PROVISIONAL PATENT APPLICATION: ECOSYSTEM/TRANSPORTATION

The Autonomous "Mule" & Telematics Ecosystem - "***Don't be stubborn, ride a Mule and protect your ASS-et!©***"

- Invention Title: INTEGRATED MOBILE PLATFORM FOR BIOMETRICALLY TETHERED AUTONOMOUS MICRO-MOBILITY VEHICLE RETRIEVAL, EMERGENCY RETRIEVAL ROUTING, AND ENTERPRISE TELEMATICS MANAGEMENT

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- U.S. Government Agency Interest: NO.
- Entity Status: "Micro Entity"

1. INVENTOR & ASSIGNEE DATA

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The Field of Invention

This invention relates to autonomous micro-mobility fleet infrastructure, smart-city Vehicle-to-Everything (V2X) telematics, biometric access control, and dynamic safety systems. Specifically, it introduces a decentralized, self-monitoring mobility fleet that integrates cryptographic parental oversight, multi-modal energy harvesting, meteorological failsafe's, and biometric user verification to eliminate unauthorized operation, urban fleet clutter, and rider endangerment.

2. The Technical Problem

The current global micro-mobility market (rental e-scooters and e-bikes) suffers from fatal structural flaws. Fleet management relies on manual retrieval; abandoned scooters clutter pedestrian walkways, creating municipal hazards. Furthermore, there is a catastrophic lack of verifiable user oversight. Minors routinely bypass basic age-verification screens, resulting in severe injuries. Existing systems possess no dynamic mechanism for a legal guardian to actively govern a dependent's vehicle, nor do they possess meteorological failsafe's or autonomous self-retrieval routing.

DETAILED DESCRIPTION OF THE DRAWINGS (LOGIC FLOWCHARTS)

- Flowchart 1: Dynamic Summon & Intercept
- Flowchart 2: SOS Emergency Protocol
- Flowchart 3: Multi-Modal Energy Harvesting
- Flowchart 4: Traffic Adherence & Intersection Logic

- Flowchart 5: Kinematic Fall-Recovery
- Flowchart 6: Biometric Immobilization & Anti-Theft
- Flowchart 7: Advertiser-Integrated Wayfinding
- Flowchart 8: Parental Guardian Oversight (Subsystem J)
- Flowchart 9: Meteorological Failsafe (Subsystem K)

Flowchart 1: The Dynamic Summon & Intercept Pathway (Subsystem B)

BOX 1: User initiates "Summon Sequence" via secure mobile application interface.

BOX 2: Mobile application begins transmitting continuous, real-time shifting GPS coordinates to the Micro-Mobility Vehicle MCU.

BOX 3: Vehicle MCU calculates a Dynamic Intercept Pathfinding Matrix.

BOX 4: Vehicle MCU automatically deploys dual rear Dynamic Transit Outriggers (micro-casters) to establish a secure, three-point rolling wheelbase.

BOX 5: Vehicle engages autonomous electrical propulsion while continuously scanning the environment via onboard multi-spectral optical array.

BOX 6: Vehicle MCU continually updates and alters its intercept vector as the user's GPS coordinates shift.

BOX 7 (Decision Node): Has the vehicle arrived at the user's exact current physical coordinates?

If NO: Return to BOX 5 and continue pathfinding.

If YES: Proceed to BOX 8.

BOX 8: Vehicle halts propulsion, verifies user biometric proximity, and retracts transit outriggers to restore standard two-wheel manual operation.

Flowchart 2: The SOS Emergency Protocol (Subsystem C)

BOX 1: User actuates the hardcoded high-priority "SOS" emergency command via the mobile application.

BOX 2: Vehicle MCU instantly halts standard operations and engages an electronic deadbolt on the internal Emergency Payload Vault.

BOX 3: Vehicle MCU engages Autonomous Evacuation Mode, calculating the fastest route to the distressed user's live GPS coordinates.

BOX 4: Vehicle navigates to user. Sub-routine: If unauthorized tampering or physical interception is detected en-route, Vehicle MCU instantly locks hub motors (magnetic braking) to prevent theft.

BOX 5: Vehicle arrives at the user's coordinates and searches for the local biometric proximity handshake from the user's smart device.

BOX 6 (Decision Node): Is the biometric proximity verified at the recovery site?

If NO: Keep Payload Vault locked to prevent unauthorized access.

If YES: Proceed to BOX 7.

BOX 7: Vehicle unlocks the Emergency Payload Vault for the user and transmits an automated 911/distress dispatch containing the exact recovery location data.

Flowchart 3: Multi-Modal Energy Harvesting & Power Routing (Subsystem E)

BOX 1: Vehicle is in active transit. Vertical suspension oscillation activates linear induction coils (Kinematic Harvesting) AND/OR vehicle deceleration activates bi-directional hub motor inverters (Regenerative Braking).

BOX 2: Harvested alternating current from both mechanical systems is routed simultaneously through the onboard electrical rectifier.

BOX 3: Rectifier conditions the current into DC power and routes it to the Power Management MCU.

BOX 4 (Decision Node): Is the primary internal lithium-capacitor matrix below maximum capacity?

If YES: MCU routes power directly into the internal matrix to ensure maximum range for emergency autonomous dispatch. Return to BOX 1.

If NO: Proceed to BOX 5.

BOX 5 (Decision Node): Is an external device (e.g., user's smartphone, emergency medical beacon) tethered to the external auxiliary charging port?

If NO: MCU safely shunts excess voltage or disengages magnetic resistance (freewheel mode). Return to BOX 1.

If YES: MCU dynamically diverts the continuous excess power to the external port to actively charge the user's device.

Flowchart 4: Traffic Adherence & Intersection Logic (Subsystem F)

BOX 1: Vehicle proceeds autonomously along the Dynamic GPS Intercept Pathway.

BOX 2: Forward Multi-Spectral Optical Array continuously scans the immediate environment for municipal traffic control infrastructure.

BOX 3 (Decision Node): Does the system detect an active intersection boundary, stop sign, or red/yellow traffic light in the vehicle's immediate path?

If NO: Maintain autonomous propulsion along GPS vector. Return to BOX 1.

If YES: Proceed to BOX 4.

BOX 4: Hierarchical Safety Override engages. MCU instantly halts propulsion and deploys dual gyroscopic stabilizers at the intersection boundary line.

BOX 5: Optical array continuously monitors the intersection for a state change (e.g., light turns green) and actively scans for pedestrian or vehicular cross-traffic.

BOX 6 (Decision Node): Is the traffic control state visually verified as "Clear/Green" AND is the physical intersection clear of dynamic obstructions?

If NO: Maintain stabilized, locked position. Return to BOX 5.

If YES: Proceed to BOX 7.

BOX 7: Retract stabilizers and safely resume autonomous propulsion across the intersection.

Flowchart 5: Kinematic Fall-Recovery & Bystander Gamification (Subsystem G)

BOX 1: Vehicle is operating in unmanned autonomous transit mode.

BOX 2: Onboard IMU detects a catastrophic lateral tilt exceeding safe operational parameters (a fall event).

BOX 3: MCU engages Safety Lockout, cutting propulsion, and activates localized Acoustic Distress Broadcast to engage nearby pedestrians.

BOX 4 (Decision Node): Has a physical bystander uprighted the vehicle, restoring vertical IMU alignment?

If NO: Maintain audio broadcast loop and transmit GPS distress beacon to the primary user. Return to BOX 3.

If YES: Proceed to BOX 5.

BOX 5: Vehicle ceases acoustic distress broadcast and initiates the localized APE-X.ai Reward Gateway prompt (via audio request or localized screen display).

BOX 6 (Decision Node): Does the bystander input valid contact data (e.g., NFC tap, QR scan, or email input)?

If NO: Vehicle expresses localized audio gratitude and resumes autonomous transit.

If YES: Proceed to BOX 7.

BOX 7: Vehicle securely transmits bystander data to the enterprise network, automatically dispatching a digital asset/coupon to the rescuer, and seamlessly resumes its autonomous GPS intercept pathway.

Flowchart 6: Biometric Immobilization & Anti-Theft Protocol (Subsystem H)

BOX 1: Vehicle is parked or is awaiting user at a designated GPS coordinate.

BOX 2: MCU continuously monitors the BLE/NFC proximity tether to the authorized user's smart device.

BOX 3 (Decision Node): Is the proximity tether severed or unauthenticated?

If NO: Maintain standard unlocked operational state. Return to BOX 2.

If YES: Proceed to BOX 4.

BOX 4: MCU alters electrical phasing of hub motors, engaging high-torque magnetic phase-lock to physically immobilize the wheels.

BOX 5: Onboard multi-axis IMU actively monitors the chassis for unauthorized lifting, dragging, or lateral movement.

BOX 6 (Decision Node): Is unauthorized physical tampering detected while the system is locked?

If NO: Maintain silent immobilized state. Return to BOX 5.

If YES: Proceed to BOX 7.

BOX 7: MCU triggers the User-Programmable Acoustic Deterrence payload (broadcasting localized vocal warnings) and simultaneously transmits live GPS tracking coordinates to the user's mobile application.

Flowchart 7: Advertiser-Integrated Wayfinding (Subsystem I)

BOX 1: User inputs target destination into the mobile application.

BOX 2: MCU calculates optimal GPS route while querying the APE-X.ai advertising database for high-value locations along that vector.

BOX 3: Navigation system displays route and overlays "Sponsored Stops" that align with the user’s personal transit history.

BOX 4 (Decision Node): Does the user accept a sponsored navigational diversion?

If NO: Vehicle proceeds directly to the original destination.

If YES: Vehicle re-calculates the intercept vector to include the sponsored waypoint and activates the promotional audio/visual display.

BOX 5: Upon arrival at the sponsored location, the APE-X.ai gateway issues the promotional reward or discount token to the user’s digital wallet.

BOX 6: Vehicle updates the user's behavioral profile for future hyper-localized advertising precision.

Flowchart 8: The "ASS-ett" Parental Guardian Oversight & Geo-Fencing (Subsystem J)

BOX 1: Administrator (Guardian) defines "Safe Zone" perimeter boundaries in the APE-X.ai application.

BOX 2: Vehicle MCU continuously compares live GPS data against the hardcoded Safe Zone coordinates while in transit.

BOX 3 (Decision Node): Is the vehicle approaching or outside of the defined Safe Zone boundary?

If NO: Maintain standard operational parameters. Return to BOX 2.

If YES: Proceed to BOX 4.

BOX 4: MCU triggers an audible "Boundary Warning" to the rider and sends an immediate real-time GPS alert to the Guardian’s smart device.

BOX 5 (Decision Node): Does the Guardian initiate a "Kill-Switch" (immobilization) or "Speed Cap" override via the application?

If NO: Allow vehicle to operate under restricted, limited-propulsion mode until returning to the Safe Zone.

If YES: Proceed to BOX 6.

BOX 6: Vehicle engages the high-torque magnetic wheel phase-lock, halts all propulsion, and broadcasts a location-specific distress signal to the Guardian’s app.

Flowchart 9: Meteorological Failsafe & Sensor Redundancy (Subsystem K)
This chart maps the logic of detecting environmental sensor degradation and initiating the "Safe Harbor" protocol.

BOX 1: Vehicle is operating in autonomous transit mode.

BOX 2: MCU continuously monitors optical and ultrasonic feedback fidelity from the multi-spectral sensor array.

BOX 3 (Decision Node): Is the sensor data fidelity below the minimum threshold (e.g., visual obstruction by snow, rain, or debris)?

If NO: Maintain autonomous transit. Return to BOX 1.

If YES: Proceed to BOX 4.

BOX 4: MCU throttles propulsion to "Cautionary Transit Mode" and initiates high-intensity sensor cleaning/de-fogging sequences (if equipped).

BOX 5 (Decision Node): Has sensor fidelity returned to safe levels?

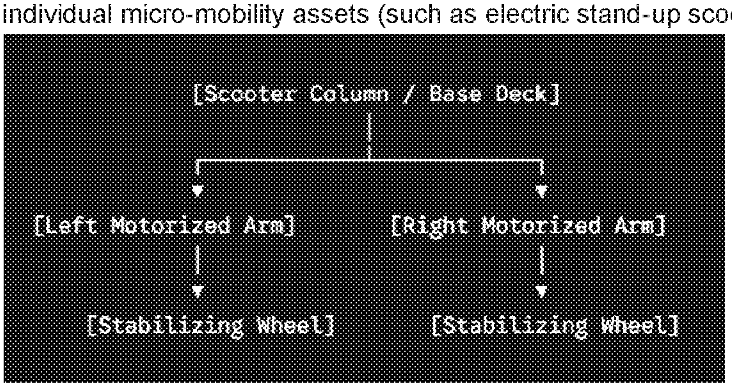
If YES: Resume standard autonomous operation. Return to BOX 1.

If NO: Proceed to BOX 6.

BOX 6: MCU triggers "Safe Harbor" protocol: vehicle halts, deploys stabilizers, locks hub motors, and transmits a "Meteorological Halt" alert and live GPS pin to the user’s mobile application for manual retrieval.

2. SPECIFICATION: ARCHITECTURAL OVERVIEW & ENABLEMENT

The present invention defines a comprehensive system, architecture, software environment, and electronic hardware layout engineered for the autonomous summoning, pathfinding retrieval, emergency payload delivery, and localized telematic data capturing of individual micro-mobility assets (such as electric stand-up scooters, e-bikes, and personal transport units).



The Technical Solution: Subsystems A through K

Subsystem A: The Dual Mechanical Kickstand & Stabilization Array

To permit completely unmanned, autonomous, self-guided locomotion along pedestrian pathways, trails, or open spaces, the vehicle relies on an active mechanical stabilization matrix configured to prevent tip-over events during stationary periods or low-speed maneuvers.

- Gyroscopic Outriggers: Dynamic Transit Outriggers with Micro-Casters: The chassis is outfitted with an automated, dual flip-out motorized rear stabilization array deployed near the rear axle hub. Unlike standard static kickstands, the terminal ends of these outrigger arms are equipped with multi-directional, low-friction micro-casters (e.g., polyurethane transit wheels). Upon the initiation of an unmanned autonomous sequence, these outriggers instantly deploy to form a widened, continuous three-point dynamic wheelbase, actively preventing lateral tipping while the vehicle is in motion over uneven terrain.
- Proximity-Triggered Kickstand Deployment: The exact millisecond the biometric proximity tether between the scooter deck and the primary operator's smart device is broken, the MCU sends an immediate command to drop the outrigger stabilizers. The motorized arms extend outward and downward, creating a structural three-point stance that automatically balances the vehicle upright on uneven, unpaved terrain without requiring manual rider intervention.

Subsystem B: Remote Manual Over-ride & Dynamic GPS Intercept

- Live Optical Feed Control: The forward-facing column of the micro-mobility vehicle houses a high-definition optical video camera module networked natively to the secure user app via a high-bandwidth cellular or satellite data link. If the vehicle enters a highly complex layout or requires fine tactical alignment during an unmanned retrieval sequence, the remote operator can open a live video stream through their smart device and guide the vehicle manually via an on-screen joystick or virtual steering inputs.
- Dynamic Coordinate Intercept Pathfinding: When the user initiates a "Summon" sequence via the smart device, the vehicle transitions to an autonomous retrieval mode. Rather than traveling to a single static street address, the vehicle's navigation system tracks the dynamic, constantly shifting real-time GPS coordinates of the user's paired mobile device or wearable beacon. If an operator is trekking down a wilderness path or moving due to an emergency scenario, the micro-mobility asset actively computes live intercept vectors to meet the user mid-route.

Subsystem C: The Life-Preservation Emergency "SOS" Protocol

- The Critical Safe Haven / 911 Function: The user interface features a specialized, hardcoded high-priority emergency button configuration. If a juvenile or adult operator becomes incapacitated, profoundly lost, physically fatigued, or faces immediate peril on a mountain or remote path, pressing the SOS function instantly reconfigures the vehicle's operations.
- Autonomous Evacuation Protocol: The unit instantly engages full autonomous propulsion mode to guide and transport the distressed user directly back to their pre-programmed home base station or to the nearest verified safe location (such as a ranger outpost, emergency shelter, or medical triage point) currently mapped within the app's spatial memory core.
- Secure Payload Vault: The vehicle frame includes an electronically locked internal containment chamber optimized for emergency medical components, trauma kits, survival gear, and hydration reserves. During an unmanned rescue dispatch sequence, this secure vault remains locked down via a high-security lock to prevent roadside interception, only releasing the storage lock when the specific verified user's biometric signature or device proximity is confirmed at the recovery site.
- Active Wheel Lockout Security: If an unauthorized third party tries to hijack, pull, or carry off the unmanned rescue vehicle while it is traveling to its destination coordinates, the internal security core triggers an automated electronic wheel lockout loop. The hub motors instantly freeze, acting as high-torque magnetic brakes that lock the wheels solid. This completely eliminates the need for physical keys that can be lost, stolen, or forgotten by distracted operators.

Subsystem D: The Big Data Enterprise Telematics Engine

The autonomous platform forms a comprehensive enterprise intelligence node configured to capture and stream rich data pools directly to operational control networks:

- Operational Mileage Metrics: Tracking continuous operational distance travel trends and performance stresses across varying age demographics.
- Dynamic Spatial Mapping: Mapping precise structural route vectors, identifying popular route layouts, tracking destination dwell-time metrics, and detailing geographic coordinate choices made by user bases.
- Predictive Life Reporting: Processing real-time operational telemetry to stream active, live battery state-of-health tracking and precise remaining operational lifecycle estimations back to structural manufacturers.
- Parental Shield Tracking & Speed Restriction Enforcement: Providing parents with permanent real-time geographical asset coordinate oversight. If a vehicle crosses a customized speed envelope or enters an unsafe geofenced layout (such as a busy vehicle intersection or restricted zone), the network triggers an automatic velocity override, smoothly throttling down the electronic drivetrain to guarantee occupant safety.

Subsystem E: Multi-Modal Energy Harvesting & Emergency Power Routing

To ensure maximum operational range during autonomous retrieval or emergency 911 dispatch sequences, the vehicle chassis integrates a multi-modal energy harvesting matrix.

- Kinematic Suspension Harvesting: The structural steering column and primary deck suspension linkages house linear electromagnetic induction coils. As the rider actively utilizes the vehicle (e.g., bouncing, shifting weight, traversing uneven terrain), this kinetic vertical oscillation is captured and converted into electrical current.
- Dynamic Regenerative Braking: The electric hub motors feature bi-directional inverters. During deceleration or downhill transit, rotational wheel friction is converted into high-yield electrical drag.
- Bi-Directional Auxiliary Routing: Energy captured from both the vertical suspension travel and horizontal wheel rotation is routed through an onboard rectifier to constantly saturate the primary lithium matrix. Similar to the bi-directional infrastructure of the seating hardware, excess generated power can be routed to an external port on the console, allowing a distressed user to actively charge a depleted smartphone or medical beacon while the vehicle autonomously transports them to a safe haven.

Subsystem F: Urban Traffic Adherence & Semantic Vision Matrix

To ensure the safe traversal of complex municipal environments during autonomous retrieval or emergency dispatch sequences, the vehicle relies on an advanced, localized computer vision (CV) and edge-computing network rather than strictly following blind GPS vectors.

- Multi-Spectral Optical Array: The forward steering column and chassis integrate a synchronized array of high-definition RGB cameras, LiDAR sensors, and ultrasonic transceivers. This array continuously scans a 360-degree localized operational bubble.
- Semantic Segmentation & Landmark Recognition: The onboard MCU utilizes a localized neural network to perform real-time semantic segmentation of the optical feed. The system actively differentiates between designated pedestrian pathways, cycling lanes, active vehicular traffic lanes, and impassable terrain (e.g., curbs, construction barriers, natural landmarks).
- Dynamic Traffic Law Adherence Logic: The neural network is explicitly trained to identify, decode, and obey municipal traffic control infrastructure. The optical array continuously scans for, and dynamically reacts to, stop signs, yield signs, pedestrian crosswalk markings, and active traffic light states (Red, Yellow, Green).
- Hierarchical Safety Override: The traffic adherence logic operates as a hierarchical safety override above the GPS pathfinding matrix. If the dynamic GPS intercept pathway instructs the vehicle to proceed forward, but the optical array detects a red traffic light, a stop sign, or cross-traffic at an intersection, the Traffic Adherence Logic instantly overrides the propulsion command. The vehicle engages the gyroscopic stabilizers and halts at the designated boundary line until the optical array confirms a green light or visually verifies that the intersection is clear of cross-traffic and pedestrians, at which point autonomous propulsion is securely resumed.

Subsystem G: Kinematic Fall-Recovery & Bystander Gamification Interface

In the event of an unavoidable lateral tip-over during autonomous transit, the vehicle utilizes a localized gamified interaction loop to solicit human assistance and resume operations.

Acoustic Distress Broadcast:

The onboard six-axis IMU continuously monitors the vehicle's vertical orientation.

If a tilt exceeding a critical threshold (e.g., >45 degrees) is detected, the MCU instantly cuts hub motor propulsion and activates an integrated acoustic transducer. The vehicle broadcasts pre-programmed, localized, human-centric audio distress prompts (e.g., comedic or urgent requests for physical assistance) to engage nearby pedestrians.

The APE-X.ai Bystander Reward Gateway:

Once a bystander physically uprights the vehicle, the IMU verifies the restoration of a safe vertical orientation. The vehicle's interface (via an onboard LCD screen, localized vocal prompt, or active NFC broadcast) instantly engages the rescuer, requesting contact data (e.g., an email address input or an NFC smartphone tap).

Smart-Contract Tokenization:

Upon receiving the bystander's contact data, the vehicle transmits a confirmation packet to the enterprise network. The APE-X.ai ecosystem automatically mints and dispatches a digital reward—such as a partner sponsor coupon, hyper-localized promotional credit, or digital utility token—directly to the rescuer, gamifying the physical hardware recovery process and actively expanding the verified digital advertising network.

Subsystem H: Biometric Proximity Immobilization & Active Anti-Theft Protocol

To permanently neutralize the threat of vehicle theft when parked or during an unmanned autonomous dispatch, the vehicle architecture integrates a multi-tiered, proximity-based electromechanical immobilization loop.

Magnetic Phase-Locking Immobilization:

The vehicle MCU maintains a continuous low-power Bluetooth (BLE) or NFC proximity handshake with the authorized user's smart device. The moment this tether is severed (indicating the user has walked away), the MCU instantly alters the electrical phase of the brushless hub motors, converting them into high-torque magnetic deadbolts. The wheels are physically seized, rendering the vehicle entirely un-rollable and useless to unauthorized individuals. Control is only restored upon the re-establishment of the biometric proximity tether or via an encrypted remote retrieval command.

Tamper-Activated Acoustic Deterrence:

While in the immobilized state, the onboard multi-axis IMU continuously monitors for unauthorized physical lifting, dragging, or structural tampering. If tampering is detected, the system triggers an aggressive active defense protocol.

User-Programmable Audio Payloads:

Upon a tamper trigger, the vehicle activates an integrated acoustic transducer. Unlike standard, easily ignored automotive sirens, the vehicle broadcasts a customizable, high-decibel vocal deterrent pre-programmed by the user via the companion mobile app

(e.g., broadcasting specific emergency context such as: "Warning: This is an active medical rescue vehicle. Put me down. Police dispatch initiated."). Concurrently, a silent GPS distress alert is transmitted to the owner's smart device to track the compromised asset.

Subsystem I: Integrated Multimedia Infotainment & Advertiser-Driven Navigation

The vehicle chassis features a high-fidelity acoustic output array and a dedicated data-link bridge, transforming the vehicle into an interactive, advertiser-supported transit environment.

Streaming Media Integration:

The onboard MCU establishes a high-bandwidth data tether with the user's smart device. This allows for the seamless streaming of high-fidelity audio (e.g., satellite radio, subscription music services, podcast platforms) directly through the vehicle's acoustic array.

Hyper-Localized Advertiser Navigation:

The navigation interface functions as a bi-directional data exchange. When the user inputs a destination (e.g., "Take me to the nearest bike park"), the APE-X.ai engine processes the route while simultaneously cross-referencing the user's demographic profile against local advertising partners.

Interactive Sponsored Wayfinding:

During transit, the navigation interface visually and audibly highlights "Sponsored Destinations" or promotional opportunities along the route (e.g., “You are passing your favorite coffee shop, would you like to add a 2-minute stop for a 50% discount?”).
This turns standard route-finding into an active, incentivized advertising portal where users voluntarily engage with brand-specific content in exchange for promotional tokens or discounted navigation services.

Subsystem J: The "ASS-ett" Parental Guardian Oversight & Geo-Fencing

Subsystem J: The "ASS-ett" Parental Guardian Oversight, Governor & Sunset Protocol
The vehicle integrates a real-time Parental Oversight protocol, marketed as the "ASS-ett" (Autonomous Safety & Security – Enforced Tethering Technology). This protocol grants a registered primary administrator (parent/guardian) absolute remote authority over the vehicle’s operating parameters.

Hardcoded Geo-Fencing & Speed Governor: The administrator defines a "Safe Zone" and sets a maximum "Top Speed Governor" within the application. If the rider exceeds the speed limit, the MCU automatically throttles the motor to the preset safety ceiling. If the vehicle approaches the edge of the defined Safe Zone, the MCU issues a dual-stage warning: an audible alert to the rider and a push notification to the guardian. Crossing the boundary triggers a "Limited Propulsion" state.

Daylight-Dependent Sunset Timer: The system utilizes local atmospheric light-level telemetry (ambient light sensors) and real-time sunset data. As dusk approaches, the MCU broadcasts a proactive, vocal "Daylight Expiry" warning to the rider (e.g., "Warning: Daylight ending. Please return to Safe Zone or propulsion will be restricted."). If the rider fails to return by the designated time, the vehicle automatically initiates a progressive power-reduction state, forcing the rider to return home before the battery reaches the emergency lockout threshold.

Remote Kill-Switch: The administrator retains an absolute, high-priority "Kill-Switch" command, capable of instantly engaging the magnetic wheel phase-lock, seizing the motor, and broadcasting the vehicle's exact GPS location.

Subsystem K: Dynamic Meteorological Failsafe & Sensor Redundancy

Because the vehicle operates in diverse outdoor environments, the autonomous transit matrix incorporates a meteorological failsafe to prevent blind navigation during adverse weather events (e.g., snow, heavy rain, mud accumulation).

Environmental Sensor Degradation Protocol: If the MCU detects a critical drop in optical fidelity or ultrasonic interference across the multi-spectral array, it automatically restricts the autonomous top speed and engages a "Cautionary Transit Mode."

Safe Harbor & User Alert: If visibility drops below minimum safe operational thresholds, the vehicle immediately aborts the autonomous intercept vector. It deploys the dynamic transit outriggers to halt, securely locks the hub motors, and transmits a "Meteorological Halt" alert alongside a live GPS pin to the user's application, requiring manual retrieval to ensure public safety

REPRESENTATIVE CLAIMS

- Claim 1: A micro-mobility vehicle apparatus comprising: an onboard drivetrain and micro-controller unit (MCU); a localized biometric verification module preventing unauthorized operation; a multi-spectral sensor array; and a gyroscopic self-balancing mechanism enabling un-crewed autonomous navigation, summoning, and municipal compliance repositioning.

- Claim 2: The apparatus of Claim 1, further comprising a cryptographic remote-tether protocol (Subsystem J) paired with a primary guardian network node, wherein said node possesses priority architectural override to dynamically alter geofence perimeters, impose curfews, and throttle the drivetrain speed of the apparatus in real-time.

- Claim 3: The apparatus of Claim 1, further comprising a dynamic meteorological failsafe (Subsystem K) configured to continuously monitor environmental sensor fidelity, wherein a critical drop in optical resolution automatically triggers a pre-emptive transit abort, mechanically locking the apparatus and transmitting an emergency geographic halt beacon.

- Claim 4: The apparatus of Claim 1, further comprising an automated SOS collision protocol configured to broadcast an emergency medical beacon and absolute GPS coordinates to municipal first responders upon detecting kinetic impacts exceeding safe operational thresholds.

- Claim 5: The apparatus of Claim 1, further comprising an integrated acoustic telematics protocol configured to broadcast localized digital proximity handshakes to pedestrian wearable devices, triggering automated directional auditory collision warnings.