Don’t Just Play. Race.

Introducing the HB Rig
High Fidelity Motion
Ecosystem.



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Blur the Line Between Virtual and Reality.

Professional simulation is no longer about watching a screen. It’s about feeling the road texture, the G-force, and the limit of adhesion. We bridge the gap between simulation physics and your physical senses.

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Focus Only on Driving

A ‘Plug and Play’ experience that eliminates complex settings.

Zero Hassle

The system is designed to operate without requiring user intervention.

Automatic Calibration

Smart motor technology that self-tests and resets on every startup.

Pre-set Profiles

Driving modes optimized by race type.

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Setup in Seconds, Not Hours.

- **Auto-Handshake:** Proprietary BLE-to-Serial bridge injects WiFi credentials directly from your phone.
- **Smart Provisioning:** The rig detects your network and configures itself automatically. No command lines required.
- **Identity Sync:** Automatic MAC address detection applies hardware-specific overrides on first boot.



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Control in Your Pocket.

- **Mobile Command:** Manage connection status, reboot the system, or check IP addresses via the Ignite web app.
- **Pixel Control:** Customize ambient LED lighting modes directly from your device to match your room or team colors.
- **Wireless Bridge:** Bluetooth Low Energy (BLE) integration for instant local control.



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Automatic Game Detection

Smart Switching: The system listens to data packets on the network and automatically detects which game is being launched (e.g., F1 2023 or Dirt Rally).

Profile Management: Without requiring the user to make a manual selection, it activates the physics engine specific to that game.

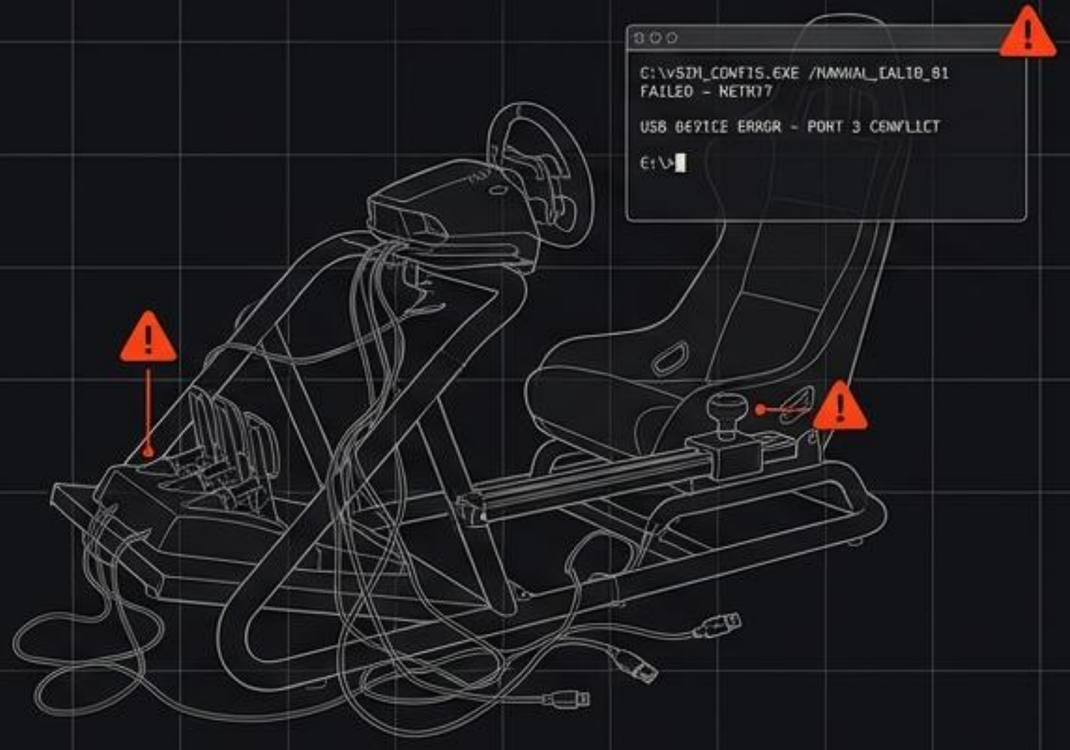
Multi-Support: Full compatibility with PC and Console simulations.

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THE PHILOSOPHY OF ‘ZERO REWORK’

Customer satisfaction is a function of accuracy minus frustration. The HB Vortex architecture is engineered to eliminate manual calibration, network configuration, and physical maintenance.

TRADITIONAL SIMULATION



THE VORTEX SOLUTION



- **AUTOMATED PRECISION:** Concurrent homing routines eliminate rnanual leveling.
- **DETERMINISTIC LATENCY:** Industrial EtherCAT protocols reject USB jitter.
- **SELF-HEALING CONFIG:** Automated WiFi handshakes and identity syncing.

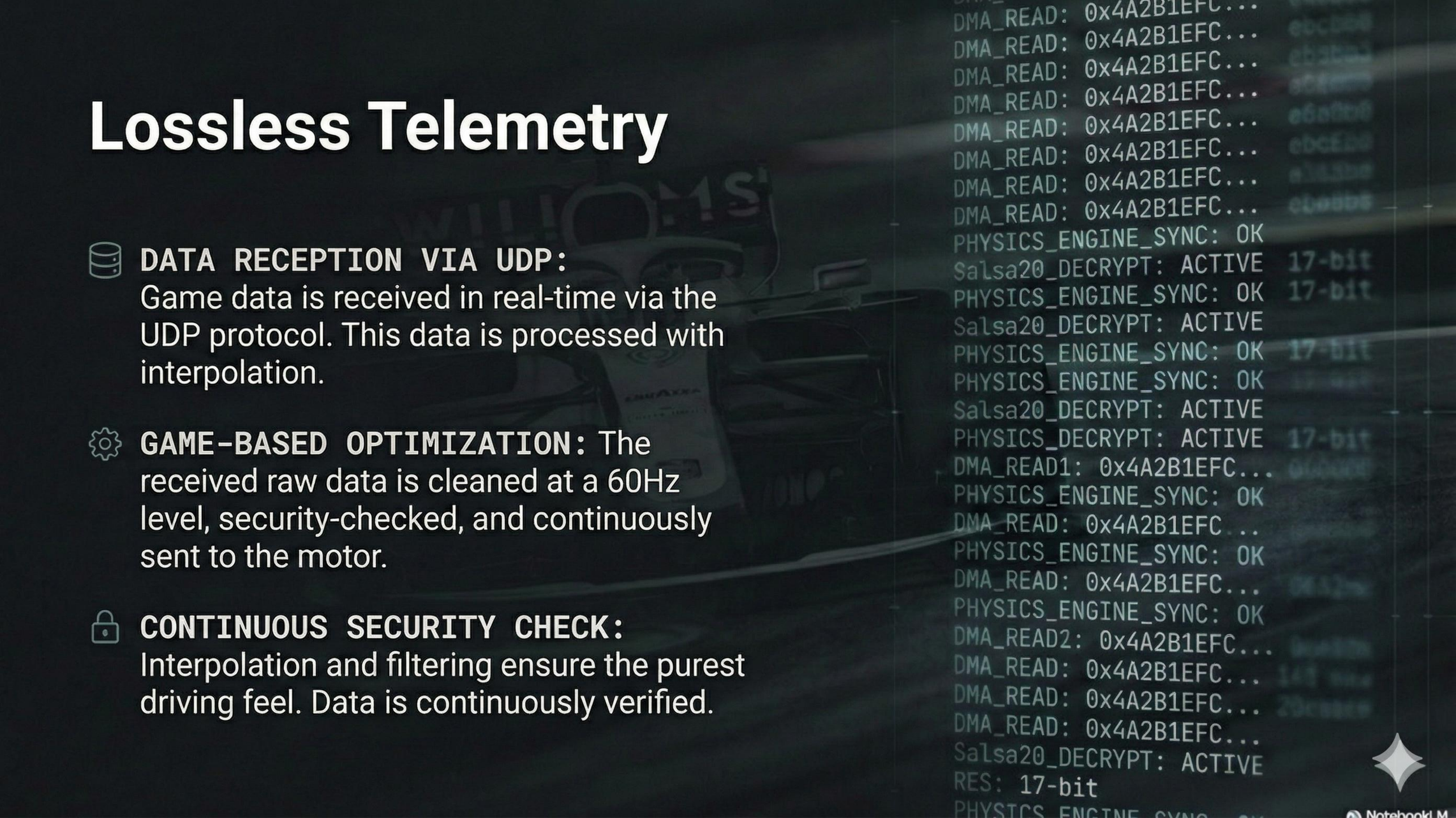
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Lossless Telemetry

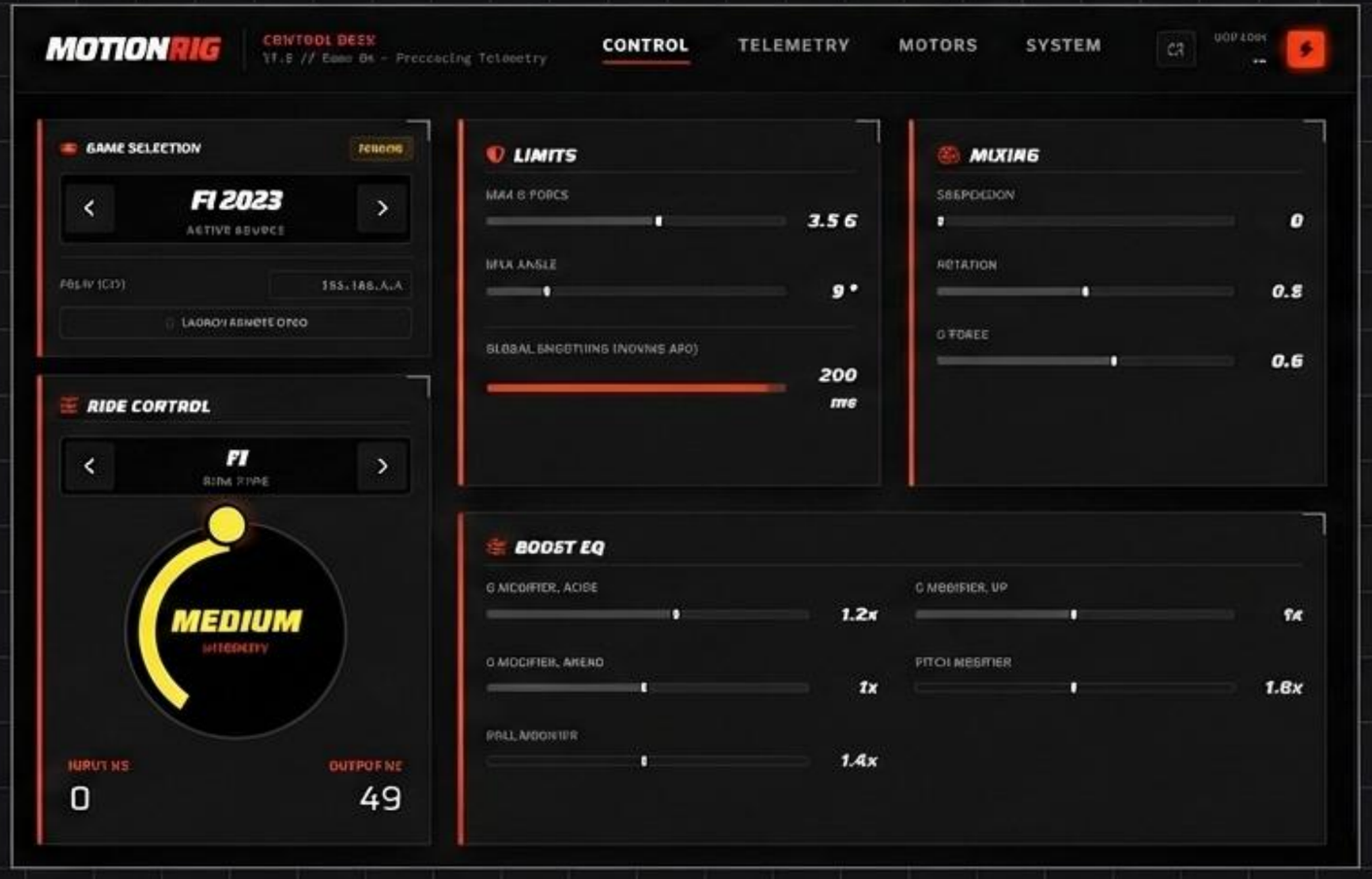
DATA RECEPTION VIA UDP: Game data is received in real-time via the UDP protocol. This data is processed with interpolation.

GAME-BASED OPTIMIZATION: The received raw data is cleaned at a 60Hz level, security-checked, and continuously sent to the motor.

CONTINUOUS SECURITY CHECK: Interpolation and filtering ensure the purest driving feel. Data is continuously verified.



THE DASHBOARD: REAL-TIME TUNING



RIDE PROFILES:
One-touch switching between Soft, Medium, and Hard mixing ratios.

LIVE INJECTION:
Updates `_input.js` variables instantly—tune the 'bite' while on the track.

VISUAL CONFIRMATION:
Real-time Input/Output Hz monitoring.

No file editing. No restarts. Just drive.

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Dynamic Driving Feel

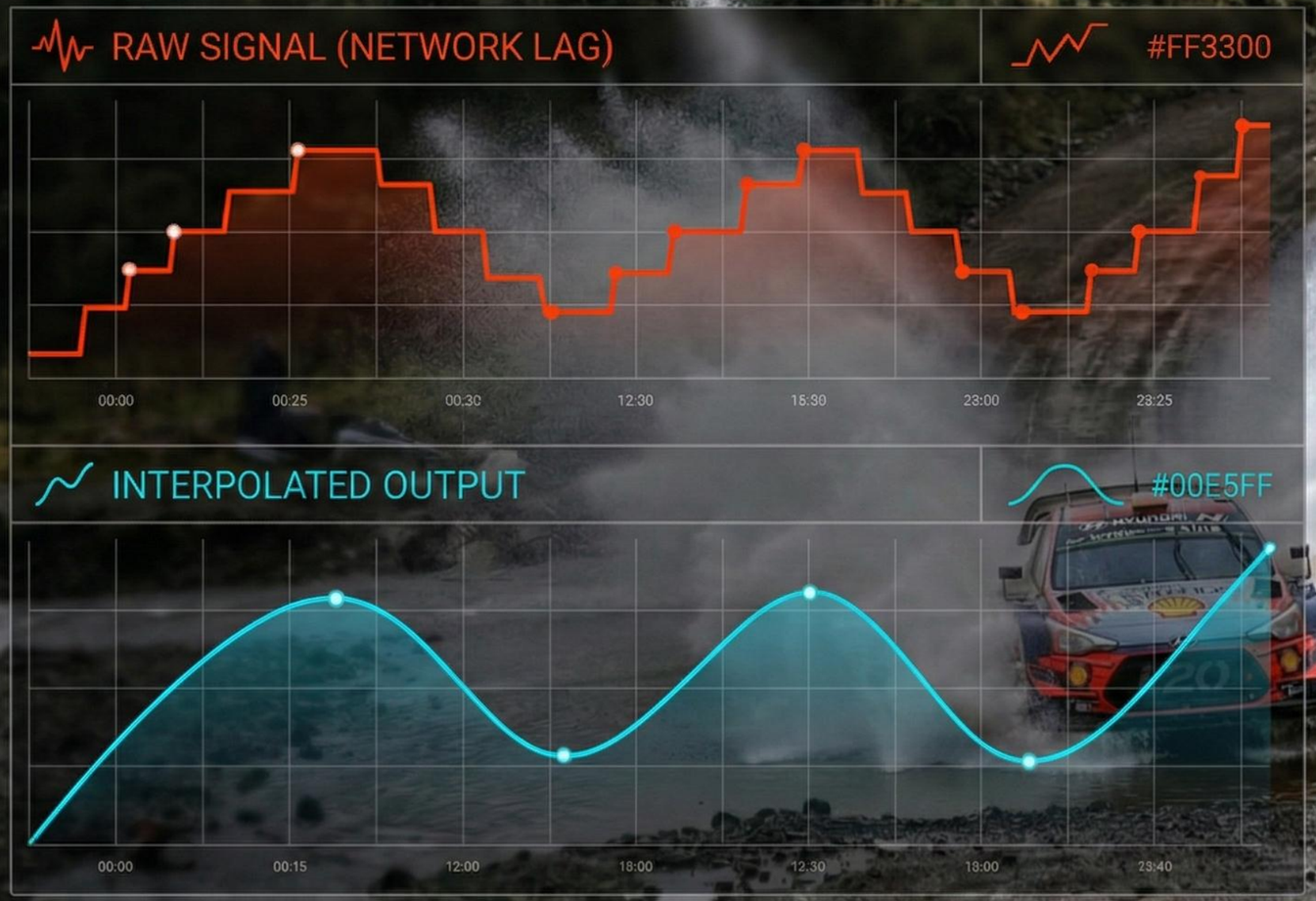
1. ***Aero Sway**
   At speeds over 100 km/h, the ‘float’ feeling that simulates aerodynamic lift force is activated.

2. ***Smart Filtering**
   While filtering out motor noise at low speeds, it provides the maximum G-force feeling in corners.

3. ***5-Axis Motion**
   A seamless blend of Pitch, Roll, and Heave (Elevation) motions.

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TEMPORAL SYNTHESIS (JITTER ELIMINATION)

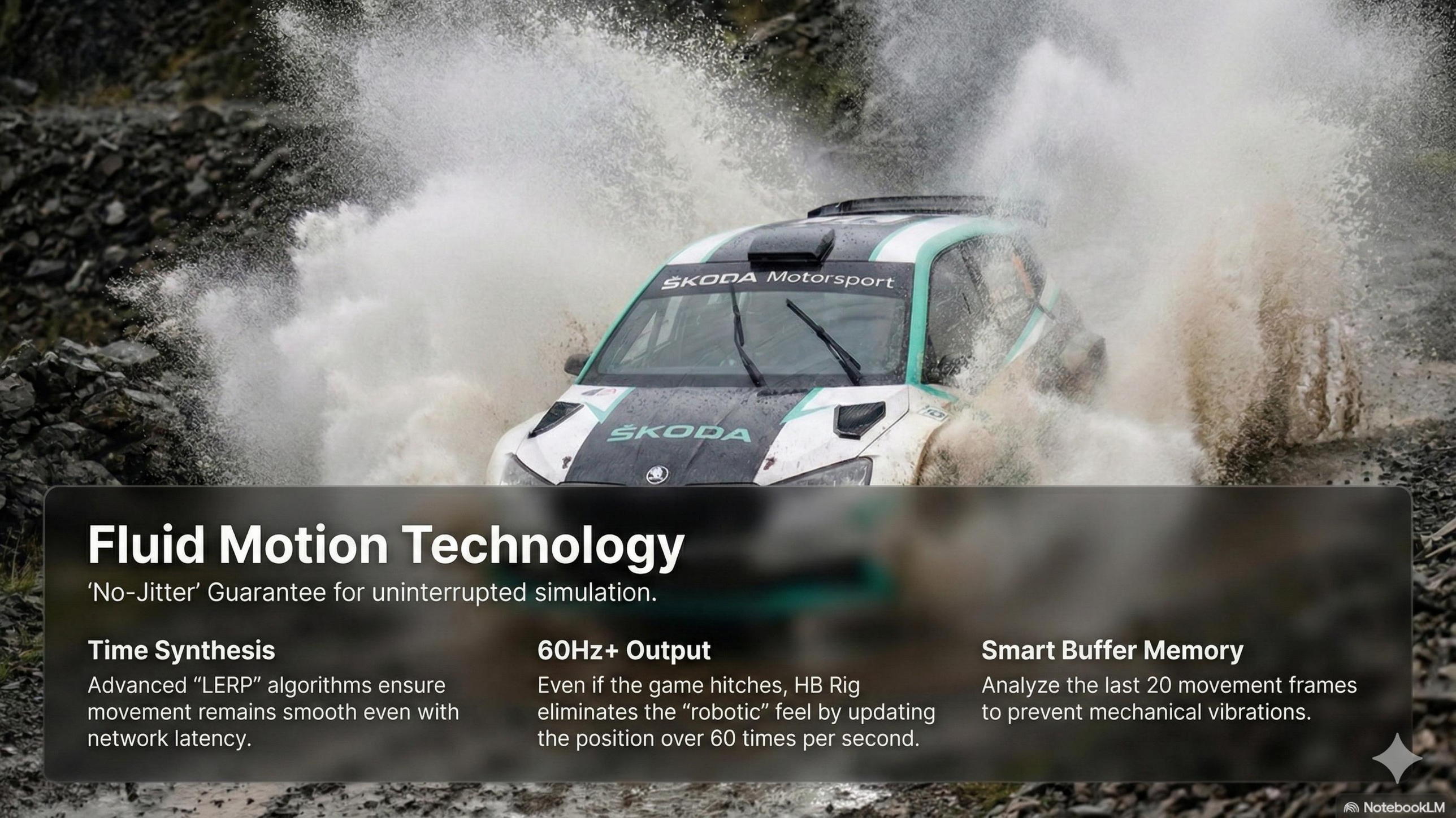


- **INTERPOLATION:** We do provide interpolation. Linear Interpolation bridges gaps between irregular game packets to output a smooth 60Hz+ motion stream.

- **CLOSE MONITORING:** We do perform close monitoring. A deque buffer stores the last 20 frames and the input Hz is constantly tracked for health.

- **USER FEEDBACK:** We do provide proper feedback to the user about the state of the system. If input drops below 1.0 Hz, the `signal_lost` flag triggers a safe 'Park' routine and informs the user, preventing erratic behavior.

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Fluid Motion Technology

‘No-Jitter’ Guarantee for uninterrupted simulation.

Time Synthesis

Advanced “LERP” algorithms ensure movement remains smooth even with network latency.

60Hz+ Output

Even if the game hitches, HB Rig eliminates the “robotic” feel by updating the position over 60 times per second.

Smart Buffer Memory

Analyze the last 20 movement frames to prevent mechanical vibrations.

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Hardware Supervisor: Active Safety

Safety Line

- **Independent Protection**
  The ESP32 processor, running independently of the main software, supervises the system 24/7.

- **Smart E-Stop**
  In emergencies, it stops the system safely without damaging the motors (‘Soft Park’).

- **Proximity Limitation**
  By preventing movements that push mechanical limits, it extends hardware lifespan.

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‘Black Box’ Diagnostic System



- **Burst Trace Technology:** Records the last 3 seconds of data (motor position, game commands, temperature) in high resolution at the moment of failure.
- **Remote Support:** Logs are automatically uploaded to the cloud; technicians can diagnose the issue without recalling the hardware.
- **Preventive Maintenance:** The system tracks operating hours and stress levels.

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