

# Beyond Vision: Unleash the Possibilities

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### ABSTRACT

*As technology rapidly evolves, displays have surpassed their traditional roles, becoming integral to modern life and transforming how we perceive and interact with the world. At the forefront of this evolution, AUO, as a leading display solution provider, drives innovation to redefine visual experiences and enhance quality of life across diverse sectors. Powered by pioneering Micro LED display technology, AUO unveils groundbreaking advancements that unlock new possibilities and push the boundaries of display applications, ranging from immersive entertainment to smart mobility and beyond. Moreover, AUO remains committed to a greener future, showcasing eco-friendly ESG display solutions and a forward-looking vision that seamlessly blends technological innovation with environmental responsibility, paving the way for a better, more sustainable world.*

### 1. Introduction

As we progress into 2025, the landscape of display technology and human-centered innovation is expanding into new dimensions. Driven by demographic shifts, emerging markets, urbanization, and sustainability goals, the future is focused on creating immersive, personalized, and resilient experiences. This paper discusses key megatrends influencing the next big things in display and societal development, highlighting AUO's role in pioneering solutions that shape the future.

### 2. Key Megatrend Themes Shaping Next Big Things

The future will be shaped by several key themes that are redefining societal and technological landscapes. The rise of the "Active Silver Age" represents an increasing engagement of seniors in health and social activities, supported by personalized wearables that promote active lifestyles. In Asia's emerging markets, "XaaS" (Everything-as-a-Service) models are driving innovation and industry transformation toward greater sustainability. Meanwhile, the development of smart cities will leverage data and "Phygital Fusion" —the seamless blending of physical and digital experiences — to create more flexible, adaptive urban environments. AI-powered personalization will further enhance user experiences across various sectors. Additionally, addressing climate change, IoT, AI, and simulation technologies will play crucial roles in supporting

smart grids and environmental resilience. Green solutions will prioritize energy efficiency and eco-friendly materials to promote urban sustainability. Lastly, health and wellness will become central to daily life; displays will support relaxation and mental well-being, catering to all age groups and improving quality of life.

### 3. Display Technologies for Next Big Things

Advancements in display technologies are driving a new wave of innovation with profound industry implications. AI vision enhances visual experiences through sophisticated 3D technologies and cost-effective touch solutions, enabling more immersive and intuitive interactions. Actively promoted technologies like 3D displays and AI glasses are paving the way for future applications such as AR navigation, marine signage, and compact displays— demonstrating ongoing commitment to delivering innovative solutions across diverse markets. At the same time, a strong focus on sustainability is leading to the development of energy-efficient displays— such as HiRaso (ChLCD), Field Sequential Color Display, and Eco+LTIPS— that significantly reduce power consumption and environmental impact. The frontier of display innovation is also being pushed forward by Micro LED technology, which unlocks new high-quality, versatile, and immersive applications across many sectors. Furthermore, integrated "Vertical Solutions" ensure seamless hardware and software integration, allowing for customized display systems suited for mobility, healthcare, and beyond. These cutting-edge innovations collectively transform how we live, work, and communicate in the digital age.

#### 3.1 Display Innovation for AI Vision

AI technology facilitates the conversion of 2D content into 3D, supported by cost-effective display architectures that enable simultaneous 2D and 3D viewing. Based on waveguide technology, AR glasses are designed to be lightweight and deliver high optical uniformity, with ongoing collaborations to develop high-refractive-index materials and advanced optical technologies. Driven by mega trends, these advancements in display and AI integration will propel the development of a wide range of vertical application solutions, aligning with future human demands for more immersive, efficient, and versatile visual experiences across various industries.

#### 3.2 Micro LED is the game-changer that Unleash the Possibilities

Micro LED technology is revolutionizing display innovation with features such as transparency, seamless

large-screen tiling, HDR with vivid colors, high reliability, wide viewing angles, and energy efficiency. AUO has achieved a significant breakthrough by developing the world's largest 42 inch single-piece Micro LED module, effectively overcoming large-scale transfer process challenges. This technology has been extended to transparent and free-form applications, suitable for watches, large TVs, and automotive displays. The upgraded 4.5th-generation production line is scheduled for mass production from 2025, with product launches—including spliced TVs, transparent displays, and automotive screens—expected from the second half of 2025 to 2026 (Fig.1). Cost-wise, optimized module tiling allows a 127 inch TV to be assembled with only eight 42 inch modules, reducing assembly time and costs, while enhanced production efficiency further lowers manufacturing expenses. AUO also aims to develop high-efficiency chips to decrease power consumption and elevate display quality, maintaining a competitive edge in Micro LED innovation.

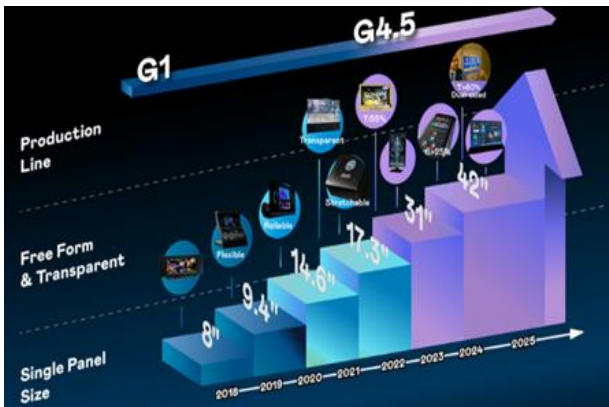


Fig.1 AUO's Milestones in Micro LED Technology

### 3.3 Vertical Solution in Mobility

AUO envisions an evolving smart cockpit ecosystem from 2023 to 2025, integrating advanced display technologies with sensing and AI-driven software to create immersive, flexible, and interactive mobility solutions for both passenger and commercial vehicles (Fig.2). The three major trends in cabin display technology are Invisible (discreet design), Immersive (enhanced user experience), and Interactive (improved interactivity), which not only improve aesthetics but also elevate user engagement. AUO is developing a new generation of HUD (Head-Up Display) based on Mini LED technology, offering advantages like slim profile and large-area projection to enhance in-vehicle display performance. Additionally, AUO is introducing UDC (Under Display Camera) technology for a cleaner, more integrated cabin design. Finally, through branded display customization with wood

grain textures, AUO aims to enhance the aesthetic appeal of vehicle interior.



Fig. 2 AUO's Smart Cockpit Evolution

### 3.4 Committing to Sustainability in Display Innovation

AUO has made significant advancements in display technology and sustainability initiatives. AUO unveiled the world's first low-power 1Hz LTPS display technology for notebooks, incorporating TDDI In-cell touch solutions to reduce costs and improve energy efficiency. Currently, notebook touch penetration is approximately 15-20%, but as costs decline, demand is expected to grow steadily. In the realm of energy saving innovations, AUO developed FSC (Field Sequential Color) display technology, which reduces backlight power consumption by 50% and solves the color breakup issue (Fig.3).

Besides, AUO introduced HiRaso, a reflective bistable display technology based on CHLCD, characterized by low power consumption, wide temperature operation, and shock resistance, making it ideal for transit and outdoor public information displays. AUO has developed a comprehensive sustainability roadmap for 2030, aiming to reduce overall power consumption by 65% and ensure 100% use of recycled materials in new products. In addition to material innovations, AUO is also focusing on advancing high efficiency backlights and low power IC technologies to support sustainable consumption and further promote environmental responsibility.



Fig. 3 Low Power Consumption Display - FSC

## 4 Conclusion

AUO's integrated strategy—blending display innovation, manufacturing excellence, and sustainability—firmly positions it as a leader in future-ready solutions. By advancing Micro LED ecosystems, transforming automotive and mobility interfaces, and embracing eco-conscious practices, AUO is shaping a resilient, immersive digital future. Displays are evolving from simple visual tools to essential components of human-centered and environmentally sustainable experiences. Leveraging emerging trends such as Micro LED, AI personalization, and phygital fusion, AUO seeks to unlock the full potential of visual technology—empowering lives, enhancing interactions, and building a smarter, brighter future for society.

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