

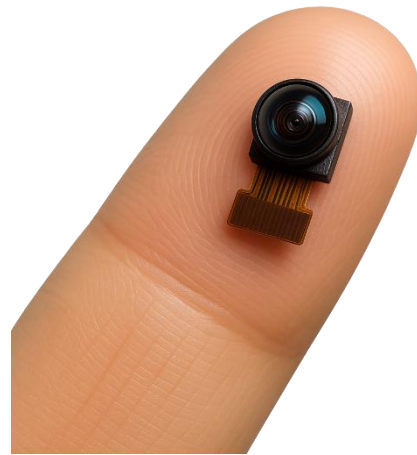
Breaking the Size Barrier: How Camemake is Transforming Spatial Imaging for Smartglasses and AR/VR

Introduction: Sometimes the Smallest Pieces Change Everything

Every once in a while, a technical breakthrough quietly shifts the entire landscape of an industry. In the world of AR, VR, and smart wearables, it isn't always flashy new features or app ecosystems that make the difference. Sometimes, it's something as simple as a camera module getting just a millimeter smaller.

If you think that sounds minor, you haven't tried to build a comfortable, everyday pair of smartglasses or a lightweight, all-day AR headset. That's where Camemake comes in. Our team has spent months chasing a single, stubborn goal: to make cameras so compact and so capable that designers no longer have to choose between style, comfort, and function. And we're proud to say we're the first in the world to crack the **3mm barrier** for a **1.3-megapixel, 140-degree wide-angle** camera module, without cutting corners on performance or reliability.

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The Industry Stalemate: Why Everyone Got Stuck at 4.5mm

If you ask anyone in AR or wearable hardware design what the hardest component to shrink is, they'll tell you: the camera. Lenses take up space. Sensors need room. Wires, PCBs, connectors; each fraction of a millimeter matters. For a long time, the industry seemed stuck at >4.5mm as the smallest size you could realistically make a decent wide-angle camera. The teams that tried ended up with narrow field, low resolution camera modules used in the medical world, not only overkill for the use cases but also very expensive.

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Why did this matter so much? Because every millimeter counts when you're trying to make technology disappear. That extra 1.5mm is the difference between a pair of glasses that looks normal and something that feels awkward on your face. It's the difference between a headset that you can forget you're wearing, and one that makes your neck hurt after an hour. For product designers, this has been a frustrating bottleneck. Everyone wants immersive, full-surround vision,

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but nobody wants bulky hardware. The result? Compromises. Fewer cameras, smaller fields of view, or just clunky, conspicuous wearables that never make it to mass adoption.

The Camemake Approach: Rethinking the Camera From the Ground Up

At Camemake, we didn't have the luxury of thinking small. Our clients, some of the world's most ambitious hardware makers, demanded something radically better. Our team, that mixes optical engineering veterans with fresh, creative minds, set a bold target: create a wide angle camera module not bigger than 3mm, but with real, production-ready performance.

This wasn't just a matter of squeezing things tighter. It meant inventing new ways to design lenses for minimal distortion at ultra-wide angles. It meant creating PCB layouts that use every micron of space, testing new materials for flexibility and reliability.



The result is a camera module that fits comfortably in the thinnest smartglasses frames or the most streamlined AR headsets. We achieved 1.3MP resolution, a 140-degree field of view, and low distortion, all in a package just 3mm wide.

Why the 3mm Breakthrough Actually Matters

When we talk to designers and product managers, the reactions are always the same: disbelief, followed by a rush of ideas. Suddenly, you can imagine smartglasses with real surround vision cameras on the sides, back, or even multiple locations, all invisible to the user. You get true spatial awareness for hands-free navigation, gesture tracking, social interaction, and even privacy features. And you get it all without the “techy” look that turns everyday users away.



For AR/VR headsets, it means more natural field of view mapping, less occlusion, and headsets that actually look and feel like something you want to wear for hours. It opens the door for applications in robotics, industrial safety, healthcare, and any field where size, weight, and comfort are mission-critical.

There are also benefits you don't see at first glance. Smaller cameras mean less power draw and less heat. They allow for slimmer, lighter cables, which are easier to route and less likely to break. The end result is not just a better

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product on launch day, it's a product that lasts longer and gives users fewer reasons to take it off or leave it at home.

From Vision to Reality: The Camemake Development Journey

Getting to this point wasn't a simple "eureka" moment. At every stage, we hit walls that seemed insurmountable. Lenses that couldn't quite cover the full 140 degrees without going fuzzy at the edges. Sensor packages that just barely didn't fit.

What kept us going was the knowledge that our customers truly needed this. The more we shared early samples with trusted partners, the clearer it became: a true 3mm wide, high-res, wide-angle camera could be the missing piece for a whole new generation of wearable devices.

A big part of our success was keeping everything in-house. Camemake isn't just a design lab, we have our own factory, cleanrooms, assembly lines, and QC labs. Every prototype and production unit gets the same attention to detail, from sensor alignment to final programming and testing.

It's Not Just About One Camera

While we're excited about what we've achieved at the micro scale, it's important to note that Camemake is much more than a "one hit wonder." Our catalog covers camera modules from 0.3MP up to 200MP, with options for every major sensor platform: Sony, OmniVision, OnSemi, GalaxyCore, Himax, and more. We offer rigid, flex, rigid-flex, and stacked PCB modules. Our lens options range from auto-focus to endoscope, fisheye to high-res zoom. We provide USB, MIPI, DVP, and SPI interfaces, so you can drop our modules into nearly any system with minimal friction.



Our factory is built for scale, up to 30 million units a month, with Class 100 and 10,000 cleanrooms and a fully modern SMT line. But we still treat every customer as a partner, whether they're ordering a few dozen samples or a million units.

Practical Use Cases: How the 3mm Module Changes Product Design

Here are just a few ways our ultra-compact camera modules are already changing what's possible:

- **True surround smartglasses:** Multiple cameras fit along the frame, capturing side and rear views for real-time AR overlays, safety alerts, and even private social experiences.
- **Lighter, sleeker AR/VR headsets:** No more bulky housings or awkward protrusions, just seamless integration and better spatial mapping.
- **Industrial safety and robotics:** Smaller, more robust cameras enable multi-directional vision in tight or hazardous environments.
- **Healthcare wearables:** Discreet cameras in medical devices for remote monitoring and AI-driven diagnostics.
- **Next-gen IoT devices:** Flexible modules that conform to curved surfaces and odd-shaped enclosures.

Want to Work Together?

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If you're dreaming up the next generation of smartglasses, AR/VR devices, or any product that needs to see more while taking up less space, we'd love to connect. The future is getting smaller and the view is only getting bigger.

For more about what we do, or to talk with our team, visit www.camemake.com or email us at sales@camemake.com.

About Camemake

Founded in 2016, Camemake has grown from a small startup to a global leader in camera module innovation. With 600+ employees, a 20,000 square meter facility, and a customer-first mindset, we deliver imaging solutions for everything from smart home devices and robotics to next-gen wearables. Every module is engineered, tested, and built in-house, ensuring consistent quality and fast turnaround, no matter the size or scope of your project. See our factory tour:

<https://youtu.be/AowR8zcPffk?si=MaUsXYK0FGtotKxE>