

Powering your digital transformation

The benefits of network cameras in Industry 4.0

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CRITICAL INFRASTRUCTURE AND INDUSTRIAL SITES



Navigating Industry 4.0

The road here

Smarter ways of working drive more efficient production. That's why companies that last are always looking to improve their understanding of their operations, and to innovate based on that information. They're not alone. Humans in general are driven to understand, explore, and innovate. Over the years, these human drives have led to multiple industrial revolutions and given us game-changing tools that industry has since put to use: IT and the internet, artificial intelligence, robots and automation, 3D printing, nanotech, biotech, and more.

Today, in the Fourth Industrial Revolution, Industry 4.0, transformation isn't just about remarkable individual technologies. It's about the integration of those technologies. Fusing them has reshaped the industrial landscape and taken us a quantum leap forward.

What is Industry 4.0?

In Industry 4.0, existing and emerging technologies and systems communicate with and support each other – and humans – for more proactive, efficient, and safer processes. Here, the Industrial Internet of Things plays a huge role, sending and receiving key production-related data.

A cornerstone of Industry 4.0 initiatives is the network camera.





From images to insights

What is a network camera?

Industrial sites are often large, intricate webs of people, assets, and many simultaneous processes and procedures. Onsite inspections and industrial control systems like SCADA are crucial to monitoring what's going on, but they only tell part of the story. Network cameras open a new window into the heart of your operations.

Revolutionizing oversight

Network cameras are more than tools to see what is or was happening. They're more accurately described as sensors. They're active participants in the digital revolution, collecting vast amounts of data and helping you analyze it. And because network cameras can share data with other IP-based devices in an Industry 4.0 environment, a camera running edge-based analytics enables real-time alerts and automated responses to detected events. As a result, you benefit from a new level of transparency and control.

Efficient monitoring

Intelligently monitor a scene to determine when an alert should be triggered – for instance, when anomalies or objects of interest are detected.

Efficient operations

Monitor a scene to detect and prevent, or diagnose and correct, events that reduce productivity or increase downtime.

Improved insights

Leverage statistics and trends derived from video and thermometric data to improve operations and make more informed decisions.

Safety

Detect and mitigate risk to on-site staff by using analytics-equipped network cameras together with network speakers, strobe sirens, and access control.

Privacy

Intelligently mask identifying features of people in a scene, upholding employee privacy while ensuring you can see what's happening.

What network cameras offer

Putting IP cameras to work

Maximize your production

Network cameras support production by enabling the transparency, control, and insights you need to establish more efficient processes and minimize costly downtime. Here's how.

Transparency: See more

Network cameras support real-time awareness of what's happening in scenarios or places that are challenging to monitor – for example, areas that are remote, hazardous, unmanned, or difficult to access.



Sample use cases:

- Remotely monitor a difficult-to-access gauge.
- Detect gas or oil leaks.

Control: See what matters

There's a lot happening at production-focused sites. Network cameras can be equipped with sophisticated analytics and integrated into other systems – such as industrial control systems – to direct attention where it's most needed.

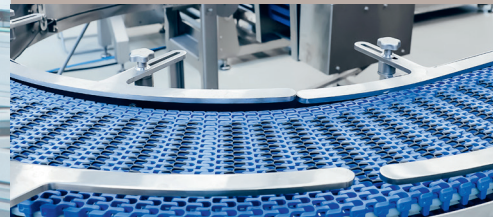


Sample use cases:

- Automatically detect anomalies.
- Assess alerts and alarms to determine next steps.

Insights: See the future (almost)

Finally, cameras and collected data can be used to provide a more complete view of processes sitewide, and to identify patterns and trends. These insights enable more proactive and intelligent action. Data can be processed on the device, on a server, in the cloud, or in a hybrid solution.



Sample use cases:

- Plan predictive maintenance.
- Visually inspect processes to identify inefficiencies.



Introduction to analytics

What are analytics?

Analytics use algorithms to go through real-time and recorded video content or metadata and generate actionable insights. Using computer vision and machine learning, analytics-equipped cameras can detect humans as well as objects such as vehicles, machinery, and products or components, then monitor them for significant events.

Ready-to-go analytics

Network cameras may come with certain analytics pre-installed. However, these analytics are typically selected because they add value across different industries – for example, identifying when a person is present in the camera's view. If you want to address product-specific challenges in a production line, you'll need a more targeted solution.

Collaboration is a powerful multiplier of innovation.

The best network camera providers don't just offer top-quality devices and proven analytics. They also make it easy for third parties to develop analytics that enable you to use the camera to solve new challenges.

Innovating with analytics

Anomaly detection

Anomaly detection is a popular use case for analytics. By catching an anomaly or error almost as soon as it appears, businesses can move quickly to correct it, saving time and money. But an anomaly at a sawmill looks dramatically different from one at a pharmaceutical manufacturing plant, or one at an automobile manufacturer. As a result, anomaly detection typically involves training the algorithm on what's normal and not normal for your specific use case.

Training and customization

Sometimes only a small amount of training data is needed – for example, if you want to identify bottle caps being produced in the wrong color. But for other tasks, such as identifying misaligned cuts on packaging or labels, many hours of training data may be needed for each unique package or label being produced. And for specialized use cases there may be no ready-made analytic models. Instead, one may need to be built from the ground up before training can begin.

Choosing your starting point

Digitalization is a process, not a destination. It's a tool to make your site more productive, and you can jump in where you choose. Whether or not you're ready to develop custom analytics for a niche use case, you can still unlock the benefits IP-based cameras offer: integrated systems, increased transparency, and actionable insights from the sophisticated analytics already available. And you can tackle more complex or specialized challenges when it's right for you.



Putting it all together:

Building the right solution

Putting together an effective network solution is a lot like manufacturing a quality product. Good components matter. Here are some of the key ingredients for putting together a solution that delivers on its promise.

The right cameras

Rugged

Production-focused sites also need cameras matched to the industrial environment. For example, self-cleaning cameras for dusty environments. Or explosion-protected cameras for hazardous areas. Cameras that can stand up to harsh disinfectants or a wide range of temperatures. Stainless steel options that can withstand exposure to saltwater spray.

Reliable

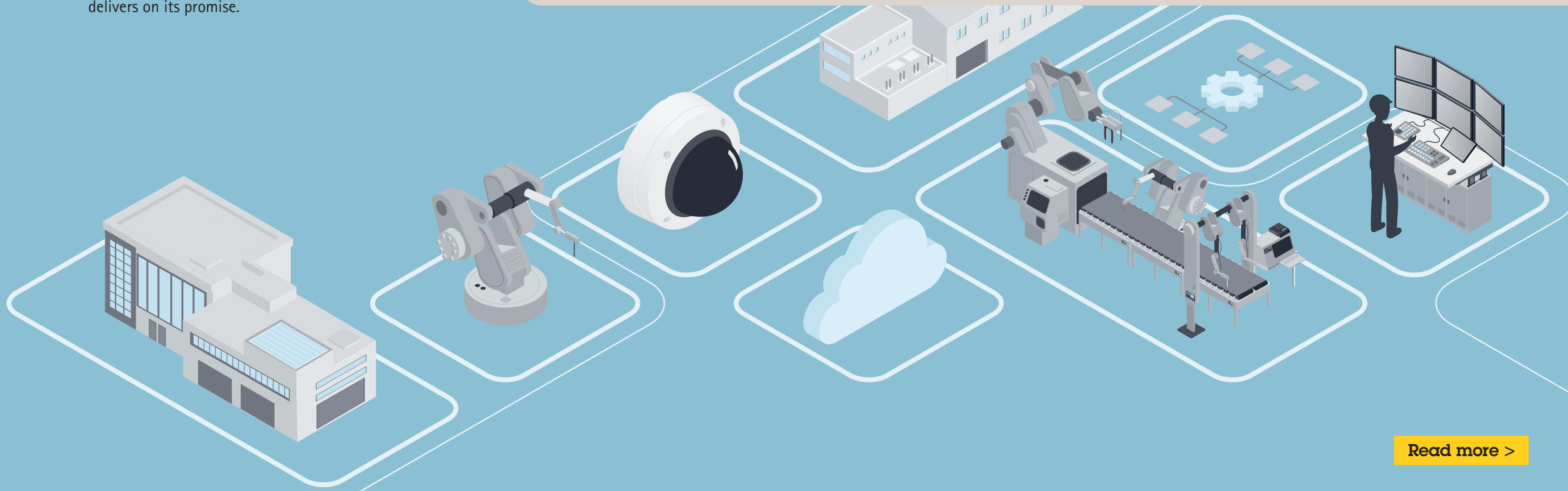
Small details can make big differences in production, so image usability – even in tough conditions – is essential. Consider where you'll be using your cameras to know what you need. For example, Electronic Image Stabilization (EIS), Wide Dynamic Range (WDR), or technologies to ensure true-to-life images in low-light environments.

Matched to the job

The job to be done also influences the kind of camera you need – for example, PTZ (pan, tilt, zoom), panoramic, fixed box or dome, modular, or thermometric. Choose a provider that has a portfolio broad enough to meet your needs.

Trusted

Bringing more devices online can introduce new challenges and risks. For this reason, it's crucial to choose a network camera provider that takes robust cybersecurity measures in hardware and software design, and which makes it easy to manage, monitor, and update systems throughout their lifecycle.

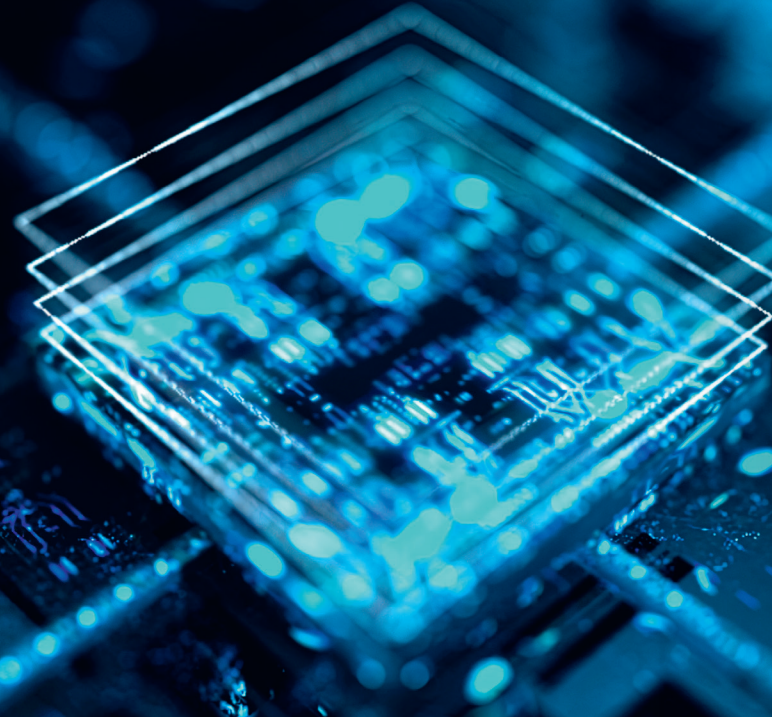


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Putting it all together:

Building the right solution

continued



The right analytics

Often, there's more than one way to solve a problem, so developing a solution is a question of finding the best option for you – tailored to your industry, your company, and your specific needs and goals. The best cameras are built on an open platform. That means you're free to choose from the widest possible range of analytics on the market, or develop your own.

The right integrations

Industrial sites typically depend on multiple systems to run smoothly and efficiently. The right network video solution is easy to integrate with other systems, so you can use it to support and improve multiple processes. Here again, an open platform can make all the difference, since it ensures you don't have to choose or purchase all your functionality up front. Instead, the system can evolve as you do.

Looking forward

The integration of powerful network cameras and sophisticated analytics into industrial sites has led to one of the biggest transformations in industry. And it will continue to do so.

We're not just in the middle of the Fourth Industrial Revolution. We're standing on the edge of Industry 5.0, driven by advanced AI. The insights AI gives us will also be powered by data – some of which network cameras must provide.

Now more than ever, network cameras help futureproof sites.



About Axis Communications

Axis enables a smarter and safer world by creating solutions for improving security and business performance. As a network technology company and industry leader, Axis offers solutions in video surveillance, access control, intercom, and audio systems. They are enhanced by intelligent analytics applications and supported by high-quality training.

Axis has around 4,000 dedicated employees in over 50 countries and collaborates with technology and system integration partners worldwide to deliver customer solutions. Axis was founded in 1984, and the headquarters are in Lund, Sweden.