GlobalDWS

2022

DISINFECTION SERVICE ROBOT (DSR) CASE STUDY

Autonomous Disinfection Robot adds IAQ monitoring capabilities to enable healthier and smarter workplaces.

As organizations plan to return to the physical workplace, many are faced with the complexity of ensuring employee and organizational safety while also rapidly adapting existing processes.

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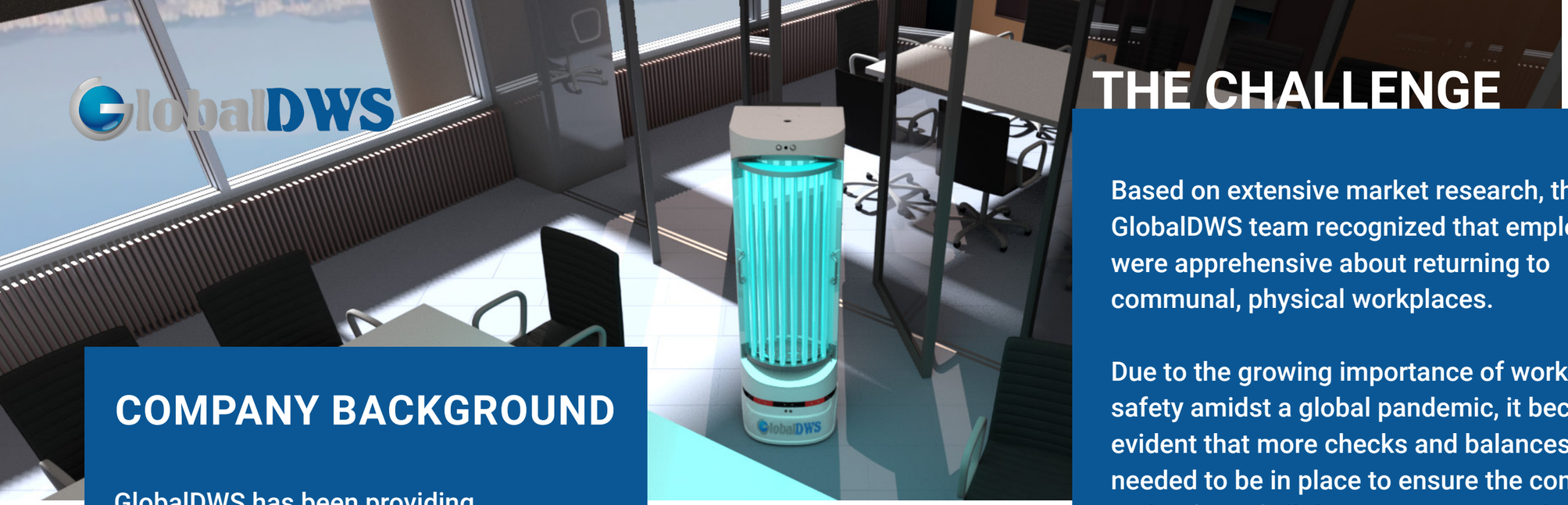

COMPANY BACKGROUND

GlobalDWS has been providing innovative technology solutions to create dynamic, human-centric, and productive workplaces for customers and partners for over a decade.

The pandemic highlighted the dire need for an autonomous disinfection solution that also enabled monitoring, quantifying, and communicating disinfection and air quality levels in physical workplaces and other indoor communal spaces.

> **Innovation and creativity are key to empowering our customers in building a healthy and dynamic workplace...**

GlobalDWS integrates innovative technologies such as Service Robots, AI, and IoT to design modern Business Solutions that allow our customers to return to in-person operations by prioritizing health and wellbeing in the workplace. We are also excited to have the recent opportunity to integrate Indoor Air Quality (IAQ) monitoring to our Disinfection Service Robot (DSR) solution.

THE CHALLENGE

Based on extensive market research, the GlobalDWS team recognized that employees were apprehensive about returning to communal, physical workplaces.

Due to the growing importance of workplace safety amidst a global pandemic, it became evident that more checks and balances needed to be in place to ensure the comfort and safety of all those occupying and sharing an indoor environment.

DID YOU KNOW?

CDC

In one study of Minnesota dental offices, operator error, rather than mechanical malfunction, **caused 87% of sterilization failures.**

Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008 (cdc.gov)

SCIENTIFIC STUDIES

Current cleaning procedures are stipulated by strict infection control protocols with cleaning staff required to wear personal protective equipment (PPE). **In spaces with considerable surface area or counter space cleaning against COVID-19 is extremely time-consuming and physically-taxing which could result in human error and viral transmission amongst staff.**

Numerous studies have confirmed that Ultraviolet (UV-C) technology eliminates more than 96 percent of pathogens in operating rooms (ORs) and on medical equipment, compared to 38 percent using manual cleaning methods that rely on chemicals to disinfect surfaces. Another study by Yang et al. (2019) found a substantial reduction in surface bacteria after deploying a mobile UV-C disinfection robot in vacated rooms of patients.

[1] American Journal of Infection Control (AJIC).

OUR SOLUTION

Due to our innovative culture and mindset, the GlobalDWS team set out to answer these challenges with urgency as the Canadian economy continues to open back up and an increasing amount of pressure is placed on organizations to guarantee healthy spaces for their employees and patrons.

Our team of architects and engineers engaged in a series of multiday workshop sessions to identify the most efficient solution that addressed this growing market need.

GlobalDWS' Disinfection Service Robot (DSR) is an autonomous solution equipped with Ultraviolet-C (UV-C) lights and viral disinfectant solution to eliminate harmful airborne and surface-dwelling viruses and bacteria in indoor spaces.

The DSR utilizes chemical as well as radiation-based disinfection methods to carry out a thorough microbial cleansing of air and inanimate surfaces.

DISINFECTION METHODS

The key ingredient of the Optin 33TB is Hydrogen Peroxide which is a broad-spectrum anti-microbial agent. **Its proven enhanced efficacy against bacterial and viral pathogens, especially the various strains of human coronavirus,** makes it an essential first line defense against transmission of disease, ensuring workplace safety.

UV-C effectively inactivates micro-organisms. **The integration of the UV-C treatment with the chemical disinfection procedure significantly mitigates infection risks** associated with environmentally mediated transmission routes.

As the trajectory of the pandemic became longer than originally forecasted, we further realized the value of our Disinfection Service Robot (DSR) solution for local businesses and identified areas of improvement that could further enhance health and safety in the physical workplace. It became evident that more sophisticated methods of disinfection as well as the prioritization of high-risk areas was the next step in the product development.

INTEGRATION OF INDOOR AIR QUALITY (IAQ) MONITORING

As part of this process, several key questions emerged:

Q

- How do we know the air is safe?
- How can we measure the efficacy of our disinfection routine?
- How can we automate the prioritization of areas and surfaces in terms of disinfection?

A

To answer the questions above, the GlobalDWS team arrived at the conclusion that the integration of Indoor Air Quality (IAQ) monitoring was the next phase in the development of the Disinfection Service Robot (DSR) solution. The IAQ sensors are from Piera Systems through their strategic partner, Universal PropTech.

WHY IAQ?

The IAQ monitoring sensor uses a breakthrough custom processor optimized to measure and count particulate matter.

Unprecedented accuracy across the entire range of particulates means you can build more powerful products than ever before. The IAQ monitoring sensors identify a number of particles including particle mass and counts for PM (Particulate Matter) 10 microns down as small as PM 0.1 microns. Identifying particle counts means you can identify the air quality within rooms and facilities and assess against other HVAC equipment and filter decisions, in addition to ongoing use of DSR.

This can make sure DSR prioritizes polluted areas – creating a trigger for the disinfection schedule to run. This is critical as many viruses and bacteria, including COVID-19, are in the sub-micron range so boosting customer confidence must start with accurately monitoring the air.

BENEFITS

- Can locate source of pollution
- On-demand disinfection
- Real-time environment reporting
- Eases the ‘back-to-office’ transition

ENABLING AN EFFECTIVE AIR QUALITY PLAN

From the Universal PropTech perspective, the data confirms that buildings and HVAC systems are unique, and particle counts indicate effectiveness in providing good air quality for users, or it identifies the need for additional customized changes in filters, locations of required disinfection and HVAC deficiencies.

Additionally, the use of IAQ monitoring sensors enables facilities to move to on-demand ventilation opportunities to maintain good air quality and reduce HVAC expenses.

BENEFITS

- Data insights
- Experience in HVAC optimization
- Integrating with a smart building ecosystem
- GlobalDWS as smart building partner
- Geo-spatial IAQ audits

Moreover, air purification in the office was done using UV-C (ultraviolet C) lamps installed on GlobalDWS' Disinfection Service Robot (DSR). UV-C is highly effective at getting rid of harmful particles and viruses from indoor air and surfaces but does not have the ability to target high-risk areas and surfaces automatically.

By fixing the particle sensor on autonomous robotic platform, this integration allows DSR to prioritize polluted areas by creating a trigger for the disinfection schedule to run.

THE RESULT

GlobalDWS is now expanding the installation of IAQ monitoring sensors by integrating the solution on our other mobile robotic solutions in addition to DSR.

This is revolutionary in that, in collaboration with Universal PropTech and Piera Systems, we are bringing intelligent-autonomous capabilities to the IAQ monitoring market for the first time. GlobalDWS is now offering this ground-breaking mobile air quality monitoring capabilities for their other clients because the need for clean air is important as the COVID-19 pandemic continues to evolve.

DSR's new Air Quality Monitoring capabilities enable…

Monitor

Accurately measures air quality

Inform

Derive insights, classify sources, identify causes

Mitigate

Employ effective methods to clean air

THE ONLY SOLUTION IN THE MARKET THAT OFFERS:

- The lowest installation costs
- Ability to conduct ad hoc inspection (audit)
- Submicron data for detailed decision making

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DSR DISINFECTION PROCESS

Our solution was designed for dynamic and fast-paced work environments and can easily avoid obstacles as it autonomously navigates to its destination.

DSR is managed and controlled by a cloud-based IoT (Internet of Things) Robotics Management System (RMS) which gives the user a full platform to manage and monitor the disinfection process.

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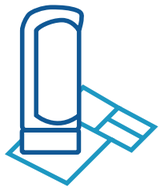


In preparation for the automated disinfection process, DSR plans its route by scanning the environment using Simultaneous Localization and Mapping (SLAM) technology to create a digital map

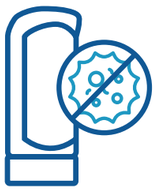
2

User validates security checklists, assigns room details, and sets the schedule using robot screen or mobile device

3

DSR navigates to designated areas to perform the disinfection duty to inactivate viruses and harmful bacteria

4



DSR diffuses 0.5% Hydrogen Peroxide and emits UV-C light at 254nm for 360° disinfection

5

DSR notifies the user when the disinfection process is complete and returns to the charging station

6

Users can obtain real-time insights and reports using the Robot Management System (RMS) portal

The process is triggered by intelligent data analysis and adaptation to the current environmental readings. The process affects both disinfection intensity and duration of disinfection.

DSR AND GLOBALDWS' WORKPLACE INTELLIGENCE PLATFORM (WIP)

The DSR uses the centralized Workplace Intelligence Platform (WIP) that combines Artificial Intelligence and Internet of Things to successfully implement/ deploy an effective disinfection program.

The WIP allows the DSR to virtually map, understand, and visualize its environment to navigate around workplace, while intelligently analyzing and prioritizing high-risk areas using its built-in sensors managed by the IoT to safely run multiple disinfection schedules.

All of this can be viewed and managed on DSR's management portal.

DSR IN THE NEWS

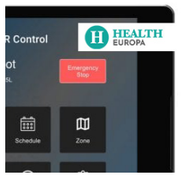
GlobalDWS' Disinfection Service Robot has been featured in various media outlets for its contributions to community safety and Canadian innovation.

For the latest on DSR and more, please visit our website www.globaldws.com under Newsroom.

Tech company in Toronto creates COVID-19 disinfection robot
Aaron Navarro. (2020, June). BlogTO.

IPSoft and GlobalDWS launch service robot powered by Amelia
David Edwards. (2020, May 28). Robotics and Automation News.

Fairchild TV
Samantha Li. (2020, October). Fairchild TV.



Building an autonomous UVC robot for COVID-19 prevention
(2021, Feb 4). Health Europa

NGen investing $5M in five disinfection robot projects
(2020, July 8). Design Engineering.

Next Generation Manufacturing Canada
(2020, July 6). NGen Supporting Manufacturing of Disinfection Robots. GlobeNewswire.

For all media-related inquiries, (including, but not limited to, requests for high-res images, interviews, magazine credits, releases) please contact info@globaldws.com.

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