



Airlinez Whitepaper 2.1

OVERVIEW

BASIC GAME STRUCTURE

SCORING

EXPONENTIAL DECAY FUNCTION

SCORE NORMALISATION

FINAL SCORE CALCULATION

EDGE CASES

VERIFICATION AND DATA STORAGE

PAYOUTS

FEES

TECHNOLOGY

GAMIFICATION

SUMMARY

Overview

Airlinez is the world's first PvP chart trading platform. It is Technical Analysis as an eSport.

It replaces complex, convoluted, technical trading interfaces with a user friendly, fun, “easy to learn but difficult to master” trading game. It allows for all of the incentives and rewards of traditional game loops to be applied to chart trading.

You also get to be a little aeroplane.

Basic Game Structure

Each game occurs in four phases:

1. Pre-Game Phase:

Players begin by selecting:

- Which chart they want to try to predict (BTC/ETH, ETH/USDT, etc)
- How long they want the game to last (from 5 minutes to 1 week)
- How much they want to bet on this game (0.1 ETH, 10USDT, etc)

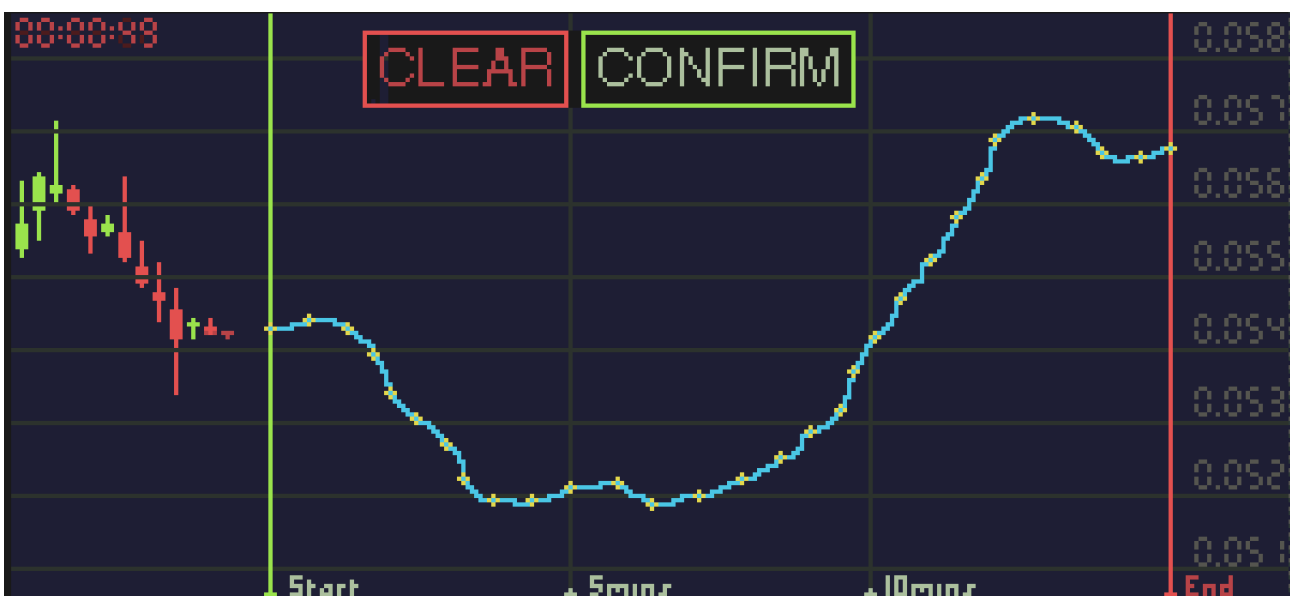
Trading Pair	Duration	Buy-in
ADA/USDT	1 week	0.1 ETH
BTC/USDT	5 minutes	0.5 ETH
ETH/USDT	15 minutes	1.0 ETH

All of the bets are aggregated in a prize pool, to be distributed to the winners at the conclusion of the game.

Players can create new games or join existing games, and apply advanced filters such as min/max number of players, games that are starting soon, games with the most players, games with the largest prize pool, etc.

2. Prediction Phase:

Players now predict what the chart will look like over the duration of the game. To do so, they simply draw a line representing their prediction about how the relevant chart will appear when the game is complete.



This allows players to convert their intuitive sense of chart patterns into complex, multi-directional predictions with a simple swipe of their hand. Patterns that would require a complicated mix of orders and stops on a traditional trading platform can now be achieved in seconds, in a much more user friendly and rewarding way. Players all lock in their prediction before the game starts, at which point no modifications are possible.

3. Gameplay Phase:

Once predictions are locked in, players enter a passive viewing phase where they spectate as their predictions play out in real-time. During this phase, each player's position is represented by a customisable aircraft flying along their prediction line, in front of an entertaining variety of creative and dynamic scrolling backgrounds. As the actual price renders in real time, players can compare their progress to that of others. Their plane is rendered on-screen further “forward” or “backward” depending on their ongoing score, providing an easily legible visual metaphor for who is in the lead.



As all predictions are locked in prior to the game beginning, the player does not need to actively follow or control the game as it transpires. The player is free to use the chat function, join other games, or even log off entirely.

The graphical interface at this point is designed to be an entertaining, clear and intuitive representation of who is winning and by how much.

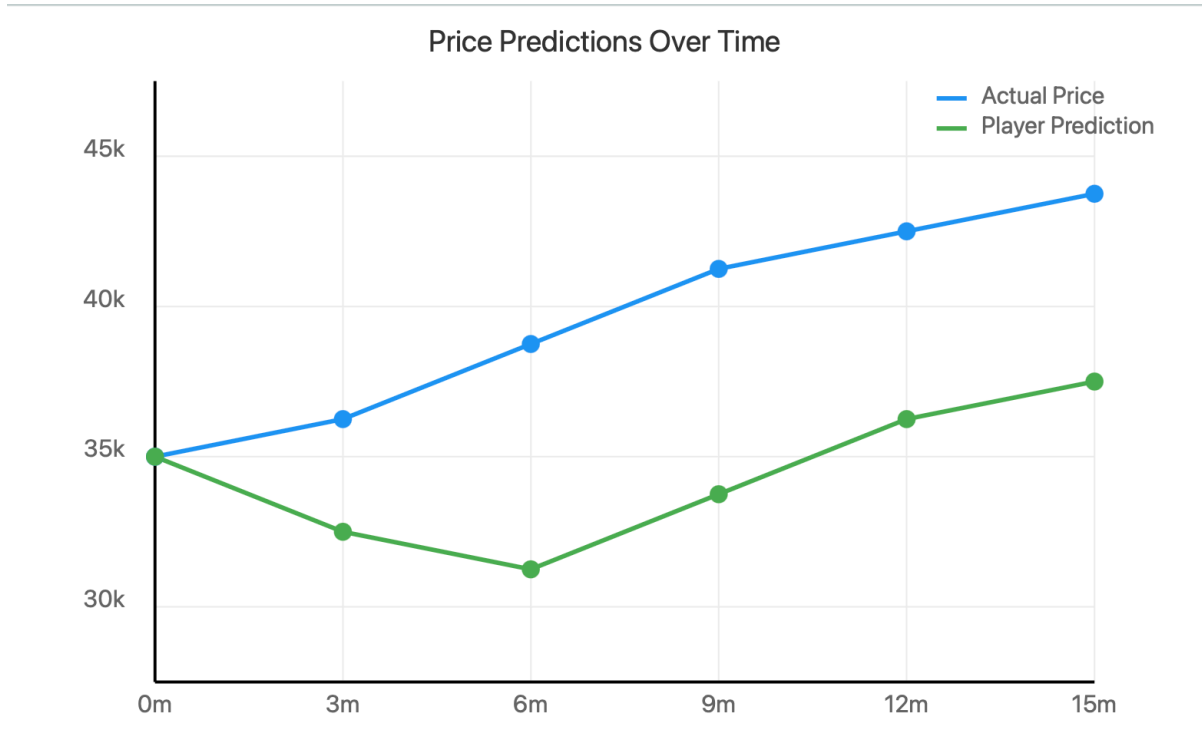
4. Scoring Phase:

When the predetermined time limit of the game is reached, the game ends, scores are tallied (see below) and winners are declared.

The prize pool is allocated to the winners, who also receive in-game rewards.

Scoring

Scoring in Airlinez is performed by dividing each game into a discrete number of subunits of time, called Checkpoints. The graph below shows a 15 minute game, containing 5 Checkpoints at the 3,6,9,12, and 15 minute marks.



At each Checkpoint, each player’s prediction undergoes a two step process: First, it is put through an exponential decay function, in order to quantify their error (how far from the actual price they are) and assign a score along a decay curve, from 0-1000. Then, the scores are normalised, so that every checkpoint has an equal weight in the final score calculation.

For the game durations that we will be using at launch, the checkpoint frequency is as follows:

Game Duration	Checkpoints	Frequency
5 minutes	60	Every 5 seconds
15 minutes	90	Every 10 seconds
30 minutes	120	Every 15 seconds
1 hour	120	Every 30 seconds
4 hours	240	Every 1 minute
1 day	288	Every 5 minutes
1 week	336	Every 30 minutes

Step 1: Exponential Decay Function

$$S = 1000 \times e^{-M \times |P-A|/A}$$

This exponential decay function forms the foundation of the Airlinez scoring system, providing a clean way to rank price predictions based on their accuracy. Let's explore how it works and why each component matters.

The core formula, e^x , is used because it creates an exponential decay curve from 1 (a perfect score) to 0, that never reaches zero. Perfect for differentiation where small differences in predictions create different outcomes.

Formula Components Explained

Base Components

- **S (Score)**: The raw score, ranging from 0 to 1000 points
- **e**: The mathematical constant (approximately 2.71828)
- **P**: The player's predicted price
- **A**: The actual price at the checkpoint
- **M**: A variable modifier that controls the score decay rate

The Error Calculation

The term $|P-A|/A$ represents our error calculation:

- $|P-A|$ gives us the absolute difference between predicted and actual price
- Dividing by A (the actual price) converts this to a relative error
- This relative approach means the scoring works identically whether we're trading Bitcoin at \$100,000 or Dogecoin at \$0.10

Why Exponential Decay?

We use exponential decay because it provides several valuable properties:

1. Scores are always positive
2. Perfect predictions ($P=A$) result in exactly 1000 points
3. Scores decrease smoothly as predictions get further from the actual price
4. It works well across any price range
5. And maintains correct relative rankings between players

Why variable Modifiers?

The modifier M controls the gradient of the scoring curve and varies by game duration to account for different volatility expectations. Since the potential for price deviation naturally increases with time, we use different modifiers to ensure scoring remains meaningful across all game durations:

Game Duration: Modifier (M)

5 minutes:	60
15 minutes:	45
30 minutes:	35
1 hour:	30
4 hours:	25
1 day:	20
1 week:	15

Higher M values create steeper scoring curves that heavily differentiate between small prediction errors, appropriate for shorter timeframes where price movements are typically limited. Lower M values create more forgiving curves suitable for longer durations where larger price swings are expected.

This graduated system ensures that scoring remains meaningful and proportional regardless of game duration, while adapting to the natural increase in potential price movement over time.

Step 2: Score Normalisation

Running the Exponential Decay formula on its own carries the risk of different Checkpoints carrying different final weights as the price deviates from its original point. As a result, we can use min-max normalisation so that Checkpoints towards the end of the game are just as heavily weighted as Checkpoints at the beginning:

For each checkpoint, raw scores are normalised in the following way:

$$\text{normalised_score} = 1000 \times (\text{raw_score} - \text{min_raw}) / (\text{max_raw} - \text{min_raw})$$

Where:

- **raw_score** = Player's raw score from Step 1
- **min_raw** = Lowest raw score among all players at this checkpoint

- **max_raw** = Highest raw score among all players at this checkpoint

Properties:

- This preserves relative performance differences between players
- It ensures each checkpoint carries equal weight in final scoring
- And maintains granular score differentiation

Final Score Calculation

The final score is calculated by adding the cumulative normalised scores across every Checkpoint. Then players are ranked from the highest score to the lowest.

Edge Case: Tiebreaks

In cases where two or more players in a prize winning position have a tied score at the end of the game, winners will be decided by determining who got the highest score at the final checkpoint. If that result is also identical, results will be compared one checkpoint prior, and so on.

In the extremely unlikely scenario where two prize winning bets have absolutely identical scores at every single checkpoint, Chainlink's Verifiable Randomness Function (VRF) will be used to randomly select a winner.

Edge Case: Extreme Bets or Volatility

A player may wish to test the limits of the game system by drawing a chart that makes extremely violent and irrational moves (for example, a BTC/USD chart that yo-yos from \$0 to \$10 million, over and over again).

Alternatively, an extreme market movement could cause every player to be so "wrong" that their raw scores become miniscule.

In both of these instances, this will have a meaningful impact on our scoring system, as it will influence the **min_raw** value in our normalisation function. The function does not work properly when raw scores become very small.

To address this, we have a simple solution. Players are considered "off the curve" when their raw score falls below 1. If one player is "off the curve" at a Checkpoint, their score

will be rounded up to 1. This preserves our normalisation function while maintaining relative rank.

If two or more players are off the curve at any Checkpoint, the last place player will be awarded 1 point, with the closer players being awarded 1 extra point per position. So if 3 players are “off the curve”, last place will receive 1 point, second last will receive 2 points, and third last will receive three points. This maintains relative rank while ensuring that our normalisation function doesn’t break under extremely small inputs.

It means that even if every player is off the curve (for instance, in the case where there was a significant market movement that no players had anticipated) the rank order of players will be maintained.

Additionally, any player who remains on the curve (raw score ≥ 1) must always score higher than players who went off the curve. If a player's raw score would result in them scoring less than or equal to the highest off-curve score, their score will be automatically adjusted to one point higher than the highest off-curve score.

For example, in a 5-player game where three players go off the curve and receive 1, 2, and 3 points respectively, if a fourth player's raw score would normally give them only 2 points, they will instead receive 4 points to maintain the principle that staying on the curve is always better than going off it. This ensures that fair rank is maintained in every instance.

Verification and Data Storage

Each game will run through secondary verification of the score at its conclusion, using the same formulas but in a different code structure, in order to guarantee accurate scoring and consistency.

Additionally, Checkpoint data will be stored on the following schedule:

- Data for every player, at every Checkpoint, will be stored for 7 days after each game
- Data for every player, for a subset of Checkpoints, will be stored for 31 days after each game
- Game metadata will be stored permanently

This gives players a 7 day appeal window in order to raise any grievance they have about the game being scored fairly and accurately, in which time full Checkpoint data will be retrievable.

Summarised Checkpoint data, stored for a month, will provide a longer dispute window but without the same information density as the initial 7 day period.

Payouts

The game creator will choose the payout distribution before the game begins. They will be able to choose from three options: **Winner Takes All**, **Top 3**, or **Top 5**.

Winner Takes All is self explanatory. 100% of the prize pool (after fees, see below) will be awarded to the player in 1st place.

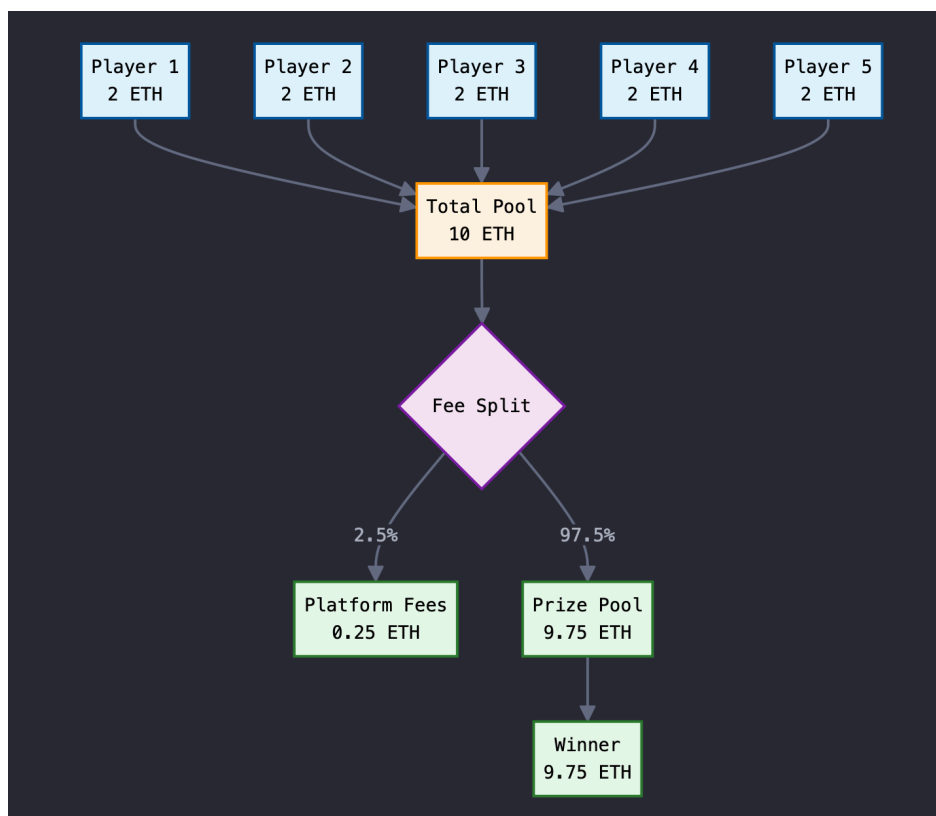
Top 3 awards the prize pool to the top 3 places in a ratio of 60/30/10% for 1st/2nd/3rd.

Top 5 awards the prize pool to the top 5 places in a ratio of 45/25/15/10/5% for 1st-5th.

Fees

Airlinez charges a flat fee of 2.5% per game. This is removed from the total bet pool at the moment the game completes, leaving the remaining 97.5% as the available prize pool.

To illustrate, the diagram below shows a 5 player, 2 ETH buy-in game with a Winner Takes All prize allocation:



Technology

Price feeds

Ensuring that the live price data in each game is secure and accurate is one of the core mechanisms for assuring users that the game is functioning fairly. Airlinez is a completely neutral platform that benefits from wide adoption, and ensuring highly reliable price data is fundamental to this.

For this reason, Airlinez uses Chainlink Data Streams, the best-in-class source of accurate, low latency, secure price data in Web3, in order to feed price data into live games at sub-second latency.

<https://chain.link/data-streams>

Blockchain

Airlinez will utilise smart contracts to escrow and manage user funds and fees. The token will be chain neutral, built upon Chainlink's Cross Chain Token (CCT) standard. The game contracts will be built upon Arbitrum AnyTrust; a low cost, high throughput chain from one of the best teams in the space when it comes to credible neutrality and technical innovation.

<https://arbitrum.io/anytrust>

Historical Price Data

During the prediction stage, users will have the ability to interact with past charts, in order to inform their intuitions about future chart movements. This is less of a critical dependency than the live price data, and as a result Airlinez will use Binance's Public API in order to populate the historical chart information.

<https://developers.binance.com/docs/binance-spot-api-docs/web-socket-api/public-api-requests#ui-klines>

Wallets/Authentication

Airlinez will utilise the robust authentication and wallet management stack provided by Privy. Privy is an all-in-one user identity solution that allows for connection through both Web2 and Web3 services.

<https://www.privy.io/>

Gamification

One of the great strengths of Airlinez is that it allows game loop elements to be incorporated into the existing incentives of chart trading. Beyond the user interface, which is focused on fun and accessibility, these elements include:

Ranks: As players advance and win games, they can ascend in rank. Pilot ranks (Captain, First Officer, etc) are a natural fit for this, given the aviation theme of the front end. Player rank can be more than just a flex, it can be a ticket to exclusive games that have bonus funds added to the prize pool by the platform (eg: a “Captain or higher” game that has 5 ETH added to the prize pool, on top of the player buy-in). These ranks can also be displayed on player profiles.

Unlockables: The rank system goes hand in hand with more unlockable content. Higher ranked players can unlock new aircraft, new backgrounds, and even new UI skins. As games will be viewable by non-players who just wish to spectate, the possession of “elite” aircraft will be a desirable opportunity to show off your status as a top trader.

Tournaments: The Airlinez framework is well suited to play-off style tournaments. Where the top number of players from successive games can qualify for subsequent rounds, all the way up until a championship match. This has the benefit of allowing for large prize pools for small buy-ins, and even systems like satellite tournaments where players can win a seat in high value tournaments for a fraction of the buy-in price.

Leaderboards: Leaderboards will apply not just to tournaments, but will be kept at all times, to allow for top players to constantly show their superiority. One of the most compelling draws of Airlinez will be the opportunity for a small number of Technical Analysis specialists to definitively demonstrate that they are superior chart traders. This is a very strong piece of marketing material if you are an aspiring Technical Analysis influencer.

Seasons: Airlinez plans to run in discrete “Seasons”. These are three month periods with their own leaderboards. This allows there to be a regular run up to exciting play-offs, and then a general reset so that new players feel like they can join and climb the ladder. Unlockables for each season will be kept, however, as established players will no doubt want to show off their vast cabinet of trophies and elite content.

Summary

Behind its playful veneer, Airlinez is a sophisticated engine for converting players’ intuitive sense of chart patterns into accurate and quantifiable predictions. It captures latent interest in chart trading/Technical Analysis, and converts that into a directly competitive PvP system. It then layers on all of the compelling elements of modern games, to create a game loop that rewards regular play and success.

By providing a provably fair neutral ground for competitive chart trading, it is hoped that Airlinez becomes both the central proving ground for aspiring Technical Analysis influencers, as well as a fun, fair and accessible regular “thing to do” for retail crypto natives.