FoVI^{3D} develops light-field displays and light-field display enabling technologies to provide a superior visualization capability to reduce the cognitive burden, increase memory retention, and aid in rapid decision making with greater confidence.

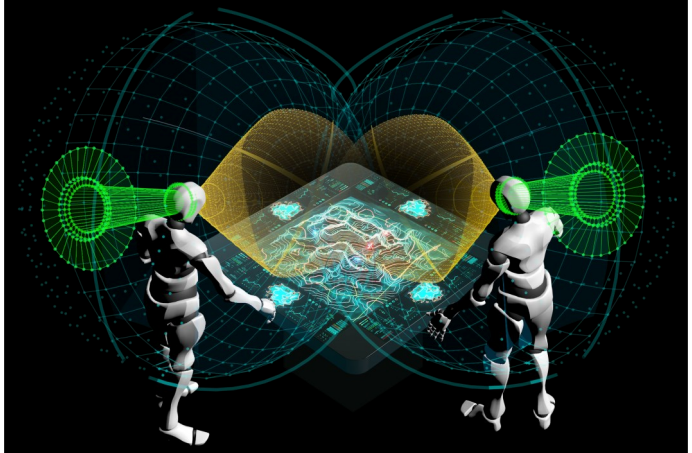
Core Competencies/Capabilities
World leader in the discipline of light-field displays and light-field display technologies

Patented mature and demonstratable light-field display architecture
consisting of:

- Radiance image computation
- Photonic assembly
- Hogel light-field optics
- Multi-view processing unit (MvPU) architecture relieves the host system from rendering concerns and currently, accelerates extreme multi-view rendering systems by 3x with pathway to 10x acceleration
- Developed quantitative and qualitative field of light metrology algorithms and processes
- Proprietary simulation environments for multi-view rendering, optical throughput, radiance image distribution

Company Value

- Extensive patent portfolio
- Deep technical expertise
- Produced multiple light-field prototype displays



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Pioneering Visualization Technology

NAVSEA Operational Need

As the Navy continues reducing the manpower requirements associated with operating and maintaining ever-increasing technologically complex systems, material solutions are sought to allow an operator to effectively and efficiently use various systems. Three-dimension (3D) visualization technologies promote improved operator task accuracy, faster operator response time, and reduce cognitive overload, but lack a common standard similar to the 2D application programming interface (API) that allows for the ease in integration. Lacking a common language/API inhibits the ability to exploit improved visualization technologies and improve sailor performance.

Required Specifications

Emerging novel Field of Light Displays (FoLD) have proprietary interfaces, require custom applications, and require significant computation resources to compute the 3D visuals. A common optimized 3D graphics standard/API should be developed that can be utilized by novel 3D display developers and support a variety of 3D visualization technologies. The solution must enable an AEGIS display environment that allows the operator the flexibility to choose the best display device for the visualization task without an expensive and time-consuming integration or development effort. The API must support accelerated 3D rendering for novel multi-view display architectures and insulate the software application development from a variety of novel 3D display implementation.

Warfighter Value

- Reduced integration efforts for various novel display technologies by 5x
- Increased frame rate and interactivity for radiance image computation for multi-view displays by 5-10x
- Flexibility to select best visualization technology for the job at hand

With the incorporation of a light-field display,

- For operator decision and action: reduce time to decision making by 50% and increase time to action by 100%
- For planning and training: reduces cognitive strain by 25%
- Allows for prolonged use

Display Agnostic Graphics API

FoVI^{3D} has developed a novel graphics API known as the Object Graphics Language (ObjGL). ObjGL is a high-level, cross-platform, and display-agnostic graphics API that can facilitate rendering on a wide range of Field of Light Display (FoLD) architectures. ObjGL draws heavily from OpenGL, yet it is streamlined for fast rendering for multi-view display systems. ObjGL enables a modular implementation of the Heterogeneous Display Ecosystem (HDE), allowing the operator to select the best visualization device for the task increasing task efficiency and user effectiveness.

Publisher-Subscriber Format

ObjGL allows various display types to subscribe to the application stream and receive the broadcast scene state in the form of geometry and render commands. The 3D application has no knowledge of the number, location, or architecture of displays subscribed to the application. Once subscribed, each display will enable the user to select how to view the data (multiple various first-person point of views or vertical/horizontal third-person overviews).

The Display Environment

Augmented Reality (AR) and Virtual Reality (VR) headsets are disrupting the traditional 2D display market by creating new and more complex visualization systems. Light-field Displays (LfDs) are an emerging display type with the benefit of natural 3D visualization that does not require glasses, headgear, or head/eye tracking systems. An LfD is a perfect collaborative work station as it supports multiple viewers simultaneously without headsets interfering with direct eye-contact between viewers.

These novel display technologies each have strength in various use cases. What is lacking is a mechanism to bind these different display systems into a single cohesive ecosystem. FoVI^{3D}'s ObjGL is a key component within the architectural solution enabling the Heterogeneous Display Ecosystem (HDE).

Within the HDE, the host application that creates a 3D scene is loosely bound to the display environment. Responsibility for rendering is placed with the display. The host app broadcasts the 3D scene data in a display agnostic manner via ObjGL for the display to receive and render appropriately for the display system's viewing requirements.