

THE DOT 2026

30 Years of Discrete Droplet Dispensing™ Innovation



The Dot



Building on our legacy. Trailblazing into the future.

Welcome to the second edition of The Dot, an annual publication in which we share inspiring customer stories and update our audience on the latest developments at BioDot. 2025 was a pivotal year for the company, as our continued partnership with ATS Corporation brought exciting opportunities to combine our know-how with a variety of complementary technologies, supporting both new and existing customers on their projects. This collaboration paves the way for a promising future in miniaturized manufacturing while ensuring a continued expansion of our offerings for the laboratory.

We also took the opportunity to focus both inwards on strengthening talent – investing in our people to ensure that they have the tools and support they need to innovate and excel – and on our customers’ needs, through an increase in on-site visits, in-depth conversations, workflow reviews, and structured ‘voice-of-customer’ sessions. These interactions have given us a deeper understanding of what our customers need today, and how they are preparing for the challenges of tomorrow. We are sincerely grateful for the openness, time, and candor our customers brought to every conversation. Our customers challenge us to think differently, inspiring improvements that we may never have discovered on our own. These insights are helping to shape our future strategy and refine our solutions to better address the constraints and opportunities of real-world environments. They have also contributed to the development of NANOlabor™, one of the most innovative solutions we’ve ever created.

At the end of the day, we’re building a future with our customers, not for them. It is their feedback and guidance that enable us to deliver world-class products to laboratories across the world, with recent and future product launches set to drive higher throughput at smaller liquid volumes, disrupting the market, strengthening our core offerings and inspiring the next generation of scientists.

I hope you enjoy reading the second edition of The Dot.

Brian Kirk,
 general manager at BioDot



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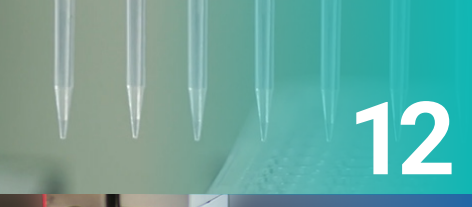
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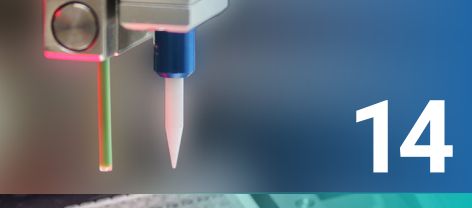
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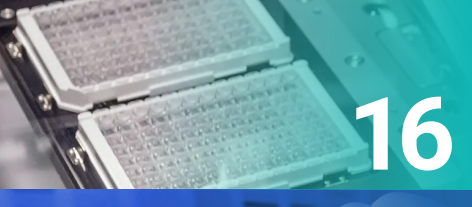
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30 Years of Partnership in Lateral Flow Testing

Rapid diagnostic testing plays a vital role in healthcare, food safety, and veterinary applications, where timely results guide critical decisions. Lateral flow assays are widely adopted in all of these sectors for their ability to deliver accurate results without the need for complex instrumentation, making them especially valuable in resource-limited settings. Spanish manufacturer Operon has been at the forefront of lateral flow test development for more than 30 years and now relies on BioDot's cutting, dispensing, and web handling systems to ensure the consistency of its products.

Operon is a family-owned company founded in 1973 and based in Zaragoza, Spain. Known for its pioneering role in lateral flow testing, it has grown into one of Europe's leading development and manufacturing facilities in the field. Its expertise spans early pregnancy tests through to advanced assays for detecting gluten in food, with highly specialized solutions serving the human health, veterinary, and food sectors.

In the early years, Operon faced several challenges in developing its lateral flow tests. Membranes were highly inconsistent, the materials used in test strips were fragile and required precise handling, and the ability to dispense accurately at such a small scale demanded specialist expertise. Even minor inconsistencies could compromise test performance; reactions between molecules needed to be tightly controlled, porous membranes had to be cut with precision, and any damage to nitrocellulose could disrupt fluid flow and cause variability. Handling was equally critical, as misalignment or small gaps could break the continuous flow path essential for test function. Recognizing the need for greater engineering precision, Operon sought external expertise from BioDot in the 1990s and the long-standing and successful collaboration between the two companies continues to this day.

Operon uses BioDot equipment in both its R&D and production workflows. In small-scale projects, BioDot's XYZ™ dispensers precisely deposit tiny reagent volumes before assembly, after which BioDot cutters slice the lateral flow membranes into test strips. At the production scale, Operon uses two large reel-to-reel dispensers from BioDot, which apply reagent lines to long rolls of material that are then rewound for downstream processing. A key strength of these systems is the precise transition between pumps; when one pump closes and another opens, the minimal gap ensures smooth, continuous dispensing across the full length of each roll. As **Vincente Corbatón, technical director at Operon**, explained: "When you work with a reel-based system, the materials come in rolls of around 100 meters





long, with a single roll producing roughly 22,000 test strips. You have to make sure that every one of those tests is exactly the same. The materials themselves can vary because they're porous, which is something you cannot completely control, but you can at least make sure that the dispensing is as precise as possible. That's why BioDot is our preferred supplier for both R&D and production instruments; its equipment offers the precision and tolerances we need, and performance has remained consistently reliable as manufacturing processes have evolved."

Operon's ingenuity was put to the test in 2011 when a multinational corporation asked for help to tackle a widespread milk fraud issue in Brazil that had been going on since 2007. Some suppliers were mixing whey – a byproduct of cheese making – into fresh milk to increase volume and profit. Although a detection method existed, it was slow and required complex instrumentation, prompting the search for a faster, simpler testing solution. In collaboration with a European university – and using BioDot equipment – Operon was able to develop a highly effective rapid test capable of detecting whey adulteration in milk. The project was completed in just two years, and the resulting test proved so effective that, soon after it was introduced, the fraudulent practice quickly declined. As **Tomás Toribio, managing director at**

“BioDot was our first partner, and our relationship remains very close today.”

Operon, explained: “It was a very successful project, and there was huge demand for our tests, which we were able to meet rapidly thanks to our BioDot systems.”

Beyond the lab, Operon and BioDot have also jointly hosted numerous workshops at Operon's Zaragoza manufacturing base. These events have introduced participants to the BioDot technologies that support Operon's production processes, and have given attendees a firsthand look at how lateral flow tests are developed and manufactured. Experiencing the equipment in use has helped researchers and start-ups to accelerate their own R&D, and some have later adopted the same BioDot systems within their own facilities.

“BioDot was our first partner, and our relationship remains very close today,” said Tomás. In the early days, we had to build our own equipment but it was designed by scientists rather than engineers and, while it did the job, it lacked the precision and refinement of modern systems. When BioDot entered the market, we recognized the value of the precision it offered and we have continued working with them ever since. More than 30 years later, we've produced millions of tests and still rely on BioDot as our preferred equipment supplier.”

To discover more about Operon, go to www.operondx.com

To find out more about BioDot, visit www.biodot.com

Championing Continuous Improvement

Initiatives such as Lean Six Sigma and Kaizen are transforming how businesses operate across different industries, encouraging companies to look inwardly, identify weak points, and drive meaningful change. These assessments span everything from production processes to internal and external communication, encompassing anything that affects productivity and customer satisfaction. In this article, Holly Darban, ATS business model (ABM) champion here at BioDot, shares her experience advocating continuous improvement, describing how she motivates her colleagues, and what these efforts ultimately mean for customers.



Holly Darban,
ABM champion at BioDot

Continuous improvement has become a cornerstone of modern manufacturing, helping companies to optimize processes, respond to challenges, and deliver more value to customers. Frameworks such as Lean Six Sigma, Kaizen, and 5S are commonly used by companies to approach and measure improvement in a structured manner. Lean Six Sigma combines Lean principles – which eliminate waste and streamline processes – with Six Sigma’s data-driven method that reduces variation and improves quality. Meanwhile, Kaizen, a Japanese term meaning ‘change for the better’, focuses on small, incremental improvements driven by employees at every level. 5S complements these principles by creating structured, orderly workplaces where everything has its place, promoting cleanliness, safety, and efficiency. BioDot is adhering to the ABM, which brings these ideas together, ensuring that internal teams worldwide follow consistent and measurable processes. This approach has encouraged collaboration, accountability, and continuous learning – values that extend well beyond the factory floor – and has helped BioDot to strengthen its culture, enhance efficiency and, most importantly, improve the experience for its customers.

Turning Principles into Practice

Implementing the ABM framework has been central to achieving continuous improvement, as Holly explained: “True progress depends on creating a mindset that makes everyone aware of where improvement is needed

and motivated to take part. When employees are encouraged to identify what slows them down, speak openly about challenges, and help shape solutions, improvement becomes part of the culture rather than a one-time initiative. And this is what we have achieved at BioDot; our culture starts with open dialogue. We regularly map out entire processes, identify pain points, and find solutions together to reduce inefficiency and waste. Rather than focusing on blame, we emphasize teamwork and shared accountability. These sessions often uncover overlapping challenges across departments, creating opportunities to streamline operations and strengthen communication.”

“Training is another critical element. I try to make learning enjoyable and memorable, using activities based on our visual management boards. It keeps people engaged and helps them see continuous improvement as something dynamic and rewarding. I’ll sometimes even hand out little prizes – like syringe-shaped pens – to keep it fun!”

“Continuous improvement at BioDot goes beyond internal efficiency, every project is viewed through the customer’s lens.”



The BioDot team taking part in a Jeopardy style contest as part of continuous improvement training.

Building Ownership Across the Company

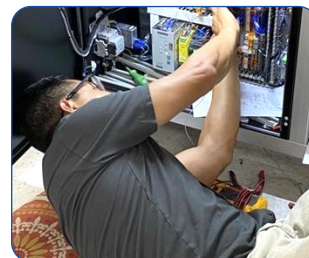
“Sustained improvement only works when leadership supports it and everyone gets involved,” Holly added. “Our management team is completely engaged, making sure goals are aligned across departments and that every improvement effort is measurable and meaningful. We also run the ‘Your Ideas at Work’ program, which gives everyone a voice in shaping how the company evolves. Every employee is encouraged to submit continuous improvement ideas, not just suggestions, but real, implementable changes that make a difference. These can be anything from reorganizing a workspace to redesigning a process. Each idea is documented, reviewed, and the savings are verified with our finance team before being approved. That process keeps everything transparent, fosters accountability, and makes progress visible to everyone.”

Elevating the Customer Experience

“Continuous improvement at BioDot goes beyond internal efficiency, every project is viewed through the customer’s lens,” said Holly. “We look at how each change affects delivery, product quality, and service responsiveness. If any of our key metrics – like delivery performance or service turnaround – fall below target for two months in a row, we immediately start a formal problem-solving process. We identify the root cause, implement corrective actions, and then track results for at least a year to make sure the improvement sticks.”

“That discipline has a direct positive impact on customer experience. Standardized processes across our sites in the US, Europe, and China mean the same levels of quality and communication everywhere. Our documentation and visual management boards make performance visible – customers and auditors see the same clear data we use internally. They often comment on the structure and transparency of how we operate, which builds confidence that every product is made to the same high standard, no matter where it’s produced. Every project we complete is looked at from the customer’s perspective. Improving quality, delivery, and responsiveness isn’t just a metric, it’s part of who we are.”

Example of ergonomics case improvement



Before: wrong position to troubleshoot and assemble instrument.



After: the production lead is using now a pallet jack to raise the instrument avoiding any body injury.

To find out more about BioDot, visit www.biodot.com

Transforming Lateral Flow Development with Precision Dispensing

Lateral flow testing is widely used across healthcare for rapid and reliable detection of numerous conditions, especially infectious diseases. Producing these in vitro diagnostic (IVD) assays requires exceptional precision to ensure consistent performance. RAPIvD Ltd, a pioneer in lateral flow development and small-scale manufacturing, employs BioDot's advanced dispensing and cutting systems to achieve the accuracy and reproducibility needed to deliver high quality diagnostic products from research through to production.



Robert Porter,
founder and managing
director of RAPIvD

RAPIvD Ltd is a UK-based biotechnology company specializing in lateral flow and IVD technologies. Founded in 2018, the company combines scientific insight with engineering precision to help diagnostic test developers bring innovative products from concept to market. RAPIvD provides a complete range of services – from assay design and optimization to regulatory support and pilot-scale manufacturing – supporting applications across healthcare, veterinary, and environmental testing. **Robert Porter, founder and managing director of RAPIvD,** has been involved in lateral flow development since the 1980s, when his father and colleagues pioneered the first test strips. Drawing on decades of hands-on experience, he later founded RAPIvD to support other organizations developing diagnostic products. Robert explained: “The company was created because we saw a real need to help people get their products to market. I wanted to use my experience to help others overcome the challenges and pitfalls I encountered along the way.”

Today, RAPIvD continues that tradition of innovation, developing advanced lateral flow assays and quantitative diagnostic tests that enable faster, more reliable detection of critical biomarkers. Accurate, repeatable dispensing is vital for producing reliable

lateral flow tests, as even the smallest variation in reagent volume can affect sensitivity, reproducibility and overall cost. RAPIvD depends on BioDot's BioJet™ and FrontLine™ dispensers to achieve this accuracy. Robert continued: “Each test has to be optimized for pH, buffers, salt concentrations, plotting method, and deposition speed. We use BioDot systems because they allow us to deposit reagents with extreme precision and consistency. BioJet, for example, applies liquid without touching the surface, preserving the structure of the nitrocellulose membrane and ensuring uniform flow. Once the process is set up, it's simple to repeat or scale up, as the same parameters produce the same results every time.”

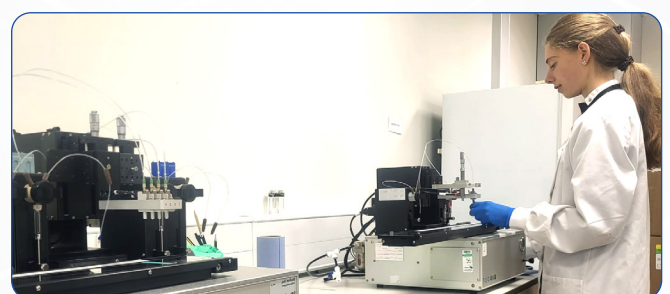
Having this reproducibility of results has made it simpler for RAPIvD to support projects as they move from development to production. Robert continued: “The precision and repeatability of BioDot's systems make it easy for us to increase production volume without compromising quality. Once the process is optimized, we can simply multiply output and the results stay consistent. That's vital as we move toward higher volumes and more quantitative diagnostics. We have the capacity to produce 50,000 lateral flow tests per day

“BioDot wants people to succeed with their systems, they don’t just sell a machine and walk away. It’s a partnership built on trust.”

and, depending on demand, our partnership with a large manufacturing facility allows us to expand to hundreds of thousands of tests per day, moving efficiently from development to large-scale manufacturing.”

Before founding RAPIvD, Robert built and led several companies in the lateral flow diagnostics industry, using BioDot instrumentation in development and manufacturing across every venture. “I’ve been a part of multiple companies, and I’ve bought BioDot equipment for every one of them,” Robert remarked. “If you want to produce high quality diagnostics, you need high quality tools. I’ve always trusted BioDot’s systems; they’re incredibly precise and reliable. During the COVID-19 pandemic, we worked closely with BioDot as part of the UK government’s efforts to expand domestic diagnostic manufacturing capacity. We were asked to source equipment for UK manufacturers to scale up production and, as an independent advisor, we recommended BioDot systems.”

“I’d describe our relationship with BioDot as a symbiotic partnership, as we’ve been working together for years, and the support we get is excellent. It’s very open and collaborative; we share ideas, experiences, and solutions freely. BioDot wants people to succeed with their systems, they don’t just sell a machine and walk away. It’s a partnership built on trust and shared understanding, and it’s one that continues to strengthen as we both keep improving and refining what we do,” Robert concluded.



Read more about RAPIvD at www.rapivd.com

To find out more about BioDot, visit
www.biodot.com

Investing in Discovery: Building the Future of Science



Brian Kirk,
 general manager,
 BioDot

BioDot has been delivering precision dispensing technologies that combine speed, accuracy, and robustness for more than 30 years. Our systems have supported some of the world's largest healthcare companies in manufacturing applications – including lab-on-a-chip medical devices, microfluidics, and biosensors – where picoliter, nanoliter, and microliter volumes must be dispensed consistently in high throughput environments. Today, that same expertise is being directed into the laboratory. The Discovery initiative represents BioDot's commitment to expanding beyond manufacturing into basic research, supporting scientists working in genomics, proteomics, cellomics, and drug discovery.

Advancing both Manufacturing and Research

BioDot has a long track record of delivering reliable performance in life sciences and diagnostic manufacturing, creating technologies to withstand the rigors of maintaining accuracy day after day on production lines. Accuracy requirements are different but just as critical in the laboratory: scientists must be able to prepare a method, run an experiment and trust that the results will be delivered exactly as expected. In both environments, confidence in an instrument's performance is essential: in production, downtime can halt output and drive up costs, while errors in experimental workflows can waste valuable time and put precious samples at risk.

Miniaturization is at the heart of this work, as moving from milliliter or microliter volumes down to nanoliters or picoliters reduces the use of expensive

reagents – and therefore the cost of experiments – while also enabling higher throughput. Miniaturization allows more samples to be packed into a smaller footprint, allowing scientists to move from tens or hundreds of samples to thousands within the same workflow.

This is where BioDot's advantages come into play. Our technology can dispense single droplets as small as 25 picoliters, placed with micron accuracy. Unlike traditional systems, which typically reach their limits at the microliter scale, BioDot's technologies combine sub-microliter precision with on-the-fly dispensing at up to 100 drops per second – compared to just one or two in step-and-repeat approaches – to deliver low volumes accurately at high throughput.

“Our dedicated teams and ongoing investment in new technologies allow us to keep building on a foundation that will serve genomics, proteomics, cellomics and therapeutics research for years to come.”

Into the Lab

While BioDot is best known for supporting clinical and medical device manufacturers, the Discovery initiative highlights how these same technologies can also be applied to laboratory research. In manufacturing, dispensing is often about one-to-many, depositing a small number of reagents across millions of devices. In research, the paradigm shifts to many-to-one, bringing multiple reagents together in a single place. Our dispensing systems support both approaches, opening the door to array-based technologies for next generation sequencing, PCR, mass spectrometry, and micro-ELISAs. Discovery is also helping to reshape perceptions: for years, BioDot was considered the ‘best kept secret’ in the laboratory, with many assuming our technologies were only suited to production. In reality, the same precision and throughput that drive manufacturing are transforming what is possible at the bench.

Investing in People and Technology

Discovery is not only about applying existing systems to new markets. It represents a deliberate investment in people and technology, with dedicated teams being formed to support laboratories worldwide, based on the long-standing culture of quality and reliability that has underpinned our manufacturing support. The same global service organization that keeps production lines running smoothly is now helping researchers to maintain instrument performance, guided by the principle that a failed experiment can be just as critical as a stalled manufacturing process. Research and production lines are treated with equal importance, and our global service network is positioned to maintain high performance wherever our instruments are used.

Accessibility and Scalability

Just as manufacturers must control production costs to stay competitive, laboratories face their own financial pressures – balancing capital expenditure with the ongoing costs of reagents, consumables, and maintenance. BioDot addresses this challenge by creating entry-level versions of our technologies that can be funded through grants or start-up resources, while providing a pathway to scale into higher volume systems as demand grows. Facilities can now begin with a small system in R&D, then expand to high throughput or production applications without leaving the BioDot family. For drug discovery companies, commercial labs, and well-funded academic groups, this balance makes Discovery an accessible and scalable solution.

Looking Ahead

Discovery embodies BioDot’s ambition to be more than just a manufacturing company. It is about empowering both researchers and manufacturers with technologies that combine low volume, highly accurate dispensing with rapid throughput – a rare combination in the market. The initiative is further strengthened by BioDot’s regulatory expertise, which will help to extend these advantages into larger clinical markets in the future. Our dedicated teams and ongoing investment in new technologies allow us to keep building on a foundation that will serve genomics, proteomics, cellomics, and therapeutics research for years to come. Discovery is BioDot’s commitment to laboratories and the future of science, and we invite you to watch this space as we continue to expand what’s possible.

Introducing NANOlabor: The New BioDot Innovation

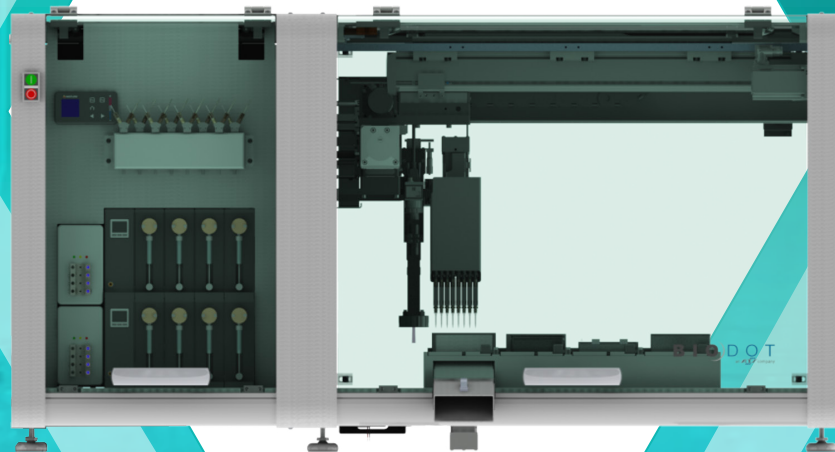
We are proud to have recently launched NANOlabor, a high precision liquid handling system for advanced genomics workflows that demand the highest accuracy with the lowest volumes. This instrument uses disposable pipette tips to aspirate and dispense nanoliter-scale volumes, and is powered by advanced robotics and intuitive software to support high throughput processing, flexible workflow configuration and true walk-away automation. Its precise nanoliter control minimizes reagent consumption while safeguarding the quality and integrity of low-abundance or fragile samples. These features ensure contamination-free workflows and make it ideal for a range of applications, including NGS, PCR set-up, and library preparation.

Features and Benefits of NANOlabor

- Versatile automated solution to help accelerate streamlined workflows.
- Configurable dispensing including fixed and disposable tips to support a dynamic range of applications.
- Nanoliter range disposable tips to eliminate cross-contamination and reduce reagent consumption and cost.
- Compact Design.
- Intuitive Powerful Software.
- Configurable nests for printing onto slides, plates, and microfluidic devices.
- Mechanical precision: X, Y, Z \leq 0.03 mm
- Automated disposable tip mount and ejection.
- Advanced Vision System.
- Integrated Wash/Vacuum Station.
- PC Control Workstation.
- ILD5000 In-Line Degasser.
- Integrated Humidity Chamber.
- Aspirate and Dispense or Bulk Dispense.

To learn more about NANOlabor, contact BioDot at www.biodot.com/contact-us

NANOl^{ab}™



NANOl^{ab}, award-winning nanoliter liquid handling platform recognized at SLAS 2026. Learn how NANOl^{ab} delivers high-precision, contamination-free dispensing for advanced research and assay development. Go to www.biodot.com/products/nanolab

A 20-year Contribution to *In Vitro* Enteric Diagnostics

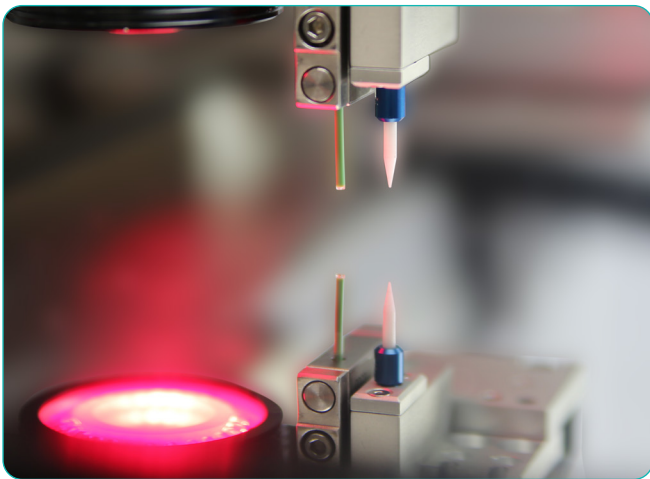
Lateral flow testing offers rapid detection of many pathogens but can be problematic when analyzing fecal matter, as clogging caused by insoluble material may result in inconsistent sample flow and test failure. QUIK CHEK™ diagnostic tests from TECHLAB, part of SSI Diagnostica Group, employ advanced upflow technology to overcome the unique challenges of fecal sample analysis by lateral flow. It is essential that these assays perform reliably and consistently, and the company relies on BioDot's advanced striping and cutting systems for accuracy and reproducibility during production.

TECHLAB, part of SSI Diagnostica Group, is an innovator in rapid enteric diagnostics, and is known for its *Clostridioides difficile* (*C. difficile*) diagnostics solutions, as well as offering tests for parasitology, intestinal inflammation, Shiga toxins, *Campylobacter*, and respiratory pathogens. The company grew out of research at the Virginia Tech Anaerobe Laboratory in the 1970s and 1980s, where its founders helped to identify *C. difficile* as a major hospital pathogen, and developed the first commercial diagnostic reagents for its identification. The company was established in 1989 to bring these innovations to market, initially focusing on R&D while its early products were manufactured and distributed by another firm. As demand increased and external manufacturing arrangements shifted, TECHLAB, part of SSI Diagnostica Group, brought production in house and began its transition into a full diagnostics manufacturing company. Since then, the company has gone from strength to strength, undergoing the Medical Device Single Audit Program (MDSAP) process and achieving ISO 13485 certification and FDA registration. Today, its Virginia manufacturing site in Radford is complemented by others in Florida, California, Denmark, and China, giving it a global presence that supports worldwide distribution.

Steven Harvey, vice president of operations and Virginia site lead, joined the company in 1995 and oversees global operations and leads the Virginia sites directly. He described the company's route to success

over the past three decades: "I joined the company when it was a small start-up with around 12 employees. At that time, it was mostly an R&D company, with a couple of FDA-approved products being manufactured and distributed by another firm. That company was bought out and, with production set to move to another site, I was asked to help establish a manufacturing business capable of in-house fabrication. Thirty years on, we're now a leading global manufacturing company in the diagnostics arena, employing over 160 people at our Virginia site."

“The big advantage here is that BioDot has smaller benchtop units that use the same dispensing technology as the larger reel-to-reel systems, so scaling up from R&D to production is straightforward.”



Steven continued: “QUIK CHEK is a rapid membrane enzyme immunoassay. Its upflow technology uses porous pads and membranes to filter the insoluble materials typically present in fecal samples to avoid clogging. We use BioDot systems to stripe an antibody to a specific target onto a membrane, which requires consistent dispensing of very specific volumes over the length of the material. The Vision QC option then performs in-process inspection to verify that the line has been printed onto the membrane correctly, and meets the necessary width specifications. However, one membrane was difficult to run on a reel-to-reel machine. BioDot helped us to develop a way of working with this material that overcame this challenge. We spent a week at the company’s Irvine facility, then technicians from BioDot’s service department came to Virginia to help us establish the system on site, working with us to achieve our goals.”

Steven explained the benefits of choosing BioDot solutions for the company’s processes: “One of our products uses dots instead of lines. BioDot was one of the few companies that could generate the dots and spacing necessary for the control line area to work, and we have stuck with the company ever since. As well as manufacturing facilities, we also have an R&D arm that is responsible for new product development, looking for novel biomarkers and enhancing existing technologies by employing new test formats to boost sensitivity and specificity. The big advantage here is that BioDot has smaller benchtop units that use the same dispensing technology as the larger reel-to-reel systems, so scaling up from R&D to production is straightforward. This seamless transition simplifies process validation and saves a lot of time. There is also the option to add or replace platform modules – changing the configuration

according to the assay’s performance criteria – which is really beneficial for R&D, allowing researchers to explore different optimization parameters to meet the required specifications.”

“We are also looking at cross-site redundancy, so that we have a backup plan should we need to move manufacturing to another facility, for instance, if materials are harder to obtain in one area than another,” Steven added. “Having the same technology platform across our sites means that we can quickly relocate production should we need to, supporting supply chain continuity. This also simplifies staff training.”

TECHLAB, part of SSI Diagnostica Group, had two BioDot RR4500™ reel-to-reel web handling dispensing systems before the COVID-19 pandemic, and added four RR120™ systems to bolster its existing manufacturing capacity when it joined the National Institute of Health’s RADx™ Tech initiative. In addition to these systems, the company uses several other liquid dispensing automation and manufacturing solutions from BioDot, including an LM8020™ laminator, an AR4000™ dipstick assembly roller, three CM4000™ dipstick cutters, a CM5000™ guillotine cutter and three ZX1000™ reagent dispensers. Typically, these are maintained by its in-house team of equipment technicians. “Installation of the reel-to-reel striping machines for the RADx contract was pretty turnkey; BioDot came to our facility, took them out of the crates and set them up for us. The company also works with our equipment maintenance team, offering guidance that enables our technicians to undertake installation and servicing of our BioDot systems in house, as well as rapidly troubleshoot any issues. We have enjoyed this successful relationship for over 20 years, and look forward to building on it further in the future,” Steven concluded.

To learn more about TECHLAB, part of SSI Diagnostica Group, visit <http://www.ssid.com>

For more information about BioDot’s liquid dispensing automation and manufacturing solutions, see www.biodot.com/products

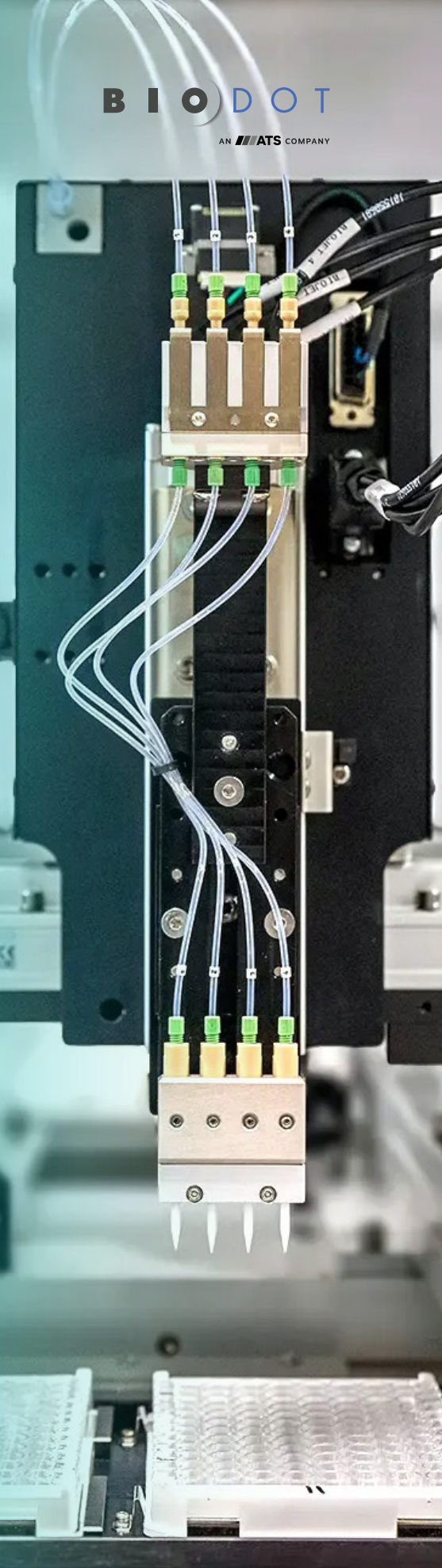
Scalable Product Design Guided by Our Customers



Rob Rich,
director of sales
Americas at BioDot

Interest in point-of-care (POC) diagnostics continues to grow, with tests now being developed for various applications, including pathogen detection, cancer screening, and vitamin monitoring. As these tests become more advanced, many now rely on biochips, biosensors, and microfluidics to deliver faster, more sensitive, and more compact solutions. This increase in both demand and complexity is pushing batch production to its limits, creating a need for more flexible, scalable approaches.

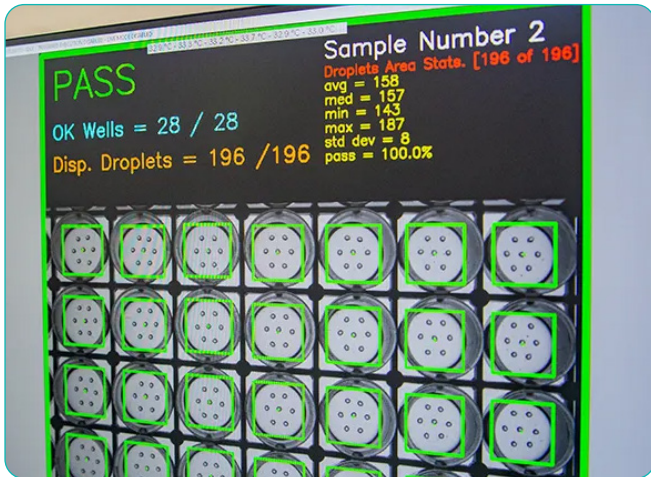
To address these challenges, we have worked closely with a leading manufacturer of diagnostic devices – a long-standing BioDot customer – to develop MODULIS™, a liquid dispensing solution suitable for in-line manufacturing at any scale. This customer needed to increase the throughput of a manufacturing process and wanted to convert the current batch production workflow to a true in-line industrial automation solution. Our R&D experts put their heads together and created MODULIS, the first scalable droplet dispensing platform for in-line manufacturing on the market.



MODULIS™ Biosensor Platform

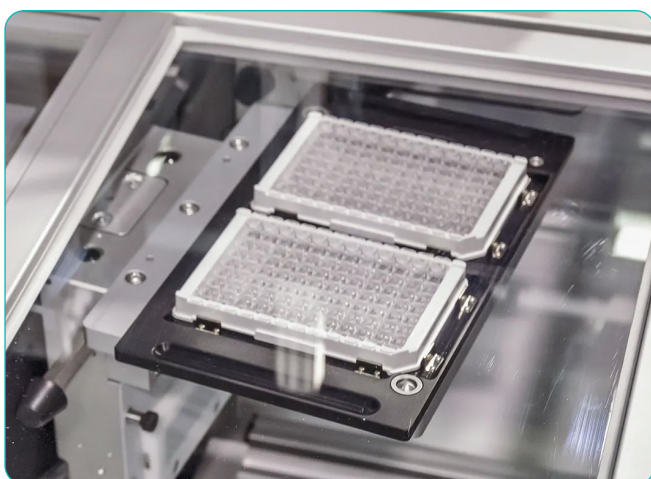
First, we improved throughput:

- MODULIS™ has multiple dispensing modules, each working independently and simultaneously.
- The base MODULIS unit is capable of double the manufacturing output of our standalone workstation, with the option to increase capacity by adding extra modules.
- Modules are connected by SuperTrak CONVEYANCE™, a maglev system with independently controlled shuttles moving at speeds of up to 4 m/s.



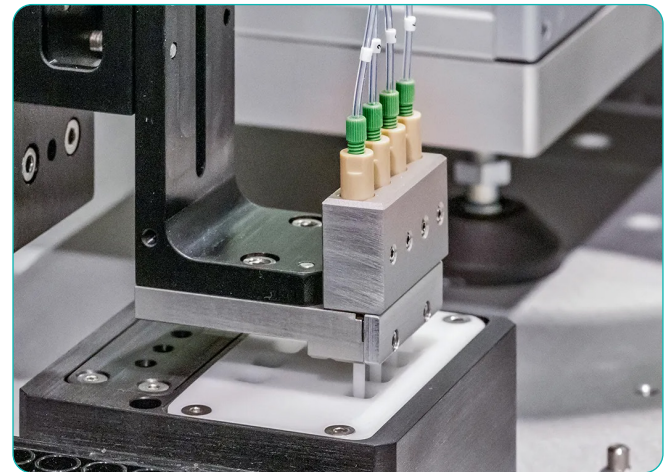
Then process monitoring and QC:

- Level sensors ensure parts have been loaded properly.
- Fiducial find modules precisely target locations where droplets should be dispensed.
- QC stations image the end of the process and automatically flag any failures.



And supremely flexible:

- The maglev track is purchased by the meter to fit into any footprint.
- MODULIS is fully compatible with complementary technologies, including robotic arms and packaging components.



It is integrated:

- Each module features comprehensive logging.
- Detailed monitoring through the whole process reports dispensed volumes and quality data.

And there you have it – MODULIS was born. Backed by BioDot’s state-of-the-art dispensing technology, the modular nature of the system makes it ideal for any precision application, with the added advantage of it being customizable into bespoke solutions specific to each customer’s needs. We’re delighted to have worked with a customer to produce this system and look forward to supporting many customers in their projects, from R&D to full-scale, high-volume manufacturing.

To find out more about MODULIS, visit
www.biodot.com/products/modulis

Developing a Miniaturized CRISPR/Cas12-based Microarray to Advance Rapid Genotyping

Microarrays offer a highly sensitive approach to measuring many genes simultaneously, providing greater throughput than many traditional genotyping methods. They therefore have the potential to advance clinical diagnostics in emergency situations where timely decision-making is imperative to patient care, such as sepsis. Unfortunately, microarray workflows are usually complex and time consuming, posing a significant challenge for realizing their full potential in diagnostics. The Biomolecular Sensing Research Group, part of Japan's National Institute of Advanced Industrial Science and Technology (AIST), is pioneering a miniaturized CRISPR/Cas12-based microarray using non-contact printing, creating a much faster and less complex workflow that could overcome many of the challenges of traditional assays.



Dr Hiroki Shigemori,
researcher at AIST

Sepsis is a life-threatening condition that arises when the body has a dysregulated response to an infection, often leading to organ dysfunction. Alarmingly, around 20% of global deaths are related to sepsis,¹ and nearly half of all cases are in children under the age of five.² Early detection and treatment is critical to improve the likelihood of survival, yet the various manifestations of the condition make diagnosis extremely challenging. This results in inappropriate patient care – including excessive use of broad-spectrum antibiotics, which exacerbates the antimicrobial resistance crisis – and can lead to long-term morbidity or death.³ There is therefore a pressing need for novel solutions to diagnose sepsis, supporting a more detailed and personalized approach to improve patient outcomes.

This field is of particular interest to the Biomolecular

Sensing Research Group, a laboratory at AIST's Molecular Biosystems Research Institute (MoBiS). The research group conducts cutting-edge work in the identification and development of measurement technologies for various biomolecules, such as nucleic acids and proteins. Innovations stemming from the group are helping to drive progress in rapid diagnostic testing for some of the world's most challenging conditions, including sepsis.

Dr Hiroki Shigemori is a researcher in the Biomolecular Sensing Research Group, and has worked at AIST since 2021. He recently published a paper on research conducted during his tenure – *Miniaturization of CRISPR/Cas12-Based DNA Sensor Array by Non-Contact Printing*⁴ – which describes the miniaturization of a solid-phase collateral cleavage (SPCC) system⁵ based on CRISPR/

“The AD1520™ reduced reagent consumption, improved reproducibility, and maintained performance even at print volumes as low as 10 nl.”

Cas12. It is hoped that this technology could one day be used in emergency genotyping situations, including sepsis diagnosis and intraoperative rapid pathology. According to the paper, the major benefit of this approach is that the DNA detection process is quite rapid. Traditional DNA microarrays rely on hybridization to single-stranded DNA (ssDNA) molecules on the array surface, meaning double-stranded DNA (dsDNA) must first be denatured into single strands before it can interact with the surface-bound probes. This is a time-consuming process, entailing multiple steps to ensure specificity and signal stability. In contrast, the CRISPR/Cas12 system directly hybridizes complementary dsDNA sequences, eliminating the denaturing step. In this mechanism, the Cas12 enzyme forms a complex with CRISPR RNA (crRNA) that binds to specific dsDNA sequences. Upon target recognition, Cas12 becomes activated and initiates non-specific cleavage of nearby ssDNA molecules – a process known as collateral cleavage. The cleavage of fluorescently-labeled ssDNA reporters reduces signal that can be triggered by combining dsDNA amplicons, the Cas12–crRNA complex and the reporter probes in a single reaction mixture.

Dr Shigemori and his colleagues have miniaturized this process using non-contact printing of the SPCC-based system to enable comprehensive genotyping, and evaluated the minimum possible size of the sensing spots for detecting target dsDNA. They used the AD1520 Aspirate Dispense System from BioDot for non-contact printing, and applied the VP5000 Vacuum Pump to remove the excess droplets on the printer nozzle. The AD1520 dispensed the Cas12–crRNA complex onto the array substrate, forming uniform spots with a diameter of 0.64 ± 0.05 mm. Spot alignment was extremely accurate, allowing them to achieve a high density of sensing spots and enabling multiplexed analysis. This approach reduced reagent consumption, improved reproducibility, and maintained performance even at print volumes as low as 10 nl.

The Biomolecular Sensing Research Group demonstrated the value of using a non-contact printer for developing a miniaturized dsDNA sensor array, which was shown to have sufficient sensitivity for clinical use. Considering that the SPCC system can be performed with only hybridization and washing steps, the sensor array developed by Dr. Shigemori and his colleagues offers a simplified workflow compared to traditional DNA microarrays. This work has the potential to address long-standing challenges of managing patients with sepsis and other time-critical conditions, where a fast and accurate diagnosis is vital to save lives.

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To discover more about AIST, visit
www.unit.aist.go.jp/molbis/en

To learn more about Dr. Shigemori's research, explore the full paper in
Micromachines

To find out more about BioDot, visit
www.biodot.com

Advancing Cytogenetic Diagnostics Through Automation

Karyotyping and fluorescence in situ hybridization (FISH) are indispensable tools in clinical cytogenetics, where precise analysis of chromosomes informs diagnoses and guides treatments. These techniques reveal abnormalities that cannot be detected using conventional molecular methods. Synevo Romania is the leading provider of diagnostic laboratory solutions in Romania, offering more than 2,000 routine and advanced tests, covering the full range from prevention and early diagnosis to treatment monitoring. The company has recently worked with BioDot to upgrade its cytogenetics capabilities, developing the first automated combined cytogenetics workflow in Europe.



Dr. Ileana-Delia Manea-Săbău, assistant professor, MD and head of medical genetics at Synevo

Cytogenetic approaches – including karyotyping and FISH – play a vital role in identifying chromosomal abnormalities associated with developmental disorders, cancer and genetic diseases. By visualizing the number, structure or organization of chromosomes, clinicians can detect genomic alterations that offer insights into disease mechanisms and progression. Karyotyping involves examining the appearance of the complete set of chromosomes – their number, size, and shape – while FISH uses fluorescent probes to reveal the precise location of specific DNA sequences. Rapid and accurate cytogenetic testing is a key priority when diagnosing chromosomal abnormalities.

Synevo is part of Medicover, a leading international healthcare and diagnostic services provider headquartered in Sweden. As of the end of 2024, Synevo operates a national network of 23 clinical laboratories and 189 blood-drawing points strategically located across 80 cities, plus two veterinary labs. The company employs more than 1,600 employees and

serves over 3.6 million customers, performing more than 21.9 million tests annually.

Synevo’s busy cytogenetics lab in Bucharest provides FISH, classical karyotyping, molecular karyotyping, and sequencing for patients across Romania, Bulgaria, and Moldova. Almost all cytogenetic techniques involve accurate dispensing of small sample and reagent volumes in a controlled environment to produce slides with clear dispersion of chromosomes. Previously, the company prepared slides for karyotyping and FISH manually, which was time-consuming, required a high degree of precision, and was vulnerable to changes in the lab environment. Temperature and humidity, in particular, are crucial factors to control, because they directly influence how chromosomes spread on the slide. **Dr. Ileana-Delia Manea-Săbău, assistant professor, MD and head of medical genetics at Synevo**, noted: “With our previous workflows, it was almost impossible to keep the humidity at the optimal level. We therefore decided that 2025 would be the year that we



Members of the Synevo team

“The CellWriter™ S is very flexible, and it is important for a lab that processes so many samples to have such a powerful machine.”

moved to full automation for any process that could be automated, helping to ensure that our patients receive accurate, timely diagnoses.”

Synevo’s collaboration with BioDot, alongside newly acquired chromosome harvesters and specialized software, has resulted in the first automated combined workflow for cytogenetic analysis in Europe. “We switched from manual pipetting of the samples to using the CellWriter S from BioDot, which has made an enormous difference,” Ileana-Delia explained. “We now have cleaner slides, better dispersion of the samples – as we can control the temperature and humidity – and we can use a smaller sample volume, meaning that we retain some material for further analyses.”

Since installation, the CellWriter S has significantly improved the workflow for technicians, as Ileana-Delia explained: “The CellWriter S is very flexible, and it is

important for a lab that processes so many samples to have such a powerful machine. Our technicians can open the machine, set up the samples, then go and perform other lab chores while the slides are prepared; they no longer have to be there the whole time, which improves the efficiency of our operations.”

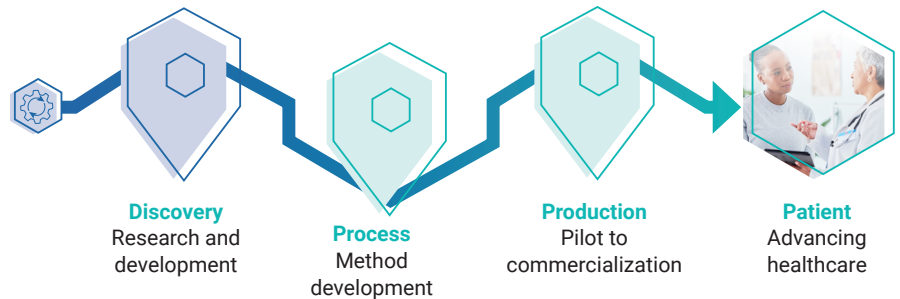
Dealing with time-sensitive patient samples means that the team requires rapid technical support from suppliers to keep operations running smoothly. “When we have questions, the field application scientist from BioDot always answers us very promptly, so we don’t have to interrupt our flow. Over the past eight months since we installed the system, we have not had any problems; we have great support from BioDot both locally in Romania and internationally.” The CellWriter S is the first product from BioDot that the team has used, and the technicians are keen to keep using it in the future. “We’re looking out for new features and technologies from BioDot and are eager to know what’s next!” Ileana-Delia concluded.

To discover more about Synevo, go to www.synevo.ro

To find out more about BioDot, visit www.biodot.com

ATS Life Sciences Group

BioDot is proud to be a part of the ATS Life Sciences Group, automating the journey from discovery to production. Together, we can accelerate the delivery of life changing diagnostics and therapies for human and animal health.



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To us, success goes beyond simply meeting expectations. Our solutions are designed to ensure longevity of your investment.



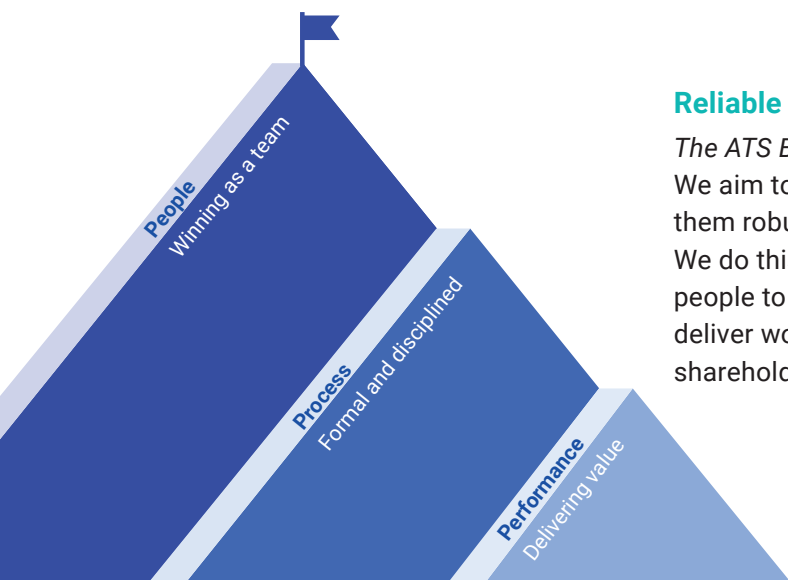
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We are a single source systems integrator whose results exemplify the power of collaboration and unified skill.



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Maximize asset performance with proactive maintenance. Onsite ramp-up support, as well as remote, classroom, and lineside training.



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At BioDot, we understand that precision dispensing requires more than just equipment; it demands reliable service, expert support, and a commitment to your goals and success. That's why our service solutions are designed to ensure maximum uptime, seamless performance, and long-term value for your BioDot systems.

Why Choose BioDot Service?

- Unmatched access to support.
- Global team with a century of combined experience.
- Performance-driven service metrics.
- A culture of continuous improvement.
- Industry leadership and experience.

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Hear what our customers had to say about their experiences with BioDot

“We can be doing other things in the wet lab, knowing that we can load up a CellWriter S, literally walk away from it for an hour and come back to 12 processed patient samples.”

- Andrew McCoy, laboratory supervisor at MD Anderson

“Our partnership continues to evolve, and this largely comes down to the BioDot team, which truly feels like an extension of our own team.”

- Phil Paik, CEO at Molecular Assembly

“The systems are incredibly straightforward to use, and we generally do most of the troubleshooting ourselves.”

- Dr Bianca Lux, head of membrane production at MEDIWISS ANALYTIC

“We have now been working with BioDot for over 15 years. The company's instruments have been real workhorses for the lab throughout this time.”

- Dr Amanda O'Brien, R&D supervisor at Enfer Group

“The genetics lab experience has been greatly improved by this user-friendly instrument. Its simplicity in interface and operation streamlines tedious manual processes, enabling technologists to focus more on specialized tasks like microscopy, tissue culture, and FISH analysis. Overall, it's been a rewarding encounter.”

- Ryan O'Mara, lab manager at UNC Health



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