White paper

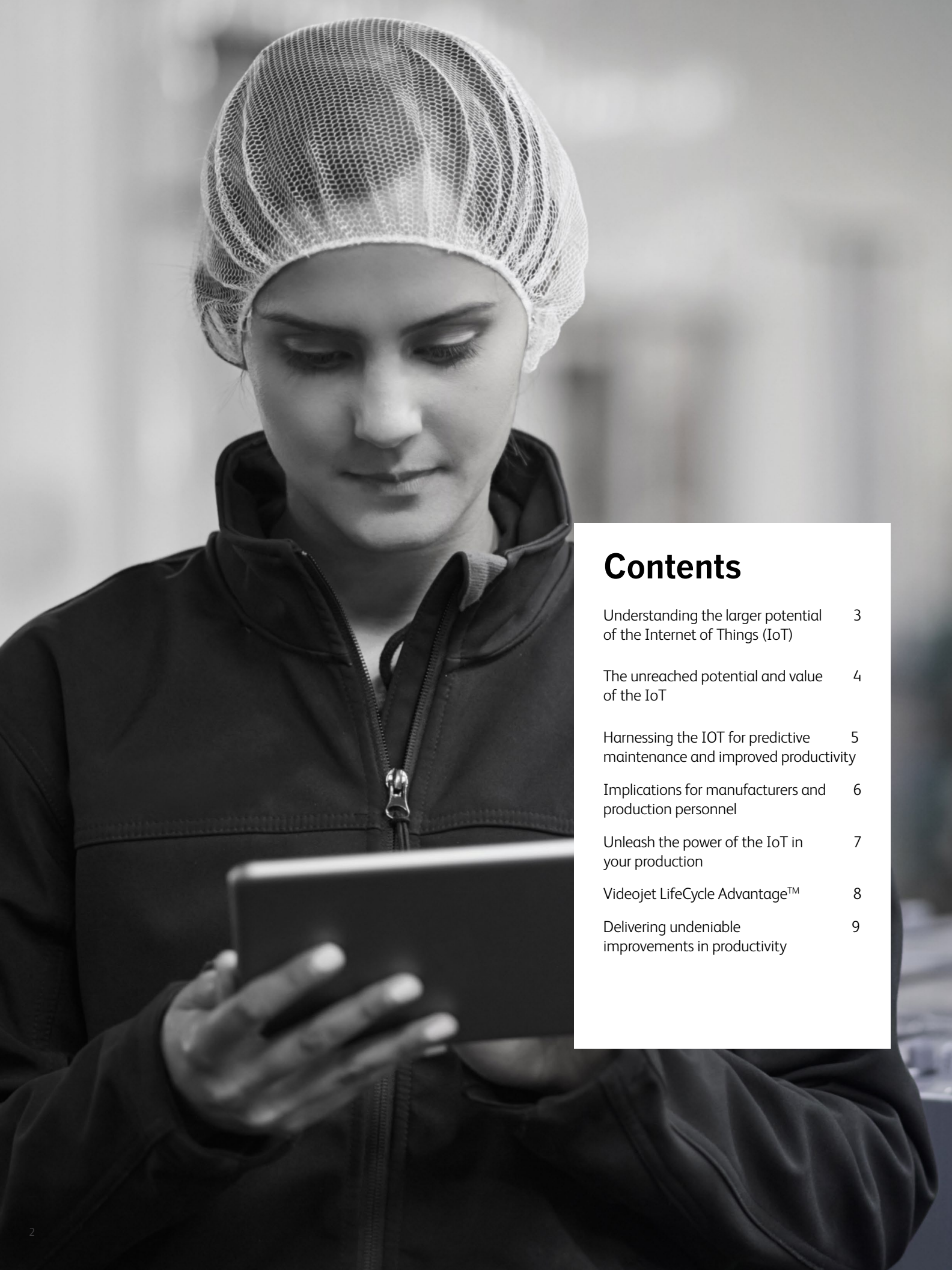
Optimizing production and profits with the Internet of Things (IoT)

Harnessing the power of data in business-to-business (B2B) operations

With growth of the Internet of Things (IoT) comes a curiosity about its value beyond consumer devices. According to a 2015 study by the McKinsey Global Institute, the value potential of the IoT is two times greater for B2B applications versus consumer applications. Moreover, 70% of the potential value enabled by the IoT can be achieved in the B2B arena.[1] Such statistics indicate the vast and untapped potential for B2B companies who can harness the power of data made available by this technology.

This white paper explores the IoT and the opportunity it can provide manufacturers for significantly improving their productivity and profits. It also explores IOT-related advances in coding and marking technology.

[1] *The Internet of things: Mapping the value beyond the hype, McKinsey Global Institute*



Contents

Understanding the larger potential of the IoT

The IoT is the interconnectivity of digital devices via a network that can send, receive and store data. This interconnectivity opens up new economic opportunities for manufacturers ready to capitalize on available data for improvements in processes and productivity, including marking and coding for products and packaging.

With the IoT, manufacturers can gain a comprehensive view of what is going on at virtually every point of production. This visibility can allow adjustments to be made in real-time, helping to both maintain an uninterrupted flow of finished goods and help avoid defects.

The unreached potential and value of the IoT

The IoT currently comprises 15 billion devices; growth to 200 billion machines is anticipated by 2020. This equals approximately 26 connected objects for each person in the world.[1] And of the B2B companies that have already invested in IoT capabilities, 94% have seen a return on their investment.[2]

While a mass of data is being collected with the IoT, less than 1% is currently being used.[3] This creates a huge opportunity for producers to harness available data to optimize the functionality of equipment and employees throughout the manufacturing process. This can help manufacturers boost productivity, improve efficiency and pro-actively address potential issues using predictive analytics.

The projected untapped value for operation and equipment optimization in factories in 2025 is between $1.2 and $3.7 trillion dollars per year.[3]

[1] *A Guide to the Internet of Things, Intel*
[2] *Machine-to-Machine (M2M): Profiting from the Internet of Things, CSG International*
[3] *The Internet of things: Mapping the value beyond the hype, McKinsey Global Institute*

Harnessing the IOT for predictive maintenance and improved productivity

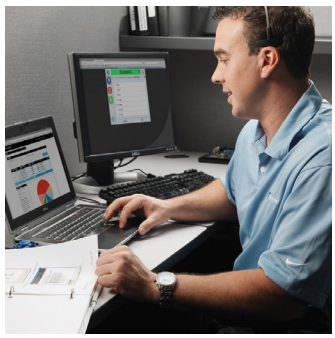
Using the power of data to drive results

Using sensors on equipment, performance data can be collected and used to determine necessary adjustments to machines or work flows. This exchange of machine-based data from sensors to a network allows for remote tracking, monitoring and even remote adjustment of equipment plant-wide or across multiple locations.

Moreover, using sensors to detect and adjust machinery performance (instead of solely relying on human judgment) can help remove the possibility of error. This harnessing of data from the tracking and monitoring of equipment, and the ability to make adjustments remotely can help empower manufacturers to recognize and address costly issues before they arise.

Another opportunity to improve operational efficiency is through predictive maintenance. Sensors can assess equipment maintenance needs by constantly monitoring and gathering machinery operational data. This continual data collection can help manufacturers more accurately identify equipment needs and required maintenance intervals in order to help avoid breakdowns.

With actionable real-time data, maintenance staff resources can be better prioritized and optimized. This can also provide for improved productivity, cost savings and less downtime. And with interconnectivity of machines throughout a facility, machine issues found upstream can often be addressed before defective product is produced and/or makes its way downstream.



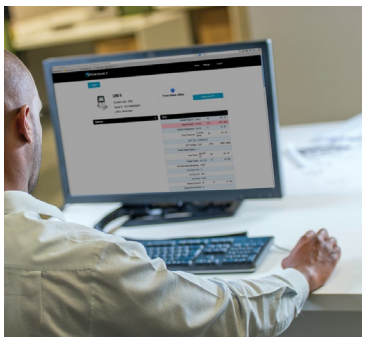
A study by the McKinsey Global Institute estimated that maintenance costs of factory equipment could be reduced by 10-40% with predictive maintenance. Moreover, predictive maintenance powered by the IoT could also reduce downtime on equipment up to 50%. And by extending useful machinery life, capital equipment investment could be reduced by 3-5%.[3]

Implications for manufacturers and production personnel

The use of IoT technology can move manufacturers from a fix and replace mentality to one of prediction and prevention

Adaptation of the IoT into manufacturing is likely easier than thought. With 40 years of automation, many machines are already equipped with sensors and actuators or can be retrofitted. Things to be taken into consideration for interconnectivity include reliable communication networks (hard wired and wireless), data security, and storage (which is commonly managed with cloud-based applications).

By harnessing the power of the IoT, manufacturers can drive performance at individual locations as well as other facilities across their network. Real time data can provide immediate as well as historical insight to production performance throughout numerous facilities. This visibility empowers manufacturers to universally track and optimize their production and processes, improving productivity and profitability. And with remote access capabilities, equipment can be evaluated and adjusted from locations other than the production floor. This functionality simplifies and streamlines tasks for maintenance staff and allows their time and attention to be focused on other priorities. Likewise, with predictive analytics, lines can experience less unplanned downtime, improving product quality as well as production staff efficiency.



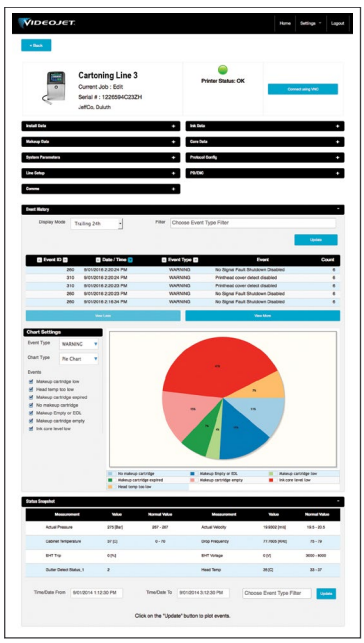


Figure 1

Videojet was the first to develop printer technology using the power of the IoT. Understanding that unplanned downtime is sometimes triggered by a few simple things that can be easily addressed, Videojet has engineered intelligent sensor technology that can identify and immediately communicate many irregularities, faults or maintenance needs. Videojet Remote Service technology is the first of its kind to quickly and pro-actively move users from incident identification to resolution.

The revolutionary Videojet 1860 printer can be equipped with optional Videojet Remote Service technology that collects and instantly shares printer data via email or smart devices to designated users. This real-time notification also provides access to plant dashboard reports (Figure 1).

Videojet Remote Service, a VideojetConnect™ product, allows users to monitor basic printer needs and address them remotely. VideojetConnect™ Remote Service also leverages this interactive printer technology to provide live and immediate assistance to plant personnel. Using remote access for networked printers, Videojet experts can sort through printer data to help troubleshoot, diagnose and repair issues as they arise.

Unleash the power of the IoT in your production

The revolutionary Videojet® 1860 for performance without surprises

Leading innovation, the Videojet 1860 continuous inkjet (CIJ) printer uses IoT technology, on-board intelligence and communication capabilities to optimize production. Through enhanced sensor technology, data processing and communication capabilities, the Videojet 1860 empowers production staff with predictive analytics and automated alerts. The intelligent design of the 1860 includes 53 sensors to continuously monitor 150 key indicators of printer performance. This performance data helps deliver unparalleled uptime by predicting and notifying users of potential unplanned downtime events before they happen.

By providing advance notice of potential issues, the Videojet 1860 empowers production staff to pro-actively address printer needs during planned line stoppages, maximizing uptime. And with optional remote access support from Videojet Remote Service, Videojet experts are immediately available to connect to your 1860 to troubleshoot potential issues in real-time or to help users improve productivity.

Remote access with VideojetConnect™ * Remote Service

The 1860 printer with optional VideojetConnect™ Remote Service delivers on-board remote service capability.

Instant access to the world's largest network of CIJ experts at the touch of a finger.
Bring the Videojet technician directly to the line to aid troubleshooting and remote printer recovery.
No other printer delivers help faster to ensure you make the right decisions when needed.

** Subject to availability in your country*

Remote Alerts:
Be the 1st to know

Real-time notification of printer needs, warning or fault conditions

Empowering you to act quicker, intelligent software dispatches immediate email notifications that inform you of any irregularities or faults that could affect your Videojet printer's performance.

Dashboards:
Be the 1st to respond

Instant visibility to valuable printer activity

Enabling proactive responses, you can now see the status of all the Videojet printers in your plant and drill down to detailed information on an individual unit. Configuration values can be quickly viewed without complicated navigation, and performance graphs can track a unit's history and help identify the cause of downtime events.

Remote Recovery:
Be the 1st to recover

With remote recovery, Videojet expertise is virtually a click away

With remote access capabilities, your in-house experts or Videojet Technical Support can electronically access your Videojet printer's operating system, troubleshoot and even make needed setting adjustments for you online. This virtual access can help you recover quicker, and often without the need for an on-site service call.

Videojet LifeCycle Advantage™

With Videojet LifeCycle Advantage™, the Videojet 1860 leverages advanced analytics, remote connectivity, and the largest service footprint in the industry to maintain our uptime commitment, improve operations over time, and help you recover in minutes from unplanned interruptions.

Improve

- Smart printers leveraging data across a fleet of connected printers to continually optimize printer performance that is tailored to your application
- Consultative services using remote service data to identify operational improvements and help you run your plant better
- The 1860's advanced monitoring and logging capability gives you a greater understanding of total printer performance across all shifts, accelerating your drive towards Lean
- More than 50 embedded sensors to improve predictive capabilities over time and get smarter about avoiding unplanned downtime
- Optional guaranteed uptime contracts to help you reduce your maintenance costs

Maintain

- On-demand remote training from Videojet Technical Support at the touch of a button
- Service packages for periodic preventive maintenance to help keep your printer in peak condition
- Configurable remote alerts notify customers of pending faults and provide warnings before downtime events occur to allow proactive resolution between production shifts

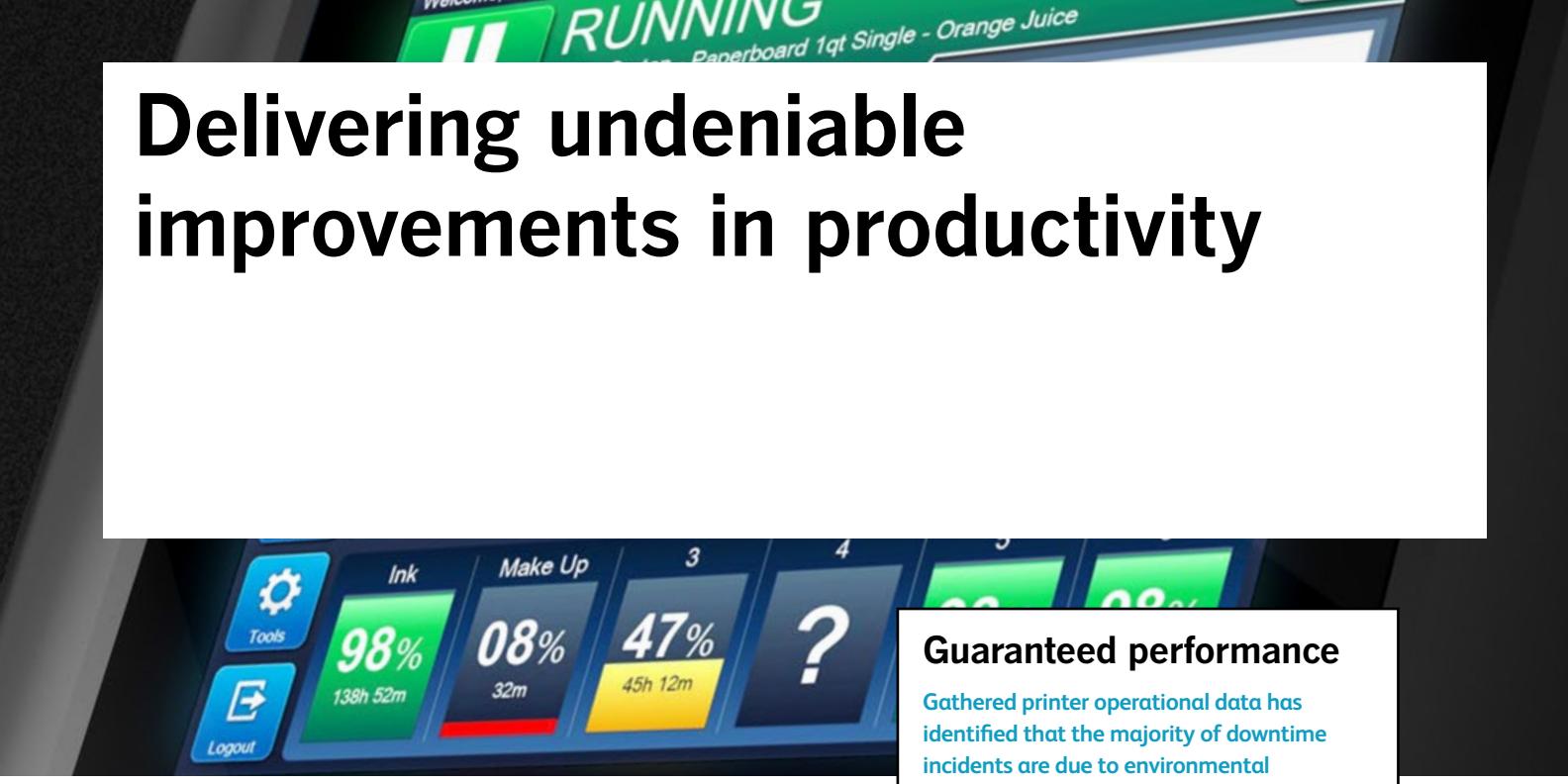
Recover

- Many repair needs can be resolved with the assistance of the Videojet team of CIJ experts in minutes, and without waiting for on-site service
- Largest global service organization in the industry to support on-site needs when complex support needs arise

The Videojet 1860...
the first printer designed with smart sensor technology to not only help maintain our uptime promise, but to get smarter and improve performance over time

Optimize your coding and marking investment

www.videojet.com/LCA



Delivering undeniable improvements in productivity

Drive productivity with the Videojet 1860

Offering unprecedented visibility into the production analytics of your printer, the Videojet 1860 collects, tracks and reports pertinent and actionable data to your production personnel. Historical events from as far back as 90 days are logged and can be analyzed via easy-to-use and multi-faceted reporting tools. This advanced data collection and reporting capability enables manufacturers to continually monitor and improve their processes.

A powerful combination, the 1860 with Videojet Remote Service capabilities enables expert Videojet technicians to help users determine root cause issues and make immediate adjustments wherever possible. The 1860 also provides real insight into how effectively it is operating, and by utilizing VideojetConnect™ Remote Service functionality, users can actively determine how to best use this intelligence to drive efficiency and productivity.

Guaranteed performance

Gathered printer operational data has identified that the majority of downtime incidents are due to environmental issues, knowledge gaps or missed routine maintenance. With advanced notice of such easily resolved issues and the extreme reliability of the Videojet 1860 printer, it is possible for manufacturers to now achieve unprecedented uptime. Videojet is the first printer supplier to make and actively support this claim. Bringing together the power of data with the VideojetConnect™ Remote Service product offering, we can measure and optimize printer performance. Offering a truly consultative approach, Videojet can deliver a whole new level of confidence and performance to your production.

These customers reported significant reductions in downtime with VideojetConnect™ Remote Service

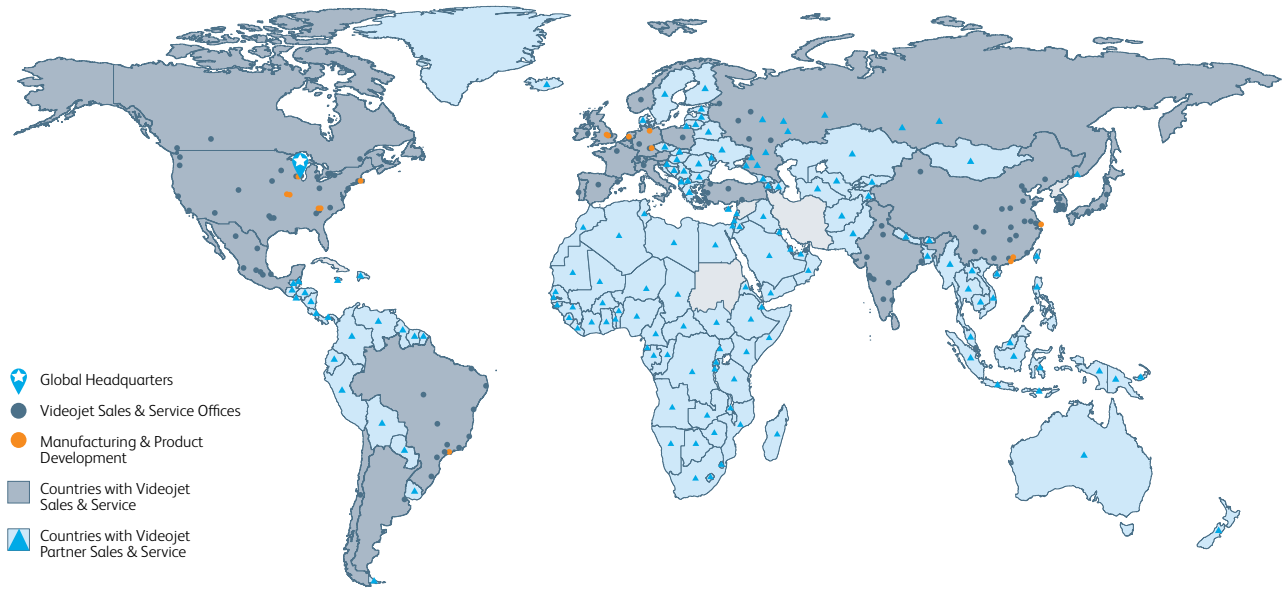
Industry	Large building materials – 8,500 employees	Consumer paper products – 3,300 employees
Testing	63 networked printers in four of 65 US locations	75 networked printers in five of 17 US locations
Testing window	30 days	30 days
Issues identified and resolved	• Lack of timely fluids replacement • Lack of regular basic printer maintenance • Limited operator knowledge • Printer settings modifications	• Lack of timely fluids replacement • Lack of regular basic printer maintenance • Limited operator knowledge • Wear parts requiring replacement • Ink stream misalignment
Improvements achieved	**81.3% reduction in downtime**	**50.3% reduction in downtime**

Peace of mind comes as standard

Videojet Technologies is a world-leader in the product identification market, providing in-line printing, coding, and marking products, application specific fluids, and product life cycle services.

Our goal is to partner with our customers in the consumer packaged goods, pharmaceutical, and industrial goods industries to improve their productivity, to protect and grow their brands, and to stay ahead of industry trends and regulations. With our customer application experts and technology leadership in Continuous Inkjet (CIJ), Thermal Inkjet (TIJ), Laser Marking, Thermal Transfer Overprinting (TTO), case coding and labeling, and wide array printing, Videojet has more than 345,000 printers installed worldwide.

Our customers rely on Videojet products to print on over ten billion products daily. Customer sales, application, service, and training support is provided by direct operations with over 4,000 team members in 26 countries worldwide. In addition, the Videojet distribution network includes more than 400 distributors and OEMs, serving 135 countries.



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