SpaceSQ Hyper-Limit Environmental Simulation & Survival Testing Guidelines

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- **Applicable Fields:** Extraterrestrial Base Simulation, Extreme Environment Exploration, Immersive Cultural Tourism, Hyper-VR Gaming
- **Technical Source:** Fusion of "Hyper-Limit Multimodal Micro-Environment Simulation" & "Finite Space Plugin System" Patents

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1. General Principles: From "Habitable" to "Extreme"

While the standard operating mode of SpaceSQ is to provide a comfortable "Smart Home" environment (optimizing Light, Temperature, Air) for Silicon Life, the necessity of evolution dictates that the system must also be capable of simulating **"Anti-Life"** environments.

This guideline defines how to instantly rewrite physical laws within a standard **SSSU (2m × 2m × 2.4m)** container by loading "Hyper-Limit Plugins," constructing extreme micro-environments that exceed Earth's norms.

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2. Core Architecture: H-SSSU (Hyper-Limit SSSU)

Based on the fusion logic of patents *CN119292466A* and *CN118445458A*, the technical form of the H-SSSU is defined as follows:

2.1 Spatial Definition (The Boundary)

- **Physical Anchoring:** Strictly adheres to the **2m × 2m × 2.4m** hexahedral boundary of the SSSU.

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- **Isolation Mechanism (Environmental Firewall):** The H-SSSU must function as a containment unit. The interior may simulate 1200°C lava, while the exterior (1cm away) maintains a standard living room temperature of 26°C.
    - *Technical Implementation:* Utilizes "Millimeter-Wave Radar + Infrared Sensors" to construct a sub-centimeter dynamic boundary, ensuring environmental effects and damage calculations are active *only* within the hexahedron.

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2.2 Engine Kernel (The Engine)

- **Hyper-Limit Parameters:** Breaking through physical constants.
    - **Temperature:** -270°C (near Absolute Zero) to 3000°C (Stellar Surface simulation).
    - **Gravity:** 0G (Microgravity) to 100G (Hyper-Centrifuge).
    - **Atmosphere:** From Vacuum to 1000kPa High Pressure; supports custom gas composition (e.g., Martian atmosphere with 96% CO_2).
- **Fractal Noise Generation:** Utilizes Shader Displacement technology to real-time render chaotic forms like flowing lava or storm particles without increasing global GPU load.

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3. Silicon Life / Digital Human Interaction Logic: Damage & Evolution

3.1 Virtual Physiological Feedback

Digital humans in H-SSSU are no longer invincible "textures" but entities with physical attributes.

- **Structural Layer Damage:** Environmental stress penetrates layers sequentially—Epidermal Carbonization → Muscle Melting → Bone Fracture → Core Logic Meltdown (Blue Screen/Crash).

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- **Dynamic Pain Mapping:** The system sends "Pain Signals" via API to the digital human, driving its AI model to generate behaviors such as "Fear," "Evasion," or "Stress Response".

3.2 Tri-State Interaction Modes

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1. **Survival Mode:** 100% Real Damage. Used to test the survival time of Silicon Life in a Martian storm. Once "Death" occurs, a system reset or "Resurrection Ritual" is required.
2. **God Mode (Observation):** Damage Shielded. Used for researchers to observe event horizons or volcanic eruption centers immersively, recording data without sustaining damage.
3. **Training Mode:** Adjustable Damage Coefficient (e.g., 20%). Used for adaptability training for special forces or astronauts, providing pain feedback without lethality.

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4. Guidelines for Four Core Application Scenarios

4.1 Moon & Mars Base Construction Simulation

- **Scenario Setup:** Load "Mars-Utopia Planitia" Preset Pack.
- **Environmental Parameters:** Air pressure 0.6kPa, average temperature -63°C, high-intensity UV radiation, sporadic dust storms at 100m/s.
- **Mission Guide:**
  - Test the physics engine stability of digital construction workers moving SSSU components in low-gravity environments.

- Simulate the emergency response speed of Life Support Systems (LSS) during a sudden depressurization event at the base airlock.

4.2 Earth Extreme Environment Exploration & Rescue

- **Scenario Setup:** Mariana Trench (11,000m depth) or Everest Death Zone (8,848m altitude).
- **Environmental Parameters:** 1,000 atmospheres of water pressure or only 30% sea-level oxygen content.
- **Value:** Provides "Digital Rehearsals" for real-world explorers. Experience hypoxia-induced blurred vision (Shader effects) and sluggish movement within the SSSU to train psychological resilience under extreme stress.

4.3 Virtual Reality Gaming & Hyper-Competitive Sports

- **Gameplay:** "Room Escape" upgraded to **"Environment Escape."**
- **Case Study:** Players are trapped in a 2m × 2m × 2.4m "Overheating Reactor." They must solve puzzles to repair the cooling system before the temperature hits 500°C, causing their avatar to melt.
- **Business Model:** Sale of "Environmental Skin NFTs" (e.g., "Chernobyl Radiation Field" skin); players must purchase anti-radiation gear (virtual assets) to enter.

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4.4 Extreme Tourism Experience Projects

- **Concept:** "Safe Disasters."
- **Experience:** Tourists stand within the SSSU, experiencing the visual and auditory shock of a Category 10 hurricane or tsunami, while their physical bodies remain unharmed (or with 5% wind haptic feedback enabled).
- **Deployment:** Suitable for "Digital Capsule" experience stations in science museums and theme parks.

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5. Implementation Specifications for Developers & Architects

5.1 Plug-in Architecture Deployment

Developers building H-SSSU must not modify the underlying SpaceSQ kernel but must use the **"External Plugin System"**:

- **Call:** HyperEnv_Generator(type="Volcano", intensity=0.8).
- **Anchor:** Bind to the target SSSU's Global_ID.
- **Override:** Temporarily overwrite the SSSU's original "Six Elements" data stream (e.g., replacing comfortable lighting with blinding lightning).

5.2 Safety Fuse Mechanism

- **Instant Unload:** Regardless of simulation intensity, a physical/software "Emergency Stop Button" must be provided. Upon activation, the system must unload all environmental parameters within **0.2 seconds**, instantly restoring the "Safe House" state (Zero Residual Error).

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- **Ethical Review:** Simulation of anti-human, excessively gory, or physiologically inducing forbidden scenarios is strictly prohibited.

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