Milesight FusionXpert Technology

Seamlessly Stitched, Naturally 180°

FusionXpert

A MILESIGHT TECHNOLOGY MOMENT

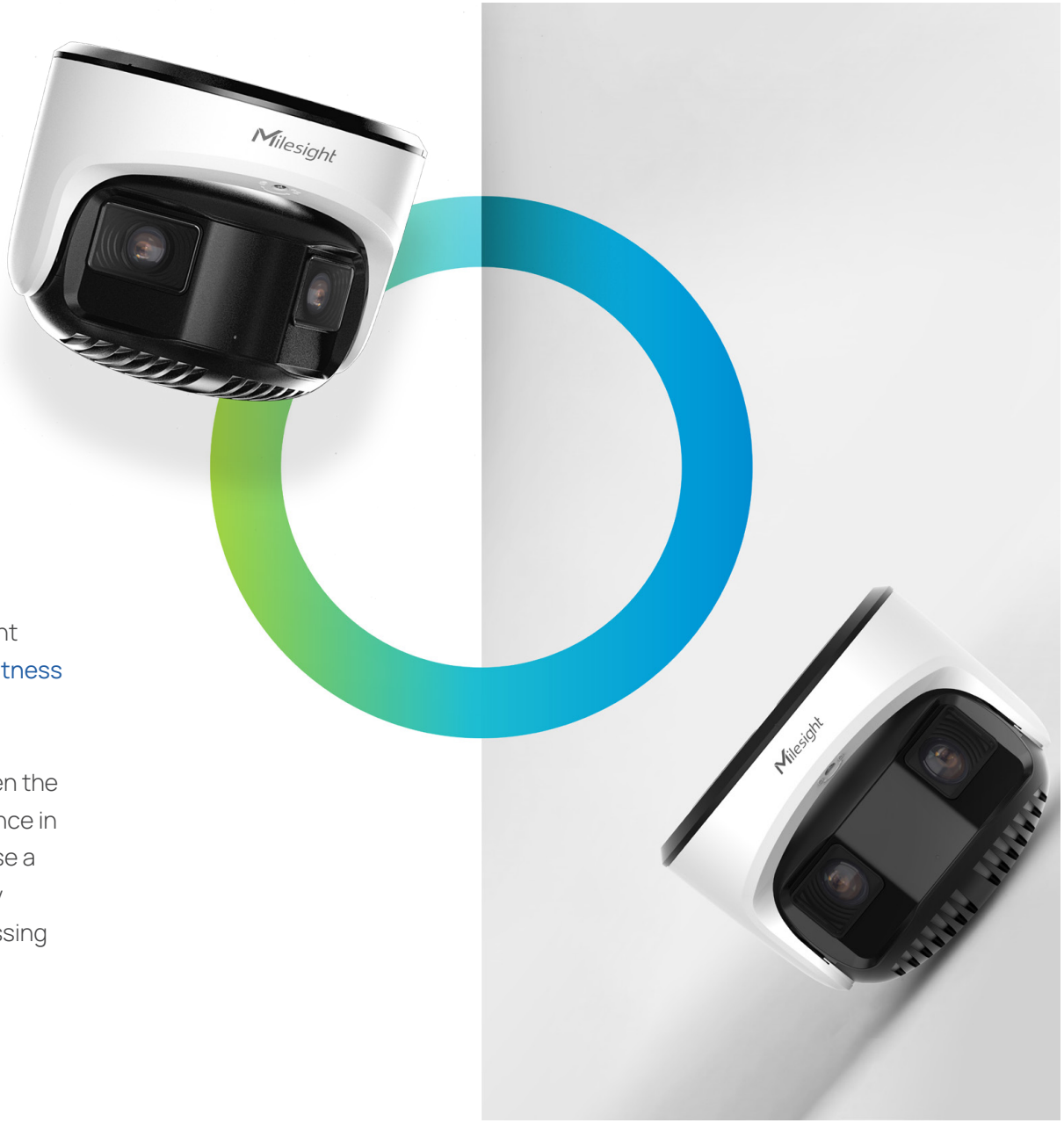
Milesight

Behind the Scene: Milesight R&D Team

Even in the dead of night, we were determined to set off miles away to consult experts, just to tackle a single technical challenge.

—— David Huang

Technical Manager in Milesight



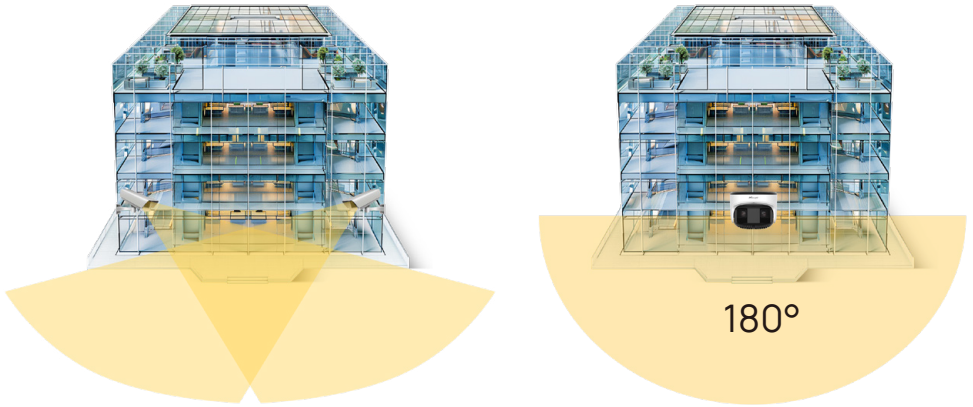
Technical Background and Challenges

The realm of stitched panoramic imaging presents significant challenges, particularly concerning image distortions, brightness uniformity, and color consistency.

Image distortions arise due to the inherent disparity between the field of view angle captured by two cameras, like the difference in viewpoints between human eyes. Brightness disparities pose a challenge, as even lenses of the same model and batch may showcase differences in light sensitivity. Meanwhile, addressing color inconsistency—the most difficult challenge within the industry—demands careful attention to detail and creative solution in order to overcome it.

What is Milesight FusionXpert Technology?

Milesight FusionXpert Technology powers the Milesight AI Dual-sensor 180° Panoramic Camera, providing the seamless stitched 180° panorama. Seamlessly stitching images from two cameras, it delivers a true-to-life picture with no color or brightness discrepancies, and zero distortion. Experience a seamlessly stitched image that appears as if it was always one cohesive whole.



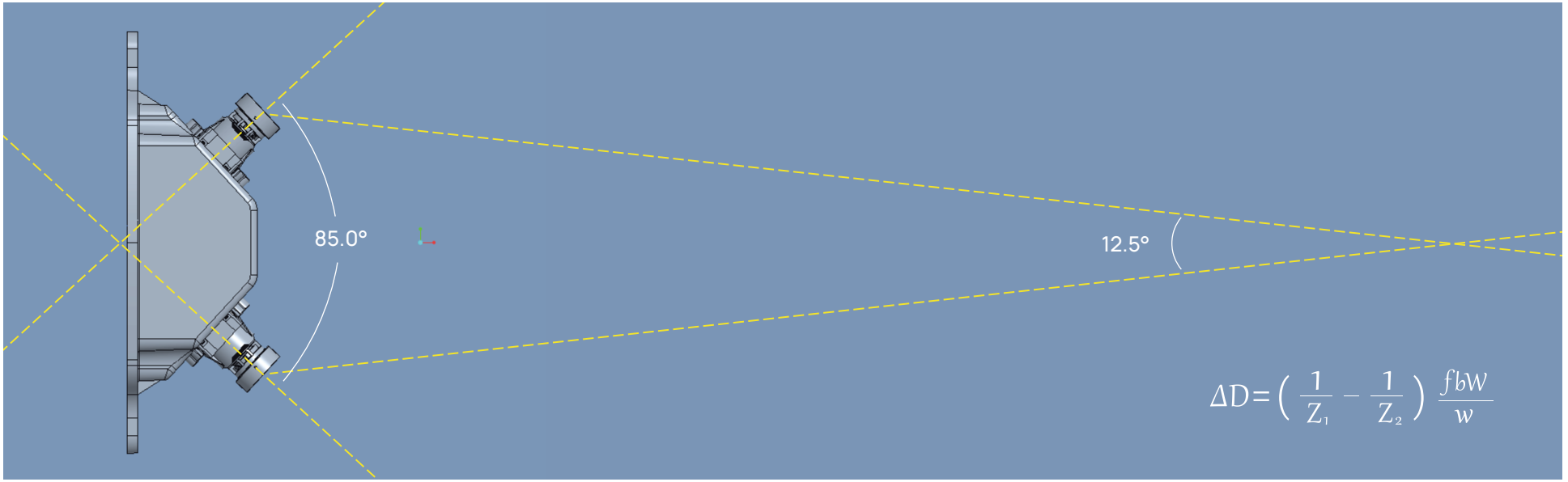
How Milesight FusionXpert Addresses Industry Challenges ?

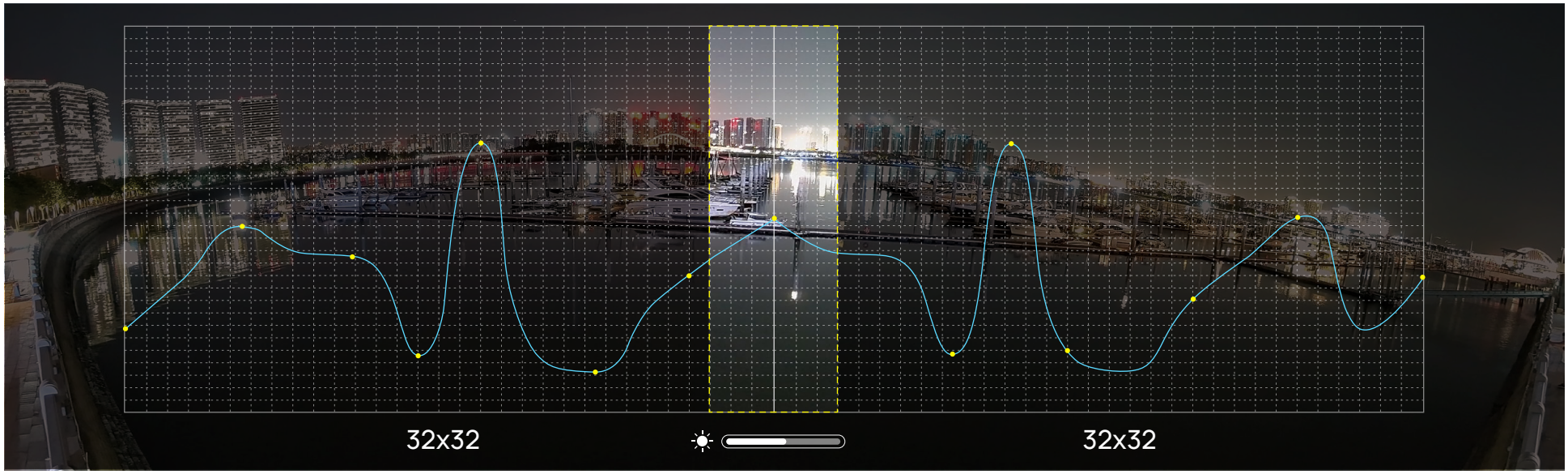
Golden 12.5° & Computational Model Solve Edge Distortions

Edge distortions are indeed a significant concern in single-lens panoramic cameras, often resulting in the loss of crucial information during surveillance. However, it is greatly solved with Milesight FusionXpert technology. The Image distortions stemming from spatial disparities between the two cameras are effectively addressed by the "Golden 12.5°" principle. This principle not only ensures a 180° field of view but also maximizes structural adjustments to minimize the impact of parallax.

Additionally, on the software side, to accommodate various installation requirements and ensure undistorted image effects at distances ranging from 0.5 to 30 meters, we have introduced a computational model function for distortion correction. This function resolves issues such as misalignment or ghosting in the stitching fusion zone and can automatically adjust parameters based on the environment, achieving seamless stitching at the geometric level.

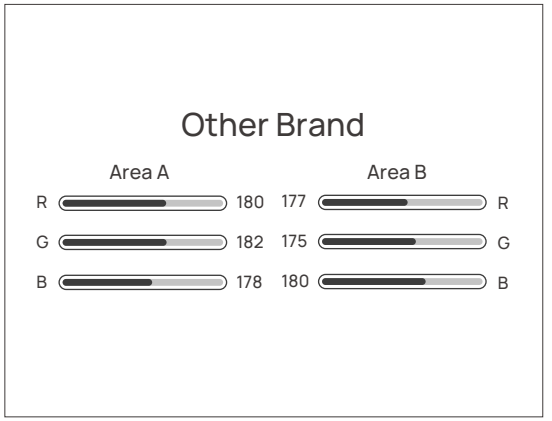
Plus, every Milesight device undergoes meticulous calibration before leaving the factory to ensure that each unit achieves the best possible correction results.

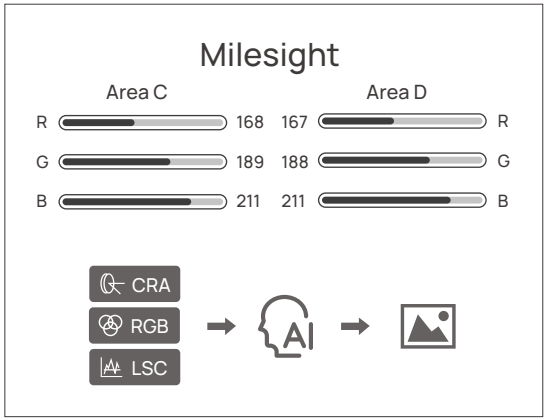




Advanced Algorithms Ensuring Brightness Uniformity

The challenge of maintaining brightness uniformity across the panoramic image is tackled through advanced algorithms and chip-level innovations. Acknowledging the inherent variations in light sensitivity among lenses, Milesight's R&D team explored both algorithmic and hardware solutions. By partitioning the image with 32x32 Mesh Shading algorithm and analyzing the luminance values for each cell, the algorithm extracts, calculates, and integrates light presentation, ensuring consistent brightness across both cameras.





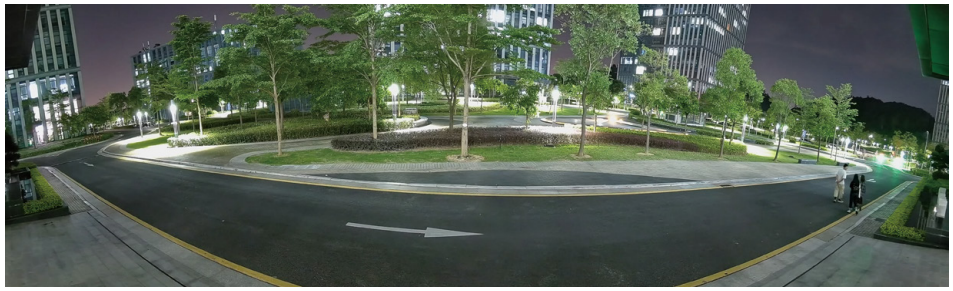
Industry Challenge: Addressing Color Consistency

Color inconsistency, a pervasive issue in stitched panoramic imaging, posed significant hurdles for the Milesight R&D team. Extensive research and collaboration with industry experts led to breakthroughs in achieving color consistency. Our team conducted in-depth research on chip-level image principles to achieve automatic white balance adjustments for the images captured by both lenses. By analyzing the Chief Ray Angle (CRA) of the lenses and sensors, and studying the RGB decay curves under different color temperatures, we gained a profound understanding of color variations.

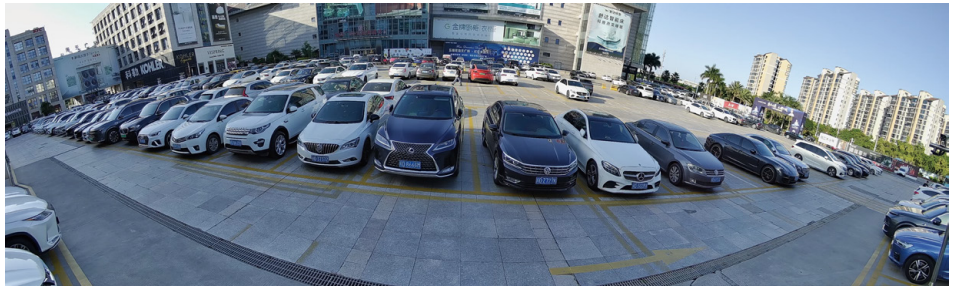
Combined with Lens Shading Correction (LSC) techniques, we meticulously adjusted color values using color consistency algorithms to ensure smooth transitions and consistent representation across the entire panoramic image.

Results Showcase

Extensive Area in Daytime



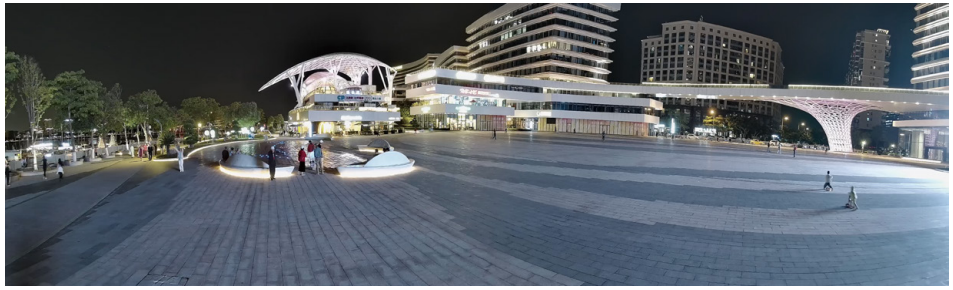
Building Entrance in Night time



Parking Lot in Daytime

Park with Smart IR II On

Conference Room with 140dB WDR On



Public Square under Complex Lighting Condition

Make Sensing Matter

Contact Us: sales@milesight.com support@milesight.com

Add: 220 NE 51st Street, Oakland Park, Florida 33334, USA
Tel: +1-800-561-0485

Add: 925, Anyang SK V1 Center, LS -ro 116beon-gil, Dongan-gu, Anyang-si, Korea
Tel: +82-31-990-7732

Add: Building C09, Software Park Phase III, Xiamen 361024, Fujian, China
Tel: +86-592-5922772