



# AUTOMATED UV DISINFECTION

**PN** PIEDMONT  
NATIONAL





# UV Disinfection Robot

- Autonomous Mobile Robot for disinfecting high traffic areas
- Moves a UV light\* mounted on the robot from room to room
- A front and back light flashes UV light for 2-30 minutes to disinfect
- Initial deployment environments: warehouses and manufacturing facilities



Proven to kill up to 99.9% of:

- Coronaviruses
- SARS
- Influenza
- Salmonella
- MRSA
- Norovirus
- *C. Diff*
- *E. coli*
- *C. auris*

# Featuring Dual Pulsed Xenon UV Lamps



## Light Source & Flash Interval

- Proprietary Pulsed Xenon Lamp\*
- 1 UV Flash every 6 seconds

## Wavelengths

- UV-C (200-280nm) Germicidal
- UV-B (280-320nm) Germicidal
- UV-A (320-400nm) Bactericidal

## Safety

- Motion sensor for automatic shut off to prevent unnecessary UV exposure
- UL Certified
- FCC compliant
- RoHS compliant
- FDA - cleared for use in food and medical areas
- EPA registered



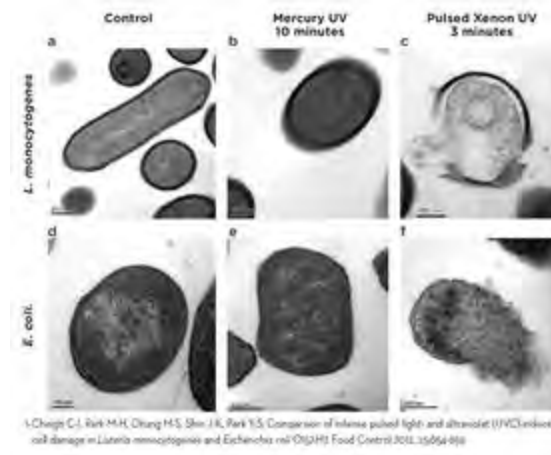
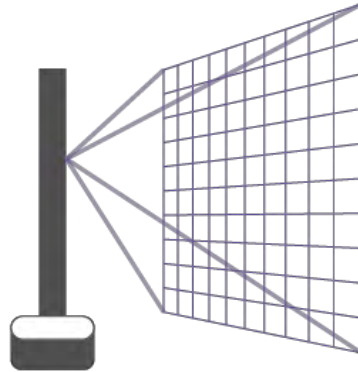
# Advantages of Pulsed Xenon

**PURO™**  
UV Disinfection Lighting



- Powerful Disinfection Agent
- Environmentally Friendly
- Approved for Use with Food Processing
- Fits Perfectly into Process Requirements
- Low Temperature Process
- Reliable Technology
- Highest Germicidal Power
- Minimum Use of Energy
- Extensive Testing Undertaken by Researchers
- Individualized Solutions

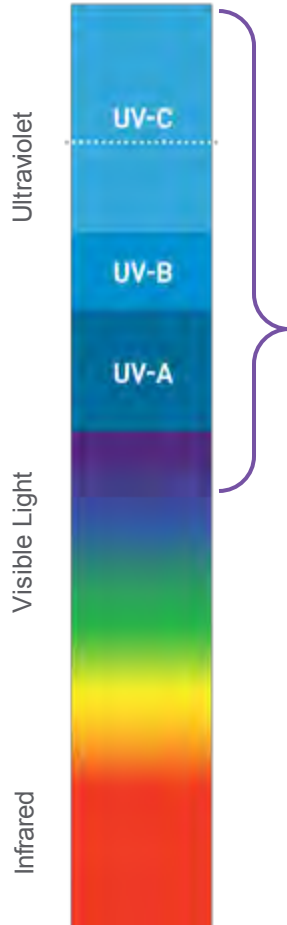
# Not all UV lamps are equally effective



Not all light is equally effective in the eradication of pathogens. Low pressure mercury vapor technology emits continuous UV-C at one wavelength (254nm). This single wavelength of low intensity, continuous UV is not the most effective wavelength to create pathogen damage.

Pulsed Xenon systems produce germicidal UV at all wavelengths from 200-315nm. This broad spectrum UV light incorporates all germicidal wavelengths including those best known to deactivate the DNA and RNA of organisms.

# UV Disinfection Wavelengths



Most UV disinfection fixtures: 254nm

Inactivates viruses and bacteria by damaging DNA and RNA

## Broad Spectrum UV & Blue Light 200nm - 470nm

- UV-C (200-280 nm) is most traditionally referred to as germicidal UV with ability to kill bacteria, viruses, mold, and fungi
- UV-A (320-400 nm) and UV-B (280-320nm) provide additional benefits by light causing oxidation of proteins and lipids causing cell death
- Broad spectrum UV lamps have also been shown to inhibit photo-reactivation, the process that can result in self-repair of damaged microbes
- Blue light in the 405 nm to 470 nm wavelengths has been shown to be able to have up to 100% bacterial suppression over the proper intervals.
- The blue light causes photoexcitation of endogenous porphyrins that leads to the generation of reactive oxygen species, which are toxic to bacterial cells



Features	Low Pressure Mercury	Pulsed Xenon
Energy Required to Clean	Higher	Lower
Directional and Targeted UV	No	Yes
Cleans UV A & B Anti Bacterial/Microbial	No	Yes
Cleans UV C Anti Bacterial/Microbial	Yes	Yes
Robotic Battery Run Time	2-2.5hrs	7.5-12hrs
Loses efficacy over life of lamp	Yes	No
Photon Degradation with Long-Term Exposure	Yes	No
Mercury Based Product	Yes	No
Cleans Optimum UV C Range 265–267nm Range	No	Yes

# Manual vs. Autonomous



## Manual Operation

- 50% overall effectiveness
- 68% of high touch surfaces missed
- Ongoing exposure to the chemicals used poses a health risk to workers
- Requires full-time headcount to manage and move manually
- Placement renders UV ineffective in shadowed areas

## Automated Disinfection

- Fully automated disinfection
- Cover more space with little to no labor
- Autonomous robot can be positioned in various poses to maximize coverage
- Does not need to be manually repositioned
- Automatically charges itself when needed



# Coverage and Disinfecting Area

## Range

- 10' linear surface cleaned from as few as 18" away
- 60" deep on surface

## Coverage

- Two UV Light Engine Model\*
  - 250+ high-touch surfaces disinfected in 8hrs
  - Up to 2,700 linear feet per 8 hours
  - Smart Disinfecting maximizes efficiency based upon distances for minimum cleaning time and maximum surface area
- Four UV Light Engine Model\*
  - 450+ high-touch surfaces disinfected in 8hrs
  - Up to 5,000 linear feet per 8 hours
  - Smart Disinfecting maximizes efficiency based upon distances for minimum cleaning time and maximum surface area



# Reporting & Verification with 4SITE



Time



Photo Record



Date



Disinfection  
Duration

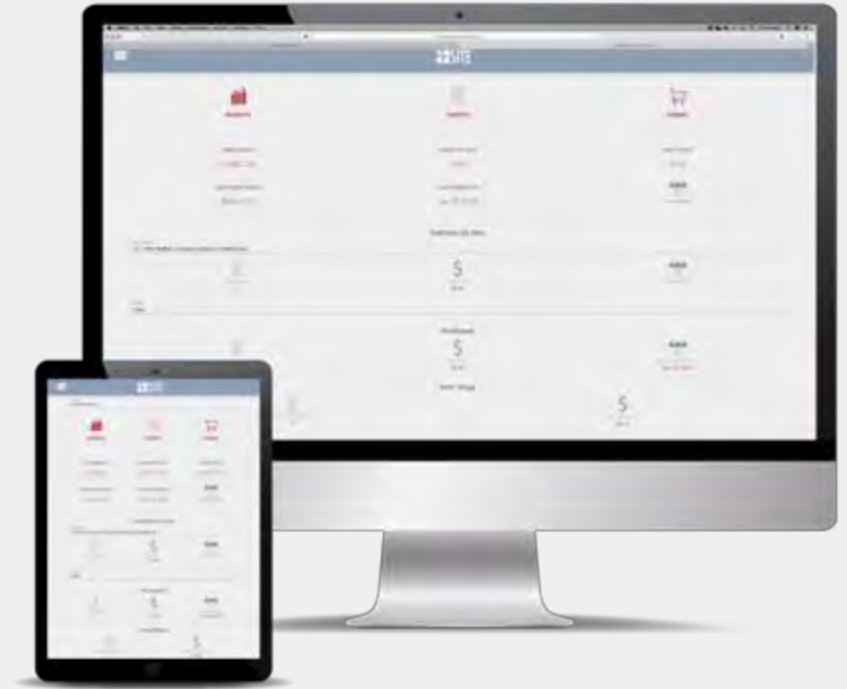


Location



Cleaning  
Performance

- 4SITE cloud-based platform delivers disinfection event validation and UV light performance
- Disinfection event records including: date, time, location, photographic evidence, disinfection duration, cleaning performance and more, all powered by 4SITE technology.



# Ideal Applications



• Hospitals

• Grocery Stores

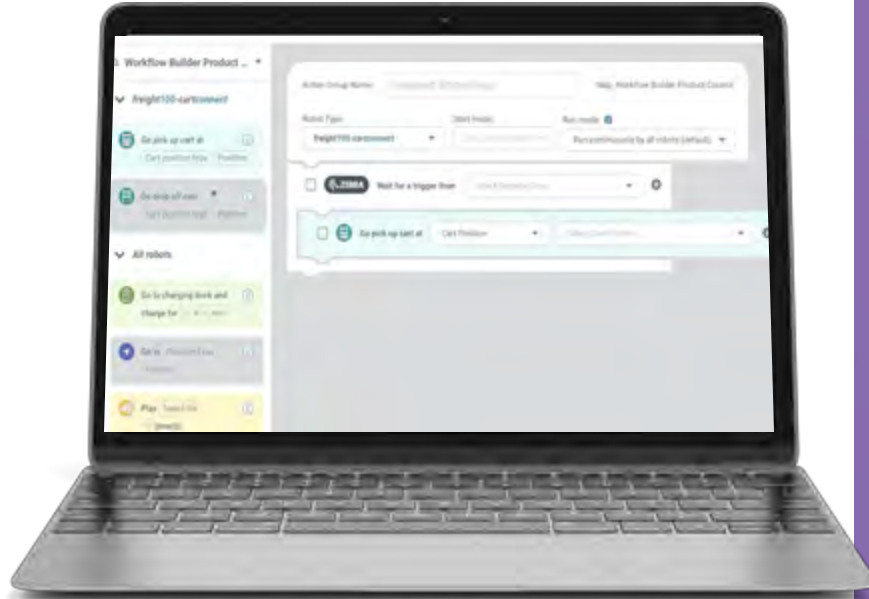
• Restaurants

• Warehouses

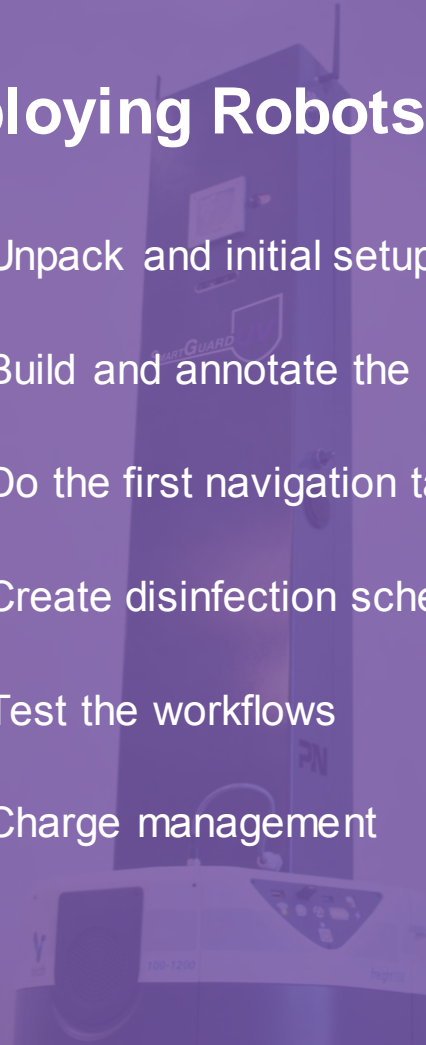
• Manufacturing



# Deploying Robots



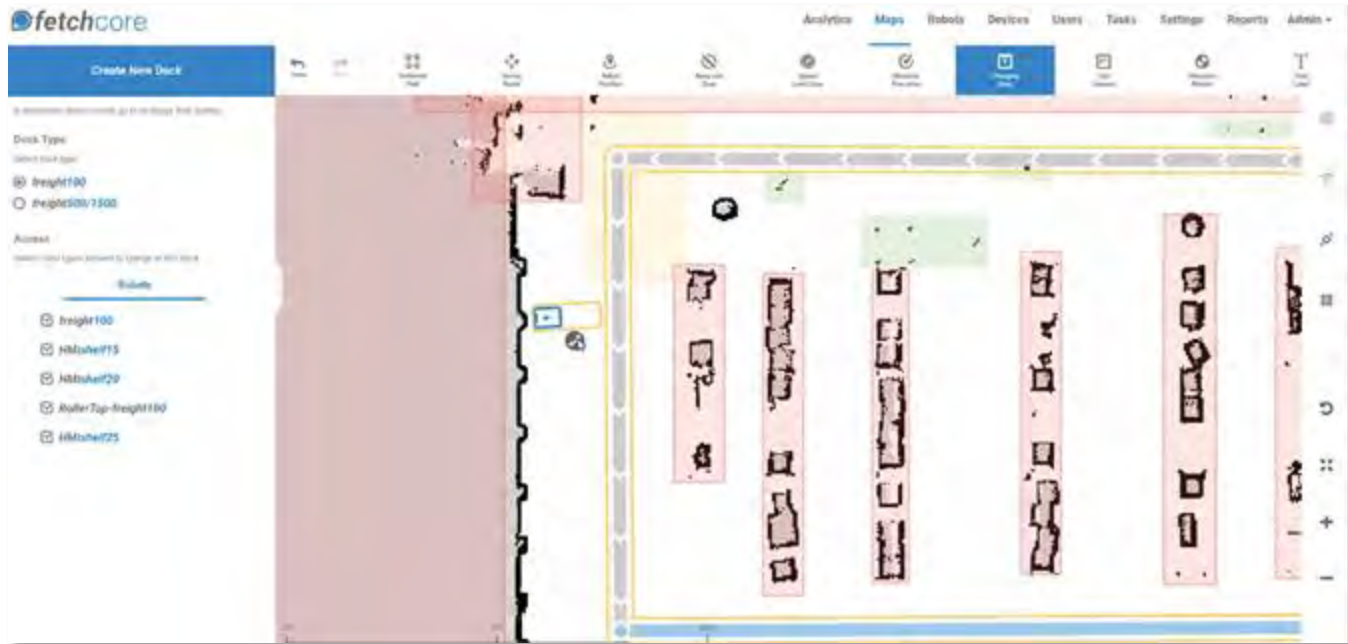
- Unpack and initial setup
- Build and annotate the map
- Do the first navigation task
- Create disinfection schedules and workflows
- Test the workflows
- Charge management



# Map the Facility



# Annotate the Map



# Create Customized Disinfection Schedule



## Automated Disinfection Workflow Builder

allows customer to create customized solutions for devices by dragging and dropping graphical blocks into a workflow:

- Exception Management
- Conditions around spaces
- Accessories add Triggers & Actions



# Operating Environments

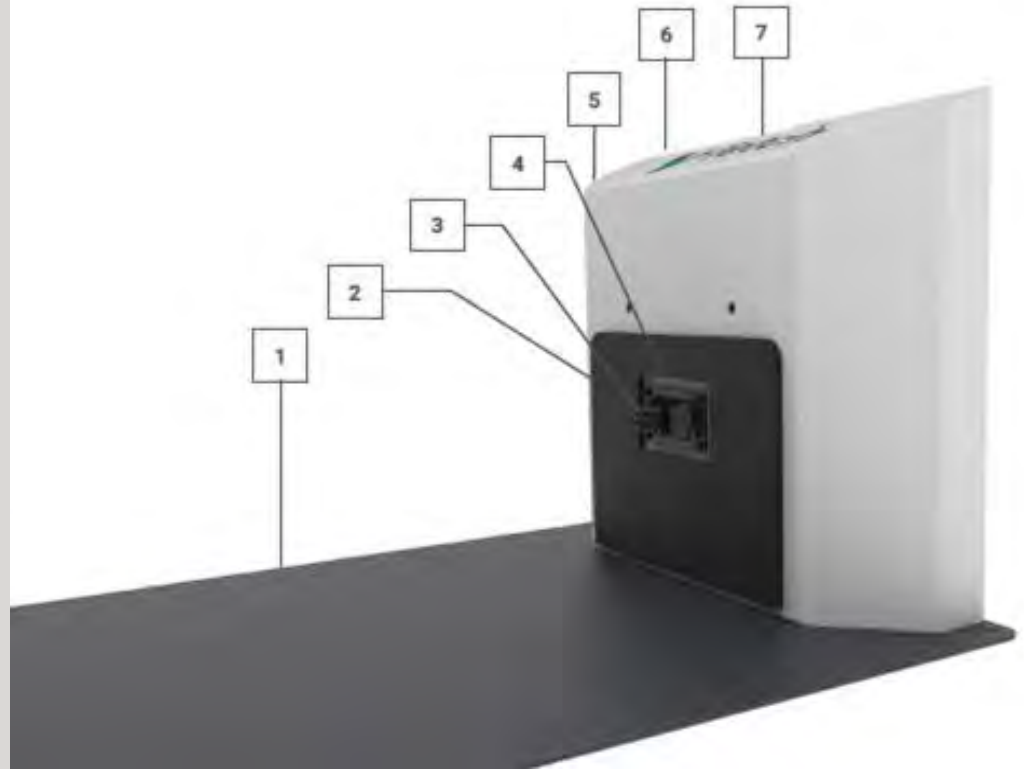
- Indoors
- WiFi availability
- Aisle-width requirements
  - 3.1 ft'
- Operating environment does not have:
  - Significant temperature changes
  - Wet floor conditions
  - Inclined surfaces



# Charge Dock

- 120 VAC and 240 VAC compatible
- Patented floating connector
- 3 hours to charge from 0% to 90%
- 8 to 10 hours operation per charge
- 1 deep charging cycle per week
- Total of 9 hours working per day

#	Description
1	Skid pad
2	Bumper
3	Power inlet
4	Alignment mechanism
5	AC connector
6	Front housing
7	Back plate



# Proven Robotics Capability



Manufacturing, Distribution, Fulfillment, Medical, and Decontamination

Industries Served:

- Automotive
- Aerospace
- Appliances
- Consumer Electronics
- Energy
- E-Commerce
- Government
- Healthcare
- Industrial
- Logistics & Supply Chain
- Omni-Channel
- Retail & Apparel



6,200  
Techs

North, Central,  
South America

4,900  
Techs

Europe, Middle  
East, & Africa

1,700  
Techs

Asia, Oceania,  
China, Hong Kong,  
Taiwan

4,000  
Techs

Japan



Ready to scale  
with 17,000 field  
service resources



## Global, Comprehensive Support Services and Software Updates

### FetchCore Software Services

- Zero-touch/OTA updates of all FetchCore software (cloud, robots, accessories)
- Access to FetchCore APIs and SDKs
- 24 x 7 x 365 FetchCare software support

### FetchCare Hardware Assurance

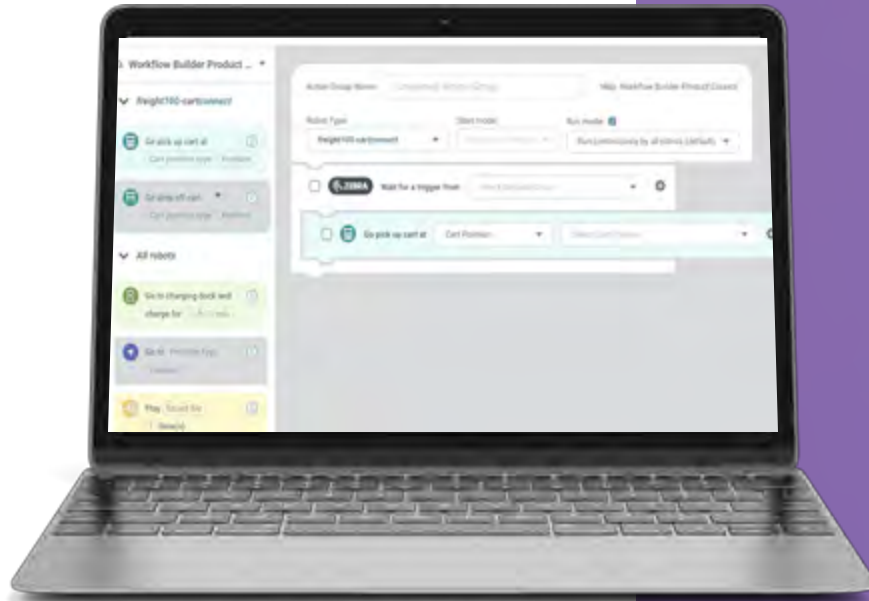
- Premium global hardware support and maintenance
- Included with robot purchase (1 yr)

### FetchCare Implementation Services

- Customized design, integration, configuration, and deployment



# Disinfection-as-a-Service (DaaS)



- SmartGuard UV AMR & Software
- Cloud infrastructure
  - Servers, networking, storage
  - 24x7 operations and security
  - Redundancy, backup, DR
- Cloud applications
  - Mapping, verification reports, real-time monitoring, and more
- 24x7 support
  - Technical support
  - Hardware & software warranty & maintenance
  - OTA updates
- One monthly fee
- No hassle bumper-to-bumper warranty and part replacement (labor & materials)

# Thank You!

Questions & Next Steps



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