



2009 Lunacy Strategy

Team 2587 – DiscoBots – Houston, TX

Written by Student Coach Lalo Torres

The Role of the Driver:

The drivers' main focus is to efficiently execute fundamental driving maneuvers. Even a great strategy will fail if with poor fundamental driving. The driver should definitely know all the in's and out's of how to: control their robot, their trailer, pin, as well as how to avoid being pinned. There are several strategy terms (short hand names that were made up) in this paper that the driver should be familiar with.

The Role of the Collector:

Obviously to know how to operate the collector at maximum efficiency (How to fill up the hopper with the least amount of "playing with it" , A.K.A running the collector backwards and forwards). There is much more to this role than just collecting though. The collector should also know the fundamentals of the driving in order to correct the driver of any inefficient driving habits. The collector will be our primary scoring spotter and therefore should know all about how to pin and as well as what are the best areas of the field to pin/score. The collector should also be familiar with the terms of strategy and game because that is who the coach may relay useful information to from other teams. All of these terms and strategy will be gone over in detail in this paper.

The Role of the Human Player (HP):

This will be covered towards the end of the paper.

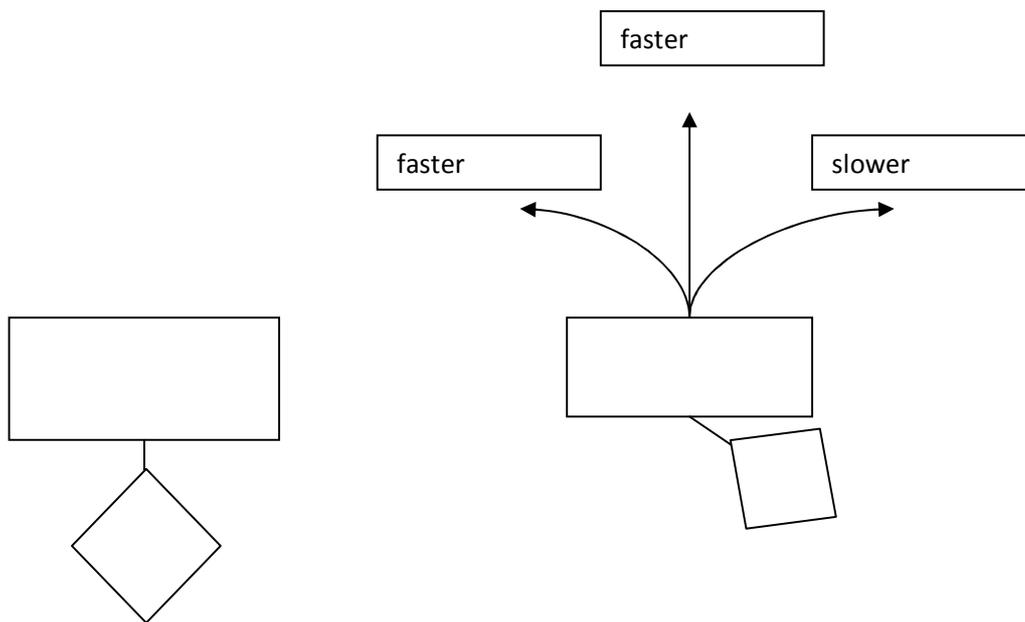
The Role of the Coach:

To know the strategy for the entire alliance and communicate well with other teams on the alliance, relay relevant information to the driver and collector, be able to coordinate all three teams so that they can work as one, and have the ability to change the strategy mid-game when needed.

Driving

Here are some basic driving maneuvers that may seem obvious but in the heat of the match many teams tend to forget these driving fundamentals.

Turning:



You can see above on the left a robot going straight. On the right is a robot that is either turning right or one whose trailer is being jacked knifed by another robot. This will happen very often and it is important that you know the best way to stop this jack knifing and turn quickly. Many drivers will continue to turn right when this happens even though it causes them to lose massive amounts of speed (which is hard to build back up). Here you could:

Keep going right: This is what most drivers tend to do. I recommend that you avoid doing this when at all possible. It tends to slow your robot down too much. Our robot also does not turn well this way at all on regolith at all from what I remember. Which gives others opportunities to score on you.

Go Straight: This is a better option. You do not have to go straight for long, just enough to straighten out your trailer. Then you can turn right again. The bad part is that your turn will be a lot wider but if you have room to do

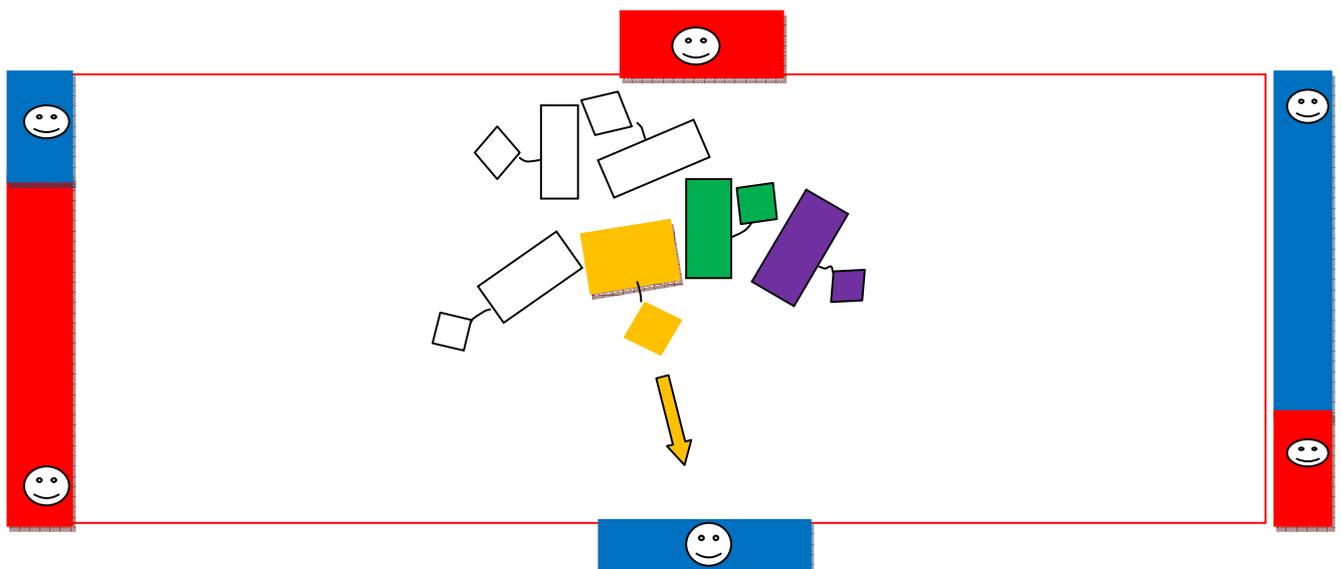
this one you should. This way most of your hard earned momentum is conserved and you can continue to collect balls at a high speed (or use that momentum to ram and pin someone else) while also being a hard target for opposing HP's. Moving fast in this game is a good thing.

Turn Right:

This is the option that will un-jack-knife that trailer the fastest. But if you do not straighten out soon after that you will have the same jack knifing problem in the opposite direction.

Backing Up:

From what I noticed, many drivers are not backing up to get out of tough situations. Many times during a match there are large pile ups when almost all of the robots are in the in one huge clump. I have seen drivers actually try to turn around in one of these pile ups while there where robots on both sides of it (did not work well at all).



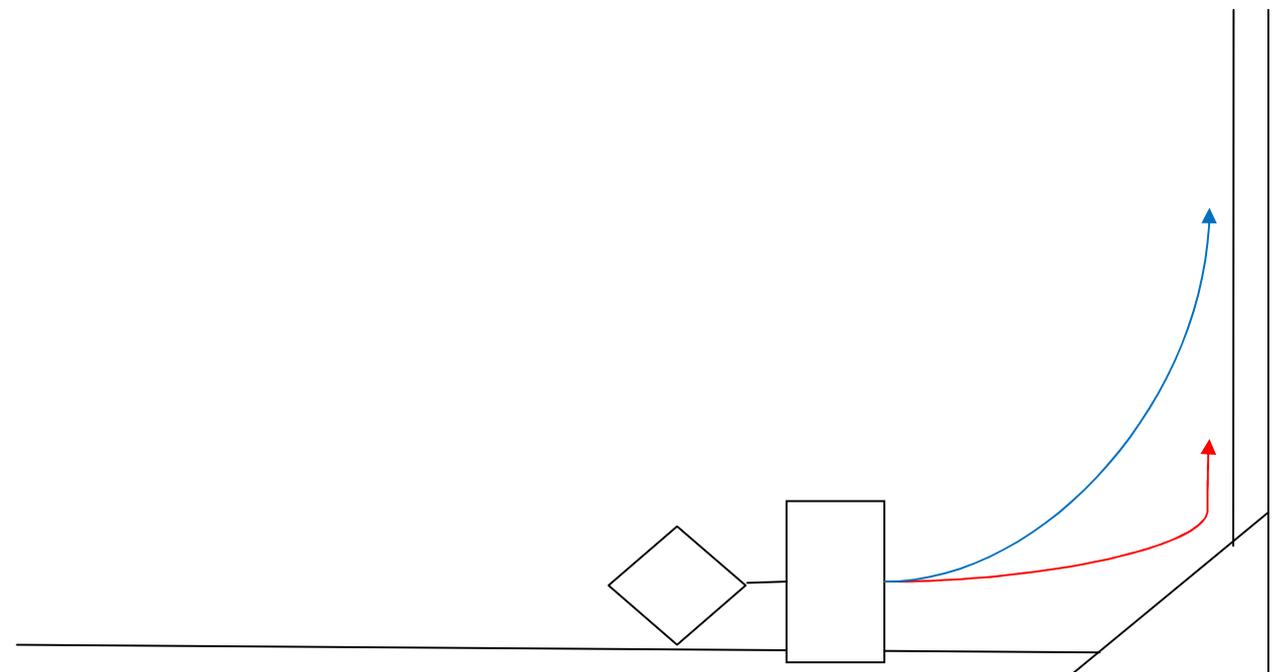
Above is an example of a pile up. First let's look at the orange robot in this situation. There are robots on both sides of it, making it very difficult to turn. This is how most pile ups happen and the fastest way out is usually backwards, even if that means jack knifing your trailer.

The main reason that you want to back out when you are the orange robot is because you do not want to be like the green robot. The green robot was in a very similar spot as the orange one until another robot (the purple one) pulled up on it to score. Now the green robot has robots all around it and moves where ever the pile moves (that's one bad spot to be in). We

want to be the purple robot, the last one to pull in, score, and then get out of there before someone does the exact same thing to us (we will go over this in the pinning section).

Conservation of Momentum:

Because of the wheels, playing surface, traffic, and our lack of traction control it will be difficult to gain momentum on the field. Going faster than everyone else has clear advantages: we can catch and run from opponents easier, push better, collect balls faster, and be harder for opposing HP's to score on, so when we gain some speed let's not lose it because of some driving mistakes.



Before I get to the picture above let me state the obvious. DO NOT hit the wall that outlines the field when you are trying to drive along the border of the field (a real momentum killer). This seems very dumb to say but I have seen it happen many times. It may be because the coefficients of friction on the left wheels and right wheels as a result of the carpet running along the border of the field (Just something to keep in mind).

Now on to the picture. This shows another thing that happens often. Drivers seem to forget that the corners of the field have the fueling port that sticks out like shown above. Some drivers have run right into it (especially on the far side of the field), bringing them to a near stop. Many also try to take to route of the red arrow. This is not a good idea because robots cannot make a

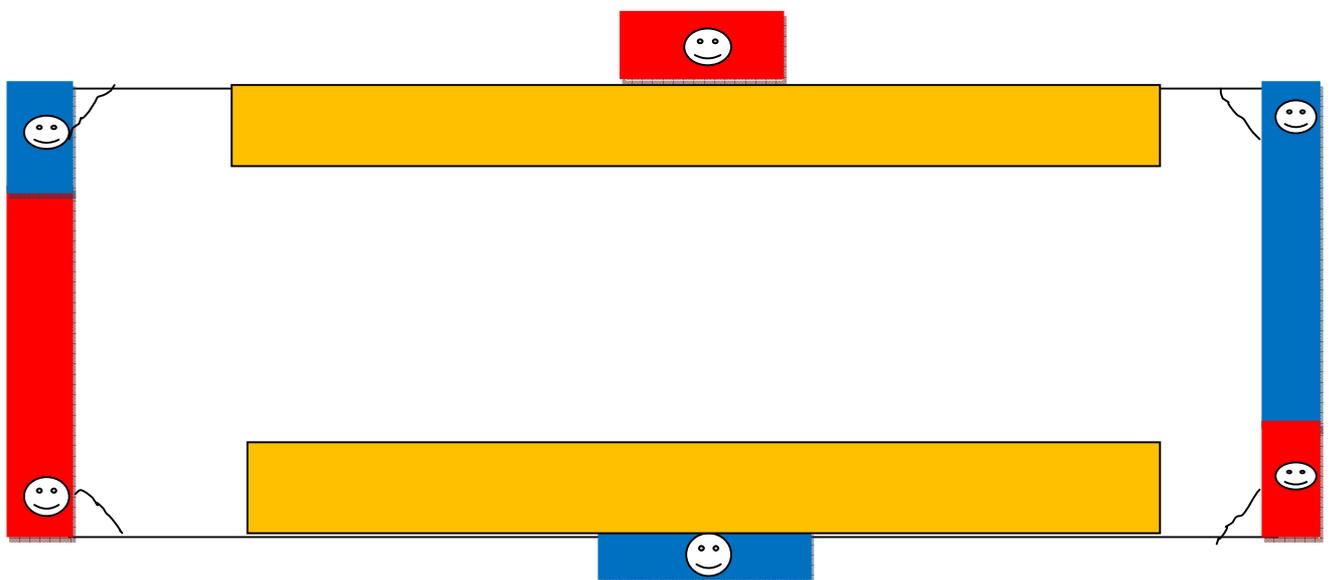
turn that sharp on regolith, especially if they are going fast. Many robots that run the red route just slide right into the fueling port, really killing their momentum.

The blue route is a much better route to take. It is a wider turn but much safer. This way you do not slide into the corner and your trailer does not jack-knife, which will save you a lot of momentum. When you pass by the corners you want to do it quickly to avoid getting “corner pinned” and the “black zones” (these terms will make sense later). When passing by the corners you never want to take the red route, always the blue one because it is much safer and faster. Also anticipate the slide. You will slide when you try to turn and stop. The faster you are going the more you will slide. So **turn early not late!**

Collisions of any kind really slow you down. So watch out for the bulky parts of your robot unintentionally clipping other robots (even your own alliance partners).

The Availability of Balls:

Human Players generally miss a lot and most of those balls end up along the edges of the field.



The orange areas in the picture above show area where many balls tend to be (especially right at the end of autonomous). These are generally good places to collect a lot of balls. Keep what was said above in mind; watch the walls and the corners with those fueling ports.

A Strategy Note on This

There is a trade off to collecting here right after autonomous because that is usually when HP's are really letting orbit balls fly. Teams will also be aggressively trying to pin you in the first seconds of tele-op to score those 7 preloaded balls. Big pile ups are common in this period too. So when collecting in this period be careful not to get pined against a wall, especially in the Black Zones (we will cover this later).

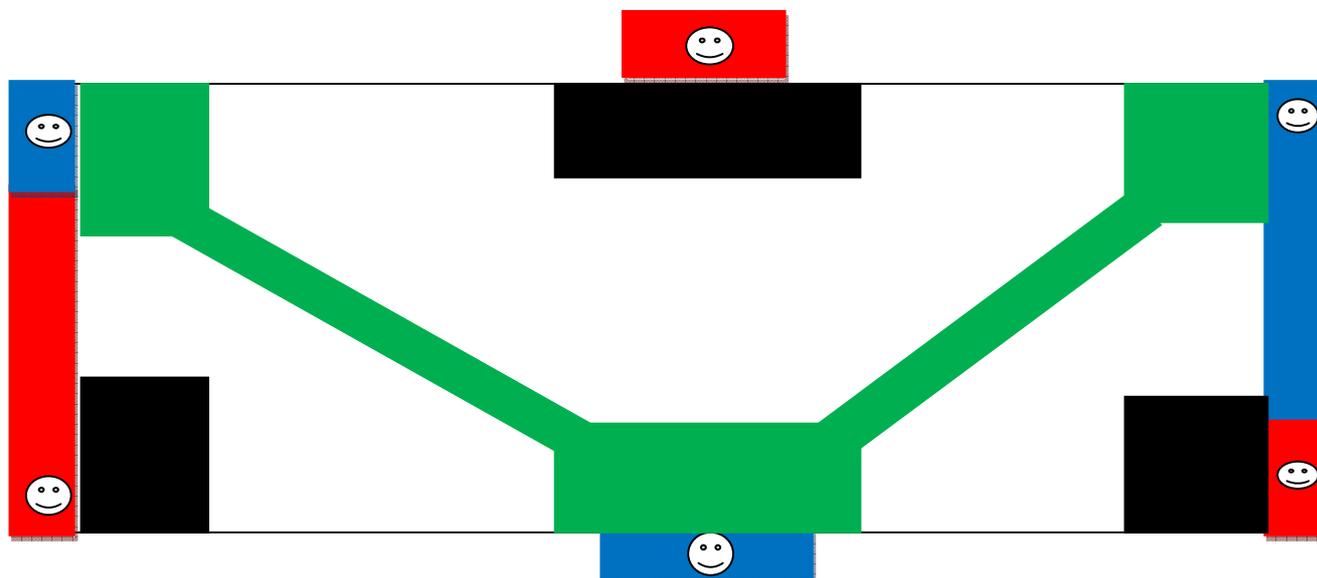
Driving Strategy

Now that we have gone over the basic driving stuff lets get into some driving strategy...

Keep Moving:

In Lunacy a stationary trailer is usually a full trailer. Moving is needed, but you should always be moving with a purpose. It should be either scoring, transferring empty cells, pinning, or defense. Teams that wonder around the field doing random things do not often do well. Two minutes is not long, and for the entire two minutes you should have a purpose for driving. No driving around scatterbrained and thinking about what you are going to do next because you just dumped a load and did not have a plan of what to do after that. If you are just moving for the sake of motion, with no specific goal (ex. Collect those balls, score on that trailer, or pin that bot), then something is terribly wrong with your strategy.

The Driving Triangle:



This is what I call the driving triangle. Let's assume that you are the blue alliance. The **"Green Zone"** is your friend. When you are in the green zone it is the hardest for the opposing HP's to score on you, it is where your HP's can score on opposing robots that try and score on you (HP's can scare the opposing bots away), and it is the most efficient route to transfer empty cells. This route also avoids the middle of the field where many pile ups tend to happen. When you have a full load of balls and are looking to pin & score, the first place you should look to do it is in the green zone (that way your HP can also score and opposing HP's do not have a good shot your trailer). If there are no good scoring opportunities in the green zone then look for the next best opportunity.

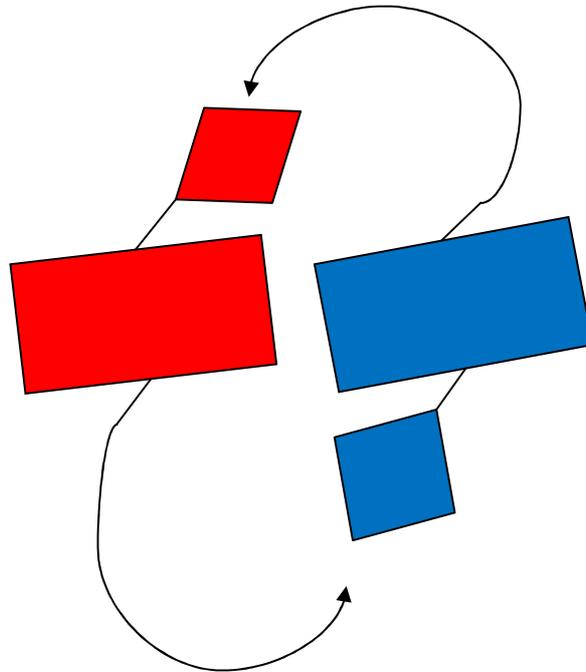
In the **"Black Zones"** you have no friends. Stay away from the black zones especially the corners. If you get pinned there you are most likely in for a double dose of trouble, from both the opposing HP and robots. Getting pinned in these corners often means a full trailer. I would think twice about going to score on someone in these zones. Besides instances like when you have a huge load of balls while there is a really weak opponent in one of these zones and there are no decent scoring options anywhere else, I would avoid the Black Zones.

A Note on Black Zones:

When the opposing HP's run out of balls Black Zones are no longer dangerous. The outpost is usually the first one to run out (relatively soon) and then later sometimes the fueling stations will run out too. The coach will keep an eye on this and tell you when a black zone becomes "safe". Lunacy is a quick changing game, those who can not adapt to change mid-match lose.

Don't Dance:

Do not get into a circle driving contest with another robot when you are full and ready to dump.



As the two robots above dance around each other neither one of them scores (this happened a lot at the Houston Scrimmage). No scoring... this is not what we want to happen when we have a full load. This waste too much valuable time and there should be plenty of other scoring opportunities (especially if we coordinate a pin with one of our alliance partners). Let's not waste our time doing this dancing stuff in a match.

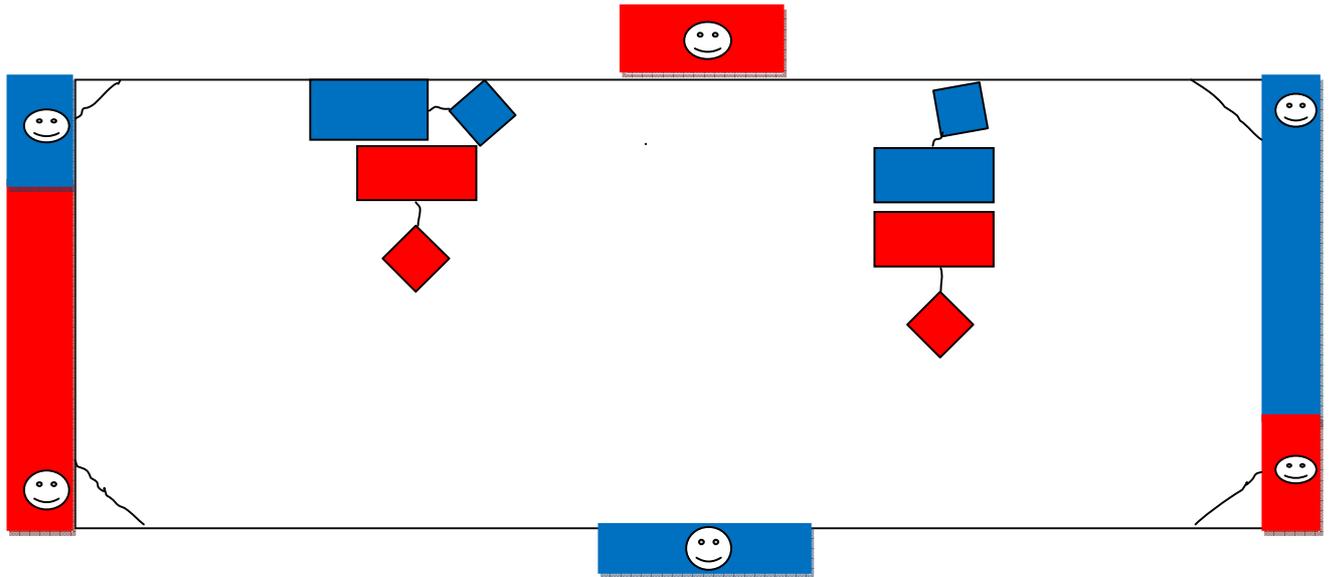
Scoring

Pin & Dump:

We will most likely be using the pin and dump strategy for scoring. Our shooters are very unreliable from a distance and it is also just easier to score on a stationary target. So this brings up a very important problem/question. So just how do we pin?...

Wall Pin:

The best thing to use to pin is the walls that go around the perimeter of the field. Walls are solid, never move, run along the whole field, and a wall pin could possibly set up your HP for an easy score. Wall pins are the most common and the easiest to execute (especially if you can push other bots).

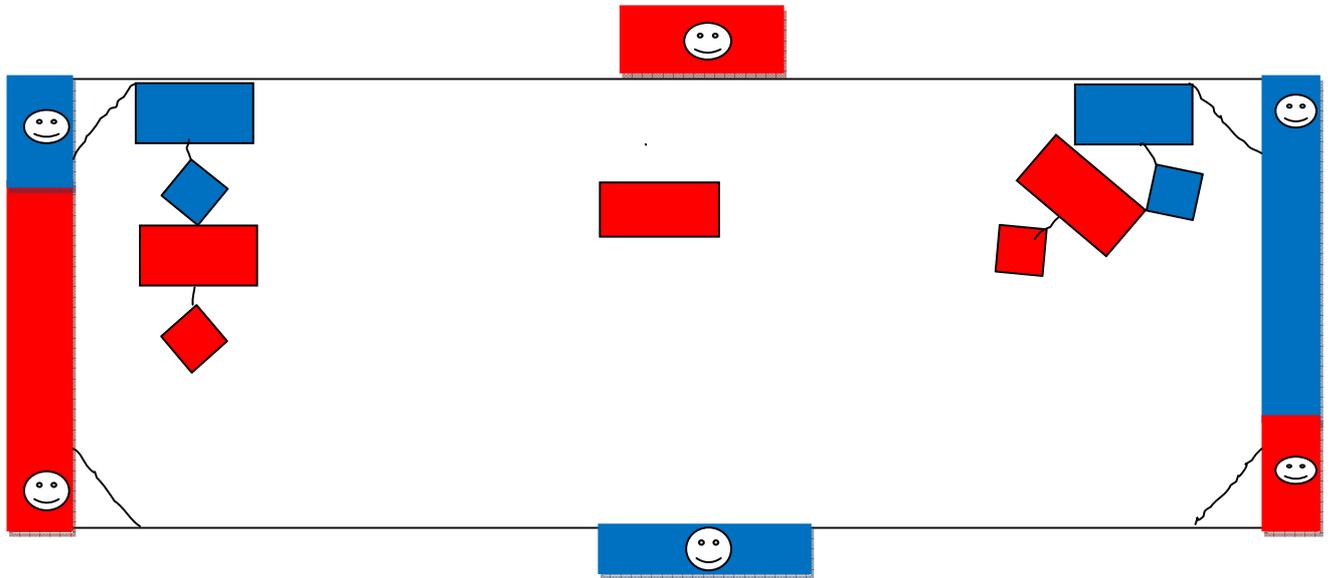


Above picture above is just illustrating a few simple examples of a red robot wall pinning a blue robot.



Corner Pin:

A corner pin is very similar to a wall pin except it is in the corner and is much more effective if you can pull it off (especially in the Green Zone).



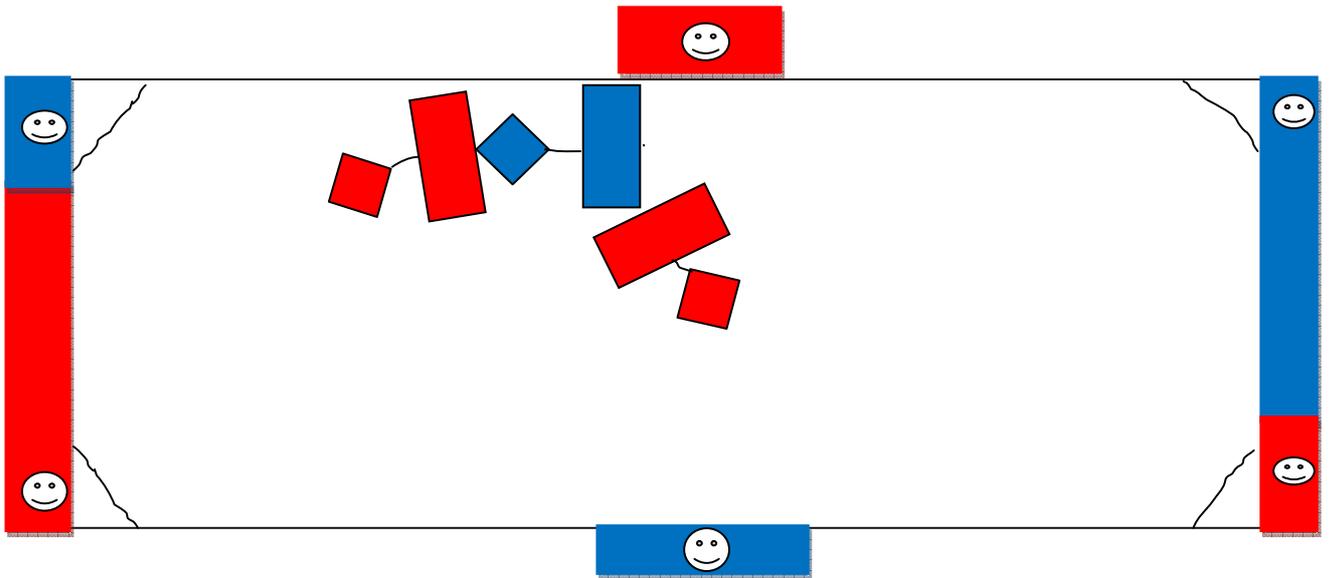
The corner pins above (and some more not shown) have proven to be effective and drastic game changers that are extremely difficult to get out of.

A Note on Corners:

Stay away from the corners. You have to access the situation and see if the reward outweighs the risk when deciding to collect, score, or transfer empty cells to the corners. If an opponent pins you in a corner you are in bad shape, especially in the black zones. So don't give them the opportunity to do put you in that situation.

Using Alliance Partners:

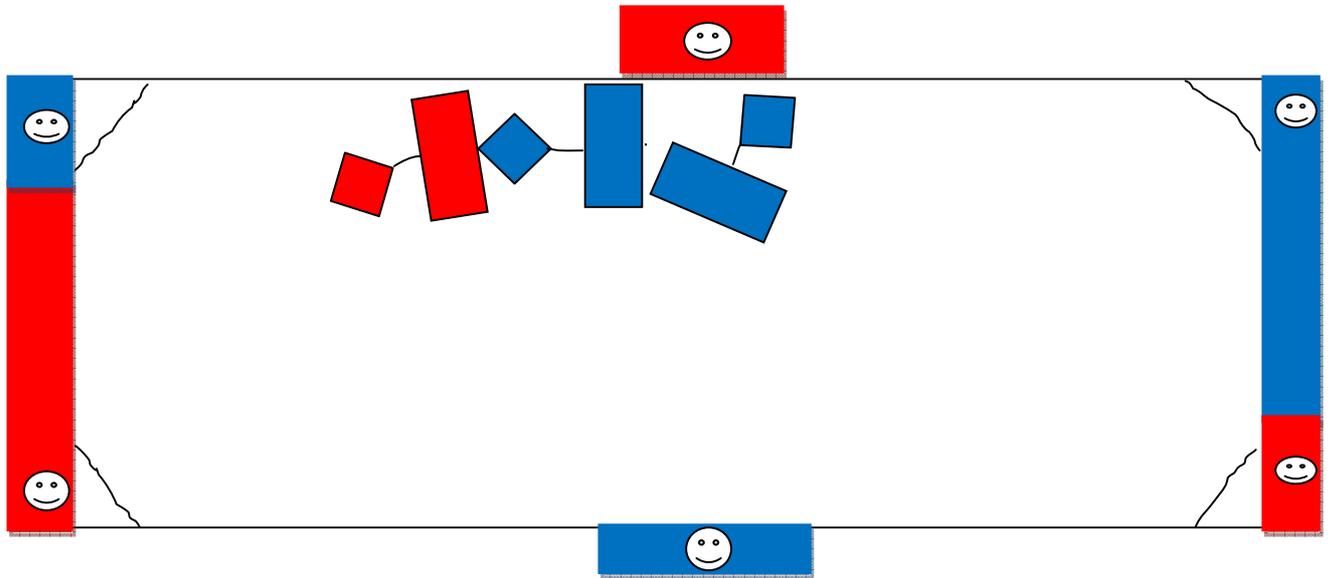
Ideally we would be fast and good pushers so that we could pin and score on our own. Unfortunately things will most likely not be ideal and we will have to rely on our alliance partners to pin for us so that our job is cut in half and we can just drive up and dump.



Above you see two red robots working to score on one blue one. The bad part about using your alliance partners to assist you in scoring is that you then focus two of your robots on one of theirs. And you leave your other alliance partner playing in a two on one game. Despite this fact we will probably run this play often because I see it working well.

Using Opposing Robots to Score:

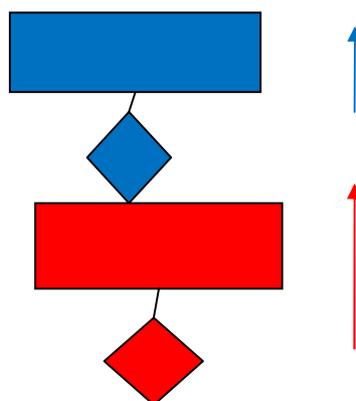
This one is tricky but if you can pull it off it you are doing a great thing for your team. It is essentially the same as using your own alliance partners to pin but it instead uses their alliance partners to do it.



The picture above is just an example of how a red robot can take advantage of two blue robots getting too close to each other. This is really good because it takes two of their robots and only one of yours, and you score. If their bots are close together this one is worth a shot.

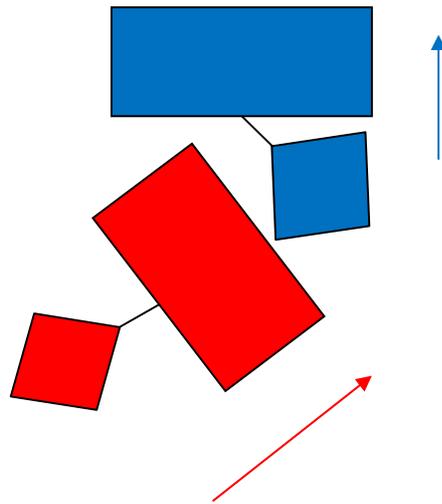
Moving Pin:

I saw a post on Delphi about this one but I'm still trying to find video confirming that it works. It would be nice if we could pull it off.



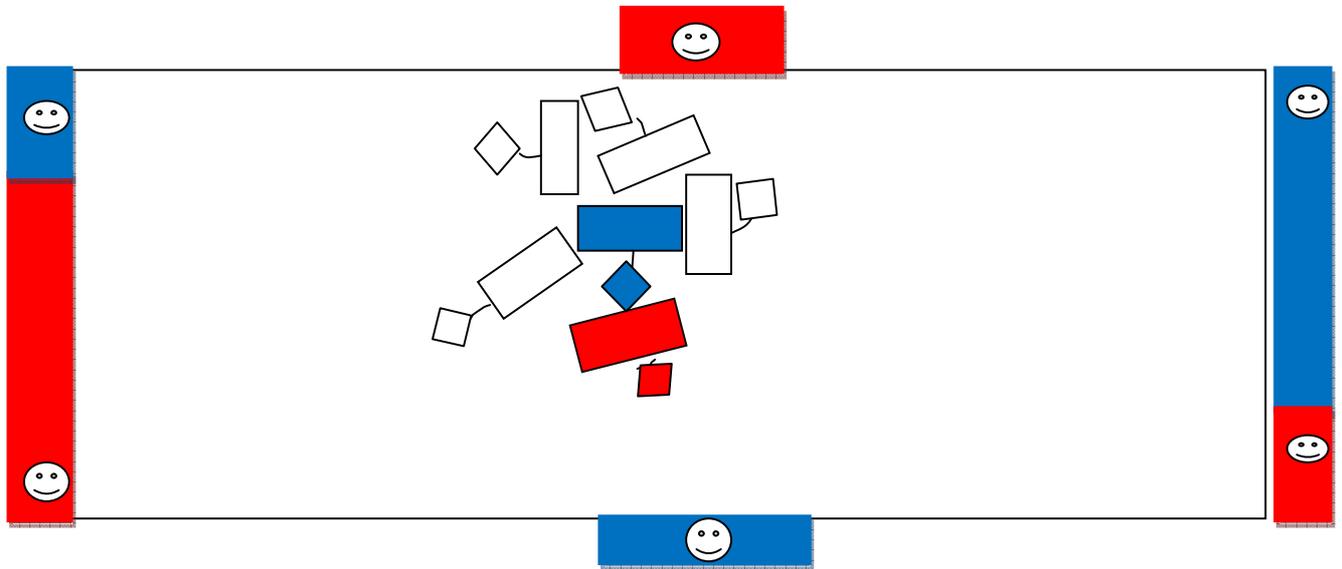
You basically drive faster than your opponent, come up right behind them and push their trailer into their robot, keeping if form moving from side to side and making it easier to score for you (the mouth that our robot has in front may work well for this).

The same kind of fake/moving pin can be done on a trailer that is jack-knifed on an opposing bot. As long as you push their trailer into their robot so that it is stationary. As can be seen by the red robot putting a moving pin on a blue robot in the picture below.



Scoring on a Pile-Up:

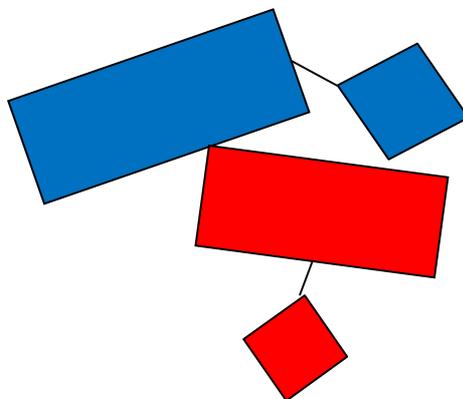
There will be many large pile-ups in the game (especially right after autonomous because that's when everyone is trying to score). These are good scoring opportunities because many robots end up with nothing sticking out of the pile-up except for their trailer.



With the way that the blue robot is in the pile up it is practically pinned, all that we (the red robot) would have to do is pull up, score, and then get out of there. We basically want to be the last one into the pile-up and the first one out of it. And always on the outer most part of it, never in the middle. Or someone will do this same thing to us.

Pinning Long Robots:

I read on a post on Delphi that when long robots get pinned this way they have a very hard time getting out of it, especially against a wall.



I think that this pin is effective because you get part of your robot on the opposing robot and trailer, making it really difficult for it to turn, or do just about anything for that matter (this also works for wide robots too.)

Defense

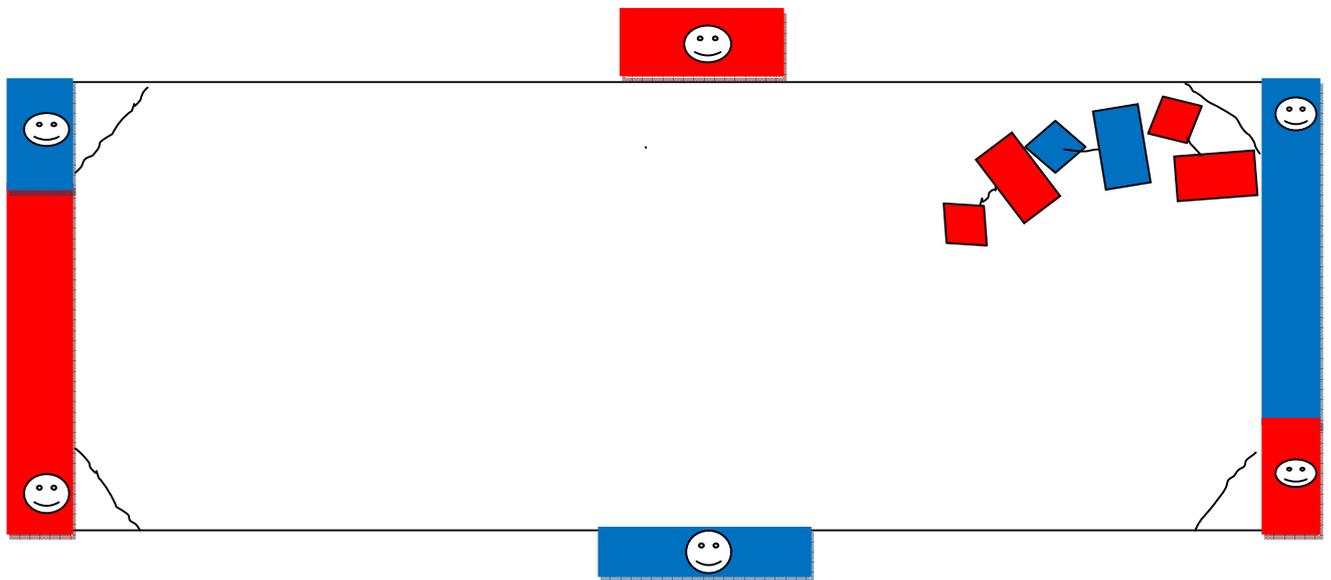
How to Shut Down Opposing Defense:

Let's go through a little thought experiment. A match starts and it soon becomes obvious that the other alliance has assigned a robot to play some serious defense on you. They are really following you hard and not letting up, they won't let you collect, transfer empty cells, and they definitely won't let you score. They are following you, ramming you, and trying to pin you every chance they get. What do you do?

DO NOT try to pin them. Their objective is clearly to take you out of the game by keeping you pinned and away from the action all game. Trying to pin them is a waste of time and you would also be completing their objective for them, because if you are pinning them then you are obviously not doing anything else. And boom, they have just successfully taken you out of the game if you try to pin them (or you end up getting pinned).

DO NOT spend the whole match running away from them. You will probably not score too much with them on your tail the whole match anyways. This is a better option than the first one because at least you are moving and will probably get scored on less. But there is still a better option than this one...

DO try to put a massive pin on another one of their alliance partners (preferably their main scorer), and ideally a corner pin in the green zone. Assuming that we are the blue alliance in the following picture it would look like this.



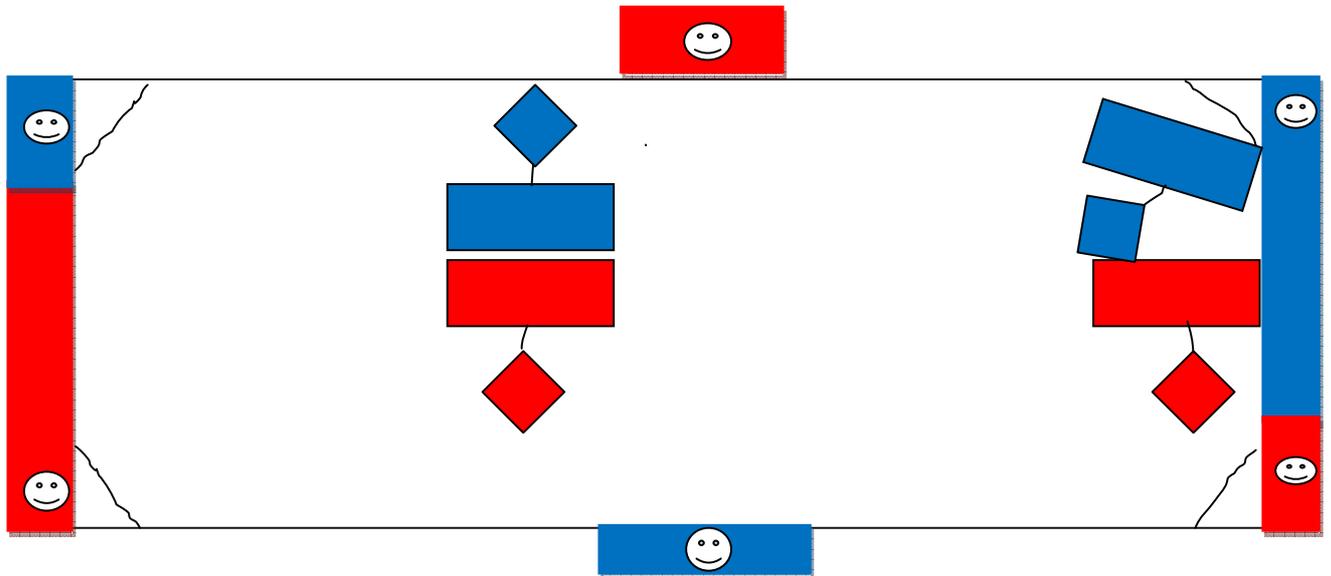
Where the red robot behind us is the one that is planning D us on and the one in front of us is the one that we pinned. The robot that was defending you will most likely keep on trying to pin you (while they are really just helping you pin their alliance partner) or try to un-pin their alliance partner (which rarely ever works, & almost never works in the corners). Many alliances do not have the attentiveness and communication to pull off a change in strategy mid match, so by doing this you take two opposing robots “out of the game” (hopefully their best scoring bot), turning the match into a 3 vs. 1 game. You are also giving your HP some easy shots on two mostly stationary trailers (can you say super cell !!!). Your alliance partners could also come and score on these two trailers that you have trapped in the green/safe corner.

Let’s assume that they do have good strategy and communication and are able to realize what is going on. They tell the driver who is playing defense to forget about it and go do something else. Then that’s great, now you can just keep holding that pin to let your HP score, go collect and score, or do whatever you want because no one is playing defense on you anymore. And there you have it; you have just successfully out strategized their though defense and possibly even got some points out of it. Nice!

Defending a Super Scoring Robot:

Many of the super scoring robots are power dumpers and shooters with huge ball capacity that can be unloaded very quickly. So just one dump from them can mean deliver a devastating amount of balls. The key here is to pin them (preferably a corner pin the green zone) and to not let them out the whole match. Do what ever you can to make sure that they are not close to a

trailer. Hit them, push them, pin them, just keep them from scoring. Drive very carefully because one wrong move and you could end up costing some major points. The pin that you get on them does not have to be pretty, anything works as long as they are not scoring.



Above are some examples of pins that you would like to get on a super scoring robot. On the left the blue superbot is being pinned “face to face” and most likely cannot score. On the right (I really like this one) the superbot is being corner pinned and cannot score. It will most likely shoot its balls out of the field from this position. Maybe your alliance partners could even score on these super bots now that they are already pinned?...

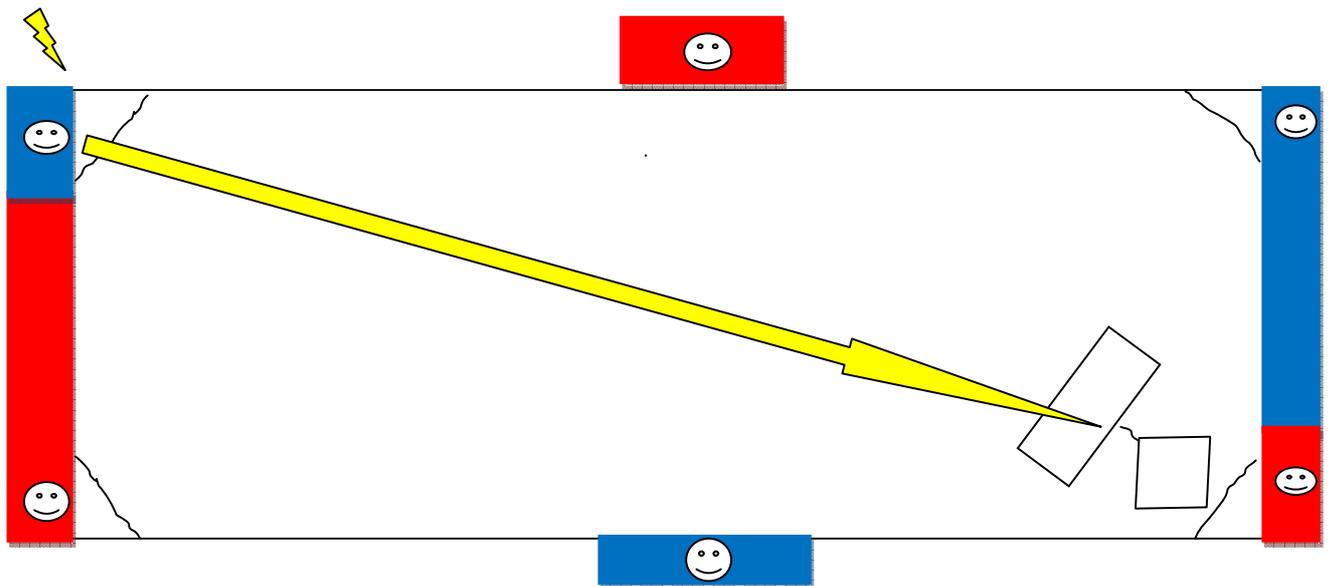
Defense of Empty Cell Runners:

In the eliminations especially, many alliances get one robot run empty cells. If you wanted to take their opportunity of the game changing super cells away then you could mess with their empty cell runner. It would not be a full time job but if the collector notices that you are close by while the transfer is happening then maybe you could disrupt this robot, possibly even steal the empty cells and use them for your own alliance.

Super Cells

Where To Go When the Super Cells Come Into Play:

Your coach should walk to the opposing fueling station at the end or the driver's station and see if the opposing HP has any super cells. If they do not then great, come to the green zone right on our side of the field and you are a whole field away from the only remaining super cell threat. This is shown below



That's one far shot!

If the coach tells you that the opposing fueling station at the end of your alliance station does have super cells then go to the middle of the field and spin in circles. Also be careful. This is not the time to be caught sitting still or pinned in a black zone.

If the coach tells you that we have super cells then try to pin an opponent in a green corner so we can get an easy 15 or 30 points!

Driving/Scoring Conclusion

You only have two minutes so drive fast but don't rush. Think about what you want to do and how to execute that maneuver in the most efficient way, then do it. All of the fundamental driving maneuvers should be executed correctly almost automatically. Driving is the most

fundamental part of the game and even a small mishap can cost you huge amounts of points. Even if you dive well but do not score 40 points a match, an empty trailer is a very useful thing to contribute to your alliance. While a full trailer because of small driving mishaps would most likely end up hurting your alliance unless you scored a massive amount of points that match.

Let's score more points than we give up!

General Strategy

General Strategy:

I think that our general strategy is going to be to score our seven preloaded balls as soon as tele-op starts. Then we should drive around and collect ball until we have a full hopper (around 20) or until our collector can not handle any more balls. Then we pin (or get one of our alliance partners to pin for us) and dump our whole load into their trailer. We have a large ball capacity and the ability to score so I think that we can contribute major points to our alliance, especially with some pinning help. For the rest of the match we could try quickly score again, run empty cells, or play some defense, depending on what is needed. In the last 20 seconds we are in super cell mode and are either hiding in our corner or pinning in our corner (we want to be nowhere near their corners!!!).

1 Scorer, 1 Pinner, & 1 Other:

It would be nice to have an alliance partner who was running around the field and not getting scored on until we were almost ready to score. Then we could get them to ram, push, get in the way of, slow down, hopefully even pin an opposing robot. Then we just drive up and quickly score on it and leave, going to collect another bin full of balls and doing this again. It would be good if the "Other" robot on our alliance could not only run empty cell but also score. So then our "Pinner" robot could pin for us and this "Other" team.

The down side to this strategy is that it now takes two of our robots to score on one of their robots. But if we can pull this "you pin I dump" strategy off quick enough I think that it will work well.

I also think that strategies like this cause pile-ups because the situation above already requires three robots to be very close to each other. One of the opposing alliance partners will see this as good scoring opportunity and try to score on one of our trailers. Now there are four robots with bumper to bumper contact. Then another bot decides to try and score in this pile-up and the situation snow balls. If we do not score quickly and then get out of there we could find ourselves in the middle a pile-up (not a good spot to be in).

The key to this pin and dump strategy is executing it quickly!

Communication

Robot Nick Names:

Communication within an alliance is key. Coaches will not have any time to have conversations about strategy during the match. Coaches need to be able to yell and get useful information across quickly and without confusion (we have no room/time for things to get lost in translation between coaches during a match). Yelling team #'s will be long and confusing during the match, and robot names can also be long (ours for example). That is why we should give the robots nick names. It makes getting a clear message across quickly easy to do (no misinterpreting which robot they are talking about). Ours for example could be "Disco".

Hand Signals:

The HP at the outpost could quickly glance up at the driver's station every once in a while and if a team's coach is standing behind the driver's station waving their arms above their head that could be a signal that this team is going to try to transfer an empty cell. Then the HP could grab an empty cell off of the rack and feed it through the hole to the corresponding team. This would make transferring empty cells smooth and quick. It would also prevent them from being put into the field at the wrong time.

We might not know if our HP on the opposite side of the field has any super cells when the last 20 seconds rolls around. That HP could give the coaches at the driver's station a signal (maybe waving their arms above their head) indicating that they have super cells. So that we could try to pin an opponent in that far corner.

Zones:

We can refer to the field in three zones when talking between coaches. The **close zone**, that being the area around our alliance wall. The **middle zone**, obviously the middle of the field. And the **far zone**; the area around the opposing alliance wall.

For example coaches could yell things like:

"Disco pining in far zone"

"Disco Pinned in middle zone"

"Someone pin in close zone"

"Disco is ready to score in far zone"

The way our alliance partners know exactly who we are, what part of the field we are in, and what is happening. All of this information in just 5 word sentences!

Safe:

When an opposing human player runs out of balls we can call that zone safe. Indicating that because that human player has no more balls that area for the field is no longer dangerous (A.K.A...no longer a black zone). Coaches could yell out:

“Far zone safe”

“Middle zone safe”

“Close zone safe”

These terms will also be very useful during the super cell period!!!

Human Player

I know that the 2 minutes 15 seconds will seem like they fly by but you will only have 13 balls, (7 will be loaded into the robot at the start of the match. I am sure that there will be many shots that you think that you can make, but do not forget objective, to get all 13 balls into an opposing trailer. Don't be afraid to wait for a shot that is almost a sure score. Also if you get rid of your balls very quickly than you have just freed up that part of the field for the opposing alliance (just a little motivation to wait for a shot). Keep that in mind but don't worry about it too much, if a robot does not move in autonomous than by all means unload on it! Yes that means that you free up that part of the field for the opposing alliance, but who cares, you did your job and got all 13 of your balls into an opposing trailer!

Know the rules! Get them tattooed on your arm so that you see them every time you take a shot. But seriously, I am pretty that every penalty this year has come from a human player.

Never throw an empty cell over the outpost wall.

Never break the plane by sticking your hand over or around a wall or through the hole in the outpost.

Never grab a ball from the fueling port with anything other than the provided tongs.

Never even get close to touching another robot.

Super Cells

Remember that you have 20 sec. to score your super cells. I have seen too many human players rush to grab a super cell as soon as the 20 second buzzer rings and then take a half court shot while there is still 18 or 19 seconds left in the match. Don't rush the shot, you get 20 seconds, don't be afraid to use them. If your alliance knows that you have super cells (refer back to the "Hand Signals" part of this paper to find out how to tell them), then they will coordinate a pin in your corner so that you will have the easiest shot possible. If you do not have a really easy/sure shot then give your alliance some time to try to pin an opposing robot in your corner. You should **NEVER EVER** be left with a unused super cell at the end of the match. This seems dumb to say, and I have never seen it happen, but lets defiantly not be the first to do it.

Super cells are big points, let's make them count.