



PURE LIGHT LED PRODUCTS

# ADAPTING THE NEW NORMAL

## CERBERUS™ BIO-DEFENCE SOLUTION

### PUBLIC TRANSPORT



Pure Light Led Products is a South African manufacturing company. Over lock-down period new range of Ultraviolet Germicidal Disinfecting products was developed and certified, specifically designed to combat air-borne diseases such as Covid19, TB, Flu, Measles, etc. UV-C radiation is a known disinfectant for air, water and surfaces that can help mitigate the risk of acquiring infection

Public transport taxis and buses are the places where commuters confined in an enclosed space for a long period of time, sufficient enough for virus to infiltrate into human body. Thus such places require an improved protection from highly infectious viruses and bacteria. Prevention plays a vital role in keeping commuters and drivers healthy, as it will reduce or stop infection transfer

Devices specifically designed to keep air consistently clean and surfaces disinfected, serving as proactive and preventative solution to minimise air-borne and surface virus transfer



## PROBLEM

Research conducted by various scientific institutions ( among others TOHO University\* in Japan and AALTO University\* in Finland), shows that when person continuously breathing, speaking, sneezing or coughing, an aerosol cloud is emitted. Hundreds of thousands of contagious aerosols can be generated within a few minutes. Most of the heavier droplets falls on the ground within one minute, contaminating surfaces. Micro-droplets (1/10 000 of 1 millimeter) can drift in the air for a long time, if no air movement is present. If aerosols contains high concentration of viruses or bacteria and if they are inhaled for long enough, the chance of infection will increase

Air conditioning will worsen situation, as enforced air flow will spread contaminated aerosols evenly

Keeping vehicle windows open helps to clean air, but its not always possible at adverse weather conditions (during rains, cold or hot weather), as well as at high speed

### *References:*

\* AALTO University Research

<https://www.youtube.com/watch?v=ajHK0Nt-GrM>

\* TOHO University Research

<https://www.youtube.com/watch?v=H2azcn7MqOU>

## SOLUTION

UV-C rays are lethal to viruses and bacteria, as it destroys links in their DNA

Coronavirus is an air-borne disease and thus virus should be intercepted and neutralised while it in the air, before it reach and contaminate surfaces or get inside of a human organism.

Rate of air circulation & disinfection plays crucial role in reduction of possible disease transfer. Despite current pandemic commercial aircrafts flying at full capacity, with every seat and row occupied by passengers. How is that authorities world-wide permitted 100% occupation during flights? Answer is that air being constantly filtered and disinfected during flights, reducing risk of air-borne particles flying around.

Cerberus UV-C LED Vehicle recirculating device designed to constantly disinfect air in an enclosed vehicle cabin



# HOW SAFE IS AIR TRAVEL?\*

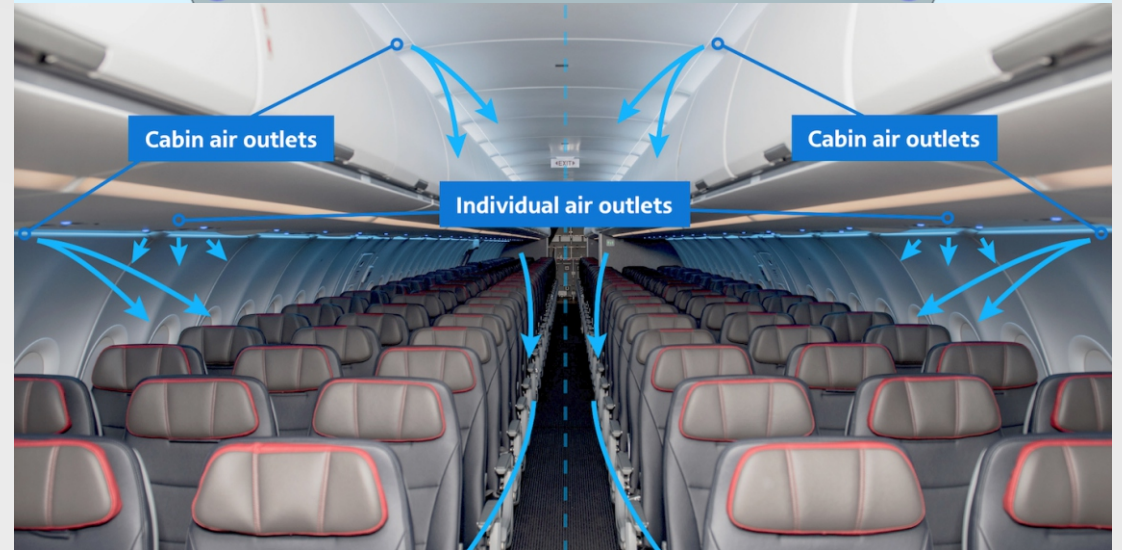
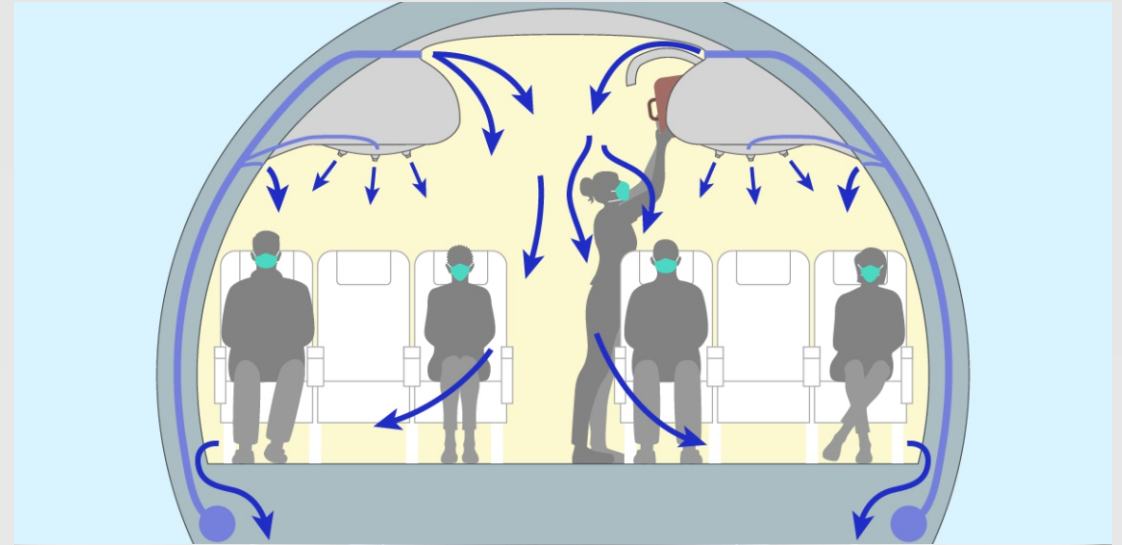
At first thought, a narrow metal tube in which strangers are crammed together for hours might seem like a flying petri dish, especially during a pandemic. The reality is a bit more nuanced. While there are risks associated with flying, it may be safer than you think. For starters, the air quality on a commercial airliner is actually quite high, with the air volume in the cabin being completely refreshed every two to four minutes.

Once air leaves the cabin, about half is dumped outside, and the rest is sent through HEPA (high-efficiency particulate air) filters, similar to those used in hospitals, before being mixed with fresh outside air and entering the cabin again. Of course, passengers and crewmembers moving up and down the aisles can disrupt this airflow, altering the path of any airborne particles. And while the HEPA filters used in commercial aviation can filter out 99.97% of virus-sized particles, they can't capture every respiratory droplet or viral aerosol before someone else inhales it.

Still, the design of air-handling systems on commercial aircraft makes it unlikely that you'll be breathing in air from anyone more than a few rows away. In fact, a 2018 study that examined the transmission of droplet-mediated respiratory illnesses during transcontinental flights found that an infectious passenger with influenza or another droplet-transmitted respiratory infection was highly unlikely to infect passengers seated farther away than two seats on either side or one row in front or in back.

And that was without masks.

<https://medical.mit.edu/covid-19-updates/2020/09/how-safe-air-travel>



DESIGNED & MADE  
IN SOUTH AFRICA



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# CERBERUS UV-C VEHICLE DEVICE



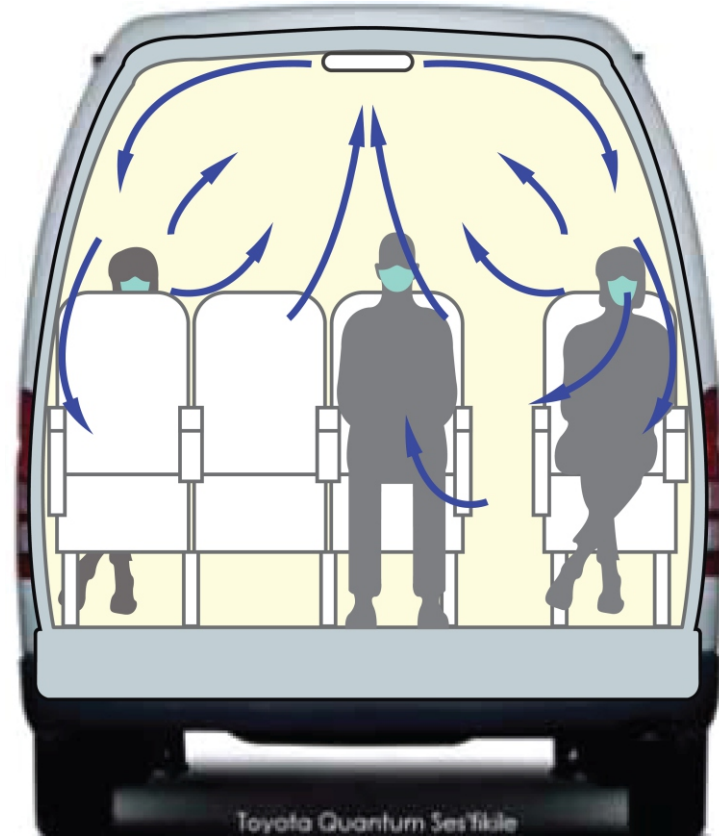
Cerberus UV-C LED Vehicle device designed to constantly circulate and disinfect air in an enclosed vehicle cabin, following same design principle as it happens in commercial aircrafts.

Public transport vehicle's air conditioning systems not that much sophisticated comparing to modern aircrafts in terms of air circulation and disinfection.

UV-C Device, mounted on the ceiling will constantly rotate and disinfect air at rate similar to commercial aircrafts. Air flows into the device from below area at rate of  $68 \text{ m}^3$  an hour, instantly disinfected using high power ultraviolet LEDs and is sent sideways in a circular motion, exiting at floor level. Device completely safe for people below, which was confirmed by testing conducted at NMISA (National Metrology Institute of South Africa)

Easy installation with plug-in into cigarette charger (12V version) or connected directly to vehicle electrical system (12V/24V)

2 devices installed inside of the standard Toyota Quantum minibus taxi vehicle, will circulate and disinfect air about 15 times per hour, or every 4 minutes



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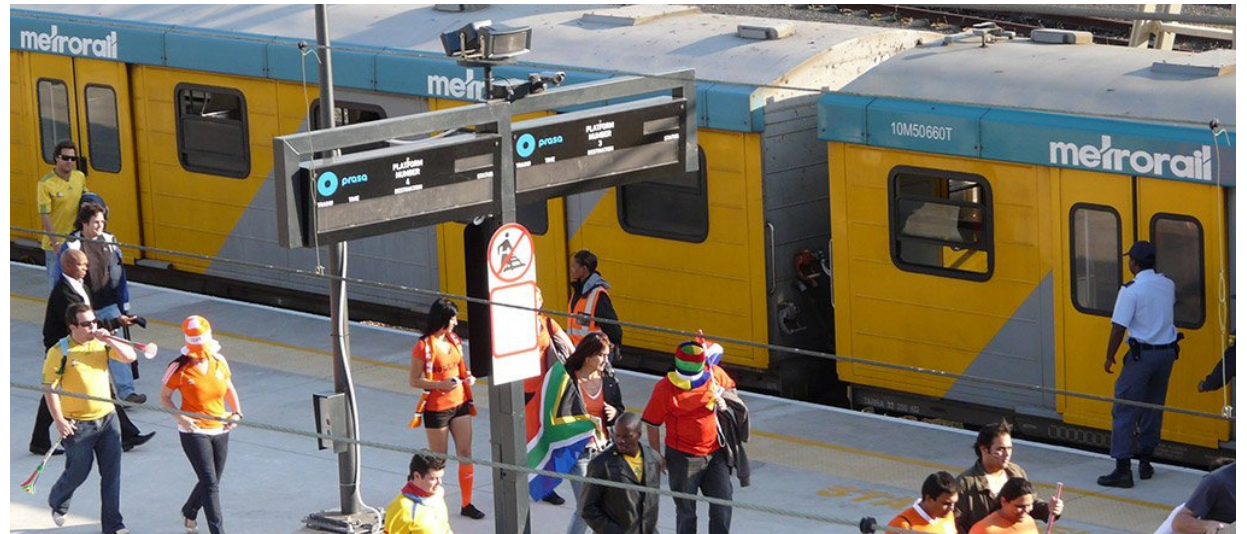


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Cerberus UV-C LED device can be installed at any type of public transport: minibuses, buses, trains

Quantity of devices should be determined by the internal volume, to provide fast and efficient air circulation and disinfection



# CASE STUDIES AROUND THE WORLD



NEWS RELEASE 14-DEC-2020

LED lights found to kill coronavirus: Global first in fight against COVID-19

Tel Aviv University finding suggests technology can be installed in air conditioning, vacuum, and water systems

Researchers from Tel Aviv University (TAU) have proven that the coronavirus can be killed efficiently, quickly, and cheaply using ultraviolet (UV) light-emitting diodes (UV-LEDs). They believe that the UV-LED technology will soon be available for private and commercial use. This is the first study conducted on the disinfection efficiency of UV-LED irradiation at different wavelengths or frequencies on a virus from the family of coronaviruses. The study was led by Professor Hadas Mamane, Head of the Environmental Engineering Program at TAU's School of Mechanical Engineering, Iby and Aladar Fleischman Faculty of Engineering.

[https://www.eurekaalert.org/pub\\_releases/2020-12/afot-llf121420.php](https://www.eurekaalert.org/pub_releases/2020-12/afot-llf121420.php)



Made for minds.

UVC technology could help fight coronavirus

Ultraviolet light is already used in air conditioning systems and for disinfection in hospitals. Several scientific studies are now showing that UVC radiation can effectively kill viruses and may help fight the pandemic.

<https://www.dw.com/en/uvc-technology-could-help-fight-coronavirus/av-55543743>



Applications of ultraviolet germicidal irradiation disinfection in health care facilities: Effective adjunct, but not stand-alone technology

This review evaluates the applicability and relative contribution of ultraviolet germicidal irradiation (UVGI) to disinfection of air in health care facilities. A section addressing the use of UVGI for environmental surfaces is also included. The germicidal susceptibility of biologic agents is addressed, but with emphasis on application in health care facilities ...

[https://www.ajicjournal.org/article/S0196-6553\(10\)00420-7/pdf](https://www.ajicjournal.org/article/S0196-6553(10)00420-7/pdf)



New findings warn of higher risk in airborne coronavirus transmissions | COVID-19 Special

What does the latest research tell us about the spread of coronavirus? Do masks help prevent new infections? A study by Berlin's Charite Hospital has found the risk of catching the coronavirus from contaminated surfaces is lower than thought. The bad news is the risk from droplets and aerosols is greater than previously thought. Aerosols are tiny particles, like fine dust. Virus particles can attach themselves to the aerosols and spread infection. <https://www.youtube.com/watch?v=-PmD7ajep54&feature=youtu.be>



# FAQ

## **Can UV-C light prevent COVID19 transmission?**

Ultraviolet radiation of C band (UV-C) is the most effective sterilizing remedy (in range between 200nm to 280nm), as organisms with damaged DNA can't replicate. During 2020 research conducted by many scientific organisations confirmed efficiency of UV-C against COVID19 virus. Research centers not limited to include: IUVA, the International Ultraviolet Association, a non-profit organization dedicated to the advancement of ultraviolet technologies; ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers; IES - established in 1906, the recognized technical and Educational authority on illumination, and many others scientific and research centers and test labs worldwide

## **Design Standards**

In medical area UV-C is a familiar technology (invented back in 1877), as it used for decades for disinfection in ICU, surgeries, other medical facilities. Devices designed according to SABS and European CE standards. Measurements verified and confirmed by testing conducted at NMISA (National Metrology Institute of South Africa).

## **Support**

Support to be provided at planning stage to determine correct quantity and installation location for every device. Support team will conduct inspection on regular basis, maintaining devices for problem-free experience, subject of SLA agreement

## **Benefits:**

- Set of devices will protect commuters and drivers from infecting each other
- Long term universal protection against currently known airborne diseases, not only COVID19, but TB, flu, measles etc.
- Better chances to face-off against any new future pandemic (Covid19 pandemic will not be the last: WHO chief)





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