



This summary highlights how this sustainable smart-glass and dynamic display substrate integrates with the Sublimaview pixel-scrambling engine, VR Flyer, and SIDOG architectures to replace toxic static packaging and architectural displays.

Programmable Smart-Glass: Provisional Patent Summary

The Technical Problem

- The global commercial printing and consumer packaging industries rely heavily on static cellulose-based substrates (paper/cardboard) and toxic chemical inks/paints, resulting in millions of tons of landfill waste and massive carbon emissions from constant reprinting.
- While traditional "Smart Glass" (PDLC, Transparent OLED) and E-Ink exist, they are restricted to high-power architectural applications or flat, opaque e-readers, lacking a scalable, mouldable, transparent display medium for ubiquitous consumer packaging or dynamic residential/commercial glass.

The Sublimaview Engine & Hardware Embodiments

- **Embodiment A (Viscous Magnetic Suspension for Consumer Packaging):** Designed for scalable consumer goods (beverage bottles, containers), this embodiment suspends photo-luminescent magnetic nanoparticles within a viscous, transparent fluid matrix between layers of mouldable polymers (PET). Using magnetophoresis, the Sublimaview engine arranges nanoparticles into high-resolution images or barcodes. Because of the fluid's viscosity, the system achieves a "bistable state," requiring zero electrical power to maintain an image indefinitely once formed.
- **Embodiment B (Fixed-Pixel Matrix for Architectural & Automotive Glass):** Designed for structural applications (storefronts, automotive and aircraft windows), this embeds a fixed, transparent micro-LED, Electrochromic, or PhOLED mesh directly within silica glass panes, utilizing algorithmic overrides to emulate multi-layered designs or render the glass entirely transparent.

Advanced Features & Integration

- **Enterprise Cryptographic Security:** Requires an authenticated cryptographic handshake (AES-256, rolling UWB codes, secure cloud API keys) before executing pixel-scrambling or magnetic reassignment, featuring a hardware failsafe that locks the display or reverts it to transparency during unauthorized intrusion attempts.
- **Consumer Interface & AI Generation:** Allows users to interface with smart glass via a mobile app (NFC, BLE, Wi-Fi Direct) using templates or an integrated AI generative engine to create custom, on-the-fly graphics.
- **Aerospace & Environmental Simulation:** In commercial airliner or vehicle windows, the glass can display commercial advertising or simulate a high-definition "sunny view" during night flights or bad weather, integrating seamlessly with the VR Flyer and SIDOG architectures for passenger comfort.
- **Optical Multiplexing & AR/XR Integration:** The pixel-scrambling engine interleaves a secondary polarized or frequency-shifted image within the primary macroscopic display space, rendering it invisible to the naked eye while viewable by users equipped with synchronized AR/XR smart glasses.

Representative Claims Overview

- **Claim 1:** A programmable display system featuring a transparent/semi-transparent physical substrate whose visual output is exclusively dictated by a dynamic pixel-scrambling algorithm (Sublimaview) to render, alter, or erase imagery on demand.
- **Claim 2 & 3:** A sustainable packaging medium where photo-luminescent magnetic nanoparticles are suspended in a viscous fluid matrix, utilizing magnetophoresis and bistability to maintain images without continuous power.
- **Claim 4:** Structural glass embedding a fixed matrix of transparent light-emitting pixels that dynamically transition between transparent and graphic-display states.
- **Claim 11:** An enterprise security protocol requiring a verified cryptographic handshake prior to visual alteration, paired with a hardware intrusion failsafe.
- **Claim 15:** An optical multiplexing method that interleaves a secondary, invisible encrypted image viewable only via synchronized AR/XR or polarized eyewear.
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This summary encapsulates the eco-friendly, dynamic display capabilities of the Programmable Glass architecture.