



OTSAW

OR_x

The world's first UV-C LED
Autonomous Disinfection Robot

www.otsaw.com





Introducing O-RX by OTSAW.

The O-RX is the world's first ever autonomous robot to utilize UV-C LED technology for disinfection.

With an efficacy of 99.99%, it effectively kills microbes in the air and on surfaces, including viruses such as the Coronavirus.



UV-C LED
technology



99.99%
Disinfection rate



Disinfects 2583sqft
(240sqm) hourly



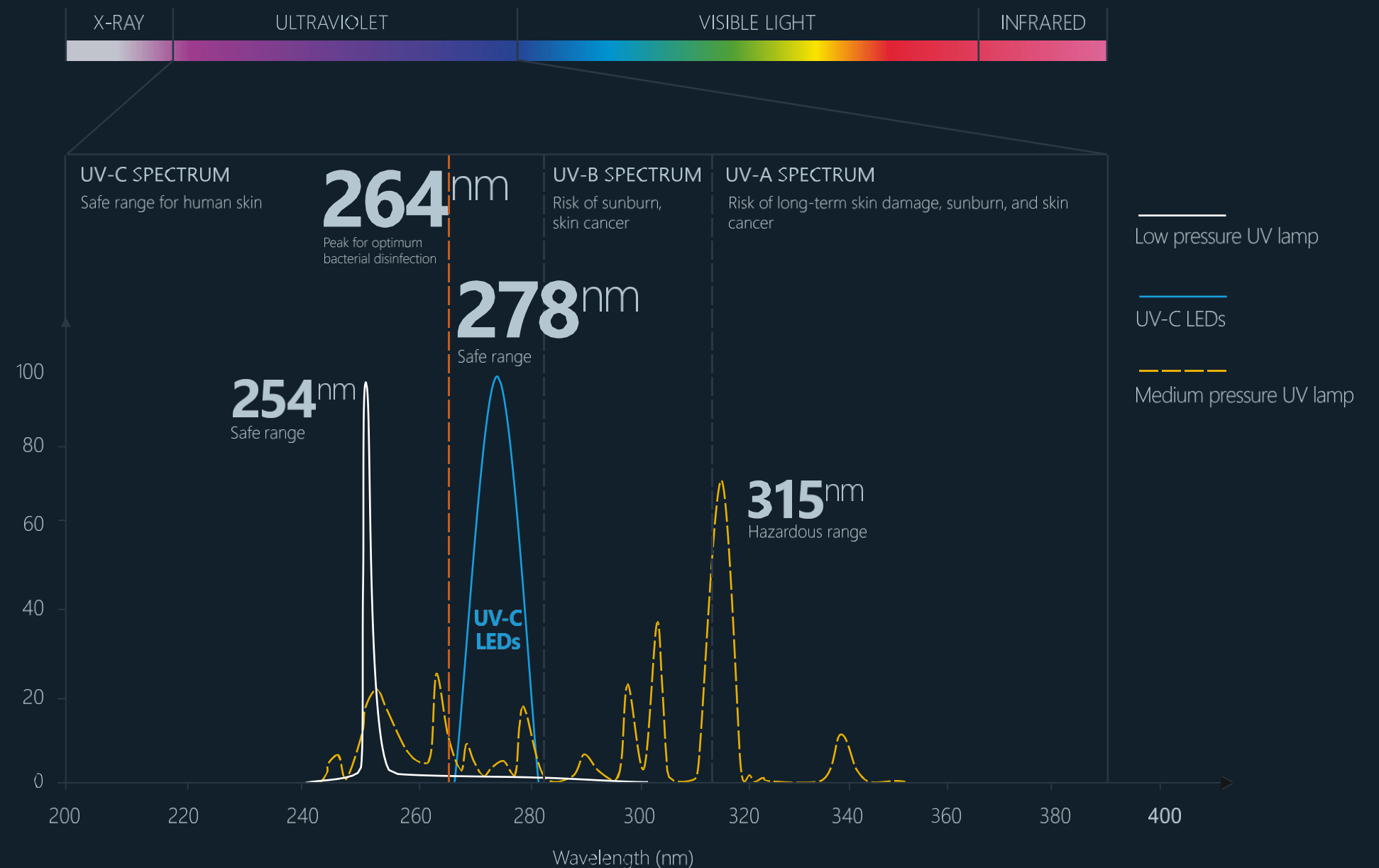


UV-C LEDs

In the midst of the global pandemic, OTSAW has brought innovation to the frontline, developing new and effective ways to combat the coronavirus.

OTSAW's innovative patented UV-C LED technology emits **only** UV-C rays, destroying microbes and viruses such as the Coronavirus with 99.9% efficacy within 5 minutes at 2.5 meters.

UV-C LED technology is energy efficient and safe against human skin, compared to conventional mercury lamps which emit harmful UV-A and UV-B radiation.



UV-C LEDs vs UV Mercury Lamps

Ultraviolet germicidal irradiation (UVGI) is a cost-effective and practical method of inactivating viruses and bacteria.

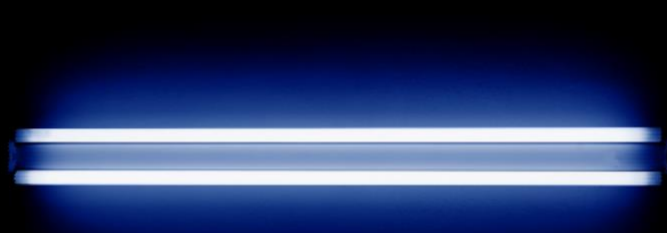
Existing high-power UVGI systems use UV lamps for large-scale disinfection.

The use of conventional UV lamps poses several risks, both to humans and the environment.

UV-C LED holds many advantages over conventional UV lamps in efficiency, efficacy, safety and in environmental concerns.



O-RX UV-C LED



Standard UV Lamp

Characteristic	UV-C LEDs	UV Lamps
Safe against human skin	✔ Within safe UV-C range	✘ Range overlaps UV-A, UV-B & UV-C
Power consumption	✔ Approx 300W	✘ Approx 1000W
Size	✔ Compact	✘ Bulky
Time to reach full brightness	✔ Instantaneous	✘ 1 - 15 minutes warm-up
Irradiance	✔ 8.6 uW/cm²	✘ 3 uW/cm²
Angle	✔ Directional	✘ Omnidirectional
Lifespan	✔ 3 years	✘ 1 year
Operating hours	✔ 5 hours	✘ 2.5 hours
Time needed for disinfection	✔ Disinfects 240m² in 1 hour	✘ Disinfects 180m² in 1 hour
Mercury content	✔ None (Environmentally friendly)	✘ Contains mercury (Environmentally hazardous)
Voltage operation	✔ Low voltage operation	✘ High voltage operation
Maintenance	✔ Maintenance-free	✘ Requires bulb replacement and routine cleaning
Ozone production	✔ Zero. Safe for humans	✘ Produces ozone, hazardous to respiratory tract
Durability	✔ Durable and solid construction	✘ Fragile and dangerous

Laboratory Tested

Lab reports are essential to measure a response to bacteria reproduction. If not, products may contain misleading information on the inactivation of microorganisms when using UV-C light products.

OTSAW's O-RX has been successfully lab-tested against live human coronavirus samples, achieving a disinfection efficacy of 99.9% within 5 minutes, at a range of 2.5 meters on 21 August 2020.

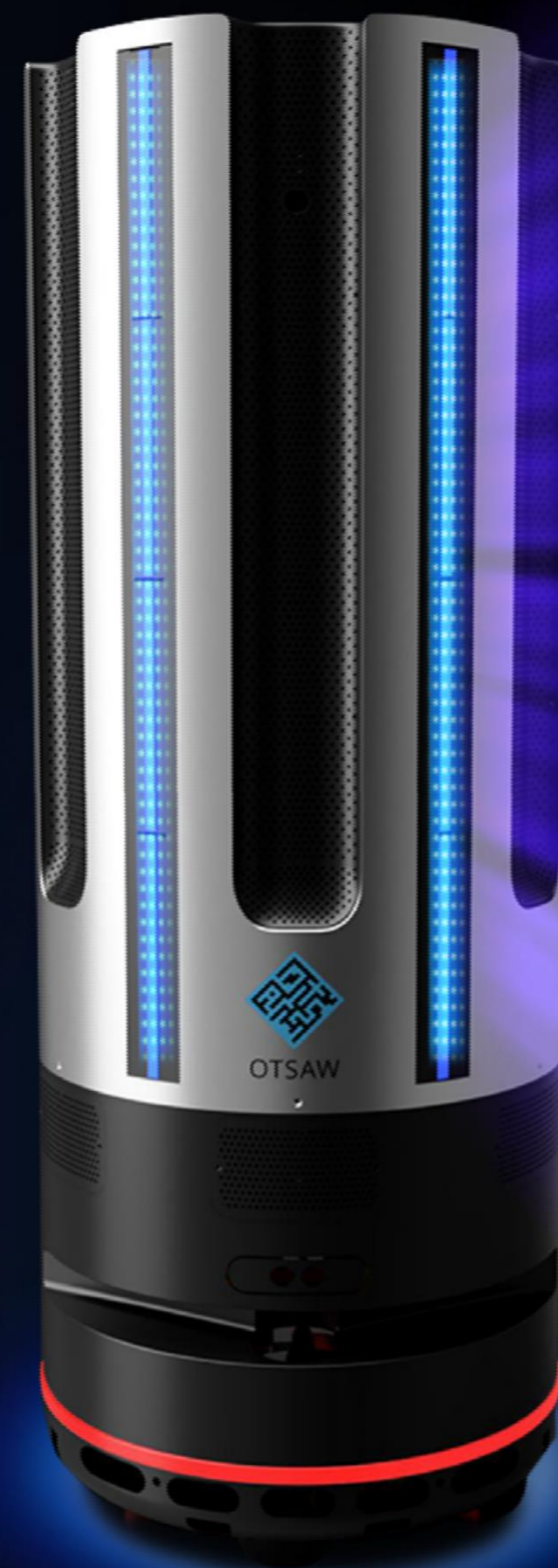
In addition, there is certification by internally accredited certification provider, TÜV SÜD PSB Singapore. The O-RX has been proven to achieve 99.99% disinfection in the killing of Escherichia coli bacteria within 10 minutes, at a range of 2.5 meters on 9 June 2020.



Lab tested on
live human
coronavirus
samples



99.9%
disinfection
in 5 minutes
at 2.5 meters



O-RX Key Features



Cutting Edge Disinfection Tech

- UV-C LEDs have several advantages over conventional mercury lamps
- Lower power consumption, longer operation time
- Long range and controllable disinfection direction
- O-RX capable of disinfecting up to 2583 sq. ft hourly



Health & Safety Features

- Controllable wavelength does not emit harmful UV-B (which is potentially cancerous)
- Visual & audible warning while UV-C LED is on
- Camera based analytics detect proximity to humans and disables LED lights for safety



Ease of Operation

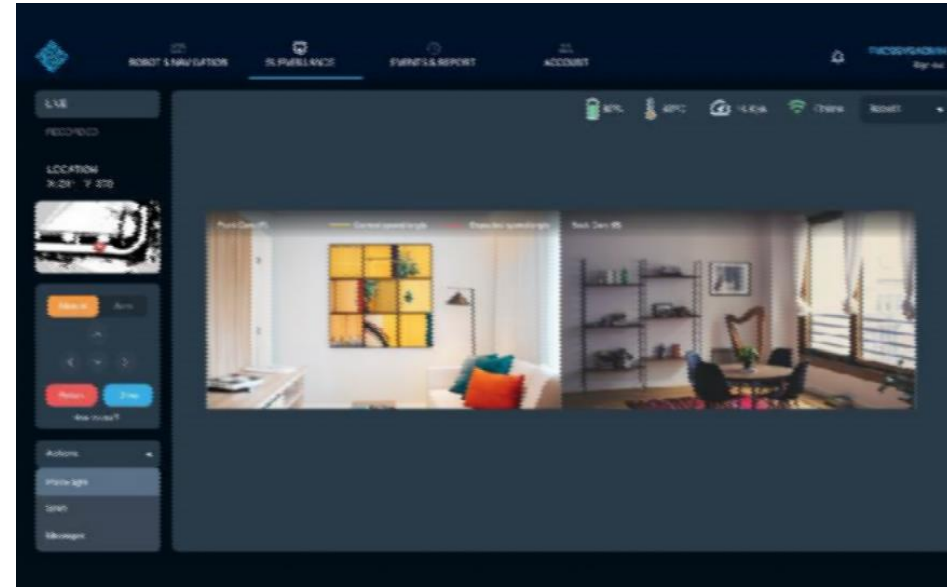
- Ease of detachment/changing of UV-C LED module for maintenance and swapping
- Autonomous navigation and disinfection around the designated area
- Autonomous docking and charging of the robot
- Fleet Management Control System monitoring, scheduling and controlling of multiple robots

O-RX Key Features



Safety

- Does not emit cancerous UV-A, UV-B rays
- Front and back camera and special cover to block LED light upon human detection
- Remote control from fleet management



Fleet Management Software

- Full remote control the robot and UV-C LED system
- Schedule autonomous disinfection, docking and charging
- Live video feed for monitoring (AGV and UV-C LED control)
- Manage multiple robots at the same time for disinfection



Server & Network Requirements

- On premise: Local Wi-Fi/4G
- Server requirements: Linux based, Core i5, 16GB RAM and above

Intelligent audio and visual features

Proximity Detection

Obstacle avoidance and autonomous navigation for reliable operation

Audible Warning

Speakers project an audible warning to keep safe distance from O-RX while in operation

Visual Analytics

Front and back camera analyses surroundings to cover LEDs upon nearby human detection

Ease of Operation

Live video feed for monitoring, scheduling and controlling





O-RX Specifications

Disinfection

- UV-C LED module
- Kills 99.99% of bacteria within 2.5 meters
- Disinfects up to 2583 sq. ft hourly

Power

- 5 hour run time
- 5 hour charge time
- Autonomous docking and charging

Navigation

- Differential drive
- Autonomous navigation & obstacle avoidance via Lidar, Sonar, IMU Sensor Fusion
- Autonomous docking and charging

Suitable Terrain

- Flat
- Indoors

Dimensions

- Diameter: 0.5m
- Height: 1.3m

Weight

- 60 kg



Robot as a Service (RaaS)

At OTSAW we offer our disinfection service on a subscription base to help you reduce time to benefit and be more flexible. RaaS allows you to enjoy a state-of-the-art quality service and a seamless customer experience from setup to deployment and operations.

Your contract includes setup, training, maintenance, and software updates to make sure your OTSAW O-RX is always at top performance at all times.



Lower
upfront cost



Full support &
maintenance



Free updates
& upgrades

Responsible Innovations



OTSAW



TRANScar

Automated Guided
Vehicle for Material
Transport

TREx

Multi-use Portable
UV-C LED
Disinfection

QRx

Autonomous
UV-C LED
Disinfection

Camello

Autonomous
Last-Mile Delivery

QR₃

Autonomous
Outdoor Security



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