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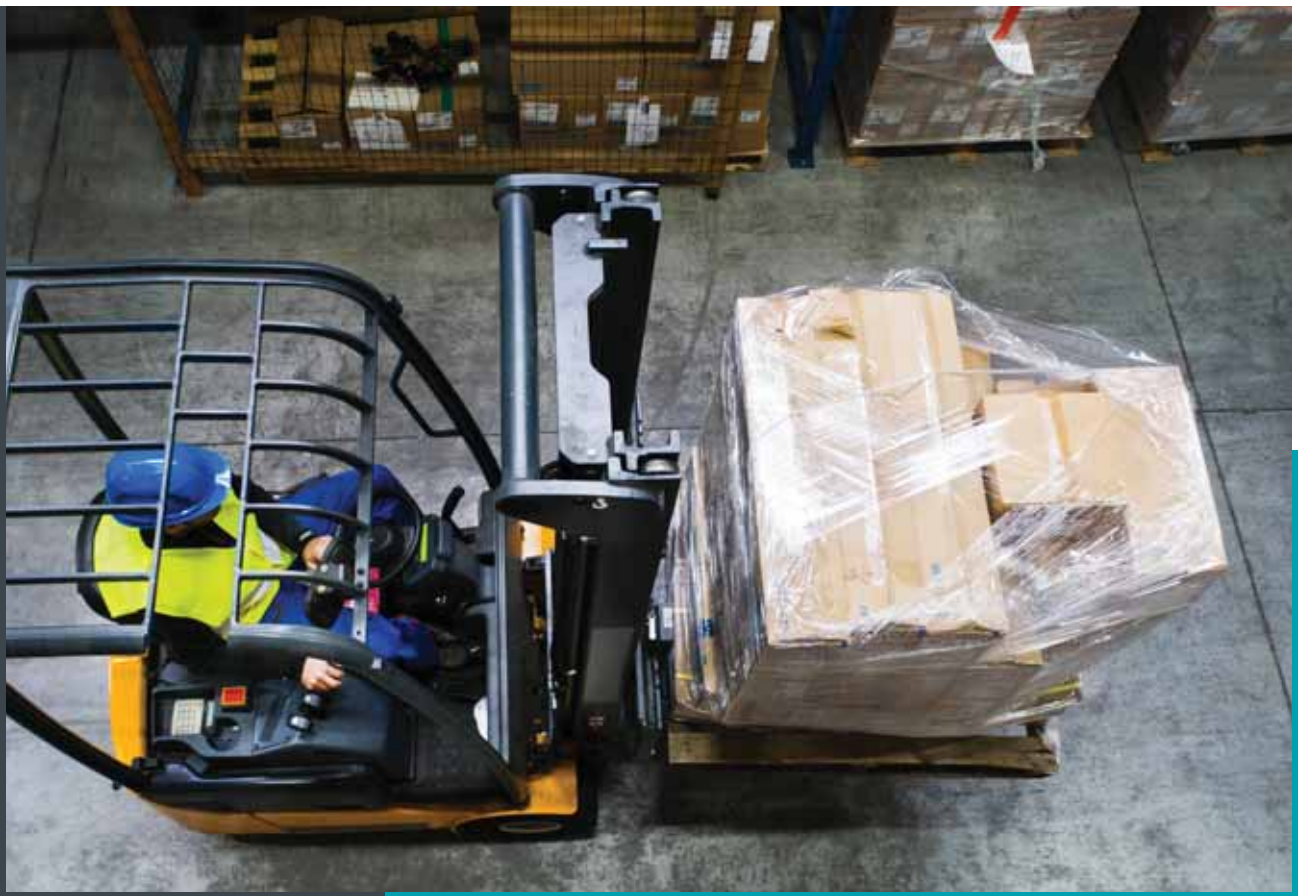
Logistics Under the Lens

Improving Profitability with IP Video Tech



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Logistics and The Efficiency Challenge

Transport and logistics services are fundamental to the globalized economy. The emergence of more streamlined and profitable delivery operations is one of the vital foundations on which the boom in online retail has been built, fueled by Amazon and rapidly changing customer shopping habits. Alongside it, logistics firms and retail distribution are accelerating advancement in a wide range of digital technologies.

Logistics costs for US business reached $1.6 trillion in 2018, or 8% of GDP. America's highly integrated supply chain networks now link producers and consumers through multiple transportation modes, including air and express delivery services, freight rail, maritime transport, and road transport.

Today, efficient transport and logistics services are essential to manufacturing, retail, home delivery, utilities, and every aspect of modern life - in fact they are the lifeblood of the global economy.

A Time of Unprecedented Change

But the sector is facing unprecedented challenges, with pressure to deliver against a backdrop of growing threats from cyber breaches, people trafficking and organized crime; an increasing legislative burden in relation to staff and customer well-being; rising transportation costs; and disruption to trading relationships and border requirements, not least with the UK's imminent withdrawal from the EU, and rising superpower tensions over free trade.

And now the sector faces the perfect storm of the global COVID pandemic, with the need to adjust to a 'new normal' of social distancing and more stringent hygiene measures, radically transformed supply chains and new customer demand. Coronavirus is testing the resilience and flexibility of logistics operations like never before. The effects of the pandemic are likely to last for years and will continue to pose new challenges for those responsible for protecting facilities and assets, and ensuring the wellbeing of staff.

Amid all these uncertainties and business threats, IDIS is working with logistics businesses to provide complete, end-to-end video technology solutions for security, safety, automation, and data management. IDIS solutions are now in operation streamlining logistics businesses globally, enabling them to boost efficiency and profitability for real competitive advantage.

Why The Burdens of Regulation and Crime Are Growing

Not only is the natural and biological world conspiring to thwart logistics businesses in their quest to deliver, humans are challenging them too – through ever more demanding government legislation, opportunistic and organized crime, and carelessness and mishaps on the job.

It can sometimes feel as if governments only ever add to the red tape and bureaucracy involved in running a business, increasingly passing the burden of enforcement and compliance down the line to hard-pressed companies. Progressively, legislators have devolved responsibility to logistics companies for issues such as checking the right to work, stemming refugee migration and people tracking, and for a raft of health, wellbeing, and safety requirements.

49,000 transport and logistics sector workers are suffering from work-related health issues in the UK according to the Health & Safety Executive, and 16 fatal accidents occurred in the sector in the most recent year. Figures reported by the US Bureau of Labor Statistics are similar, with almost 58,000 workers subject to ill health or injury in the US and 26 work-related deaths.

Distribution centers have long been afflicted by the scourge of attempts to steal goods from warehouses and transport, sometimes including the vehicles themselves. Physical crime – and the threat of it – is debilitating enough, but increasingly cyber-crime is the greater worry.

Last year, Cybersecurity Ventures predicted that cybercrime will cost the world $6 trillion annually by 2021, up from $3 trillion in 2015 – making it more lucrative than the global trade of all major illegal drugs combined. While all economic predictions made before the pandemic will now need to be dramatically revised, the trajectory of the threat remains clear – the trend is upwards.

Long gone are the days when companies only needed to protect their computer systems from hacking. With the Internet of Things (IoT), more and more devices are becoming internet-enabled and connecting to each other on wireless networks. These include computer systems and peripherals; warehouse management and route planning systems; refrigeration, lighting, heating, and air conditioning; and even the very devices helping to protect us, such as alarms, access control and surveillance cameras. While this brings operational efficiencies, utility, and convenience, it adds to the complexity of securing against cyber-crime.

The Cost and Reward of Switching to Network Surveillance

Most modern logistics operations and centers are already reaping the rewards of networked surveillance. Yet some smaller operations may be tempted not to upgrade because of the perceived simplicity and cybersecurity of traditional analog CCTV.

But the benefits of migrating to IP are so significant that they far outweigh the need to cyber-secure them. In fact, they offer a futureproof investment.

Importantly, using IP allows operations managers and security staff to monitor facilities outside of the control room – from client software or via mobile devices. This brings significant operational efficiencies and flexibility.

IP cameras record at a higher resolution, meaning they provide high quality footage and images that are usable in countering crime and fraud. They also offer a better field of view and can cover an area that might previously have required multiple cameras.

An IP system can also flag incidents based on specific parameters - including motion detection, tampering - while configuration via video management software (VMS) provides real-time notifications to events. And the latest cameras use edge video analytics, which record metadata and remove the need for users to search through endless hours of footage to find what they are looking for.

Cameras that use Power over Ethernet (PoE) and NVRs with built-in switches guarantee the most efficient method of cabling during system installation and upgrades. This is an important consideration for large logistics and distribution centers.

Mostly most importantly, IP allows total scalability and flexibility, making it easy to integrate with third party systems and to add new technologies as they become available – technologies with huge potential for future automation and efficiency, such as AI and deep learning.

And for customers daunted by the challenge of a large-scale video system upgrade, most reputable manufacturers support a phased migration path that not only spreads the costs but also eliminates the risks that come with system downtime, by integrating the legacy analog and keeping it fully operational during the upgrade process.

End-to-End Video Tech and The Cyber Security Factor

Because of all the pressures outlined above – from health & safety to cybersecurity - logistics operations face constant pressure to improve efficiency. As distribution centers handle increasing throughput, they need to remain competitive by focusing on all aspects of operations management, from reducing risks to shipments to maintaining good workforce relations and morale.

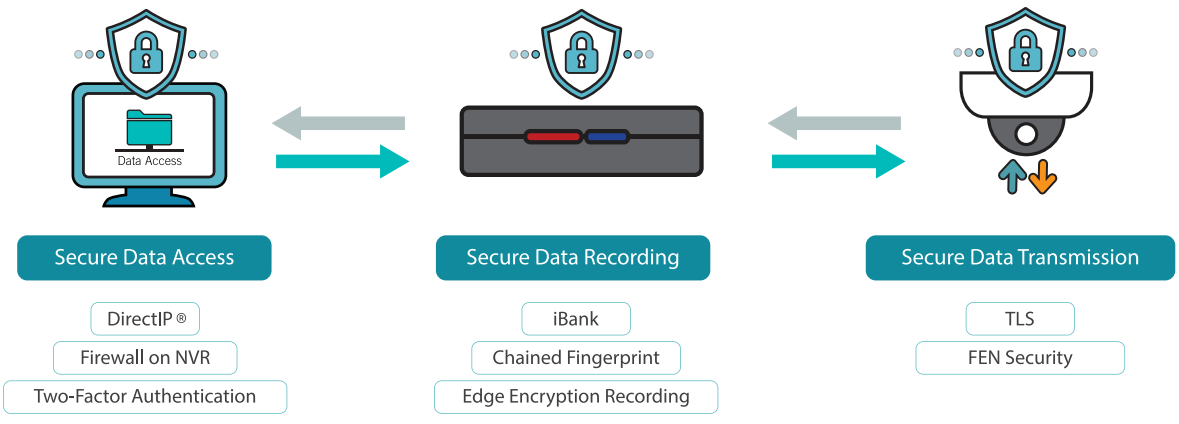
The latest generation IP video solutions can provide what is one of the best value boosts to operational efficiency. And an end-to-end solution provides everything required to build a complete surveillance and business intelligence solution by providing a comprehensive array of surveillance cameras for the widest range of conditions, integrated with NVRs, a choice of VMS, network devices, specialist monitors and video walls. With the added benefit of analytics, these all seamlessly connect to deliver rich functionality.

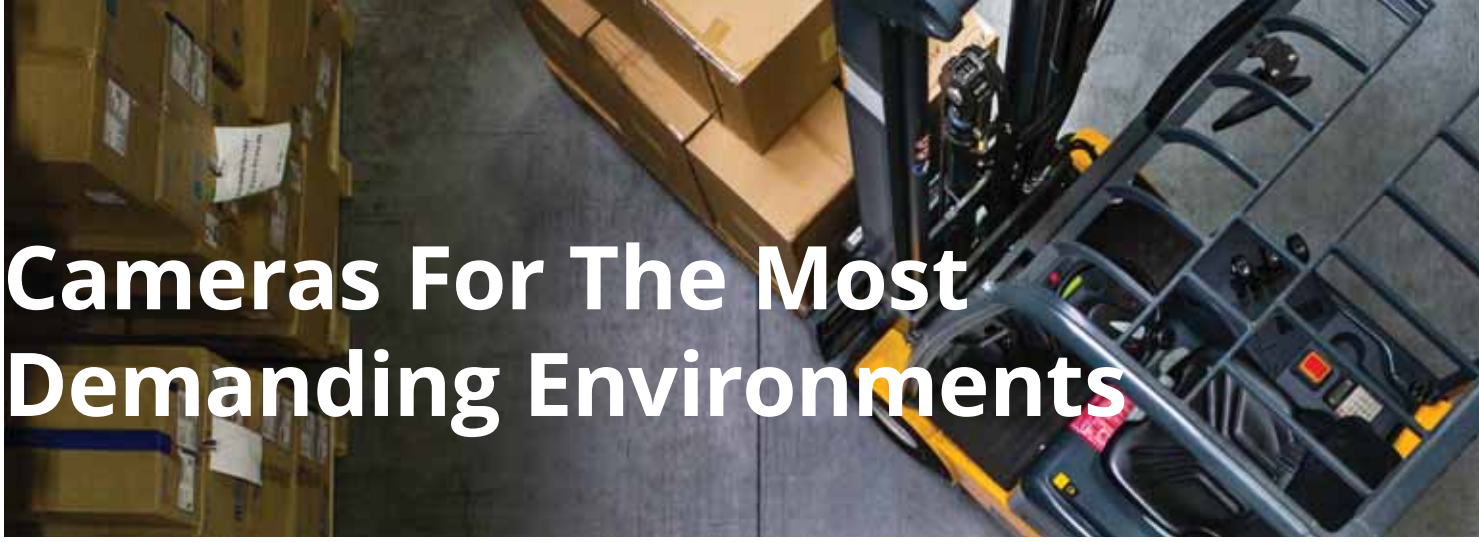
At the same time, solutions that leverage true plug-and-play technology to ensure fast, easy deployment, give the benefits of quicker installation, reduced maintenance, and more straightforward ongoing operation.

Cyber criminals are increasingly targeting IoT devices, so it should be remembered that with true plug-and-play solutions the devices authenticate each other automatically, thus eliminating the need for passwords to be entered manually. This removes an important cybersecurity weak point.

Users should be looking for cybersecurity measures that address three key areas: access; transmission; and the security of recorded footage. This should include evaluating encryptions that won't impact performance; multi factor authentication; and firewalls that prevent unauthorized access and protect against cyber-attacks.

Weighing up all these factors typically shows that an end-to-end solution will be a more cost-effective choice than configuring surveillance set-ups from separate manufacturers and software vendors, or using costly, specialist integration services. This single-source model will almost always offer lower total cost of ownership (TCO), with easier maintenance. And it should give the assurance of automatic firmware updates, long term product support - an important factor that should not be taken for granted - and long-term warranties as standard.





Cameras For The Most Demanding Environments

Warehouses and distribution centers can be affected by extremes of both climatic and lighting conditions, so cameras need to cope effectively with all weathers, temperatures, and variations in lighting

Loading bays are often relatively dark inside during the day, when bright sunlight can beam in as doors are opened. The opposite problem may occur at night when indoor lighting can cause glare against the relative darkness outside.

Fisheye or 360° panoramic cameras are a popular choice for logistics applications. These enable complete situational awareness of internal operations and can cost-effectively replace up to 3-4 fixed lens cameras. They will deliver pin-sharp images and forensic level detail covering up to 3 loading bays.

However, users need to ensure that their fisheyes come with true wide dynamic range (WDR) that is properly and finely balanced. This will ensure that they can deal with the common challenges outlined above, of high relative contrast between dark and light areas in loading bays.

Fisheye cameras rely on de-warping capability, and it is important that this works well right to the periphery, without any distortion. Only high-performance de-warping will deliver the image clarity needed for investigating workplace accidents, especially incidents that occur at the edge of facilities where other traditional security cameras often provide little to no coverage.

Powerful pan, tilt, and zoom cameras (PTZ) are ideal for protecting site perimeters, external areas, and vulnerable entrances. The best PTZs can record in ultra-HD with infra-red, providing clear night-time image capture at distances of up to a few hundred meters. Such cameras can perform virtual guard patrols and auto tracking, supplementing physical checks by security officers and monitoring staff especially out of hours.

If bandwidth is an issue, lower resolution camera models with special light enhancing technology may provide the answer while providing same quality image capture. These can also offer a pragmatic solution for sites where only wireless networks are available.

PTZs have a reputation for jerky controls, so try before you buy. Many manufacturers have now eliminated these problems to ensure that operators do not miss critical incidents in fast-paced logistics environments. Smart user controls will improve accuracy and ease of use, making it easier for operators to pan, tilt, and zoom as they track people, forklifts, and goods

Micro domes or pinhole cameras are useful for deploying on forklifts to reduce preventable accidents, caused by misuse or inadvertent errors. To overcome the challenge of external areas without fixed networks, wireless networks provide a cost-effective alternative, enabling real-time monitoring and playback. This will allow control room operators to take early action to prevent inappropriate activity, mitigating risks before an incident occurs. This reduces accidents and injury settlements and contributes to improved health and safety standards compliance.

Hidden pinholes can also be useful for areas or shelving where high value goods are stored, either as a permanent deterrent or as a temporary measure to investigate shrinkage.

Efficient Tracking and Tracing For Customer Service Advantage

Many logistics customers are finding that bodycams and smartphones, integrated with handheld barcode readers and permanently sited cameras, allow them to gain a visual record of goods as they flow through handling centers and to store each movement as an ‘event’ on the NVR. Each time a package is scanned, automatically or by hand, a time-stamped video record of that moment is captured. So, a high definition video audit trail is created and can be easily searched. Logistics operations are using this capability to monitor, record and prevent losses.

This means customer service agents can handle queries more quickly, with access to data and visual information on the progress of a package resulting in greater efficiencies and a superior customer experience

Cost-Effectively Achieving Fail-Safe VMS Performance

The best video management software (VMS) should be able to be tailored to the specific needs of each logistics business and cover the precise requirements of transport, warehousing and storage. The best provider will offer fit-for-purpose video software, scaled according to precise requirements to enable high-definition real-time monitoring and simultaneous recording.

The throughput of NVRs will need to allow control room operators to monitor operations without lag time or delay, enabling them to respond more quickly and appropriately to incidents. It's worth checking the recorded hard disk drive failure rate to get the best currently available, along with appropriate RAID support and redundant power, to give the assurance of built-in failover. The camera's SD card should maintain uninterrupted recording even when an NVR and camera become disconnected, automatically transferring footage to the NVR when the connection is restored.

Smaller logistics operations looking for a more affordable solution, should beware costly ongoing license fees and high-maintenance systems. Evaluate software that can connect and manage up to a thousand devices totally cost- and license-free. These can give small to medium operations all the essential features they need, and even some advanced tools on top – such as panic recording from an intuitive interface, and navigation via floor plan and building layouts. Such tools may allow easier use by staff who aren't security operators with specific training, for example to quickly export and securely share video clips.

For global operations, and those with multiple locations, a more comprehensive solution may be necessary – but it's important to obtain an affordable pricing structure for the centralized monitoring needed. This should cover an unlimited number of sites, with options for video wall, and multi-layered failover providing protection against network instability and power outages. This is particularly important where major distribution hubs are in areas subject to extreme weather events and the risk of fire and flooding.

Capitalizing on License Plate and Facial Recognition, and Edge Analytics

Logistics and distribution centers can be a target for highly motivated organized crime gangs fraudulently posing as companies arranging pick-ups. This makes it imperative to verify the identity of staff, trucks, and drivers coming on to site. The deployment of license plate recognition software (LPR) along with facial recognition systems streamlines this, allowing automated entry for authorized vehicles along with the automated verification of drivers. Systems like these are easy to use, with drivers enrolled by simply providing ID photos before they arrive on site.

Some newer cameras offer edge analytics that record metadata allowing security operators to access and search volumes of video data, speeding up investigations from days and hours to minutes. Edge analytic functionality can include line cross, loitering and object detection as well as features such as audio detection, active-tampering, and trip zones.

The New Advantages of AI and Deep Learning

Beyond edge analytics is the realm of artificial intelligence (AI) and deep learning analytics tools. Sophisticated manufacturers are now incorporating these into their latest camera ranges.

These technologies can be particularly useful for warehouses and distribution centers, for instance helping to protect specific areas using ‘virtual line’ trip zones that will alert security staff to unauthorized access.

Similarly, operators can establish virtual perimeters where physical barriers are impractical, for example to stop people straying into high risk areas. The software leverages artificial intelligence and deep learning algorithms to perform previously labor-intensive tasks at extremely high levels of accuracy.

Object detection technology allows operators to automatically identify and track targets, distinguishing real threats from alarms triggered by harmless environmental factors. More importantly, it can identify and track people and vehicles, detect loitering and trespassing, and count people in both real-time video streaming and in recorded footage. Operations benefit from intuitive setup of object and event rules for each video channel, for different periods of the day and for specific risk factors. And these operations can be unique to each logistics organization.

IDIS Deep Learning Analytics (IDLA)

Powered by
IDIS Deep Learning Engine

Intelligent capabilities that make it easy and practical to:

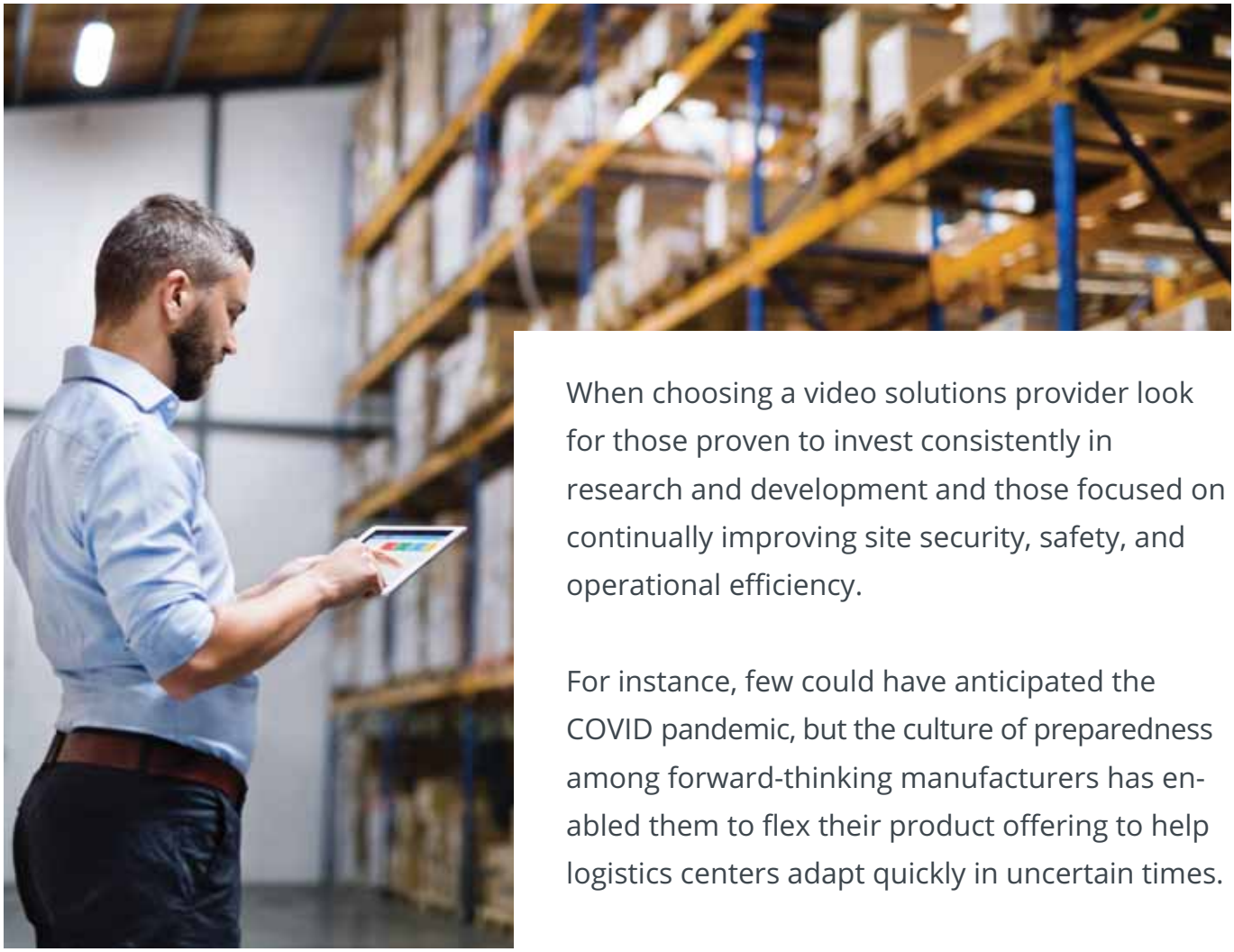
- Detect people loitering or gathering inappropriately, with detection based on location, duration, time, and other behaviors that might precede theft.
- Detect the activity of people and vehicles at loading docks and provide real-time alarms and visual verification of: employees exiting through unauthorized doors; cars and trucks parked in violation of rules; and inappropriate movements of forklifts likely to cause accidents and injuries.
- Detect entry or exit of people or forklifts from protected zones, such as high value storage areas and storeroom entry points.
- Detect vehicles acting suspiciously at the perimeter.
- Detect undesired movement and direction of people and forklifts, specified by location.
- Allow people counting and real-time heat mapping to determine high traffic and low traffic areas for facility optimization.
- Search using metadata that permits user-definable criteria to speed up investigations from hours to seconds.

Reducing Workplace Injury and Litigation with Fall Detection

Fall detection capability can also be performed using AI and deep learning analytics, which allows logistics companies to improve site safety by ensuring the most rapid and appropriate first-aid response to incidents. This same function can also help rebut fraudulent claims where no fall occurred, or where the business was not at fault in any way. Slips, trips, and falls are the second most common accident in distribution and warehousing in the USA, after pallet collapses. And according to the Occupational Safety and Health Administration (OSHA) slips, trips, and falls constitute the most accidents in general industry settings. They cause 15% of all accidental deaths, second to only motor vehicle-related fatalities. In the USA, the cost per medically consulted injury in 2018 was $41,000, while the cost per death was $1,190,000.

Fall detection capability will automatically save a slip, trip, or fall as a video event – and it will make it easy to investigate incidents automatically, and to gather, archive, or export all video evidence and witness statements, rather than wait for claims before taking action

New Solutions To Combat COVID-19



When choosing a video solutions provider look for those proven to invest consistently in research and development and those focused on continually improving site security, safety, and operational efficiency.

For instance, few could have anticipated the COVID pandemic, but the culture of preparedness among forward-thinking manufacturers has enabled them to flex their product offering to help logistics centers adapt quickly in uncertain times.

For example, real-time heat mapping on fisheye-type cameras has been deployed to verify appropriate occupancy density and queue management, both of which will remain universally applicable in a post-lockdown environment. This function can be applied for zone counting, allowing an alert to be triggered whenever an area becomes overcrowded. In the same way, thermal imaging cameras installed as a temporary measure can also help satisfy safety legislation and protect site users' long term.

Domain Expertise and Proven Capabilities

For logistics, transport and distribution businesses there is real value to be had from working with video solutions partners who can demonstrate sector expertise. Not all video tech is the same, and not all providers work to the same standard. A sensible approach is to ask for references and proven successful use cases. And above all, to look at actual results achieved.

This should include among other things:

- Proven traceability of high-value stock and reduced shrinkage where employee fraud has been a problem

Demonstrable improvements in operational efficiency

- Verified health and safety compliance
- Measurable reductions in TCO, through factors such as reduced requirement for camera hardware, faster installation, provision of license-free operation and a lower ongoing maintenance burden.

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