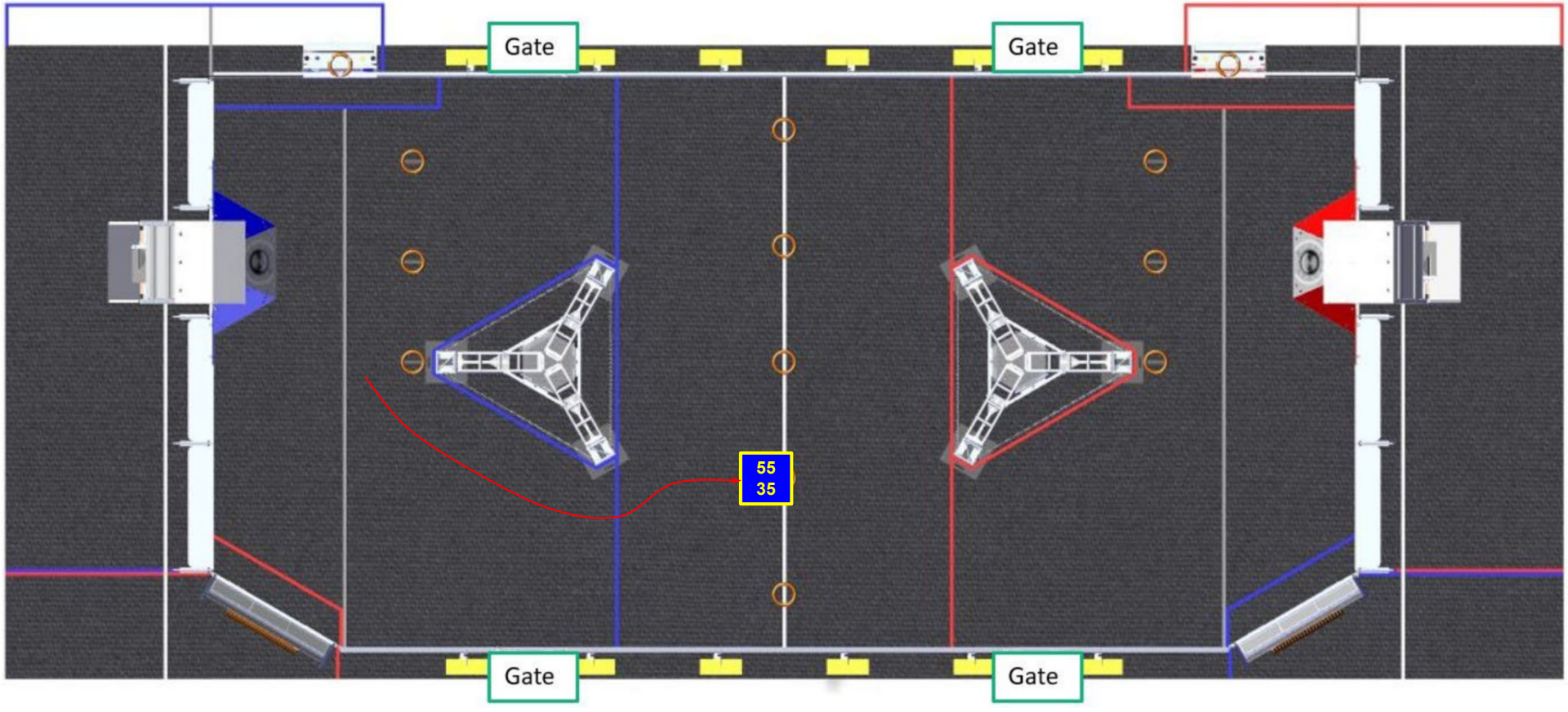
A Typical Autonomous Map

(Example below for if on blue alliance with Shuffleboard saying to get note 3 and continue collecting) (Step 3) 0:07



A Typical Autonomous Map

(Example below for if on blue alliance with Shuffleboard saying to get note 3 and continue collecting) (Step 4) 0:11



A Typical Autonomous Map

(Example below for if on blue alliance with Shuffleboard saying to get note 3 and continue collecting) (Step 5) 0.14s