

AR Alliance Expands Cross-Supply-Chain Alignment for Laser Display Development

March 23, 2026

Building an Integrated Framework for Laser-Based AR Systems



Executive Summary

The Laser Display for AR (LDAR) Committee of the AR Alliance has established a cross-supply-chain development framework for laser-based augmented reality (AR) displays. Within its initial phase, more than 30 companies have joined forces to support coordinated technical and structural alignment. The LDAR Committee has completed a comprehensive mapping of the laser display value chain, covering sources, photonic platforms, illumination systems, projectors, waveguides, and complete devices. This framework provides a shared basis for collaboration, qualification, and long-term infrastructure planning.

Overview and Context

Since its formation, LDAR has focused on establishing a structured environment for cooperation between component suppliers, system developers, and device manufacturers. Early participation reflects broad industry interest in coordinated development models.

The first work product of LDAR is the publication of a comprehensive technical map of the laser AR ecosystem showing how members are now actively participating across this full supply chain. In addition, the committee has released guidelines for development efforts in the various parts of this laser-based AR ecosystem. It serves as a reference for joint development activities and future standardization efforts, as described below.

Sources and Photonic Materials

LDAR addresses multiple source technologies, including laser diodes and superluminescent LEDs (SLEDs). Current work evaluates trade-offs between efficiency, coherence, and stability, with a focus on improving electrical-to-optical conversion performance and usable luminous output.

Photonic Integrated Circuits (PICs) under development include AlOx, SiN, and glass-based systems. These platforms support efficient photon delivery inside projectors, integrated modulation and switching functions, zonal management for LCOS applications, and high-speed pulsing for scanning architectures. This work aims to improve system-level efficiency and operational reliability.

Illumination Systems and Integration

Member companies are developing integrated illumination modules based on advanced photonic circuits. Current efforts focus on high-speed laser modulation, source coupling efficiency, compact optical packaging, integrated de-speckle functions, and zonal illumination control. The objective is to maximize luminous efficiency while minimizing size, thermal load, manufacturing cost and complexity.

Projector Architectures

Member companies support multiple projector architectures that address different performance and deployment requirements. These include near-term LCOS-based solutions for current product generations, high-brightness MEMS-LBS systems for performance driven applications, and longer-term integrated PIC-LBS, holographic, and other novel approaches based on photonic integration.

These architectures are treated as complementary development paths rather than mutually exclusive alternatives. This approach enables parallel progress across short-, medium-, and long-term technology horizons.

Waveguides and Optical Combiners

Laser-optimized waveguides form a core element of the system roadmap. Development activities cover both diffractive and geometric implementations. Current work focuses on improving transmission efficiency, uniformity, and manufacturability under laser illumination conditions.

System Integration and AR Glasses

Tier-1 system companies participate in the alliance to provide guidance on future product requirements. Their involvement supports alignment between component development and device-level constraints, including form factor, power budgets, and cost requirements.

This system-level perspective ensures that upstream development remains compatible with commercial deployment timelines.

Industry Implications

This framework provides participating companies with a shared technical reference model. It reduces interface and integration risk. It improves alignment across development stages. It establishes a foundation for qualification, governance, and long-term investment planning.

This structure supports predictable infrastructure development and coordinated resource allocation across the ecosystem.

Outlook and Next Steps

The AR Alliance will continue to expand its technical scope and membership base. Future activities will focus on deepening working group collaboration, advancing interoperability standards, and strengthening financial and operational sustainability.

Companies engaged in AR technologies are invited to become members of the alliance and participate in its development programs. Membership provides access to shared reference frameworks and collaborative infrastructure. The alliance remains committed to building a stable, reliable, and transparent foundation for the next generation of AR display systems.