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- Anthony Davies (nomercyrider)

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Star Realms Simulator!!(↪ </thread/1462398/star-realms-simulator/>)

[Star Realms – Amazon.com](#) **\$13.97** ✓prime

John [@icesphere](#) [Feb 5, 2016](#)

corum irsei @jhaelen wrote:

John @icesphere wrote:

Recycling Station is an amazing first buy and Stealth Needle is a good first buy. These are both awesome cards, but I don't usually consider them to be the best first buy.

That's indeed a strange result. Interestingly it matches the AI preference on the 'easy' setting. However, since my success rate against Easy AI is about 85%, I remain unconvinced that these two are good first-buys.

Imho, the most awesome first-buy is Blob Destroyer. I can track uncountable wins (and losses) back to getting this card early/first.

I'm not as sure about the Stealth Needle result, but it seems like I remember hearing that Darwin (the creator of Star Realms) likes to buy Recycling Station as a first buy. I'd like to see you beat Darwin 85% of the time 😊

John [@icesphere](#) [Feb 5, 2016](#)

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I made an update to the simulator this morning so that you can just put in 1 or 2 cards into the trade row and then it will randomly fill in the rest.

This allowed me to easily test the win percentage of specific cards over and over again.

In my test I had AttackBot vs VelocityBot where VelocityBot went first with 2 trade and bought an Explorer, and AttackBot went second with 4 trade.

First I tried having the trade row contain both Recycling Station and Blob Destroyer.

Blob Destroyer is a very strong first buy (as you suspected), however even more interesting is that Recycling Station was an even stronger buy every time I ran it (although they were usually very close).

I then ran the same test, but with Stealth Needle instead of Recycling Station. Now Blob Destroyer wasn't as good of a first buy (probably because Recycling Station being with it made it better), and Stealth Needle was a stronger buy almost every time I ran it (although again they were usually very close).

I then tried running the same test with each card on its own

I then tried running the same test with each card on its own.

Blob Destroyer was a pretty good first buy, although it was often not the best first buy.

Recycling Station seemed to be more situational than Blob Destroyer, but seemed to the best first buy more often than Blob Destroyer.

Stealth Needle results seemed to be worse without Blob Destroyer, but still was more often than not a good first buy.

Obviously these results would be different with real players instead of bots, but I'd like to think that my simulator is good enough that the results are still interesting.

Scott Heise Designer @HomerJr Feb 7, 2016 (edited)

Funny enough, a couple weeks ago I was running a lot of test cases just like these in the simulator in preparation for a new Megahaulin' blog article on the relative impact of each card as a starting buy on win%.

I did this by adding each card one at a time into the starting 10 card deck and played it against a normal 10 card deck. Obviously this isn't realistic but I thought it would give a fairly decent relative comparison of each card as a starting buy. I then planned to take the top cards and run real test cases, pairing up logical buys (\$4/4 and \$5/3 splits) and seeing if certain cards paired better than others, but I didn't get around to it.

I'm not sure if I'm going to get around to writing the article (on this topic, at least), so I'll just share my data here now. 😊

Before running the opening buys, I also ran each bot against each other with a normal starting deck to see which performed best and then used that bot for the rest of the simulations:

VANILLA	Random Start	10k sims					
	Attack Bot	Defense Bot	Expensive Bot	Hare Bot	Tortoise Bot	Velocity Bot	AVERAGE
Attack Bot	50%	50%	59%	44%	49%	47%	50%
Defense Bot	50%	49%	60%	46%	46%	44%	49%
Expensive Bot	41%	40%	49%	35%	36%	34%	39%
Hare Bot	56%	54%	65%	49%	52%	50%	54%
Tortoise Bot	51%	54%	64%	48%	50%	46%	52%
Velocity Bot	53%	56%	66%	50%	54%	50%	55%

Wow, Expensive bot does not do very well at all! I'm pretty surprised at this.

Also, not included on the chart was Random Bot, which only had a **10% win rate** on average against the other bots. Glad to see that strategy does in fact matter in this game... 😊

Testing which "offensive" and "defensive" bot performed best overall with each game type (Hare or Attack bot, and Tortoise or Defense bot, respectively).

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Type 1	Random Start	10k sims
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Attack Bot	41%	43%
Type 1B	Random Start	10k sims
	Tortoise Bot	Defense Bot
Hare Bot	46%	49%
Attack Bot	45%	45%

And now, all of the opening buys sorted by faction and cost, with Tortoise and Hare bots:

Base Set	Cost	Win% HareBot	Win% Tortoise	AVG
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Blob Fighter	1	56%	51%	54%
Battle Pod	2	62%	54%	58%
Trade Pod	2	63%	58%	61%
Blob Wheel	3	61%	56%	59%
Ram	3	67%	59%	63%
Blob Destroyer	4	69%	63%	66%
The Hive	5	76%	74%	75%
Fed Shuttle	1	54%	52%	53%
Cutter	2	71%	68%	69%
Embassy Yacht	3	63%	60%	62%
Trading Post	3	58%	55%	56%
Freighter	4	79%	71%	75%
Barter World	4	64%	60%	62%
Defense Center	5	70%	68%	69%
Trade Escort	5	75%	70%	73%
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Supply Bot	3	70%	69%	70%
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War World	5	75%	70%	73%

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Base Set	Cost	AVG	AVG/Cost
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Missile Bot	2	64%	7.02
Ram	3	63%	4.28
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John🔗 @icesphere Feb 8, 2016 (edited)

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- Imperial Fighter has the distinction of being the only card in the vanilla set to actually make your deck *worse* than buying nothing at all. Heh heh.
- Wow, Corvette much higher on the charts than I expected.

Wow, that's really cool to see all of those results! Thanks for sharing!

The Hive being so high is an unexpected result. I ran a scenario where your opponent bought an Explorer as their first card, and then had second player start with 5 trade, with The Hive always in the trade row. The Hive wasn't usually the best buy, and in fact was sometimes the worst buy. So I think you are right about your experiment favoring bases too much.

It looks like your results didn't include Stealth Needle, I'm curious where that card would end up in these results, although with the way you setup your experiment it probably wouldn't do as well since it would only be able to copy starters at the beginning, whereas in a real scenario there is a chance it could copy your other starting buys.

corum irsei @jhaelen Feb 8, 2016

John @icesphere wrote:
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Stealth Needle results seemed to be worse without Blob Destroyer, but still was more often than not a good first buy.

Well, I guess Recycling Station is always useful because it allows you to cycle through your deck faster, allowing you to play your good cards more often, and improves your chance to get out combos.
In addition, it works very well with cards that have a scrap ability, because if your discard pile is empty, you can discard a card from your hand to scrap it, and get to redraw it.

It still doesn't do much if you buy it as your first or second card, but it's definitely great as early as your third buy.

Stealth Needle requires a decent amount of other good cards to be good, but if you have those, then it can be devastating.

Blob destroyer is my favorite because its damage is high enough to destroy every defensive base, and if comboed, destroys a base for free, so it's like telling your opponent: don't bother with bases or else! Getting it early helps to get an early advantage that can really only be effectively countered by a pair of cutters (or comparable 'healing').

I guess, my high rating for the Blob destroyer is due to my playing most games against the AI, which prefers to go for bases, so it's guaranteed to give me an advantage.

Obviously, it's best if you have can get hold of all three cards, though 😊

Ben Gartner @benjotron Feb 8, 2016

Scott Heise @HomerJr wrote:
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I wouldn't be surprised if this is true. It doesn't take long for beginning players to figure out that all bases need to be killed immediately, and those ships need to be prioritized over economy or scrappers - with persistent bases the game won't last long enough to use either. So it wouldn't surprise me if the AI doesn't pick up early Frigates or Destroyers in order to control opposing bases.

Recycling Station is just an extremely powerful card. Combined with any early scrapper and you can maintain an effective deck size near 10 or 12 for the whole game.

John  [@icesphere](#) [Feb 9, 2016](#) [\(edited\)](#)

I have further evidence towards taking a Stealth Needle first deck.

For my last match in the BGG League I played against JivetimeJ. The winner of the match would get the second promotion spot to Platinum.

JivetimeJ started out with Trade Bot and Federation Shuttle. I started out with Cutter and Trade Pod. He then took a Stealth Needle before his first shuffle.

Obviously Stealth Needle is not as good first deck, and this was also the case this game where he only copied a Scout first time Stealth Needle came out. However if I remember correctly, the other times it came out it copied Trade Escort, Imperial Frigate, and then later, Imperial Frigate again, which was extremely effective, and he ended up easily winning the game.

So there is at least one example where a first deck Stealth Needle beat out a first deck Cutter. I even got the CommandShip and Recycling Station in that game, but it wasn't enough against the Stealth Needle paired up with the Trade Escort and Imperial Frigate.

I think the Stealth Needle has more variance, so sometimes you will get unlucky and sometimes you will get lucky, but I think overall it's effect on your deck will usually be better than other 4 cost cards even if you miss pairing it up once or twice, and so for that reason I would argue that more often than not it's worth taking first deck.

I suppose even better would be to let Stealth Needle sit in the trade row and hope your opponent doesn't buy it and then pick it up in your second deck, but you have to weigh that against the risk that your opponent picks it up.

Matt Schoonmaker-Ga... [@railbaron](#) [Feb 9, 2016](#) [\(edited\)](#)

John [@icesphere](#) wrote:

I think the Stealth Needle has more variance, so sometimes you will get unlucky and sometimes you will get lucky...

I agree with this statement. A couple of thoughts:

- 1) Stealth Needle is a powerful card that **can** win you the game. There aren't a lot of game changing cards, but this is one of them. Honestly, this is the only card in Star Realms that I buy not because it helps me now, but because it could help me a lot in the future.
- 2) Because Stealth Needle is so powerful, it changes how I play a game, whether I buy it or my opponent buys it. Like you said, it has more variance, but you can somewhat try to control that variance. If I buy it, I want ships in my deck to copy. If my opponent buys it, I don't want him to get ships, especially big bombs (a copied dreadnaught and battle blob deliver a usually lethal 24 points of damage.)
- 3) Because I change how I play with stealth needle, I think it would be very hard to use the simulator to gauge the effectiveness of stealth needle.

So yes, I agree with the simulator that stealth needle is good, and I have no problems buying it first deck, but I wouldn't trust the simulator all that much regarding this card.

Edit: punctuation

John  [@icesphere](#) [Feb 9, 2016](#)

Matt Schoonmaker-Ga... [@railbaron](#) wrote:

John [@icesphere](#) wrote:

I think the Stealth Needle has more variance, so sometimes you will get unlucky and sometimes you will get lucky...

I agree with this statement. A couple of thoughts:

- 1) Stealth Needle is a powerful card that **can** win you the game. There aren't a lot of game changing cards, but this is one of them. Honestly, this is the only card in Star Realms that I buy not because it helps me now, but because it could help me a lot in the future.
- 2) Because Stealth Needle is so powerful, it changes how I play a game, whether I buy it or my opponent buys it. Like you said, it has more variance, but you can somewhat try to control that variance. If I buy it, I want ships in my deck to copy. If my opponent buys it, I don't want him to get ships, especially big bombs (a copied dreadnaught and battle blob deliver a usually lethal 24 points of damage.)
- 3) Because I change how I play with stealth needle, I think it would be very hard to use the simulator to gauge the effectiveness of stealth needle.

So yes, I agree with the simulator that stealth needle is good, and I have no problems buying it first deck, but I wouldn't trust the simulator all that much regarding this card.

Edit: punctuation

There are so many variables in Star Realms that it is hard to generalize that a card is always good. The way I worded my recent comments makes it sound like you should almost always buy these cards, but really it depends heavily on the current game. I guess I'm just trying to say that based on the results I now value Recycling Station and Stealth Needle more than I did before I saw the results.

@greylag [Feb 9, 2016](#)

I agree with railbaron here. We all know that Stealth Needle and Recycling Station are ridiculously powerful cards. But what us humans know that the simulator doesn't is that they are both cards which can be played against.

Vs. Stealth Needle, trade row control and denying ships, vs. Recycling Station ensuring you have enough combat to keep it covered, and sometimes applying discard attacks to limit its effectiveness at crucial points.

Without those counterstrategies, these two cards both become monsters. With them, they're influential - in that they influence the opponent - and can be powerful, but they're dialed down a notch.

I think they are the kind of cards a simulator will struggle to correctly value unless it is either explicitly given rules to fight them, or follows a feedback learning mechanism in an environment with appropriately coded features to signal the importance of countering these cards.

corum irsei [@jhaelen](#) [Feb 10, 2016](#)

John [@icesphere](#) wrote:
I think the Stealth Needle has more variance, so sometimes you will get unlucky and sometimes you will get lucky, but I think overall it's effect on your deck will usually be better than other 4 cost cards even if you miss pairing it up once or twice, and so for that reason I would argue that more often than not it's worth taking first deck.

It's the variance that I dislike about the Stealth Needle. It's really hard to say, if overall, it's a better card than other 4-cost cards. It simply depends too much on the rest of your deck, and, alas, also luck.

But it's definitely one of the cards that I like to deny my opponent by discarding it from the trade row. 😈

David Low [@dlow](#) [Feb 10, 2016](#)

If I'm playing someone better than me, I'll want the Needle to help me steal a win that I might not otherwise deserve.

If I'm playing someone that I think I can otherwise outplay, I really don't want them to get the Needle, for reasons noted in the preceding point. These are the times that, as jhaelen points out, you want to get it off the trade row ASAP.

If, all things being even, I think you'll beat me, then I want to increase any variance that might be available, so as to give myself more chance of being on the upside of that variance. If you need to get lucky to win, give yourself every chance to get lucky 🤞

On the other hand, if you think you'll win most games, you want to minimise any potential variance/swing-cards that your opponent might take advantage of. On the basis that they're going to get most of their wins when they get lucky (/you get unlucky).

Good practice for this is the Campaign mode. Beating the AI is easy; getting all the 3-star achievements is much harder (for some of them in particular). If there's one thing that a thousand games against the Campaign AI over the summer have taught me, it's about positioning yourself to get lucky...

John [🔧 @icesphere](#) [Feb 26, 2016](#)

I thought it would be interesting to see what the simulator thought was the best card to buy each turn for one of the platinum league matches.

I used greylag's game report of her game against Aweberman:

<https://boardgamegeek.com/geeklist/195324/item/4474087#item4...>

I tried to set the bots each turn based on what I thought best fit what each player was trying to do. Also I didn't always know for sure what cards people had, so sometimes I had to guess.

Turn 1 (Aweberman):

Federation Shuttle: 61.40%

Explorer: 62.80%

Explorer: 53.00%
Do Not Buy Card: 53.3%

Aweberman buys Explorer.

Turn 2 (greylag):

Blob Destroyer: 51.90%
Ram: 58.00%
Federation Shuttle: 53.10%
Imperial Frigate: 49.60%
Explorer: 48.00%
Do Not Buy Card: 26.60%

greylag buys Ram.

(I simulated the second buy by putting 3 scouts and the Ram in the discard)

Federation Shuttle: 47.90%
Do Not Buy Card: 57.40%

greylag buys Federation Shuttle.

Turn 3 (Aweberman):

Blob Destroyer: 49.80%
Imperial Frigate: 35.80%
Explorer: 32.00%
Do Not Buy Card: 14.40%

Aweberman buys Blob Destroyer.

Turn 4 (greylag):

Blob Wheel: 46.90%
Imperial Frigate: 56.90%
Explorer: 51.20%
Do Not Buy Card: 34.20%

greylag buys Blob Wheel.

Turn 5 (Aweberman):

Corvette: 66.20%
Imperial Frigate: 54.60%
Explorer: 67.30%
Do Not Buy Card: 34.50%

Aweberman buys Corvette

(I simulated next buy by putting two scouts and the Corvette into the discard)

Blob Fighter: 65.90%
Explorer: 60.70%
Do Not Buy Card: 53.40%

Aweberman buys Blob Fighter

(at this point I realize I didn't have Bases & Battleships checked – oops – however I don't want to go back and rerun all of the previous turns, plus I don't think it would have had that big of an impact on the percentages)

Turn 6 (greylag):

if greylag had decided to scrap Ram and go for a TortoiseBot strategy:
Junkyard: 39.40%

Trade Escort: 40.50%
Machine Base: 44.40%
Imperial Frigate: 33.00%
Explorer: 40.00%
Do Not Buy Card: 15.20%

with AttackBot strategy:
Imperial Frigate: 28.60%
Explorer: 20.20%
Do Not Buy Card: 5.40%

greylag buys Imperial Frigate.

Turn 7 (Aweberman):

Trade Escort: 60.20%
Imperial Frigate: 50.90%
Explorer: 48.80%
Do Not Buy Card: 20.10%

Aweberman buys Trade Escort

Turn 8 (greylag):

Junkyard: 22.00%
Missile Mech: 20.10%
Machine Base: 30.60%
Imperial Frigate: 39.80%
Explorer: 36.40%
Do Not Buy Card: 4.70%

greylag scraps Blob Wheel and buys Machine Base.

Turn 9 (Aweberman):

Trade Pod: 64.00%
Imperial Frigate: 69.90%
Explorer: 65.70%
Do Not Buy Card: 60.10%

Aweberman buys Trade Pod

(I simulated next buy by putting two scouts and trade pod into the discard)

Cutter: 77.10%
Explorer: 51.00%
Do Not Buy Card: 45.80%

Aweberman buys Cutter

Turn 10 (greylag):

Embassy Yacht: 22.30%
Imperial Frigate: 25.50%
Explorer: 14.90%
Do Not Buy Card: 13.60%

greylag buys Imperial Frigate

Turn 11 (Aweberman):

Embassy Yacht: 84.00%
Explorer: 79.40%

Do Not Buy Card: 75.80%

Aweberman buys Embassy Yacht

Turn 12 (greylag):

Embassy Yacht: 29.20%
Corvette: 29.30%
Explorer: 22.70%
Do Not Buy Card: 7.60%

greylag buys Embassy Yacht

(simulated next buy by putting 3 scouts and Embassy Yacht in discard)

Blob Fighter: 17.60%
Corvette: 25.80%
Explorer: 15.00%
Do Not Buy Card: 13.10%

greylag buys Blob Fighter

Turn 13 (Aweberman):

Junkyard: 50.00%
Missile Mech: 64.47%
Construction Hauler: 71.26%
Corvette: 78.20%
Explorer: 72.70%
Do Not Buy Card: 67.30%

(Aweberman had a less than 10% chance of getting 6 trade)

Aweberman buys Corvette

(simulating next buy by putting discard into deck, then putting Corvette and two Scouts in discard along with the Corvette just bought)

Federation Shuttle: 77.70%
Explorer: 77.00%
Do Not Buy Card: 78.10%

Aweberman buys Federation Shuttle.

(simulating next buy by putting another Scout in the discard)

Trade Bot: 74.70%
Do Not Buy Card: 79.10%

Aweberman buys Trade Bot

Turn 14 (greylag):

Junkyard: 10.00%
Missile Mech: 15.60%
Construction Hauler: 17.60%
Battle Mech: 10.30%
Command Ship: 42.86%
Explorer: 9.60%
Do Not Buy Card: 4.10%

greylag buys Command Ship

(forgot to add in Federation Shuttle and Trade Bot buys into Aweberman's discard, so the above percentages are probably a little bit off)

Turn 15 (Aweberman):

(based on the game report, I'm not sure what was in Aweberman's hand, although future comments show that Blob Destroyer and Trade Pod came later and that Blob Destroyer does not combo with Blob Fighter, so I take a guess at his hand: Scout*2,Explorer, Cutter, Blob Fighter)

- Junkyard: 20.20%
- Missile Mech: 33.80%
- Construction Hauler: 40.70%
- Battle Mech: 31.40%
- Explorer: 17.90%
- Do Not Buy Card: 19.50%

Aweberman buys Construction Hauler

According to the simulator Aweberman now only has 33.70% chance of winning. Quite the drop from turn 11 where he had about 80% chance of winning after buying the Embassy Yacht.

At this point I've probably spend over 2 hours putting this together, and I'm not sure what is in greylag's hand, so I'm going to stop here. Hopefully it was interesting 😊

@greylag Feb 26, 2016

This is fun! 😊 I think what's interesting is that - unless you wanna correct me? - the bots don't have the idea of how to play toward a big card on the row. So the idea of save up trade now, spend it later, doesn't quite work for them? It sounds like they weren't taking a future Command Ship into account, basically?

John @icesphere Feb 26, 2016

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Yes that's true, I haven't programmed anything into them that makes them try to build up to get a big card on the trade row.

John @icesphere Feb 27, 2016

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Yes that's true, I haven't programmed anything into them that makes them try to build up to get a big card on the trade row.

Although there is an Economy Bot that values economy cards higher, so that bot would usually be able to get the bigger cards on the row.

John @icesphere Mar 10, 2016

Since there was no decision made against using the simulator during BGG league matches, I decided to try using my simulator during most of my games in season 15 for the BGG league.

Surprisingly I did worse than previous seasons in Gold.

Season 13: 8-3 (I don't think I used the simulator during any games)

Season 14: 8-3 (I think I only used the simulator during one game, and it was a game I thought I was going to lose)

Season 15: 6-5 (I used the simulator during most games, usually the first half of the game)

So I'm not sure if this means that my own intuition on the best card is better than the simulator, or if it was just worse luck this season. I'm thinking it's probably some of both.

Regardless, I think there are some things I've learned from this last season:

I usually would decide on an overall strategy early in the game and stick with it to the end, however it is often better to switch your strategy depending on how the game is progressing.

I used to get rid of explorers very quickly, however it seems to be better to hold on to them for a little bit longer.

Win % fluctuates wildly depending on which cards show up in the trade row - I would often see my chances of winning change dramatically just based on what card next came into the trade row - this helped me to try to better weigh the risk to reward of buying a card in the trade row. It's often better to not buy anything especially if you are currently favored to win.

Recycling station is really good - it usually had a big effect on win percentage.

Early trade wheel is a lot better than I originally thought it would be.

I think my plan for next season is to play the games without the simulator, but take notes of which cards were played, and then go back after the game and see what the simulator thought were the best choices. I think this will help me to better compare my choices versus what the simulator thinks has the best probability of winning, and hopefully I continue to lean more and get better.

Matt Schoonmaker-Ga... [@railbaron](#) [Mar 10, 2016](#)

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Thanks for sharing. I have a couple of questions/comments.

- 1) So you allowed the simulator to make all decisions, or did you ever over-rule it? If it made all decisions, you're a brave person :-).
- 2) Which bot strategy did you use?
- 3) It seems like you're simultaneously saying that the simulator isn't that great, but then you use the results to determine that the recycling station is really good :-). I agree that the recycling station is very good, but I still think the simulator has too many limitations to really trust.
- 4) I agree that the cards that get flipped can have a big impact on the game (especially your opponent), and it's often better to not buy anything if you're currently favored to win.

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- 4) I agree that the cards that get flipped can have a big impact on the game (especially your opponent), and it's often better to not buy anything if you're currently favored to win.

I usually went with what the simulator thought was best, but if the results were close I would often choose a different card.

For my opponent I picked the bot that I thought best matched the cards they had bought so far. For me, I usually used the bot that it said had the best win percentage.

I agree the simulator has a lot of limitations, however it's good enough that if it has a huge increase in win percentage for a certain card you can be fairly confident that it would be a good card to buy.

I'm still unsure if I would have done better or worse this season if I hadn't used the simulator, so it will be interesting next season to not use the simulator during the game, but then compare my choices against what the simulator would have chosen.

John  @icesphere Mar 10, 2016

I would like to try an experiment to try to get a sense of how good the simulator is.

I was thinking a best of 5 series (you choose the format) where I always buy cards based on what the simulator says has the highest win percentage.

Any takers?

Matt Schoonmaker-Ga... @railbaron Mar 10, 2016


Does the simulator choose one strategy at the start, or change strategies based on whichever strategy gives the highest win percentage at every point in time?

John  @icesphere [Mar 10, 2016](#)

Matt Schoonmaker-Ga... @railbaron wrote:

Does the simulator choose one strategy at the start, or change strategies based on whichever strategy gives the highest win percentage at every point in time?

The simulator doesn't automatically change strategies, but for this experiment I would simulate the best bot for each buy, so it could change strategies.

John  @icesphere [Mar 11, 2016](#)

John @icesphere wrote:

I would like to try an experiment to try to get a sense of how good the simulator is.

I was thinking a best of 5 series (you choose the format) where I always buy cards based on what the simulator says has the highest win percentage.

Any takers?

To clarify - this would be really easy on your end - you would just challenge me to a game, and you would just play the game normally, and then on my end I would use the simulator to decide which cards to buy. I suppose I could play against myself using pass and play, but I think it would be more interesting to see how well it does against other players.

Scott Heise Designer @HomerJr [Mar 12, 2016](#)

You know I'm game! 😊

John  @icesphere [Mar 12, 2016](#)

Scott Heise @HomerJr wrote:

You know I'm game! 😊

😊 Challenge me to a game in the format you feel you are best at.

Also be prepared for my turns to be really slow since I have to simulate each turn, especially the second half of the game when there are so many cards to put in each turn.