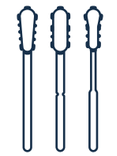
Clinical Microbiology Automation Solutions

Streamline Your Laboratory Workflow

Copan
innovating together



Collection

Transport

Processing

Artificial Intelligence

Comprehensive Preanalytics, from Sample to Interpretation

Today's microbiology laboratories face tough challenges. Increased workloads, labor shortages and the impending retirement boom of Medical Technologists and laboratory professionals have compelled laboratories to look for more efficient, cost-effective ways to process the influx of samples.

Technology that Serves Microbiology Laboratories

Copan is committed to providing comprehensive solutions for preanalytics.

With unsurpassed innovation and relentless collaboration, Copan offers solutions to laboratories around the world, helping laboratory professionals face challenges head-on. From the first automated specimen processor prototype to more than 1,000 instruments worldwide, Copan has solicited input from the Microbiology community.

As a result, Copan's full laboratory automation systems are designed to be open, modular, and forward compatible, to meet the needs of each unique laboratory today and tomorrow.

Innovation to

Improve Outcomes

MICROBIOLOGY IS ONE OF THE MOST LABOR-INTENSIVE DISCIPLINES WITHIN THE CLINICAL LABORATORY FIELD, and its role is of vital importance to overall healthcare.

It is well established that laboratory professionals are asked to do more with fewer resources and to consistently demonstrate the value of laboratory medicine in clinical outcomes.

The automation and Artificial Intelligence (AI) algorithms developed by Copan combine the unparalleled human intelligence of the Microbiology community, with the invaluable asset of AI to help laboratories amplify their resources to provide faster actionable results to clinicians.

Increase Productivity and Decrease Cost

According to a multi-center study[1], Full Laboratory Automation can almost double productivity in the microbiology laboratory and halve the cost-per specimen, regardless of the laboratory size, specimen load or location. In addition, data shows that the turnaround time (TAT) for urine cultures can be improved from 16% finalized within 24 hours to almost 60% finalized within 24 hours using WASPLab® with PhenoMATRIX® (Figure 1).

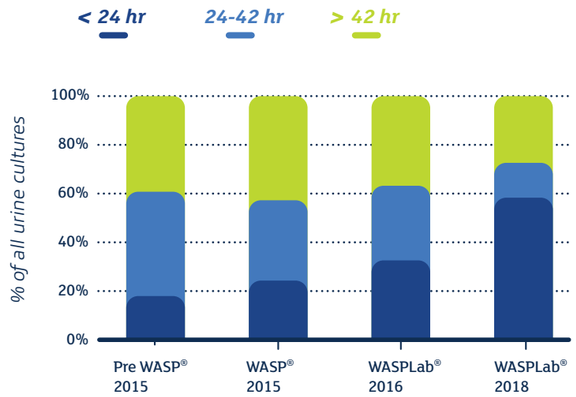
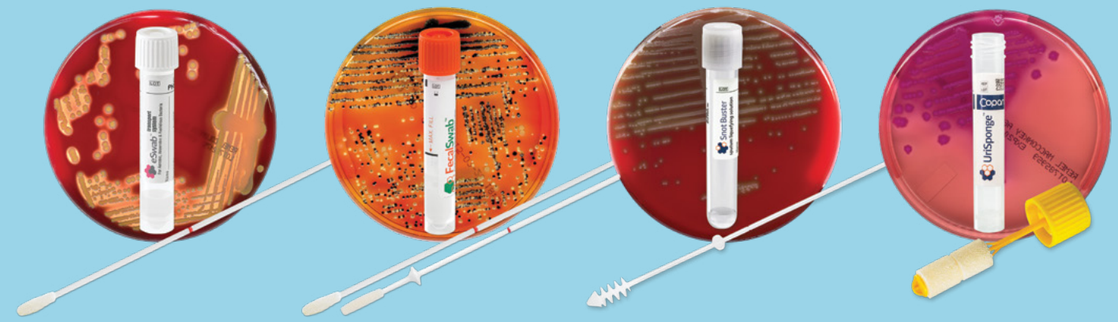


Figure 1: TAT frequency distribution with WASP® and Full Lab Automation

A Liquid Solution for Microbiology Samples

Full Laboratory Automation Begins with the Sample



eSwab® SWABS | FecalSwab® STOOL | SnotBuster™ SPUTUM | UriSponge® URINE

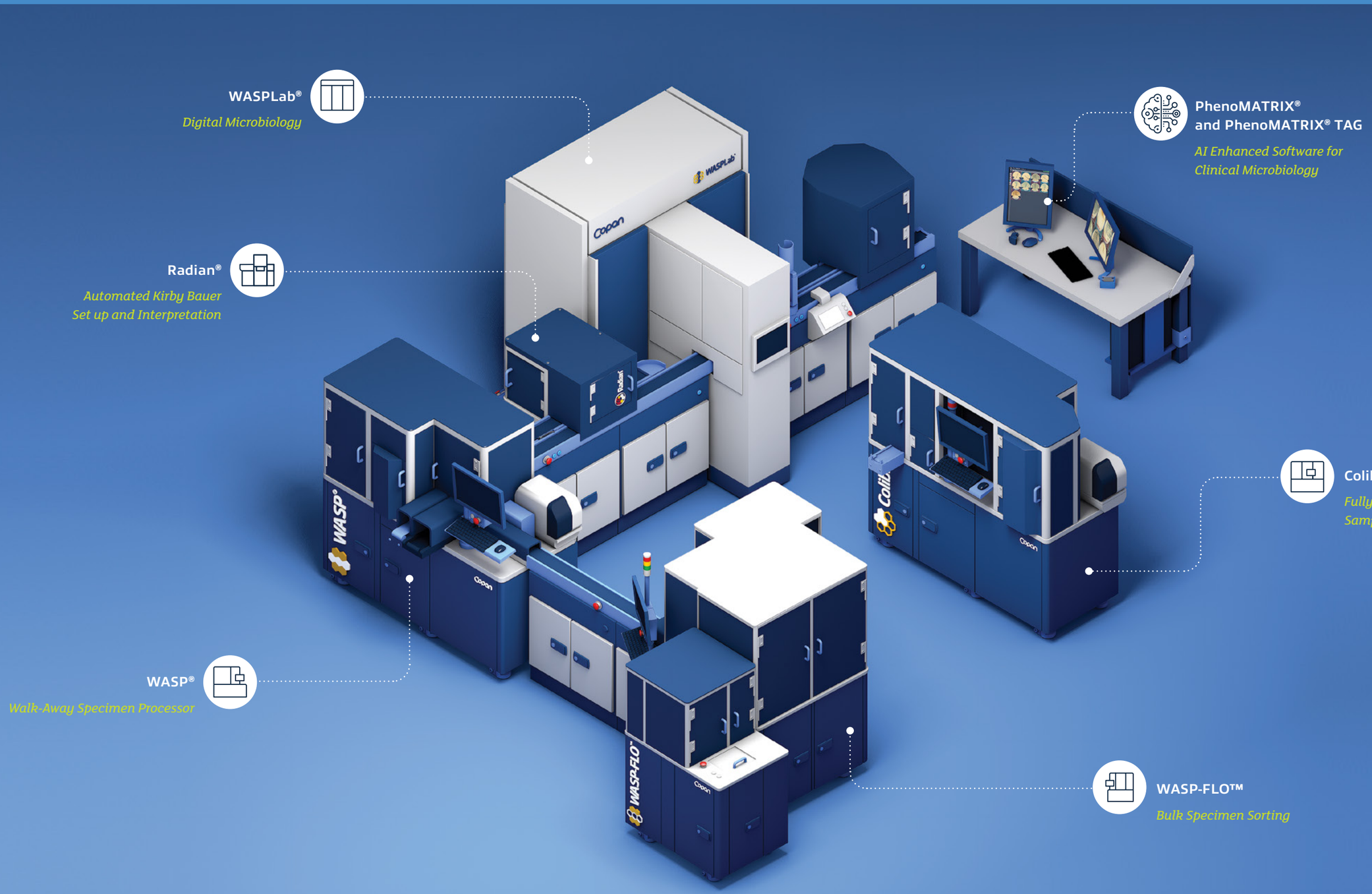
Maximize Your Automation Investment

Developed by Copan in 2006, Liquid Based Microbiology (LBM) combines state-of-the-art flocked swabs with media, transforming challenging samples into easy-to-process, multi-purpose liquid samples which are easily processed on WASP® Walk- Away Specimen Processor.

WASP® requires no manual intervention for specimen processing procedures. While non-liquid samples or traditional swabs can be managed using streak only function, Copan recommends Liquid Based Microbiology (LBM) product line to maximize your automation investment.

Ready to make the switch to better Microbiology with LBM? Copan can help with change management, workflow analysis, verification guidance and training.

Copan Full Laboratory Automation



WASP®

Automated Specimen Processor

Learn More

WASP® ALLOWS THE REASSIGNMENT OF VALUABLE LABORATORY STAFF without compromising the quality of Microbiology cultures. The system is designed to mimic a technologist, utilizing best practices for planting and streaking for every patient specimen.[3]

Standardized, High Quality Planting and Streaking

✓

Image analysis check confirms inoculum in loop

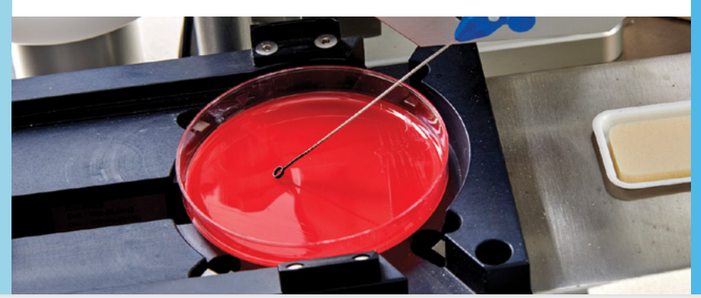
Automatically selects appropriate loop size (1µl, 10µl or 30µl)

Available loop sterilization between quadrants, for optimal colony isolation

Upfront Specimen Processing

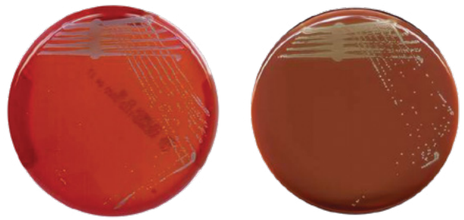
Modular, Open Platform for Complete Specimen Processing Automation

- Ensure traceability with automated labeling and barcode reading
- Minimizes reliance on consumables, reducing waste and associated costs
- Scalable system adapts to any laboratory size and workflow



Automation with Proven Scientific Techniques

WASP® follows the Manual of Clinical Microbiology and Clinical & Laboratory Standards Institute (CLSI) recommendation to use 1µL to process routine urine specimens.



Plates inoculated using Copan WASP® 1 µl loop[4]

Plates inoculated using competitor automated specimen processor, 10 µl pipet[4]

Minimize Operational Costs

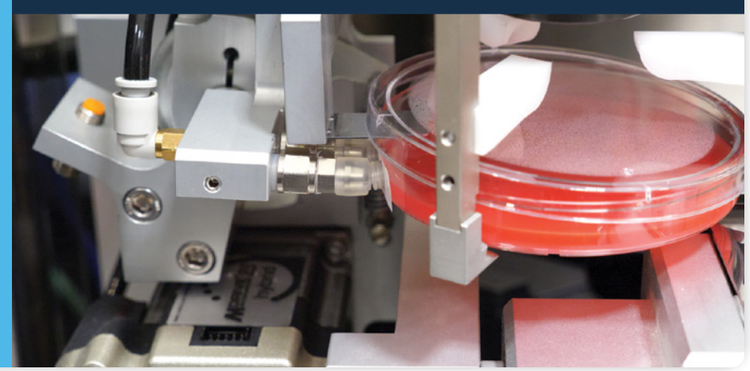
WASP® uses reusable metal loops reducing operational and waste disposal costs.

Fully electric system eliminates the need for a compressor and/or additional utility costs.

Open platform accommodates any manufacturers' media, allowing users a choice in their culture plates.

Barcode Driven System Improves Specimen Traceability

- Smart 360° scan technology reads specimen barcode labels anywhere on the container.
- Multiple labels and barcode languages on a single tube can be differentiated, discerned and read by the software.
- Labels completed plates, Gram slides, and inoculation tubes are reconciled to the patient specimen barcode.



WASP®: Walk-Away Specimen Processor

Warehouse Carousel

Optional module to manage enrichment broths and antibiotic disk dispensing

Incinerator and HEPA Filter

Ensures a clean and safe enviornment free of cross contamination risks

Inoculation Verification Camera

Checks sample presence and loop integrity

Gram SlidePrep™ EVO

Optional module prepares gram slides with laser etch printing of patient identification

Specimen Handling Robots

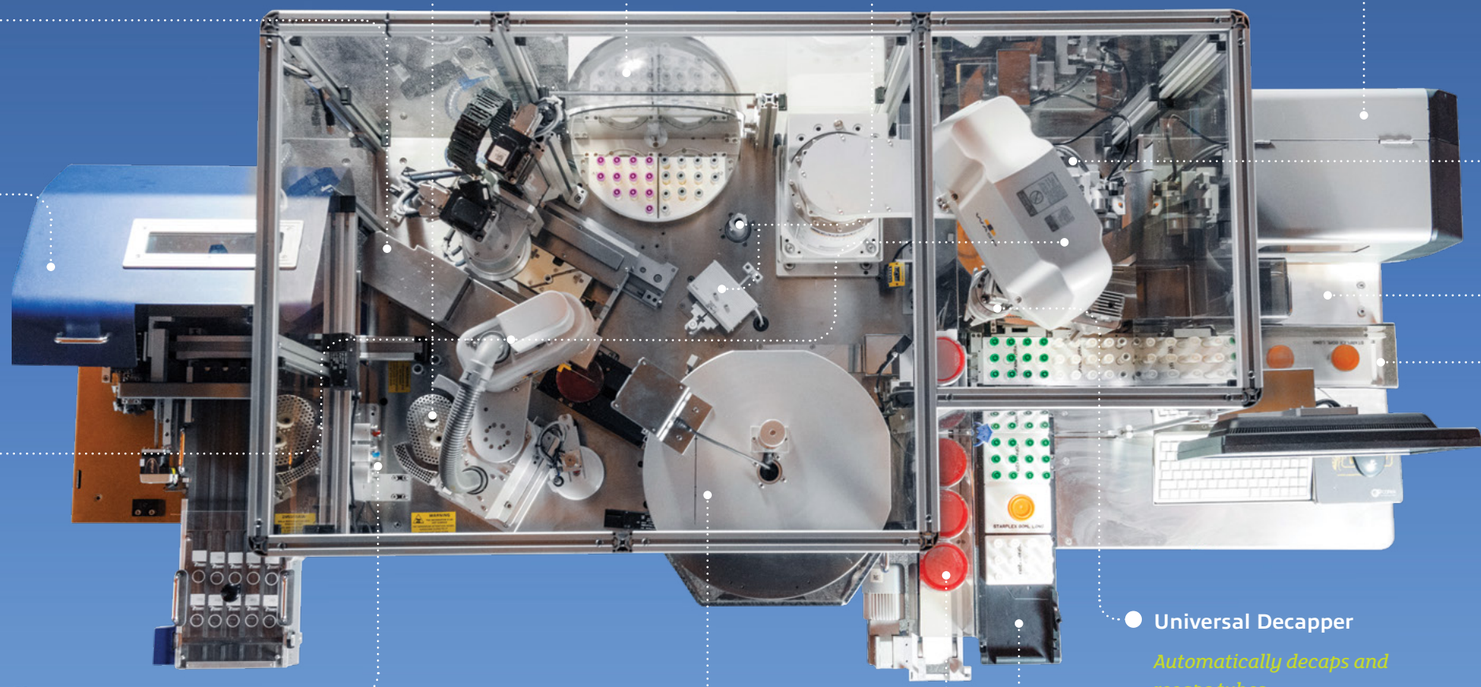
Manage samples individually to eliminate cross contamination risk

Automatic Loop Change

Choose from 10, 20 or 30 µl reusable metal loop

Open Platform Media Carousel

Holds 378 plates in 9 separate media carousels. Utilize any manufacturer's plated media.



Spinner and Vortex

Ensures homogeneous sample

Printer

Automatically labels plates, tubes, and gram slides

Smart Barcode Reader

Guarantees traceability of every sample

Rejection Bin

Segregates rejected samples

Sample Entry Conveyor

Load continuously – no need to batch samples

Universal Decapper

Automatically decaps and recaps tubes

Sample Exit Conveyors

Processed samples and plates are unloaded

Optional Pipettor Module

for customizable volume inoculations

Upfront Specimen Processing

WASPLab®

Digital Microbiology

Learn More

WASPLAB® IS A HIGHLY EFFICIENT, MODULAR, SCALABLE AND CUSTOMIZABLE SPECIMEN PROCESSING AND CULTURE WORK-UP SYSTEM FOR CLINICAL MICROBIOLOGY. Samples move from front-end processing, to Smart Incubation, Digital Microbiology and Artificial Intelligence and Interpretive Algorithms for plate reading.†

Full Laboratory Automation

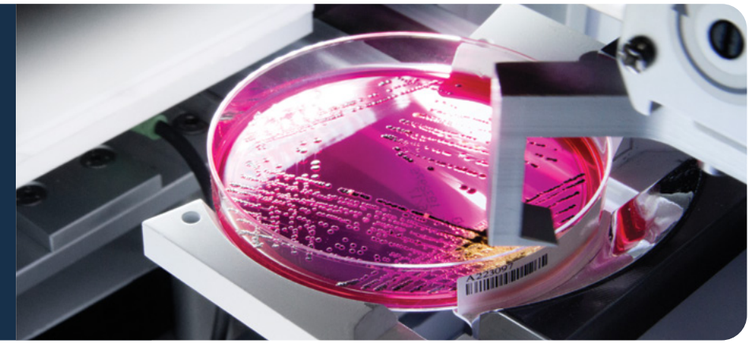
From Plate Image to Interpretation

- Standardize optimal incubation conditions for better and faster results* [5-10]
- Improve laboratory productivity and quality through automated culture sorting and automated recognition of some common clinical bacterial isolates[1, 6, 7]
- Modular, scalable, and adapts to every workflow[11, 12]

* Based on user experiences. Varies based on validation and user preference.

Image Acquisition System[b]

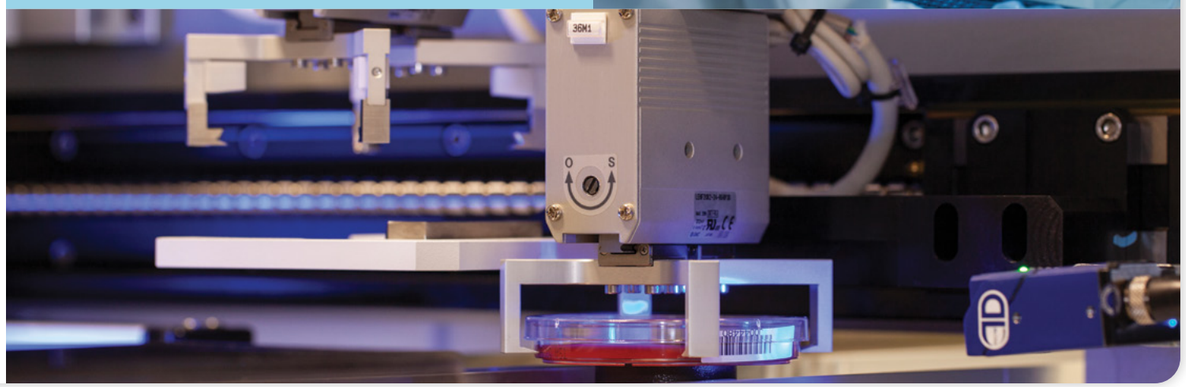
A sophisticated lighting and camera system acquires the image of each plate clearly and accurately.



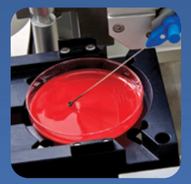
>1000	1600 pixel/mm	9 mm	24 BIT	48MP
Lighting combinations	Resolution	Depth of field	Color depth	RGB telecentric Trilinear camera

User Interface Centralizes Laboratory Workflow

The WASPLab® user interface is designed as the mainaccess point to all laboratory tasks, ensuring an easy and user-friendly interaction.



WASPLab®: Technology Leader in Full Laboratory Automation and Digital Microbiology



WASP® Walk Away Specimen Processor

Open platform, modular instrument addressing all aspects of specimen set up

Incubators

Available with O_2 or CO_2, double or single incubators

Robotic Incubation and Storage

Dual robot system efficiently loads plates media side down onto individual shelves ensuring uniterupted, homogeneous incubation conditions

Offline Carousel

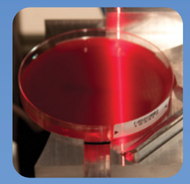
Allows user to manually load plates that have have been manually processed processed onto the system

Endline Canister System

Plates are automatically sent to removable canisters or can be directed to an end-line disposal bin

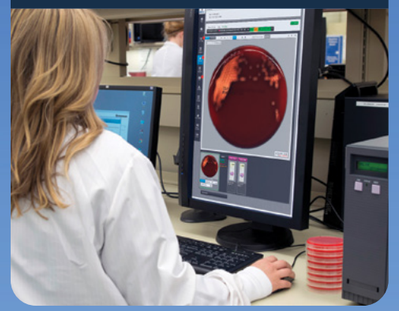
Image Acquisition

Telecentric camera acquires 48 megapixel image with multiple lighting combinations to optimize image quality depending on media type



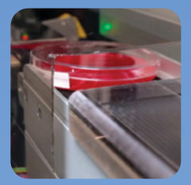
Workstations

Plate management for screening, reading, and picking



Conveyor System

Customizable conveyors move plates from upfront processing to full laboratory automation



Full Laboratory Automation

PhenoMATRIX®

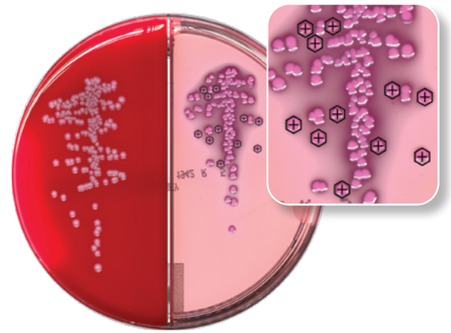
Artificial Intelligence for Microbiology

Learn More

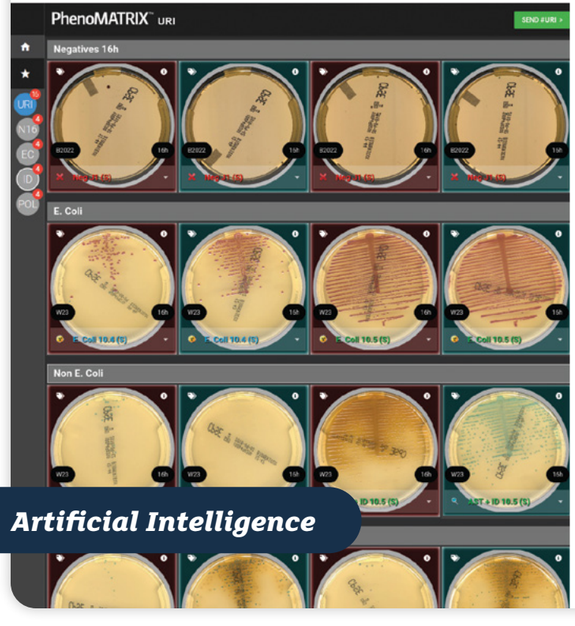
PhenoMATRIX® with TAG

PhenoMATRIX® with TAG automatically interprets growth based on the laboratory's custom rules, presumptively identifying colonial morphology, and pre-selects the best isolated colonies for workup.

The software highlights isolated colonies as well as aggregated colonies; colonies which are not fully isolated but determined by the software to be identical and thus pure. Next, PhenoMATRIX® TAG communicates the colony coordinates to the Colibri™ for reliable and accurate picking.[18-20]



UNPARALLED IN THE INDUSTRY, PhenoMATRIX® assists microbiologists by using artificial intelligence combined with clinical information from the LIS. It applies lab-defined rules to read, interpret, and categorize bacterial cultures.* Adding the PhenoMATRIX® suite of algorithms to WASPLab® automation system and assist technologists in interpretation of cultures, giving microbiology labs the ability to shorten time to results†.[13-15]



Artificial Intelligence

Streamline Culture Analysis and Reporting

- Create custom filters to group plates in a folder-style interface, based on the laboratory rules and LIS Data.[16]
- Plates are grouped by colony count – no growth, growth, mixed growth, etc. according to laboratory workup needs.
- Laboratory technologists can review all images and, following laboratory protocols, can efficiently report grouped negative and positive results directly to the LIS with a simple click.[6, 14-17]

PhenoMATRIX® Software Suite

Comprehensive Solutions for Laboratory Processing and Work-Up**

PhenoMATRIX® Essentials

Comprehensive AI software package to manage all urine culture reading and interpretation

- Colony counting and morphological recognition
- Presumptive identification capabilities
- Colony detection on validated chromogenic media plates
- Expert Rules and LIS data mining using patient information for interpretation and sorting

PhenoMATRIX® SELECT

Includes the complete Essentials package plus additional chromogenic, wound and blood culture protocols

- Chromogenic detection for MRSA, VRE and other MDRO surveillance cultures , Group A Strep, Group B Strep and *Candida auris*
- Beta hemolysis detection on blood agar for segregation of cultures with suspected Group A or B Strep
- Wound protocols‡ for segregation of cultures with suspected *Staphylococcus aureus* growth
- Blood culture protocols‡ for early detection of growth from subcultures

‡ May require additional equipment and development time

PhenoMATRIX® with TAG

The most advanced software suite includes Essentials and Select and PhenoMATRIX® TAG

- Automatic predetermination (tagging) of colonies for picking by the Colibri™ for ID and AST work up.

Contact your local distributor or Copan representative for more details and pricing.

** This product is not FDA-Cleared.*

*** Product availability may vary by country or region. Not all products shown are available in every market. Please contact your local Copan representative or distributor to confirm availability and regulatory status in your area.*

Colibrí™

Automated Specimen Workup

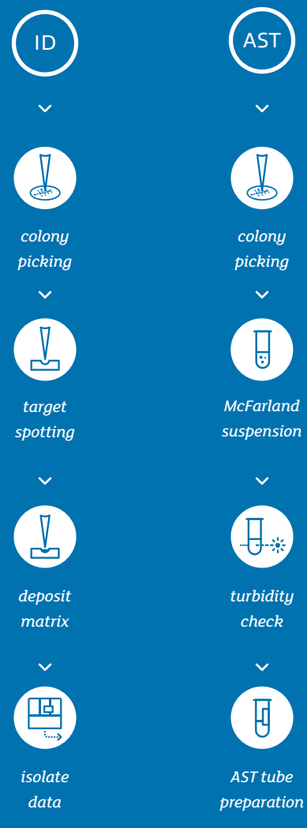
Learn More

Simplified, Automated Prep for MALDI and AST

The instrument spots targets for microbial identification through MALDI-TOF technology and prepares microbial suspensions for Antibiotic Susceptibility Testing (AST).[21-24]

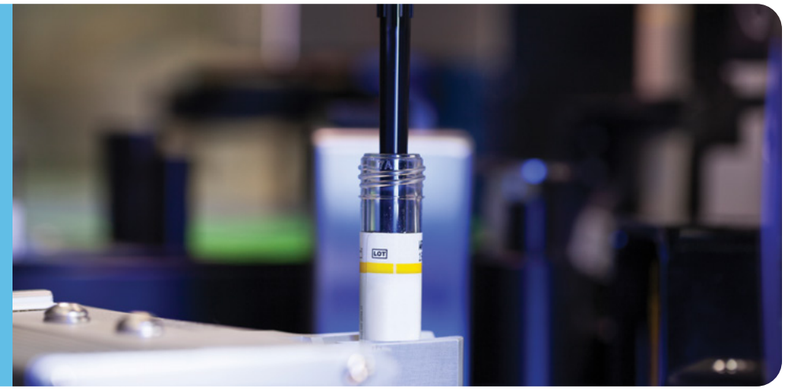
Colibri™ is the first instrument in its class to receive 510(k) clearance for the preparation of MALDI-TOF slides and McFarland AST suspensions.[25, 26]

Automated Specimen Workup



Accurate Pipetting

Synchronization of nephelometer and pipettor to maximize standardization and ensure the highest precision.

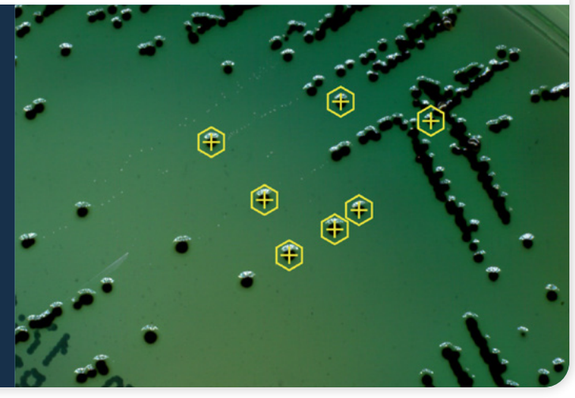


Automating Steps in Microbiology Testing for Time and Labor Savings

- ***Robotic pipettor***
  Handles both colony picking and liquid transfer with precision[a]
- ***Containers table***
  Holds up to 16 target McFarland suspension tubes and AST tubes for preparation of microbial suspension[a]
- ***Onboard Nephelometer***
  Checks turbidity of the microbial suspension to guarantee precision and standardization
- ***Printer and barcode system***
  Automatically labels tubes and purity plates for traceability and label reconciliation
- ***Vision system***
  Controls pipette alignment and retrieves the colony coordinates from WASPLab®, matching them for accurate picking

Direct communication with WASPLab® and PhenoMATRIX® TAG

The automation software highlights isolated colonies and aggregated ones with different colors. PhenoMATRIX® TAG selects the optimal colonies communicating the coordinates with Colibrí™ for a reliable picking.[18]



Radian® Expert System

A flexible, customizable, and user-friendly platform to interpret sensitive, intermediate, or resistant results. Digital interpretations are made with the specialized imaging capabilities in combination with Halo Recognition Algorithms used by Radian® Expert System.

Expert system
Keep everything in sight while working directly on the plate

Halo-reading interface
With direct communication to the rules database

Rule editor
Adapt or completely customize your own interpretation rules

RADIAN® IS A FULLY INTEGRATED WASPLAB® MODULE that automates the seeding of Mueller Hinton plates, application of antibiotic discs, robotic transfer of prepared plates to incubators, plate imaging, zone measurement, zone interpretation, and result output using the Halo Recognition Algorithms, which are part of the Radian® Expert System AI.[28-34]

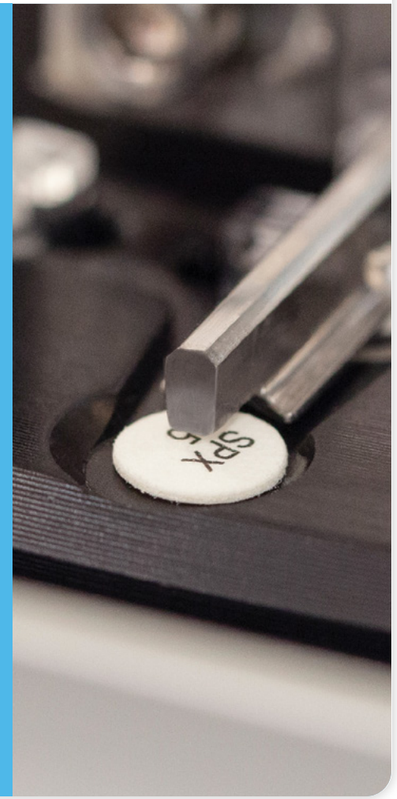
Automated AST

Increase Productivity, Decrease Operational Cost

- Streamline AST workflow using automation and AI for standardization, labor savings, and improved turnaround time[32, 33]
- When validated by the laboratory, Radian® has the potential of early susceptibility reading, allowing for more timely results[27-30, 35]
- Automatically applies CLSI guidelines for use with direct blood culture AST[33, 34, d]

Radian® In-Line Carousel

- ***Parallel redirection line***
  The Radian® module sits along the WASPLab® track, easily ingratiating AST tasks into the laboratory workflow
- ***50 cartridge carousel***
  Ensures maximum flexibility in choosing antibiotic discs
- ***Dual HEPA filtering system***
  High-capacity antimicrobial carousel allows the system to randomly select from up to 50 antibiotics for protocols using up to 8 discs per 100mm plate.
- ***Quality check***
  Dedicated vision system assures the disk has dispensed from the cartridge. The system also checks that the disk matches the selected protocol.



WASP-FLO™

Moving Microbiology

Learn More

WASP-FLO™ IS FOR MICROBIOLOGY LABORATORIES with multiple WASPLab® lines, to streamline sample loading and unloading. WASP-FLO™ automatically sorts samples[a], drives them to the appropriate WASP®, and batches the tubes in output racks after processing.

Bulk Specimen Sorter

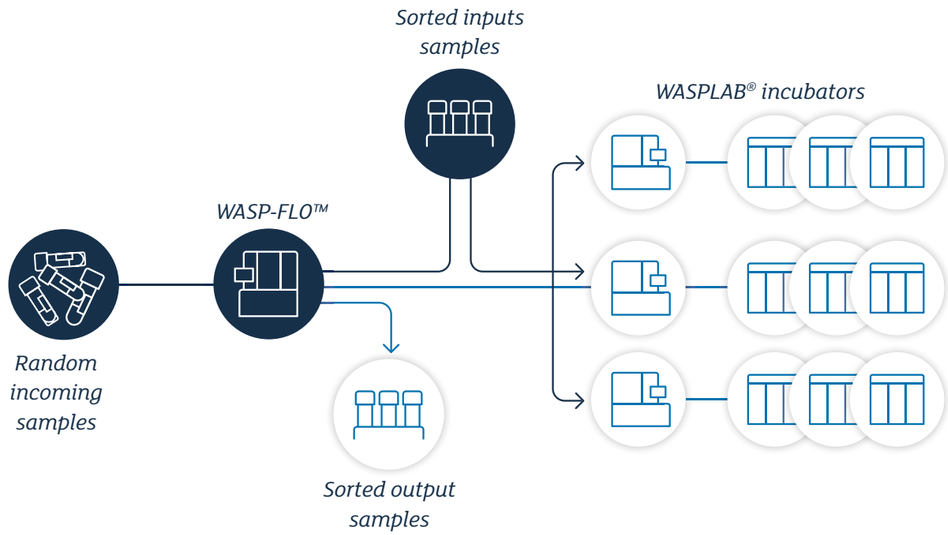
Streamline Sample Loading

- Optimizes sample management with real time evaluation of the workload
- Boosts laboratory productivity by automatically sorting and routing samples
- Data management system monitors the path of each sample for full traceability

Workflow Efficiency

- ***Dual SCARA robots***
  The Pick-and-Place robots sort tubes in RFID-driven pallets and unload completed samples onto dedicated racks
- ***Hopper module***
  Holds up to 600 samples per batch
- ***Completed specimen output***
  Holds 792 samples divided into eight output racks
- ***Manual specimen loading***
  Includes four columns composed of eleven RFID pallets
- ***Manual user interface***
  Backup manual loading system for special containers

Workflow example



Return on Investment

Administrative and Financial Considerations

THE RETURN ON INVESTMENT (ROI) for automation will differ for each laboratory. Sample volume, sample types, operating and peak hours and future growth goals will all impact the final analysis.

Factors to Consider

Total specimen volume for bacteriology samples that are manually plated

What times during the day do specimens arrive in the lab?

Planting protocols, the amount and types of plates inoculated per specimen type; bi-plate versus whole plate; incubation parameters (O_2 or CO_2 etc)

How many full-time equivalent (FTE's) are needed to process the specimens arriving into the lab?

Staffing schedules

Example Time Savings with Automation and AI

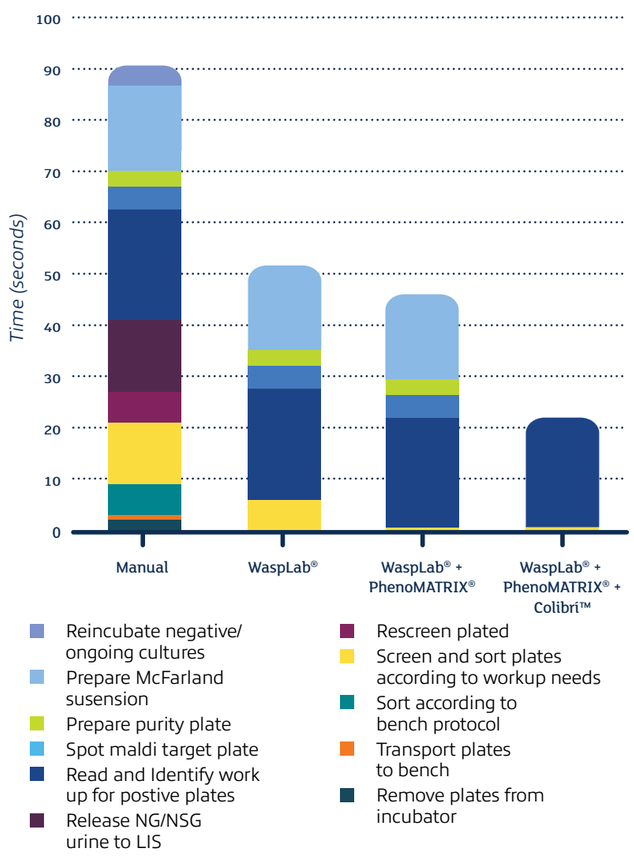


Figure 2: FTE hands-on time savings associated with automation, based on a singular urine culture and using average times from customer data collected by Copan at over 100 U.S. and Canadian laboratories

Beyond the ROI: Additional Automation Considerations

- ***FTE Reallocation***

  Is there potential to expand the scope of the lab testing by automating the upfront processing? For example, can trained lab technicians perform more molecular testing or can the lab increase volume of routine testing?

- ***Recruiting and Retention***

  Could automation allow the lab to recruit employees more readily or retain employees in this competitive market? Consider employee engagement, removal of the repetitive non-value added tasks like manual planting and streaking.

- ***Cost of Quality***

  How much rework must happen in your lab? Can savings be realized by having more consistent and reproducible specimen preparation?

- ***New Business***

  Can the lab receive more business from outreach clients if they adopt state-of-the art technology such as automation, digital Microbiology, and automatic plate reading?

- ***Turnaround Time***

  Added efficiencies of incubation, reading, set-up and reporting with automation can all contribute to faster turnaround time to results.

  Can faster turnaround time help to shorten hospital stays and improve antibiotic stewardship?

The Laboratory Workforce is Shrinking

It is widely known that the laboratories across the world are struggling to fill open vacancies in the laboratory. Laboratories face an aging population of laboratory personnel that will soon retire, a decrease in the number of graduates from laboratory educational programs and increase in testing volumes.[36]

Automation and AI Can Help Laboratories Manage Current Challenges

Streamline Routine Tasks ***Improve Efficiency and Accuracy*** ***Optimize Workflow*** ***Training and Education*** ***Preserve Institutional Knowledge***

Product Specifications

WASP®

Dimensions:	43.5 inches wide x 81.5 inches long x 76 inches high
Weight:	Approximately 1,300 lbs
Input Voltage:	220V, 20Amps
Network Ethernet:	100 MB
Interface:	LIS interface available upon request
Peripherals:	Touch screen monitor, external barcode reader, label printer
Certifications:	CE, UL, CSA
Electrical Receptacle Plug:	HBL2321 250V / 20A (for USA and Canada)

GRAM SLIDEPREP™ EVO

Dimensions:	28 inches wide x 23 inches long x 49.5 inches high
Weight:	Approximately 221 lbs

INCUBATORS

Dimensions Single:	45.1 inches wide x 33.7 inches long x 91.1 inches high
Dimensions Double:	68.5 inches wide x 33.7 inches long x 91.1 inches high
Weight:	Approximately 1,000 lbs (Single) Approximately 2,000 lbs (Double)
Input Voltage:	220V, 20Amps
Atmospheric Conditions:	CO_2 and Aerobic
Capacity Single:	795 plates
Capacity Double:	1,590 plates
Electrical Receptacle Plug:	HBL2321 250V / 20A (for USA and Canada)

COLIBRÍ™

Dimensions:	39.2 inches wide x 78 inches long x 75.2 inches high
Weight:	Approximately 1,700 lbs (according to the configuration)
Power Supply:	208-240 VAC~50/60 Hz, 1500 W max (peak)
Minimum Differential:	Magneto thermic differential swith D-16A 300mA
Connection:	Interlocked plug like IEC 60306 or NEMA L6-20P
Remote Control:	Ethernet 100Mb
Environmental Working Conditions:	15˚C-32˚C, 30%-60% Humidity
Thermal Output:	4760 Btu/1.4 Kw
Noise Emission:	Max 67.4 dB
Connected Peripherals:	Touch Screen, Mouse, Keyboard, Printer, 2XBarcode, Readers, Vision System

WASP-FLO™

Dimensions:	Hopper module: 39.1 inches wide x 45.2 inches long x 67 inches high Loading module: 89.3 inches wide x 69.2 inches long x 81.4 inches high Conveyor: According to specific layout
Weight:	Hopper module: Approximately 855 lbs Loading module: Approximately 2165 lbs Conveyor: Weight variable according to layout, approx 100 kg/m per single conveyor
Electrical Specifications:	208-240 VAC, 50/60 Hz, 2000 W max (800 W WASP-FLO Loading Module+ 1200 W WASP-FLO Conveyor)

OPERATING CONDITIONS

Height:	Up to 78.7 inches
Humidity:	From 0 to 95%
Temperature Range:	From 5˚C to 40˚C

Scientific References

1 Culbreath, K., Piwonka, H., Korver, J., & Noorbakhsh, M. (2021). *Benefits derived from full laboratory automation in microbiology: A tale of four laboratories*. Journal of Clinical Microbiology, 59(3), e01969-20. https://doi.org/10.1128/JCM.01969-20

2 Kritikos, A., Croxatto, A., & Culbreath, K. (2022). *Current state of laboratory automation in clinical microbiology laboratory*. Clinical Chemistry, 68(1), 99–114. https://doi.org/10.1093/clinchem/hvab242

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Notes

Please consult Copan for the availability of these products in your Country

a To grant the reliability of results and allow the instruments safe and correct functioning, spare parts and technical support must be provided by Copan (or its authorized distributors). Any third party's containers, culture plates and consumables to be used on the instruments must be approved in writing by Copan. Limitations may apply: Please refer to Copan's official technical documentation.

b The WASPLab® imaging system is patented (AU2014259028B2, JP6460421B2, IT1417398) and patent pending (EP2989470A1, US2016083686A1).

c Subject to final reporting performed by qualified personnel.

d For Research Use Only in USA.

e Plate compatibility and strain compatibility are in continuous development. Please contact Copan for the latest updates.

† WASPLab® and PhenoMATRIX® systems provide advanced imaging and AI tools to assist microbiology professionals in culture plate analysis. All final interpretations and resulting are performed by qualified laboratory personnel according to validated laboratory protocols.

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Copan Diagnostics, Inc.
26055 Jefferson Avenue | Murrieta, CA 92562 USA