DRONCHAIN

An innovative platform designed to reclaim data control authority
and lead advancements in the drone industry

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The drone aviation industry has been rapidly expanding and innovating various areas, such as leisure, agriculture, logistics, cinematography, surveillance and construction, as well as warfare. As of December 2024, tens of millions of people are using drones worldwide, and the magnitude of the drone industry continues to expand significantly. In fact, the drone market grew from approximately $30.8 billion in 2023 to approximately $40 billion in 2024, exhibiting an explosive growth rate of over 30%. (Source: Drone Industry Insights, Statista).

Along with this growth, the importance of drone operation data, from the safety management, has also been explosively increased. The surge in drone usage and the growing complexity of operational environments have raised serious concerns about aviation safety. Traditional aviation systems, due to their centralized structure, face challenges in ensuring data reliability, transparency, and efficiency, as well as in safeguarding individual data autonomy. In particular, the following issues impose significant threats to the aviation safety:

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Intensification of Data Silos

The drone industry is dealing with a growing problem of data silos. This happens when drone manufacturers, operators, and government agencies all use different data formats, storage systems, and access rules. Because of this, it's hard for their data to work together, making analysis and collaboration difficult.

As a result, these data silos make it much harder to get a clear picture of drone operations or use the data effectively.

This issue is even more serious as urban air operations increase. Without better data sharing, these silos could lead to bigger risks of major accidents, which might even turn into national-level disasters

Data Tampering

The integrity of drone operation data is crucial for ensuring aviation safety. However, centralized systems are vulnerable to threats like interception, replay attacks, and data manipulation. These vulnerabilities can lead to issues such as drone malfunctions, crashes, data leaks, and even terrorism threats.

To address this, DroneChain uses Distributed Ledger Technology (DLT), encryption, and proof of time to maintain data integrity. All data is stored across multiple nodes in a decentralized and encrypted way, making it highly resistant to hacking. The proof of time mechanism in the Solana blockchain ensures that the order and timestamps of the data are accurate, preventing any tampering.

DroneChain is an essential component for building a reliable and secure drone operation environment.

Data imbalance

Data is often concentrated in the hands of large corporations or government agencies, which limits individual drone users' access to important information. This lack of access can lead to insufficient safety training, lower awareness of safety protocols, and an increased risk of accidents.

DroneChain addresses these issues by providing a blockchain-based decentralized platform. It improves data accessibility for drone users, strengthens aviation safety, promotes growth across the drone industry, and helps resolve this imbalance.

Transparent Sharing of Drone Operation Data

Transparent sharing of drone operation data is essential for improving aviation safety and advancing the drone industry. DroneChain records all operational data—such as flight logs, sensor data, and maintenance records—on the blockchain, making it accessible to all stakeholders, including manufacturers, operators, government agencies, and research institutions.

This transparency enhances data accessibility, enabling better accident analysis, improved safety regulations, and the development of effective accident prevention systems.

Ensuring Data Ownership for Drone Users

Drone users are granted full ownership and control over the data they generate—such as flight logs, sensor data, and video information. This empowers users with greater autonomy in utilizing their data, encourages responsible drone operation, and even enables them to monetize their data by selling or sharing it with third parties. Through its decentralized platform, DroneChain ensures users have sovereignty over their data and guarantees their right to decide how it is used. This approach contributes to enhanced data security, privacy protection, and the promotion of responsible drone operations.

AI-Powered Safety System

DroneChain goes beyond being a simple data storage platform by integrating an AI-powered safety system that significantly enhances aviation safety. The extensive data accumulated on the DroneChain platform is combined with AI technology to provide advanced safety features such as real-time risk detection, accident prediction, and autonomous flight control.

By leveraging computer vision and deep learning, the system detects potential risks in real time. It uses machine learning to predict accidents, alert operators, or even adjust flight paths to prevent incidents. Additionally, AI based on reinforcement learning enables drones to perform safe autonomous flights.

This approach reduces accident rates, minimizes human error, strengthens compliance with safety regulations, and ultimately contributes to the growth of the drone industry.

-DroneChain introduces a new paradigm for the drone era

DroneChain is shaping the future of the drone era by introducing a safer and more reliable paradigm through the following innovations:

Safe Skies: Minimizing drone accidents with AI-powered real-time risk detection and accident prediction systems.

Data Ownership: Empowering users with ownership and control of their data through blockchain technology.

Innovative Growth in the Drone Industry: Accelerating the development of the drone ecosystem by enhancing data sharing and collaboration.

AI Service Expansion: Combining drone data with AI technology to deliver a wide range of tailored services.

DroneChain paves the way for a safer, more trustworthy, and innovative future in the rapidly evolving drone era.

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Vision of DRONECHAIN

Key Objectives

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I. Securing Data Control : DroneChain leverages blockchain technology to grant users full ownership and control over their data. Users can take a proactive role in utilizing their data by analyzing the collected information to improve drone operation efficiency and develop new business models.

II. **Safe and Transparent Data Management** : DroneChain utilizes blockchain's Distributed Ledger Technology (DLT) to securely store and manage all drone operation data in a tamper-proof manner. By integrating an oracle network, it collects and verifies data in real-time, ensuring both accuracy and reliability.

All data generated by drones is safely managed within the DroneChain platform. Additionally, encryption and access control technologies are applied to protect personal information and strengthen data security

a. Decentralized Platform : DroneChain offers a decentralized platform where users can freely participate and interact without relying on centralized control. This approach enhances system stability and minimizes the risk of service interruptions caused by hacking or errors.

All transaction records are transparently stored on the blockchain, ensuring a high level of trust. Users can manage their data directly without intermediaries and execute automated transactions through smart contract functionality.

Additionally, DroneChain integrates external data securely via an oracle network, expanding the platform's capabilities and improving the efficiency and safety of drone operations.

b.Advancing AI-Powered Autonomous Systems :

DroneChain enhances autonomous driving systems by combining drone data with AI technologies, maximizing the safety and efficiency of drone operations. The extensive flight, sensor, and environmental data accumulated on the DroneChain platform is used to train AI algorithms, advancing key autonomous capabilities such as obstacle avoidance, route optimization, and precise flight control.

This enables drones to navigate safely in complex urban environments, adapt flexibly to unpredictable situations, and find the optimal path to their destination independently. These advancements expand the potential applications of drones across various industries, including package delivery, crop management, infrastructure inspections, and disaster relief.

By doing so, DroneChain accelerates the growth of the drone industry, unlocks new business opportunities, and drives innovation in drone technology.

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c. Enhancing Transparency and Efficiency in Drone Logistics :

DroneChain enables real-time tracking and recording of cargo location, travel routes, and delivery status. This allows for accurate identification of the current location and estimated arrival time of shipments, preventing data tampering during the delivery process, simplifying logistics operations, reducing operational costs, and shortening delivery times.

Furthermore, the platform enables immediate response to issues that may arise during deliveries. By leveraging smart contracts, payments are automatically processed upon delivery completion, further boosting efficiency.

d. AI-Powered Accident Prediction and Automated Insurance and Payment System :

Accident Prediction

DroneChain collects and analyzes flight records, sensor data, environmental data, and maintenance logs to build an AI model capable of predicting potential accidents. By integrating real-time weather data, terrain information, and nearby drone flight data via an oracle network, the AI model performs real-time risk assessments.

If a high-risk situation is detected, the system sends warning messages to drone operators or automatically adjusts flight paths to prevent accidents.

Automated Insurance System

Through smart contracts, insurance policy terms are automatically executed. In the event of an accident, blockchain-recorded data is used to determine eligibility for insurance payouts, which are processed automatically.

All insurance-related information is transparently recorded on the blockchain, minimizing the risk of fraud and disputes while enhancing trust. Additionally, DroneChain enables the development of tailored insurance products by analyzing operational data such as drone type, purpose, and risk level.

This system not only prevents accidents but also ensures a streamlined and transparent insurance process, supporting the overall growth and reliability of the drone industry.

e. DroneChain-Based Environmental Improvement and Guardian System Advancement :

DroneChain leverages the mobility and accessibility of drones to monitor various environmental issues in real-time. By analyzing the collected data, it supports efficient environmental protection efforts.

The DroneChain platform goes beyond merely collecting data—it integrates AI-powered analysis and prediction systems to enable proactive responses to environmental challenges. This approach not only enhances monitoring capabilities but also helps in addressing issues such as pollution, deforestation, and disaster management more effectively.

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f. Unfolding the Future of Smart Cities :

Imagine drones navigating through urban jungles, uncovering hidden city insights with advanced sensors, and saving lives in disaster zones. This vision becomes a reality with DroneChain. By combining the power of drone and blockchain technologies, DroneChain positions itself as a driving force behind smart city development.

1) Eyes on the City
Drones play a pivotal role in various urban applications, including 3D mapping, traffic analysis, building safety inspections, and infrastructure management. DroneChain securely and efficiently manages the vast amounts of data collected by drones, providing crucial insights for solving urban challenges.
DroneChain is particularly valuable in integrating autonomous driving systems, building smart traffic solutions, and improving urban environments by creating green spaces.
2) Resilient Cities in Times of Crisis
In the event of disasters, drones quickly assess the situation on the ground, analyze the extent of the damage, and support rescue operations and recovery efforts. DroneChain enables the real-time sharing of disaster information and facilitates collaboration among relevant agencies, contributing to the establishment of an effective disaster response system.
3) Sustainable Urban Development
Drones measure and analyze urban energy consumption to enhance energy efficiency. DroneChain also supports the development of policies for eco-friendly city planning, driving sustainable urban growth.

g.DroneChain-Based E-Sports Ecosystem :

Transforming Drone Racing into an Exciting E-Sports Experience
DroneChain revolutionizes drone racing by creating an engaging E-Sports ecosystem for drone racing athletes and fans worldwide. The platform transparently manages key elements such as player registration, match schedules, results, and rankings, ensuring a seamless experience for all participants. Prize distributions are automated through DroneChain's smart contracts, providing secure and efficient payouts without manual intervention. This approach adds transparency and trust to the entire competition process.

Real-Time Streaming and Fan Engagement
DroneChain enables live streaming of drone racing events, offering fans access to a wide range of information, including race videos, player profiles, and drone specifications. Fans can actively engage with the ecosystem using DroneChain tokens, which can be used for watching races, supporting players through sponsorships, purchasing drone equipment, and even experiencing races in virtual reality (VR). Additionally, the platform's robust copyright protection features ensure that drone racing content creators are safeguarded and supported in generating revenue, further enriching the content ecosystem.

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h. Drone Racing Games and Immersive VR Experiences

DroneChain integrates gaming and virtual reality to create a more immersive fan experience. Simulation games allow users to experience the excitement of drone racing firsthand, while VR technology provides an incredibly lifelike perspective of real drone races. Fans can participate in tournaments, trade game items, or explore VR races using DroneChain tokens, ensuring a highly interactive and rewarding experience for players and enthusiasts alike.

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j. Revenue Generation Through Multiple Channels

DroneChain leverages its platform to generate revenue through diverse streams, including platform usage fees, advertisements, sponsorship deals, content sales, game item transactions, and VR experience services. This multifaceted revenue model supports the platform's growth while enhancing the overall value of DroneChain tokens. The appreciation of token value further rewards platform participants with tangible economic benefits, creating a win-win ecosystem for all stakeholders.

k. Expanding the Drone Industry Ecosystem

The development of the drone racing E-Sports league serves as a foundation for expanding the broader drone industry ecosystem. DroneChain supports drone education programs, provides resources for drone manufacturing, and fosters the growth of related industries. Through its platform, DroneChain facilitates information sharing, promotes community building, and encourages collaboration to advance drone technologies. By bridging E-Sports and industrial innovation, DroneChain plays a vital role in shaping the future of the drone industry.

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Collection and Analysis
of Various Environmental Data

A. Air Quality Monitoring

Drones equipped with sensors measure concentrations of air pollutants like fine dust (PM2.5), carbon dioxide (CO_2), and ozone (O_3) in real-time.

DroneChain integrates this data with Geographic Information Systems (GIS) to identify the distribution and movement patterns of pollution sources.

Using air quality prediction models, it forecasts the spread of pollution, enabling proactive measures.

Wildfire Monitoring and Prevention

Drones utilize thermal imaging cameras to detect wildfire-prone areas early and transmit real-time video to support rapid firefighting operations.

They collect and analyze data such as temperature, humidity, and wind speed from high-risk areas to predict wildfire risks and recommend preventive actions.

Marine Pollution Monitoring

Drones monitor marine surface issues like oil spills, red tides, and plastic waste, identifying the type and scale of pollutants to aid cleanup efforts.

DroneChain analyzes data on ocean currents, tides, and wind direction to predict the movement of pollutants, enabling preventive measures against the spread of contamination.

Ecosystem Monitoring

Drones capture images of endangered species' habitats, forest ecosystems, and wetlands to observe environmental changes and gather research data for biodiversity conservation.

DroneChain processes the collected imagery to detect ecological changes and provides critical information for developing ecosystem protection policies.

This comprehensive approach enhances environmental monitoring and protection, supporting sustainable practices through technology-driven solutions.

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B. AI-based analysis and prediction system

Predicting Environmental Changes

DroneChain analyzes collected environmental data, including weather and terrain information, using AI algorithms to predict future environmental changes. For instance, it can forecast the spread of air pollution, wildfire risks, and marine pollution, enabling proactive responses to environmental challenges.

Tracking and Analyzing Pollution Sources

DroneChain tracks and analyzes pollution sources by monitoring the origin, movement patterns, and concentration changes of pollutants. This helps identify the sources of pollution and supports the development of effective prevention measures.

Environmental Impact Assessment

DroneChain evaluates the environmental impact of development projects, construction activities, and other human activities. It provides optimal strategies for protecting the environment and minimizing harm caused by these activities.

C.Efficient Environmental Protection Support

Real-Time Information Sharing

DroneChain facilitates the real-time sharing of environmental monitoring data, enabling government agencies, environmental organizations, and research institutions to collaborate and respond quickly to environmental issues.

Automated Environmental Management

Using smart contracts, DroneChain automates environmental management systems. For example, it can send automatic warning messages when pollution exceeds acceptable levels and execute pollution prevention measures without human intervention.

Encouraging Participation in Environmental Protection

DroneChain incentivizes individuals and organizations participating in environmental protection activities by rewarding them with DRON tokens. This approach motivates active involvement in environmental efforts and raises social awareness about environmental conservation.

A Platform for Environmental Innovation

By combining drone and blockchain technologies, DroneChain establishes an innovative platform for solving environmental problems. With capabilities for collecting, analyzing, predicting, sharing, and managing environmental data, DroneChain supports efficient environmental protection activities and contributes to building a sustainable society.

Integrating Global Drone Data with DroneChain

Drones are equipped with sensors that combine IMU, GPS, LiDAR, and barometer functions into one system to gather data through DroneChain. This idea is being explored and developed from all angles technical, social, economic, and legal to make it practical and effective.

DroneChain Built on the Solana Blockchain

DroneChain is built on the Solana blockchain, which offers high throughput, fast speeds, and low transaction fees. Solana provides the following benefits to meet DroneChain's requirements:

Proof of History (PoH) Consensus Algorithm :

Solana uses an innovative Proof of History (PoH) consensus algorithm to achieve high transaction processing speeds and short block generation times. PoH works by proving the passage of time, assigning timestamps to each transaction. This guarantees the order of transactions while significantly reducing the time needed for validation.

Fast Block Generation Time

Solana boasts a block generation time of approximately 400ms, which is critical for processing and recording drone operation data in real-time. This rapid speed ensures that drone location, status, and sensor data are updated quickly, enhancing the efficiency and safety of drone operations.

High Transaction Throughput

Solana offers an impressive transaction throughput of up to 710,000 transactions per second. This capability is essential for efficiently processing and storing the vast amounts of data generated by numerous drones. It ensures the scalability of the DroneChain network and provides stable services even as traffic increases

Low Transaction Fees

Solana offers exceptionally low transaction fees, reducing the cost of storing and exchanging drone operation data. This enhances the economic efficiency of the DroneChain platform, allowing users to access and trade data without financial burden.

Building a Safe and Reliable Drone Ecosystem with Chainlink Oracle Network

DroneChain drives innovation in the drone industry through blockchain technology and smart contracts. However, smart contracts face a fundamental limitation: they cannot directly access external data.
To ensure safe and efficient drone operations, DroneChain needs real-time weather information, precise GPS data, flight details of nearby drones, and airspace regulation updates. By integrating the Chainlink Oracle Network, DroneChain bridges the gap between blockchain and external data sources, enabling secure and reliable data access for smart contract execution.

Chainlink: Empowering DroneChain as Its Wings

DroneChain overcomes the limitations of smart contracts through Chainlink, the industry-leading decentralized oracle network. Chainlink provides verifiable randomness (VRF), decentralized data delivery, high accuracy, real-time data transmission, robust security, and exceptional scalability. These features perfectly align with DroneChain's core requirements, enabling a safer, more efficient, and reliable drone ecosystem.

Chainlink: Adding Trust to DroneChain

Ensuring Data Integrity
Chainlink verifies and aggregates data through multiple independent nodes, guaranteeing high accuracy and reliability.
Real-Time Data Synchronization
With fast response times and low latency, Chainlink enables real-time tracking and control of drone movements, ensuring efficient and seamless operations.
Enhanced Security
Chainlink prevents data manipulation and external attacks through its decentralized network, encryption technologies, security audits, and Hardware Security Modules (HSM).

Chainlink: Illuminating the Future of DroneChain

Chainlink empowers DroneChain to access critical external data required for safe and efficient drone operations. By unlocking the full potential of smart contracts, Chainlink supports the creation of an innovative and reliable drone ecosystem, paving the way for the future of drone technology.

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DroneChain drives innovation in the drone industry through AI technology, building a safe and efficient drone operating environment.

1.Key AI algorithms

Computer vision

DroneChain utilizes technologies such as YOLO and Faster R-CNN (object detection), ResNet and EfficientNet (image classification), and LSTM and Transformer (video analysis) to enable environmental awareness, object tracking, image analysis, and accident prevention in drone operations

Time Series Analysis

DroneChain employs technologies like LSTM, ARIMA, and Prophet to analyze drone operation data and predict future values, including battery consumption, flight paths, and potential accident risks.

Reinforcement Learning

DroneChain utilizes algorithms like DQN, PPO, and A2C to enable drones to learn autonomously and make optimal decisions. This facilitates autonomous flight, obstacle avoidance, and route optimization

2.Training Data

Drone flight logs, sensor data, image/video data, weather/terrain information, and airspace regulation data are collected and analyzed at a petabyte scale to improve the performance of AI models.

3. AI Model Performance Evaluation

DroneChain evaluates AI model performance using a variety of metrics, including accuracy, precision, recall, F1 score, RMSE, MAE, R-squared, cumulative rewards, success rate, and average survival time. These metrics ensure precise and comprehensive performance assessment.

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4.AI System Development Roadmap

Phase 1 : Establishing Data Collection and Preprocessing Infrastructure
Build the infrastructure required to collect and preprocess large-scale drone data efficiently.

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Phase 2 : AI Model Development and Training
Select suitable algorithms, build datasets, optimize models, and focus on lightweight AI models for efficient deployment.

Phase 3 : AI Service Development and Deployment
Develop and deploy AI services, including operational optimization, predictive maintenance, risk detection, data analysis, and API integration for seamless access.

Phase 4 : Building an Intelligent Drone Ecosystem
Expand services, create autonomous flight networks, and establish regulatory frameworks and standardization to support the intelligent drone ecosystem.

DroneChain uses these AI technologies to drive innovation in the drone industry, building a safer and more efficient environment for drone operations while helping the industry grow and evolve.

Total Supply: 5 billion DRON 🐝

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Token Functions:

Used for data transactions within the platform, drone service payments, insurance, and governance operations. Serves as a foundational asset for environmental monitoring, urban safety, and maximizing drone operation efficiency.

A. DRON Token Distribution Plan

Community & Rewards: 50% (2.5 billion DRON)

→ Rewards for environmental data providers, drone operators, and platform users.

Team & Development: 15% (750 million DRON)

→ Funding for DroneChain technology development, maintenance, and security enhancements.

Investors: 15% (750 million DRON)

→ Initial fundraising through ICO/IEO and capital acquisition.

Ecosystem Fund: 10% (500 million DRON)

→ Supporting environmental monitoring, urban safety projects, and global expansion.

Marketing & Promotion: 5% (250 million DRON)

→ Increasing global awareness of DroneChain and driving user participation.

Reserve Fund: 5% (250 million DRON)

→ Emergency fund to ensure platform stability.

B. Key Economic Mechanisms

(1) Environmental Monitoring and Data-Driven Rewards

Proof of Environmental Contribution (PoEC):

DRON rewards are given to drone operators who provide environmental data such as air quality, wildfire detection, and marine pollution monitoring.

Rewards are distributed based on the accuracy, real-time relevance, and importance of the data.

Use Cases:

Air Quality Monitoring: Measure air quality and provide real-time updates on air pollution.

Wildfire Detection: Monitor wildfire-prone areas and deliver early response data.

Marine Pollution Tracking: Track and monitor plastic waste in oceans and other pollutants.

(2) Proof of Safety Contribution

Proof of Safety Contribution (PoSC):
DRON rewards are provided to drone operators contributing to urban safety through activities like traffic management, infrastructure inspections, and disaster preparedness.
Contributions are evaluated based on data and flight logs, assessing the operator's role in maintaining urban safety.

(3) Staking and Governance

Staking Program:
DRON holders can stake their tokens to contribute to ecosystem development and earn additional rewards.
Staking participants can vote on policies related to environmental protection and urban safety.

Governance Operations:
DRON holders participate in decision-making processes, including platform fee rates, data contribution reward policies, and ecosystem expansion plans.

(4) Smart Contracts and Automation

Smart Contract-Based Insurance and Safety Management:
In the event of an accident, AI models evaluate risks, and insurance payouts are automatically processed based on the data.
During urban disaster scenarios, data is shared in real-time to execute automated response procedures.

Automated Environmental Data Transactions:
Research institutions, government agencies, and companies needing environmental data can purchase it directly on the platform, streamlining the process.

(5) Diversified Revenue Model

Transaction Fees:
A small fee of 1–2% is charged for trading environmental and urban safety data on the platform.

Premium Services:
Provides AI-powered services such as route optimization, risk analysis, and environmental reports.
Payments for these services can be made using DRON tokens.

Government and Public Sector Partnerships:
Collaborates with smart city projects and supports environmental protection policies by offering data and solutions.
Generates regular revenue through partnership agreements.

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C. DRON Token Use Cases

(1) Environmental Monitoring Data Provision

Drone operators upload collected data, such as air quality, wildfire, and marine pollution, to the platform.
Government agencies and research institutions purchase the data using DRON tokens.

(2) Urban Safety Solutions

Collect and share data on road traffic conditions, infrastructure inspections, and more via the platform.
The data is used for urban planning, disaster management, and traffic optimization.

(3) Insurance and Risk Management

Automatically process insurance payouts via smart contracts in the event of drone accidents.
Develop tailored insurance products based on drone operation and environmental data.

(4) Governance Participation

DRON token holders exercise voting rights on platform policies and ecosystem expansion directions.

D. Roadmap

Phase 1 (2025): Platform Launch and Initial Environmental Monitoring Solutions
Activate the system for collecting and trading environmental monitoring data.
Establish initial partnerships with government agencies and environmental research institutions.

Phase 2 (2026): Launch of Urban Safety Solutions and Smart Insurance
Integrate traffic management and disaster preparedness systems.
Develop a smart contract-based insurance platform.

Phase 3 (2027): Global Expansion and Advanced Environmental Management
Scale the platform internationally.
Enhance environmental monitoring and management systems.

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