



The NEW Normal ~ *Navigating through Covid-19*

A cost effective, safe and reliable long-term solution for disinfection and sanitisation

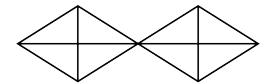


MERCATUS

About our Company

- Eight Mercatus is a venture builder group and a startup growth platform based in Singapore.
- Over the years, we have invested and incubated more than 50 startups in the high tech and biomedical industries globally.
- We are also the appointed Accredited Mentor Partners for the Enterprise SG Startup Founder Program.
- Our solutions are from our network of trusted portfolio companies, which have proven strong track records.

For more information, please visit: www.eightmercatus.com



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The New Normal - Navigating through Covid 19 and keeping safe

To provide a cost effective, safe and reliable long-term solution for disinfection of pathogens such as SARS-CoV-2 (Covid-19) with the following:

- a) Deployment of Autonomous Disinfecting Robots &
- b) FogClean™ Sanitization System

We propose that both solutions use NatShield™, a natural plant-based disinfectant which has been proven 99.99% effective against the SARS-CoV-2 virus and **proven safe for pregnant women, nursing mothers, young children and pets.**

Current challenges in Sanitisation

- Traditional sterilization methods utilise inefficient human labour or machines.
- No systematic way to maintain and control the quality/consistency of disinfection.
- Post high-risk of infection for healthcare or frontline cleaning workers.

Recommended by @utbrain19

9 new coronavirus clusters in S'pore; 2 cleaners at Northpoint City in Yishun among new 753 cases



Among the new cases include two cleaners at Northpoint City in Yishun. ST PHOTO: KEVIN LIM

PUBLISHED: MAY 9, 2020, 3:10 PM SGT | UPDATED: MAY 10, 2020, 8:40 AM



Malavika Menon

Charmaine Ng

SINGAPORE - Seniors aged 60 and older made up five out of the nine new Covid-19 cases among Singaporeans and permanent residents on Saturday (May 9).

Meanwhile, migrant workers living in dormitories made up most of the 753 new cases, taking the total count to 22,460, said the Ministry of Health (MOH) on Saturday night.

Of the infected seniors, two - Singaporean men aged 60 and 77 years old - are cleaners at Northpoint City, an existing cluster which has a total of 18 confirmed cases now.

ST VIDEOS



NatShieldTM

The Natural Sanitizer

The PathAway[®] Advantage

An all natural plant-based active ingredient processed using a proprietary formula and listed in the United States Pharmacopeia (USP 51) as an effective disinfectant.

A safe way forward

NatShield™ with Path-Away® is a lab tested, certified organic disinfectant proven to kill many different types of pathogens including fungi, bacteria, yeast and virus, while most importantly killing 99.99% of the SAR-CoV-2 (Covid-19) surrogate within a minute.

- 100% natural plant-based, chemical and alcohol-free, non-toxic if ingested.
- Does not irritate eyes, protection on skin surfaces for up to 4 hours and up to 24 hours on hard surfaces.
- Non-flammable, heat and light stable, can be safely kept in vehicles under sun.
- Safe for pregnant women, nursing mothers, young children and pets.
- Odourless, biodegradable and safe on clothes.
- Non-corrosive and does not interact with other compounds.

NatShield™
The Natural Sanitizer

Disinfectant comparison table - The NatShield™ Advantage

Properties	NatShield™	Quaternary Ammonium Compounds (Quats)	Alcohol	Hydrogen Peroxide	Sodium Hypochlorite
Active Ingredient	Path-Away® 100% Plant based botanical	Chemical	Ethyl or Isopropyl alcohol	Chemical	Chemical
Efficacy and Applications	Proven to be 99.99% effective against the feline coronavirus ¹ ; and is killed within 1 min exposure to NatShield ²	Widely used as disinfectant, surfactant, and household cleaning products	The FDA recommends that hand sanitizers should contain 60%-75% alcohol	Used in both liquid and gas form for preservative, disinfection and sterilization applications	Usually used as a bleaching agent which contains 5% sodium hypochlorite with a pH around 11
Stability and Usage	Very stable, non-flammable, heat and light stable	Very stable	Highly flammable and not heat stable	May cause ignitions and explosions	Unstable and corrosive, should not come in contact with air as it disintegrates
	Safe as aerosol spray around humans, 24 hour protection	Can be used as aerosol but not human safe	Instant effect but not lasting	Instant effect but not lasting, and has a bleaching effect	Bleaching effect
Safety Effects	Safe for pregnant women, nursing mothers, young children and pets	May cause skin problems, eye irritant	May cause Itching, flaking, scaling, peeling, cracks, redness	Can irritate the eyes, skin and mucous membranes	Causes redness and pain on skin or eyes when in contact;
	Non-toxic if ingested	In some cases of long term exposure, may cause respiratory problems		Can cause lung irritation	Inhaling causes a burning sensation, coughing, sore throat and vomiting

¹A surrogate of Covid-19 novel coronavirus

²Refer to Path-Away Lab test results

Please refer to Appendix B-Part 1 for full details

Approvals

- United States FDA GRAS approved ingredient
- United States Environmental Protection Agency (EPA) exempted
- Listed in the United States Pharmacopeia
- New Zealand Environmental Agency approval as a “non-rinse” sanitizer
- Exempted by Australian Therapeutic Goods Administration (TGA)



Environmental
Protection Authority
Te Mana Rauhi Taiao

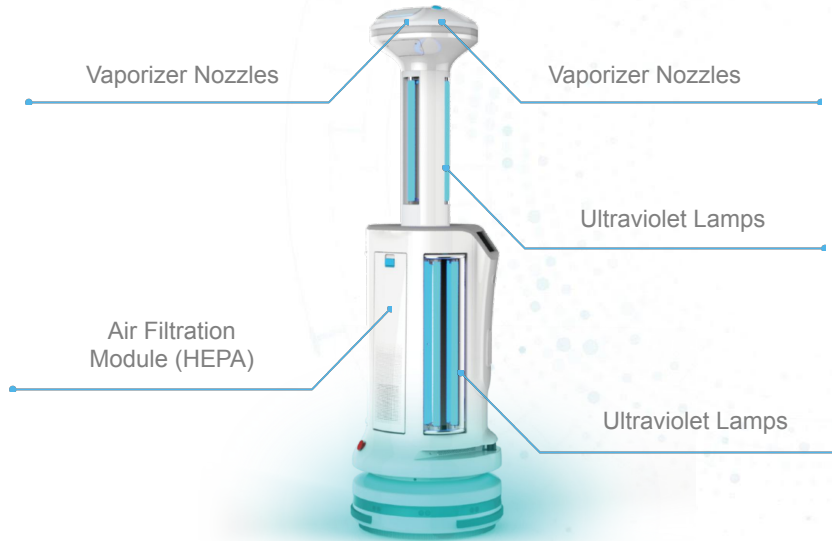
A. Intelligent Sterilization Robot (ISR)



Intelligent Sterilization Robots in operation



Intelligent Sterilization Robot



01

Multiple modes for multiple scenarios:
Vaporizer, UVC, Vaporizer and UVC

02

360° complete coverage: targeting both
airborne and surface contaminants

03

Fully autonomous: remote-controlled for
safety of operational staff

04

High disinfection efficacy: 15,000 sqft in
3hrs (UVC+vaporizer mode)






Detailed features of the ISR

- Flexible deployment in multiple situations: a) UVC only b) vaporizer only c) both UVC and vaporizer.
- Wide disinfectant range: 5m diameter and up to 3m height.
- Works autonomously and repeatedly once mapping and tasks are assigned, also manual control available.
- Obstacle avoidance and re-routing capability (elevator access optional).
- Safe to deploy in crowds using a human safe disinfectant, such as Natshield™.
- Coverage 5,000 sqft/hr, total 15,000 sqft with 3hrs runtime in dual UVC+spray mode*, for >90% disinfection efficacy (2.5hr full charge).

*Runtime up to 10hrs in spray mode

** Please refer to the product specification sheet in Appendix A for technical details

Disinfection method comparison

	Intelligent Sterilization Robot (ISR)	UVD Robot	Pulsed Xenon Light machine	Traditional Hydrogen Peroxide machine	Disinfectant wipe
					
Multi-mode functionality	Yes	No	No	No	Yes
Autonomous	Yes	Yes	No	No	No
# of vaporizers	9	0	0	6	0
# of UVC lamps	9	8	1 Xenon lamp	0	0
H ₂ O ₂ residue sensor	Yes	No	No	No	No
Extra UVC lamp protective mechanism	Yes	No	No	No	No
Smart scene adaptation	Yes	No	No	No	No
Air disinfection level	Excellent	Medium	Medium	Excellent	None
Surface disinfection level	Excellent	Medium	Medium	Excellent	Medium
Low disinfection time	Low	Medium	Medium	Long	Medium
Blind spots	Minimal	Many	Many	Minimal	Many
Residual odour	No	Strong	No	Strong	Strong
Aging of peripheral equipment	Low	High	Medium	High	Medium

Current Applications in Healthcare



Currently deployed COVID-19 applications

First line of defense, before sending in vulnerable cleaning workers.



Hospitals/
Medical clinics



Airports/
Border control



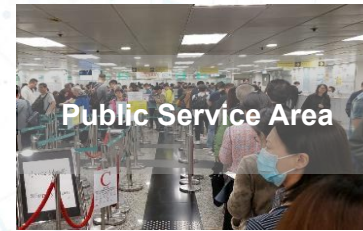
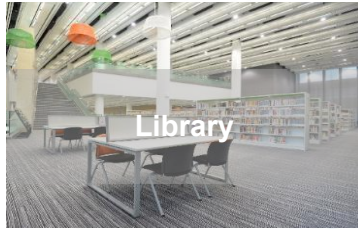
Correctional
service facilities



Public
spaces/Offices

Other Critical Applications

ISR ensures organizations build public confidence by prioritizing health and safety.



Multi-mode Flexibility

Working Scenario 1: Open spaces with crowds



Spray mode only

Navigates and sprays non-toxic human safe disinfectants

Working Scenario 2: Enclosed environment - short disinfection time (>95% efficacy)



UVC mode only

Closed indoor environment – high frequency with limited short disinfection time (e.g. toilets)

Working Scenario 3: Enclosed environment – deep disinfection (>99%)



Both spray and UVC mode

Closed indoor environment requiring a higher disinfection efficiency up to 99% or above and allows longer disinfection time (e.g. hospitals, medical clinics and toilets at quarantine facilities).

Working Scenario 4: Manual disinfection in ad-hoc location



Both spray mode and/or UVC mode

New ad-hoc or unmapped location. Manual control using iPad or joystick.

Successful installation cases - Hong Kong International Airport



Hong Kong International Airport 香港國際機場
 3月19日 17:45 · 0

機場最近找來一位新成員協助抵抗疫情。這般Intelligent Sterilisation Robot (ISR)智能消毒機械人可全自動化移動，並以紫外線消毒燈、360度消毒噴頭及0.3um空氣過濾網，消滅在空氣中及物件表面上近99.99%的細菌及病毒，過程最快只需10分鐘。

此項技術由本地科研公司研發，以往多用於醫院，而香港國際機場是全球首個機場應用此智能消毒機械人。

Recently joining the airport team to combat the coronavirus is the Intelligent Sterilisation Robot (ISR). The robot can move autonomously and sterilise up to 99.99% of bacteria and virus in the air and on object surfaces using UV light, 360-degree disinfection spray-heads and 0.3um air filter..... 查看更多

600 28個回應 105次分享

Hong Kong airport brings in cleaning robots and disinfection booth

They clean the robots can sterilise up to 99% of bacteria in their vicinity within ten minutes.

By Google

<https://www.facebook.com/hkairport.official/videos/235942094212249?sfns=mo>

<https://edition.cnn.com/travel/article/hong-kong-airport-cleaning-robots-wellness-sc/index.html>

Successful installation cases - Hospitals

Deployed in over 300 hospitals in China alone, especially in Wuhan which is the epicenter of COVID-19 outbreak.



ISR Operational Efficiency

Optimal capabilities	
Area coverage per hour	5,000 sqft
Area coverage per 24 hours	80,000 sqft
ISR run time per 24 hours* (including charge time)	16 hrs
Disinfectant used per hour	0.8 litres
Total disinfectant used per day	12.8 litres

*All performance claims are based on theoretical performance. Actual figures may vary in real-world situations.

Why you need the ISR




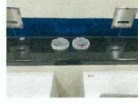



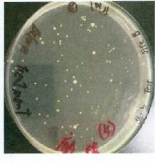


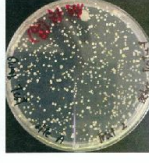



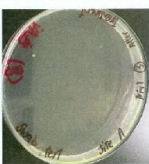


- First level of defence to minimize the risk of infection transmission amongst frontline staff and general public.
- Ability to autonomously and consistently maintain a high level of disinfection efficacy at all times - complimenting manual cleaning teams.
- Reliable and cost-effective long term investment.
- Physical presence of the ISR will instill public confidence that public health is taken seriously.
- Be the leader in setting a high industry benchmark for sanitization in respective industry

Disinfection Results

Test conducted at Hong Kong International Airport on 02 March 2020

Objective: To evaluate the bacterial killing performance by comparing the bacterial counts between groups before and after disinfection by the ISR.

Requested disinfection efficacy: 90% or above

	Female Toilet			Male Toilet		
	1 – Sink	2 – Toilet paper holders	3 – Shelf behind toilet	1 – Sink	2 – Shelf above urinal	3 – Shelf behind toilet
						
Before disinfection						
After disinfection						

Conclusion:
Bacteria killing efficacy: >93%

This test was conducted by Hong Kong Baptist University. For full test reports, please refer to Appendix A.

Workflow - Easy Programming



Select disinfection mode



Schedule disinfection time



Select disinfection place



Autonomous Plan & Move



Destination reached



Perform disinfection process



Autonomous move return to charging bay



Automatic Charging

360° autonomous movement to reach blind spots and ensure complete coverage

Self-calibration for sterilization coverage and work time

Certifications



Please refer to Appendix A - Certifications for full details

B. FogClean™ Sanitisation System

 **FogClean**

FogClean manufactures industrial and commercial disinfectant systems.

Our proprietary, ultrasonic dry fog system effectively sanitizes and disinfects large areas in minutes.

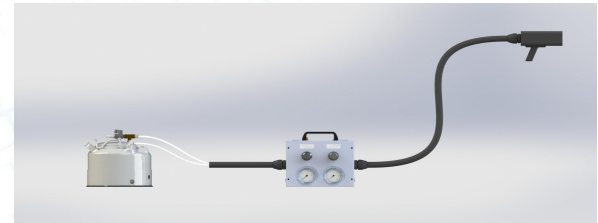


Recommended to be used with Natshield™

How it works

- The FogClean™ system is an ultrasonic disinfectant atomizer that is extremely effective at destroying surface and airborne pathogens
- Its unique nozzle can produce very dense fog droplets (3µm size) that literally blankets an area in seconds, allowing both quick and effective sanitization of the area
- Ability to target hard to reach areas
- Once a day application of NatShield™ can last for 24 hours on hard surfaces

For Product and Technical specifications, please refer to Appendix B



FogClean™ Pro Video



<https://youtu.be/VIL1VZKa2eY>

The above video illustrates how FogClean™ system works with NatShield™ (Path-Away) as disinfectant.

More Video links can be found in Appendix D

List of customers using FogClean™



FogClean™ Operational Efficiency

Optimal capabilities	
Area coverage per hour	10,000 sqft
Area coverage per 24 hours	80,000 sqft
Operation duration - standard workday*	8 hrs
Disinfectant used per hour	18 litres
Total disinfectant used per day	144 litres

*All performance claims are based on theoretical performance. Actual figures may vary in real-world situations.

Case Example:

Cost comparison with various cleaning services for Mass Rapid Transit (MRT)

For 1 Station (80,000 sqft, SGD\$)	Outsourced sanitization service	RT's cleaning team	FogClean™	ISR
Frequency	Monthly	Daily	Weekly	Daily
No. of human cleaners/robots	Included	7	1	1
Total cost/month (excl consumables)	\$19,670	\$12,425	\$530**	\$3,190*
Total cost/month (incl consumables)	\$20,000	\$22,274	\$23,570**	\$18,550*

For illustration purposes only, consumable costs will depend on the choice of disinfectant.

*Cost of ISR takes into account the amortization over 5 years, depreciation, warranty and maintenance.

**Does not take into account cost of the compressor which has to be purchased separately from FogClean™ Pro system

Refer to Appendix C for input assumptions.

Our Recommendations

- Combination of deploying the ISRs with FogClean™ to provide an overall comprehensive and consistent disinfectant solution.
- FogClean™ can be used to easily disinfect enclosed space and/or open areas as required, targeting hard to reach areas and minimising blind spots.
- The use of NatShield™ as a human-safe disinfectant means the disinfecting process can be carried out safely during operational hours whereby:
 - Frontline workers do not need to wear full PPE during the fogging process
 - Safe to deploy even during peak commuting crowds
 - Effective against surface and airborne pathogens while eliminating odours or smoke

Our Recommendations - Real world application

By Zhaki Abdullah

12 May 2020 03:57PM
(Updated: 12 May 2020 04:03PM)



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Singapore

20 SMRT buses retrofitted to help transport COVID-19 patients between facilities

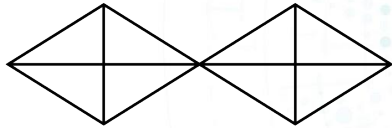


An air-tight partition on the COMET MAXI buses separates the passenger section from the driver. An emergency door on the partition can only be opened from the driver's side when necessary. (Photo: SMRT)

- NatShield™ is not only effective in large spaces, it can also be administered into air ducting to destroy lingering pathogens especially where air is recycled (enclosed air-conditioned areas).
- Perfect example of a scenario using NatShield™'s long lasting protection to help decontaminate passengers and sanitize the separate air-conditioned compartments.

<https://www.channelnewsasia.com/news/singapore/smrt-buses-retrofitted-to-help-transport-covid-19-patients-12724306>

Contact Information



MERCATUS

Eight Mercatus Pte Ltd

Blk 71 Ayer Rajah Crescent
#03-04/05 Singapore 139951

Contact Person: Joanna Soh
Email: jo@mercatus-capital.com
Mobile: +6594232373

Appendix

More information on FogClean™

- Ultrasonic Dry Fogging
- Advantages of FogClean™ System
- FogClean™ Pro Videos Demos

Appendix

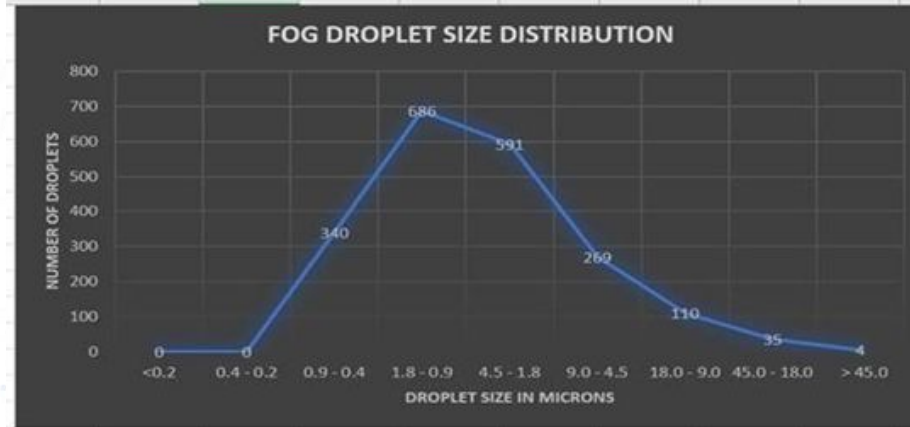
Ultrasonic Dry Fogging - FogClean™

FogClean™ systems utilize a proprietary, ultrasonic nozzle to atomize any liquid to droplets 1-10µm in size with an average size of 3µm. When decreasing the droplets to sub-micron particles, the liquid converts to a fog-like substance, enabling our process to quickly and efficiently sanitize large surface areas without any loss of potency in the disinfectant.

The dry fog will also disinfect without leaving residue or liquid behind. Computers and other electrical equipment will be safe while the fog is able to penetrate in areas (under the table, between concrete objects, hard to reach places) most disinfecting processes will leave untouched.

While disinfectants are usually designed to inactivate or destroy microorganisms and pathogens on inert surfaces, the ultrasonic nozzle's method for fog distribution also addresses airborne pathogens. Dry fog particles leave the nozzle electrostatically charged and small enough to attach to like sized particles in the air.

Advantages of FogClean™ System



90% of fog droplets produced are in the $3\mu\text{m}$ range, this results in better surface area coverage (sub $10\mu\text{m}$). Droplet size allows for best contact with airborne pathogens. Fog-Clean™ systems have the ability to contact airborne pathogens or bacteria due to the droplet size of the fog.

The system uses minimal amount of solution to achieve maximum coverage due to the smaller droplet size. We are able to treat an area 10x faster than conventional methods. This allows for our customers to get back to business faster!

FogClean Pro™ - Video Demos

Videos for reference:

Instructional Video:

https://www.dropbox.com/s/qbwofdi25yqaho0/MVI_0610.MP4?dl=0

Fogging Examples:

https://www.dropbox.com/s/azv7neyt7xk2rjf/VID_20200317_134121.mp4?dl=0

<https://www.dropbox.com/s/g5ysavi13e51u9t/RockBox%20HD.mp4?dl=0>

<https://www.dropbox.com/s/hu4hr0y8bme7w7n/RockBox%20Bag%20Area.mp4?dl=0>

<https://www.youtube.com/watch?v=zysHC4mKTV8&feature=youtu.be>

Thank you