Project MARS Whitepaper

Version 0.4

Overview

MARS is a decentralized platform that attracts public interest and financial resources to projects aimed at future colonization of Mars. In the beginning, the MARS project will act as a prediction market allowing users to stake on the outcomes connected with the colonization of Mars. The MARS project will also facilitate mostly promising projects by rewarding them with native $MARS tokens.

In the future $MARS tokens should become a basis for a decentralized open financial ecosystem on Mars.

Project phases

The MARS project will have 2 phases:

- **The Prediction market phase** will be the initial phase, during which the project will implement prediction market contracts allowing people to stake on the outcomes related to the future colonization of Mars. During this phase also the initial distribution and market creation for $MARS tokens will be accomplished. $MARS tokens in this phase will serve as a basis for the sustainable oracle system and as a voting token for the decentralized governance.
- **The Martian financial ecosystem phase** will start with the first achievements in the colonization of Mars. In this phase $MARS tokens will become an exchange medium for financial transactions both on Mars and between Mars and Earth.

Prediction market operations

Prediction markets structure

The MARS project consists of a set of project specific markets. The most promising projects, elected by the MARS decentralized governance, will be allowed to open specific staking on the platform. For each of these projects a separate prediction market will be created. Unlike e.g.

Augur, new prediction market creation decisions can be only taken by voting of all $MARS token holders.

The markets use 3-level grouping:

- **Level 1 - Sections**. Examples are: Crossing the frontier; Discover the red planet; A new home.
- **Level 2 - Milestones**. Examples are: First Orbital Flight of spacecraft fit for Mars logistics; First crew headed to Mars.
- **Level 3 - Predictions**. Examples are: Achieved by XX.XX.20XX (yes / no)? Private Company or NASA SLS? Which Agency or Nation will be the first ? What is the crew size ?

All prediction markets operate identically based on the same smart contracts code.

The basic attributes of all prediction markets are:

- A complete set of possible outcomes
- A settlement date
- Time and pool share limits.

Decisions about the winning outcomes are taken at the settlement date by a group of oracles or by governance under control of a separate Settlement smart contract.

The role of $MARS tokens in the prediction market phase

$MARS tokens play two major roles in the MARS project in the prediction market phase:

- **Basis for the MARS oracle system.** All parties that are allowed by the MARS decentralized governance to act as oracles, must stake 1,000,000 $MARS tokens. The staked tokens are locked in the Settlement smart contract until the date of settlement of a certain prediction market.
- **Voting token for decentralized governance**. Holders of $MARS tokens will be able to submit governance proposals and vote for them, e.g.:
    - Add a project specific market
    - Add / remove an oracle
    - Change fees
    - Setup a future emission control smart contract

Creation of a prediction market

A new prediction market is created by governance decision. When the decision is approved, a new instance of the prediction market smart contract is automatically deployed in the blockchain using the Factory smart contract.

Shares of outcome

Every MARS prediction market has shares of outcome tokens that can be either bought directly from the MARS prediction market contracts or traded on an external market. Every share corresponds to one of the possible outcomes for a given market. At the date of settlement the shares for the true outcome will be accepted by the MARS prediction market smart contract at the **settlement price** (see details below), alternative shares will not be accepted and therefore will have no value.

The initial shares distribution will be performed by the MARS smart contract. Users will be able to buy the shares for **1 BUSD each**. All the collected amount will be locked in the Mars prediction market smart contract until the prediction date. When a winning outcome will be settled, the collected amount will be distributed among the winning shareholders proportionally by returning their shares to the smart contract and burning them.

To make the minimum winning amount more predictable, the initial shares distribution will have the following limits (defined for each prediction market):

- **Time limit** - the initial shares distribution must be finished at some date before the predicted event. This is to prevent buying shares when some outcome becomes obvious earlier than the prediction date.
- **Pool share limit** - since some predefined date, there may be a limit on the maximum share of one outcome in the pool, e.g. 80%. When this limit is reached, the distribution for this specific outcome will be suspended until a sufficient amount of other shares of outcomes will be purchased.

Settlement price of the shares

The settlement price of the winning shares will include the initial amount of BUSD collected minus the amount of fees paid to oracles, minus the protocol fee:

P = (total_BUSD_collected - total_fees_paid - protocol_fee) / number_of_shares_won

Fees

The MARS protocol will charge fees for every purchase of shares. When a complete set of shares is bought for 1 BUSD, 0.3% will be taken: 0.2% will go to the oracles, 0.1% will be the protocol fee. Fee values may be changed by governance.

Settlement smart contract, oracle staking

A list of approved oracles is stored in the settlement smart contract and may be changed by governance. Each oracle is identified by a wallet id from which $MARS tokens must be staked. The prediction markets operation and sale of shares of outcomes is allowed only when at least one oracle has staked 1,000,000 $MARS tokens on the contract. Only approved (by governance) oracles are eligible for staking.

Oracles may withdraw their stakes unless:

1. It is the last oracle in the list. The last oracle is not allowed to withdraw his stake until some other oracle makes a new stake.
2. All the staked tokens are blocked by the settlement smart contract when a settlement procedure starts on any prediction market until the end of the settlement procedure.

Settlement protocol

When the settlement date for a given market comes, all the oracles must report the true outcome within 24 hours. All oracles have equal weights when reporting.

If 100% of the oracles are in consensus, the winning outcome is defined as a tentative outcome and the dispute phase starts.

The dispute phase lasts for 7 days during which any $MARS tokens holder can stake 100,000 $MARS tokens to start a dispute. If a dispute threshold is passed, the voting phase starts.

If less than 100% of the oracles vote for one outcome or in case of a dispute, the voting phase starts, during which all $MARS token holders may vote for outcomes. Corresponding governance decisions are created automatically by the Settlement smart contract in these cases:

- Within a dispute start transaction, or
- Initiated by anybody using the **startVoting** public method in the Settlement smart contract (this method becomes available after 24 hours from the settlement date if there is no consensus).

Every $MARS token holder will have the number of votes equal to the number of $MARS tokens in possession. The voting phase will last for 7 days.

If the quorum threshold is passed for the voting phase, the voting decision is considered final. If the quorum threshold is not passed after 7 days, the voting phase is repeated for another 7 days with the quorum threshold decreased by 50%. This procedure loops until the quorum is reached. The initial quorum threshold will be 10% and may be changed by governance.

If nobody starts a dispute within the dispute phase, the decision is considered final automatically.

Incentives and penalties

Oracles are incentivized for staking their $MARS tokens with oracle fees (0.2%) from every buying transaction on the platform. The fees are sent to the oracles after the final settlement. Only the oracles whose opinions conform with the final decision will get the fees. The total amount of fees will be divided between the conforming oracles equally. If no oracles voted successfully, the whole amount of oracle fees will be used as an additional protocol fee.

The staked $MARS tokens will be returned only after the settlement procedure. Only oracles that voted for an outcome that was finally decided true will get their $MARS tokens back. Oracles that voted wrong or failed to vote within the defined time window will not get the tokens back. 20% of these forfeited tokens will be burnt, other 80% will be distributed equally among the successful oracles. If no oracles voted successfully, all 100% of the forfeited tokens will be burnt.

Oracles that voted wrong or failed to vote within the defined time window are automatically removed from the list of approved oracles. This is done in the same transaction with finalization of the voting phase for a settlement decision.

A $MARS token holder that staked his tokens to start a dispute will get his tokens back only if the dispute will change the initial tentative outcome. Otherwise, 20% of these forfeited tokens will be burnt, other 80% will be distributed equally among the successful oracles.

Protocol fee

The protocol fee will be initially set to 0.1% from every purchased share of outcomes. This fee may be claimed at any time by the owner of a predefined wallet id.

The protocol fee receiver's wallet id and the protocol fee level may be changed by governance.

Distribution of $MARS tokens

Initial distribution

The total token supply **for the prediction market phase** is 1,000,000,000 $MARS tokens distributed in 5 pools:

- Core team pool (100M $MARS) - distributed among the core team
- Strategic investors pool (100M $MARS) - for investors of the first round
- Ecosystem pool (350M $MARS) - to attract strategic partners
  - 300M $MARS for key strategic partners (SpaceX, BlueOrigin, Moonx, and so on)
  - 50M $MARS to promote individuals and the broader community of space enthusiasts to be actively involved in the promotion of Mars exploration related activities
- Fundraising pool (50M $MARS)
- Common pool (400M $MARS) - for future ecosystem/users

Tokens from the core team pool, the strategic investors pool, the ecosystem pool and the fundraising pool are distributed based on ongoing voting proposals.

Core team pool distribution

$MARS distribution among the core team members is done according to each participant's level of contribution:

- Community lead 20M
- Senior technical contributor, full engagement 15M
- Technical or business lead part-time (3x max) 10M
- Junior technical contributor / Supporting contributor / Partial engagement 2M
- Evangelist part-time 1M

$MARS tokens distributed among the core team will be **subject to lock-in** for 2 years from the project launch. During the lock-in period the core team members will be eligible to vote for governance proposals and create them, but the ownership of tokens may not be transferred.

Ecosystem pool distribution

Ecosystem pool tokens will be gradually distributed among representatives (preferably companies) advancing the colonisation of Mars. The actual distribution will be carried out by means of smart contract voting by current $MARS governance token holders.

Common pool distribution

Common pool will be made gradually available for purchase via exchanges and DEXes, also by means of IEOs and IDOs.

Token distribution for the Martian financial ecosystem phase

After the colonization of Mars is started, $MARS token should become an exchange medium for the Martian financial ecosystem. Technically wise, in the initial phase of the project, we will foresee a future $MARS emission control smart contract that will be allowed to mint $MARS tokens over the initial 1,000,000,000 amount and also to burn $MARS tokens.

Governance

Basic principles

The Mars project is a Decentralized Autonomous Organization (DAO) governed by the community of $MARS token holders. No other person or entity has reserved rights to influence the project parameters, including the smart contracts owner.

The Mars project governance exists in 2 forms:

- **On-chain governance** is performed under control of the governance smart contract.
- **Off-chain governance** is performed using the Snapshot software.

On-chain governance

When on-chain governance is applied, every action, including proposal submissions and voting, is a blockchain transaction. The drawback is that all these actions will require network fees (gas) to be paid by the participants. The outcomes are: all votes are immutably and reliably stored on the blockchain; approved decisions may be automatically fulfilled by the governance smart contract.

To submit a proposal, a user must stake 100,000 $MARS tokens. These tokens will be locked in

the governance contract until the end of voting on the proposal. The staked tokens will be returned only if the proposal is approved or quorum not reached. Otherwise, the staked tokens will be burnt.

Voting for each proposal lasts for 7 days. Every $MARS token holder may vote for any proposal. The number of votes equals the number of tokens in possession. To vote, a user sends his $MARS tokens to be temporarily locked in the governance contract to prevent double voting. The tokens are returned when the voting ends.

To approve a decision, a certain share of $MARS token holders must vote according to the quorum threshold. The initial quorum threshold is 10% and may be changed by governance.

Therefore, we use on-chain governance only for decisions that can be done fully automatically:

- Prediction outcome decisions during the dispute and voting phases.
- Create a new prediction market.
- Change oracles for a prediction market.
- Transfer tokens from the core team pool, the strategic investors pool, the ecosystem pool or the fundraising pool to a specific wallet.
- Change the oracle fee level.
- Change the protocol fee level.
- Change the receiver of the protocol fee.
- Change the period for oracles to make decisions.
- Change the length of the dispute phase.
- Change the length of the voting phase.
- Change the quorum threshold.
- Change the amount of tokens staked by an oracle.
- Change the amount of tokens staked to start a dispute.
- Change the amount of tokens staked to submit a proposal.
- Setup a future emission control smart contract.

Off-chain governance

Off-chain governance is used to discuss and vote for decisions that cannot be formalized within the governance smart contract. Examples of these decisions could be:

- Propose development of new features.
- Preliminary voting before submitting an on-chain proposal.

Off-chain governance uses Snapshot as a voting platform. Only $MARS token holders are eligible to vote. The off-chain decisions are advisory and are fulfilled by the core project team.

Architecture