Solid Volumetrics

Solid Volumetrics are an advancement in typical volumetric display technology that allows for the creation and manipulation of tangible images and objects through the usage of specialized projection systems.

About

Though volumetric displays are widely used throughout the Kikyo Sector, solid volumetrics are far less common, perhaps even rare. They are usually much bulkier than volumetric displays, thus requiring large and complex projection devices in comparison to the highly-compact units capable of projecting the former; furthermore, solid volumetric projectors are extremely power-hungry - thus confining them to stationary emplacements that are hidden or blended into the background in order to avoid detracting from the aesthetics of whatever building or facility they're employed at. Solid volumetric systems are most commonly used to create solid photo-realistic objects for purposes such as user-AI interfaces or training systems.

History

Volumetrics - often referred to as holography in the distant past - have been used extensively throughout the history of the Kikyo Sector. As the technology was developed further, its fundamental principles remained relatively unchanged, though every so often new methods of achieving them would arise; eventually, however, volumetrics advanced to the next level when it was discovered how to make their projections tangible.

Method of Operation

Volumetric displays utilize specially-designed projectors to generate and control the behavior of visible light. Solid volumetric systems, in contrast, additionally compress particles of atmosphere or cold plasma into a thin, stationary layer in order to simulate the presence of matter - thus creating the illusion of solidity when physically contacted, as the particles themselves do not noticeably move when touched. While this is done, the “standard” components of the solid volumetric system - essentially, those that resemble the aforementioned volumetric display's components - handle the projection's visual aspects, thereby creating an extremely realistic image that provides tactile feedback.

Since many factions make use of similar or closely-related technology, there exists a large number of methods that produce equivalent or identical results. The most common “alternative” method of generating solid volumetrics involves the usage of powerful electromagnetic fields to confine and control their particles, though far more exotic approaches also exist; the Yamatai Star Empire, for example, commonly uses airborne femtomachines in their solid volumetric systems and forcefields to generate

photo-realistic projections via having each femtomachine work in concert with its neighbors to simulate the appearance of a pixel.

More advanced systems are capable of varying the behavior of their particle fields in order to accurately simulate physical characteristics such as texture, elasticity, and so on; lower-end systems, however, are usually unable to accurately reproduce effects such as iridescence or sub-surface scattering, thus giving their projections a “flat” or unnatural appearance that feels “off” to most viewers. Higher-end systems can compensate for such deficiencies in the volumetric object's characteristics by via utilizing input from visual sensors observing the surrounding environment's light source(s) to directly simulate what would occur if the object was real, while the most advanced solid volumetric systems - such as the hideously large and complex systems found in theaters - are capable of having their volumetric fields perfectly reproduce the light-related characteristics of whatever object (or objects) they're simulating; regardless of size or complexity, though, all solid volumetric systems share a single trait: bad weather, such as a rainy downpour or a snowstorm, will adversely affect the quality of whatever they're projecting.

Hard Light, although an entirely different family of technology, has many of the same capabilities of solid volumetrics, for it simply follows a different methodology: that of creating matter via a nucleus of photons as opposed to one of protons and neutrons. This photonic nucleus acts as a transistor, thus meaning that hard light can be programmed to act in different ways or have its electron shell arrangement (and therefore its atomic properties) altered; additionally, with a nucleus of nearly-massless photons, hard light is incredibly light, transparent by default, and unaffected by weather conditions - though changes in lighting can reveal transparent hard light.

Although a hard-light object is permanent - albeit vulnerable to damage (which must be repaired by a projector) like conventional matter is - maintaining, forming or repairing hard-light has *extremely* high power requirements.

OOC Notes

Frostjaeger re-created this article on 2018/08/18 14:00; Wes approved it on 2018/08/19 08:32.

Fred's Notes

The following are notes left by Fred for usage as a resource that allows players to understand the thought process and details of what was included in this article. This is of particular importance, as solid volumetrics have been in the setting for a long time - but have not had an article until now.

- It was implied to me early on after I joined that the airborne femtomachines in Star Army ships played a certain role in volumetric projection. The way I rationalized it given evidence given was that each femotomachine could serve akin to a vertex, where edges could be draw between them and form triangles and more complex shapes that would be filled out with color, just like in today's 3d modeling meshes. ~ Fred
- Another implication lending credence to the femtomachine approach was how femtomachines perform poorly when under the influence of poor weather (such as a rainy downpour), and that the

same trait appears shared by volumetric projections - likely no coincidence. ~ Fred
- 'solid' projections are likely the result of in-ship areas generating internal forcefields overlaying with the surface shapes of the femtomachine-created visuals. Those forcefields are likely not constant, but rather generated the instant the ship's quantum computer believes a touch feedback will be necessary based on monitoring the operations of the user. Other more casual gestures such as swatting a window away or squelching it shut between two hands probably have more to do with motion sensing, without needing any actual forcefields to be generated. ~ Fred