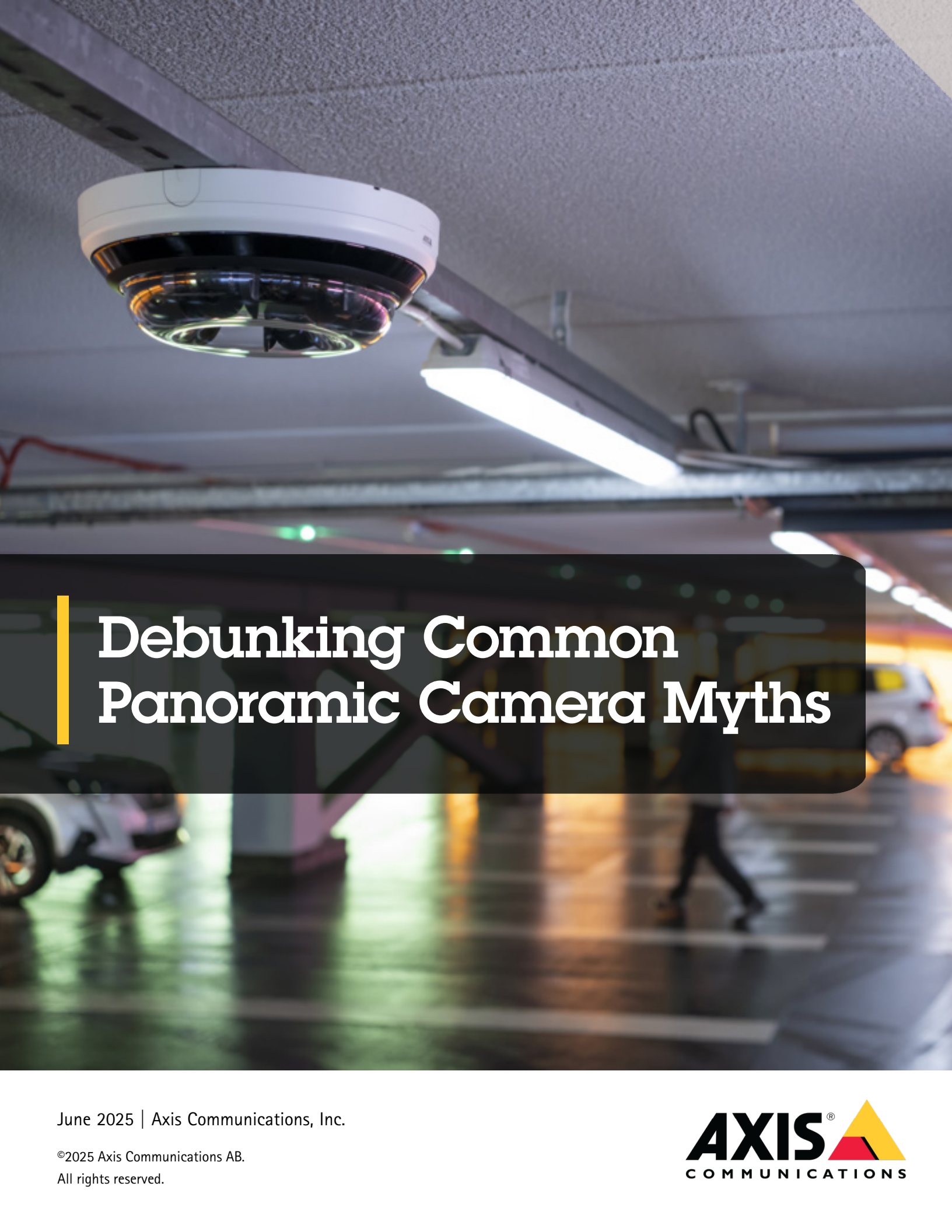




Debunking Common Panoramic Camera Myths

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Table of contents

Pg 3. **Introduction**

Pg 4. **Myth #1:**
Panoramic Cameras Perform Poorly
in Low Light

Pg 5. **Myth #2:**
Using Multiple Images to Create a Single
Panoramic View Looks Bad

Pg 6. **Myth #3:** You Are Unable to Zoom in on Details

Pg 7. **Myth #4:**
Panoramic Cameras Replace PTZ Cameras

Pg 8. **Myth #5:**
Panoramic Cameras Are Only
for Large Open Areas

Pg 9. **Conclusion**



Introduction

What Are Panoramic Cameras?

Panoramic cameras are designed to reduce the need for multiple traditional cameras, making them ideal for environments where wide-area coverage is essential. The three primary types of panoramic cameras are:

Single-Sensor Fisheye Cameras:

These cameras use a fisheye lens to capture a 180° or 360° view, which is then processed through dewarping software to correct the image distortion and present a usable view.

Multi-Sensor Panoramic Cameras:

These cameras combine multiple sensors into a single housing, stitching them together to create a seamless panoramic image without the distortion typically associated with fisheye lenses.

Multidirectional Cameras:

These cameras can monitor multiple directions simultaneously, providing comprehensive coverage of an area. The multiple camera heads can be positioned independently, providing up to 360° coverage in multiple streams, and allowing for flexibility between wide overviews and detailed images.

Why Do These Myths Exist?

Despite their advantages, myths and misconceptions about panoramic cameras persist. Many myths arise from outdated information or negative experiences with earlier models. In the past, panoramic cameras were often associated with image distortion, poor performance in low-light conditions, inconsistent (or even non-existent) panoramic stitching, as well as difficulties in installation. However, as technology has evolved, these challenges have been addressed, and modern panoramic cameras are equipped with advanced features to deliver superior performance. This whitepaper aims to dispel these myths and clarify the capabilities of panoramic cameras, highlighting the advancements that have made them a valuable tool for a variety of surveillance needs.



Myth #1:

Poor low light performance.

Where this Myth Comes From

Historically, many panoramic cameras did not include infrared (IR) illumination or had limited low-light capabilities. There were practical reasons for this, from managing power requirements to keeping consistent lighting across all stitched image sensors. As a result, many early panoramic cameras were not as effective in low-light or nighttime conditions. Without proper illumination or advanced sensors, the image quality could suffer, particularly in environments with minimal lighting.

Reality

Recent improvements in low-light image quality have revolutionized the performance of panoramic cameras. Today's cameras incorporate advanced technologies that enhance their ability to perform in low-light conditions:

Low-Light Optimized Sensors: These sensors are designed to capture more detail in dimly lit environments, allowing panoramic cameras to perform well in challenging lighting conditions.

Wide Dynamic Range (WDR): WDR technology enables panoramic cameras to capture a broader range of light levels, balancing both bright and dark areas of the scene for a more comprehensive image.

Light Amplification and Noise Reduction: These features work together to enhance visibility in low-light environments by amplifying light levels and reducing the noise typically associated with such conditions.

External IR Compatibility: For environments requiring additional illumination, many panoramic cameras offer compatibility with external IR illuminators, ensuring clear images even in complete darkness.

Best Practices

To ensure optimal performance in low-light environments:

- > Select cameras with low-light optimization features such as noise reduction and wide dynamic range.
- > Add more light to the scene through traditional means.
- > Use external IR illuminators where additional lighting is necessary.
- > Position cameras strategically to maximize the use of available ambient light, ensuring the most effective coverage in low-light.



Myth #2:

No seamless panoramic view

Where this Myth Comes From

In the early days of multi-sensor cameras, issues such as noticeable stitching lines or misalignment between sensors resulted in disjointed and fragmented images. This led many to believe that panoramic cameras could only provide multiple separate images rather than a truly seamless panoramic view

Reality

Modern panoramic cameras have overcome these issues using advanced technologies, which allow for seamless and cohesive panoramic images:

Real-Time Image Stitching Algorithms: These algorithms combine the images from multiple sensors in real-time, eliminating visible seams and creating a unified panoramic view.

Improved Processing Power: Advances in chipsets, including the addition of AI, enable seamless transitions between sensors. This enhanced processing power also allows for more sophisticated image sharpening techniques, delivering clearer and more detailed images than ever before.

Advanced Dewarping Technology: In single-sensor fisheye cameras, dewarping technology is used to correct the inherent distortion of fisheye lenses, providing a distortion-free and realistic panoramic image.

Specialty-Designed Domes: Fisheye cameras historically have struggled with image quality at the far edges of the scene, but domes advance objects located in a camera's peripheral view, capturing them more clearly.

Best Practices

To ensure a seamless panoramic experience:

- > Evaluate cameras in a variety of lighting conditions to ensure that images are stitched seamlessly, providing consistent movement throughout the entire scene. This consistency is crucial to prevent people or objects from appearing to jump around as they move across the scene, ensuring smooth and coherent video playback.
- > For clear, accurate, and usable video, ensure the Video Management System (VMS) supports high-quality dewarping for single-sensor cameras
- > Carefully optimize camera placement to minimize potential distortions caused by lens angles or field of view. These will be most obvious with panoramic multisensor cameras that have a 90-degree vertical field of view. A curved horizon can be straightened through camera software.



Myth #3:

No zooming in on details

Where this Myth Comes From

Because most panoramic cameras use fixed lenses, it was believed that they could not zoom in on specific details within their field of view. This myth likely stemmed from the fact that pan-tilt-zoom (PTZ) lenses allow users to focus on areas of interest at greater distances.

Reality

The myth that panoramic cameras lack zoom functionality is inaccurate. In fact, high-resolution panoramic cameras, such as those offering 12MP or 20MP+ resolutions, allow for effective digital zooming. This is often better than a traditional PTZ camera because you never lose the overview image when using digital zoom, even in recorded video. Additionally:

Dewarping Software: This technology allows users to zoom into specific areas of the panoramic image without distorting the view, preserving details even at higher zoom levels.

PTZ Camera Integration: Many panoramic cameras can be integrated with PTZ cameras for autotracking, ensuring that detailed zooming on specific subjects is possible as part of a hybrid surveillance solution.

Best Practices

To get the most out of zooming capabilities:

- > Choose high-resolution panoramic cameras to preserve image quality when zooming digitally.
- > Utilize digital dewarping tools to zoom into specific areas without introducing distortion.
- > Consider combining panoramic cameras with PTZ cameras for seamless tracking and zooming when precise detail capture is required.



Myth #4:

Panoramic cameras replace PTZ cameras

Where this Myth Comes From

The assumption that panoramic cameras alone can provide full surveillance coverage often leads people to believe they can replace the need for PTZ cameras. This myth comes from the idea that panoramic cameras offer wide-area coverage, thus eliminating the need for additional tracking and zooming capabilities, and is somewhat reinforced by the previous myth.

Reality

While panoramic cameras excel at providing wide-area situational awareness, PTZ cameras still serve a crucial role in security systems. The two technologies complement each other in the following ways:

- > Panoramic cameras offer comprehensive coverage of large areas, providing context and situational awareness for the entire scene.
- > PTZ cameras excel at tracking and zooming in on specific subjects or events, providing detailed views of targets in motion.

Advanced analytics can also be integrated to enable automatic hand-off between the panoramic camera and the PTZ camera when movement is detected, ensuring no critical moments are missed.

Best Practices

To achieve optimal coverage:

- > Deploy panoramic cameras for broad, overview coverage and PTZ cameras for detailed tracking and zooming.
- > Use video analytics to trigger automatic PTZ camera control based on detected motion or activity.
- > Consider combining both camera types for a more effective and flexible security system.

Myth #5:

Panoramic cameras are only for large, open areas



Where this Myth Comes From

Panoramic cameras are often marketed for large outdoor spaces, which has led to the misconception that they are only suitable for expansive environments like stadiums or parking lots. This myth overlooks the versatility of panoramic cameras in various indoor settings.

Reality

Panoramic cameras are ideal for both large outdoor spaces and a variety of indoor environments.

For example:

Retail Stores: Panoramic cameras can cover entire floor layouts, reducing the number of cameras needed to eliminate blind spots.

Warehouses & Logistics Centers: They efficiently monitor large indoor spaces, enhancing security while minimizing hardware.

Corporate Offices: Panoramic cameras enhance security without disrupting the open, collaborative environment often found in office spaces.

Healthcare & Education Facilities: These cameras provide broad surveillance coverage without the need for excessive hardware installation, offering a clean and unobtrusive security solution.

Best Practices

To optimize the use of panoramic cameras in indoor environments:

- > Select the right resolution and mounting options for indoor settings.
- > Position cameras strategically to maximize coverage and field of view.
- > Utilize intelligent video analytics to improve monitoring efficiency and effectiveness.



Conclusion

Panoramic cameras are transforming the way businesses approach surveillance and security, offering a wide range of benefits that go far beyond traditional camera solutions. By rethinking when and where to use panoramic cameras, focusing on solving real-world surveillance problems, organizations are better able to address the changing security needs of today and tomorrow. As we've explored throughout this whitepaper, these myths—ranging from concerns about image quality and distortion—are largely unfounded. In fact, panoramic cameras are designed to provide high-resolution, distortion-free images, even in challenging environments.

By debunking these myths, we hope to shed light on the true capabilities of panoramic cameras, including their ability to reduce blind spots, provide comprehensive coverage, and ultimately lower the total cost of ownership. Moreover, the integration of panoramic cameras into security systems can enhance situational awareness, improve operational efficiency, and create a safer environment for both businesses and customers.

As technology continues to advance, the performance and adaptability of panoramic cameras will only improve, making them an increasingly valuable tool for organizations seeking to optimize their security infrastructure. The myths surrounding these cameras may have been true in the past, but with a clearer understanding of their current capabilities, businesses can make more informed decisions and leverage the full potential of panoramic cameras.

In conclusion, panoramic cameras represent not just a technical advancement but a shift in how security systems can be implemented. By dispelling misconceptions and focusing on their real-world applications, organizations can better harness their capabilities to meet the challenges of today's security needs.