**Operational Need and Improvement:** Rotary wing platforms require a complex set of flight regimes using low-altitude close-proximity visual cues while in hover, launch and recovery, search and rescue, cargo management, and search-and-rescue missions. Current aircraft simulator visual displays provide monoscopic visual cues using either real image or fixed collimated displays. Each technology has its own advantages and disadvantages. However, no optimal solution exists today for low altitude operations that provide binocular disparity, and correct vergence-and-accommodation at low altitudes.

**Specifications Required:** A display system that delivers all visual cues with a sufficiently large viewing angle that matches real-world depth perception while retaining general spatial orientation; low-altitude weather and night vision goggle (NVG) presentation, chin window and cargo hatch viewing of low-altitude, landing zones with changes in depth perception that are correct with dynamic changes in own-aircraft altitude and full correlation with the forward field-of-view imagery.

**Technology Developed:**

1. **Variable Collimation Display (VCD):**
   - A wide-area collimated (WAC) display system with variable collimation provides accurate accommodation and vergence visual depth cues for image distances ranging from 3 to 60 m from pilot’s eyes.
   - Applied to VR/AR simulation and training environments.

2. **Variable Accommodation Head Worn Display (VAHWD):**
   - A head-worn display (HWD) enabled with Holochip’s focus-tunable lens stimulates natural focusing of the eye. The user experiences correct focus and vergence. Discomfort associated with Vergence-Accommodation Conflict is eliminated.

   - **Warfighter Value:** The VCD provides accurate accommodation cues based on the aircraft’s distance to the ground. This innovative display technology improves visual cues provided to pilots and low-level (< 30 ft) operations, improving safety and training. The VCD may also contribute to enhancements on other display applications currently limited by a lack of accurate depth cues.

   - The VAHWD provides accurate accommodation-vergence depth cues needed for Navy training VR and AR applications in which vergence-accommodation conflicts remain a major problem.

**Projected Business Model:** Holochip is interested in partnering, joint venture or licensing agreements with Navy training system original equipment manufacturers (OEMs) and prime contractors. We seek opportunities to work with the developers of flight simulators to integrate and demonstrate our low-cost optical display technology into various training platforms.

**Company Objectives:** Holochip is a developer and supplier of Natural Depth Cue Displays for defense, industrial and consumer electronics. Our technologies enable next-generation flight training simulator displays with correct depth cues, enabling the natural focusing response of the user’s eyes, for improved spatial awareness. The VCD and VAHMD are part of our suite of VR/AR, light field and WAC true focus display solutions for Navy and commercial customers.

**Potential Commercial Applications:** The initial commercial applications include chin window, cargo hatch, refueling and out-the-window (OTW) visual systems for fixed, rotary wing and vertical/short takeoff and landing (V/STOL) aircraft simulators and other simulation and virtual reality platforms.

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