

Home Decontamination Chamber

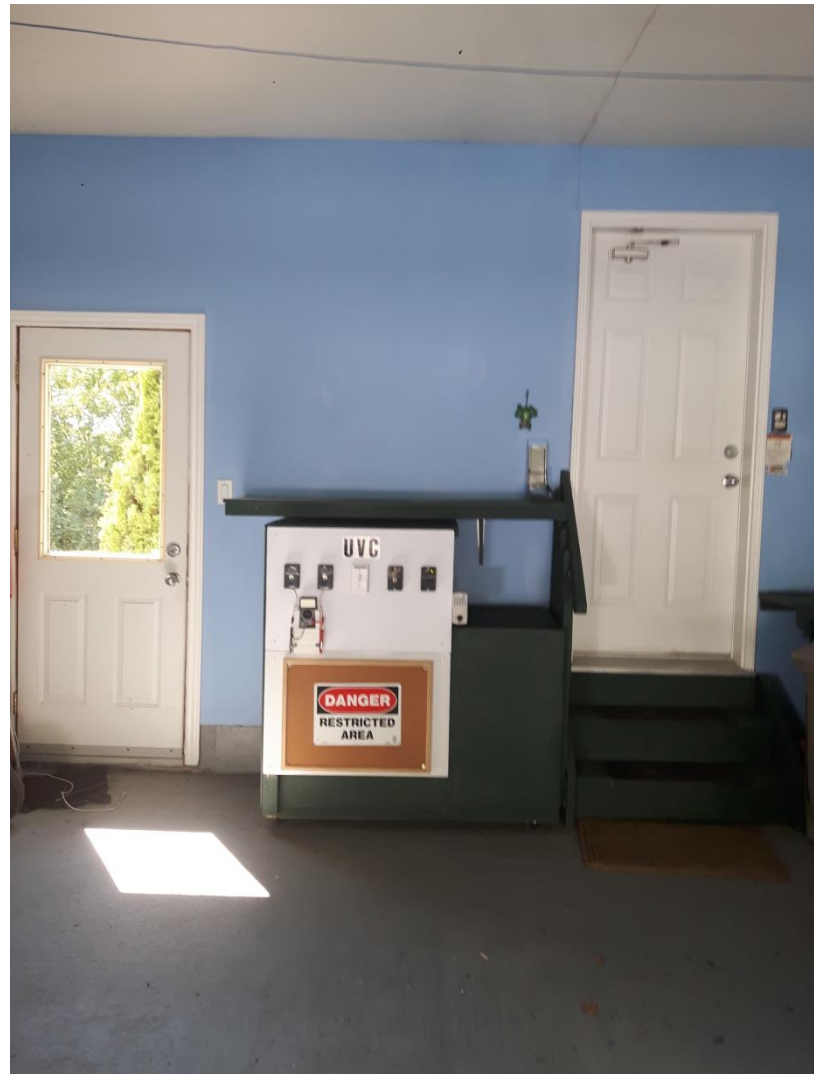
Fighting back against the
SARS-CoV-2
Virus

UVC Platform in standby mode

The UVC Platform in its home location within the garage. The door on the left may be opened for ventilation or emergency exit. The door on the right is the access door into the house.

SAFETY is top priority. This is achieved by:

1. Three levels of light tight containment. A box within a box within a box.
2. Nine levels of interlocks that are intentionally designed to be complicated and require specialty training and external equipment.
3. Knowledge of the threat imbedded in the operating procedures.
4. Ventilation and isolation in the garage.
5. Warning signage, LED lights and audible sounds.
6. Less than 20 Watts (120 VAC, 5 VDC) of power required.



Front view of the UVC (ultraviolet band C) decontamination platform

Power interlocks are controlled and monitored safely from this view of the platform.

Four black box switch, LED indicator lights, manual switches are in a row with a white emergency switch in the middle. There are 9 safety interlocks.

The white meter on the right is a Wattmeter monitoring power consumption in the platform.

The meter on the left is only a voltmeter displaying the voltage output from the solar array sensor inside the chamber. It is the only way we know that UVC light is being applied to the object being decontaminated.

Plans exist for the empty white space on this command and control station.



Closer look at the control panel

The corkboard on the lower half can be used for pinning notices as required. Only the DANGER notice exists during platform commissioning.



The platform under full power

The four black boxes each have a coloured LED light indicating from the right to the left:

1. Power passed through two levels of isolation (emergency on/off white switch and Internet Smartphone software) – GREEN LED
2. Power applied to the chamber control system – RED LED
3. Power has been activated in the TIMER circuit: RED LED
4. Power has been delivered to the UVC lamp: WHITE LED.

When the WHITE LED is on, the Voltage from the solar array sensor inside the chamber moves from 0.0 volts to about 7 volts DC.

The Wattmeter on the right indicates power delivered to the UVC LED array of 12 LEDs (254 nm UVC).



Full view of the back

The UVC chamber will remain in the garage permanently because:

1. UVC leakage can cause harm to plants, pets and humans while dismantling the DNA of bacteria, viruses and pathogens. Ventilation and social distancing is readily and safely accomplished.
2. Three containment chambers – a box in a box in a box with multiple 90 degree turn labyrinth seals reducing the leakage substantially.
- 3 The top right is a repurposed microwave oven with all the microwave hardware removed, the front door window sealed inside and outside and most of the controls decommissioned. Only the timer controls, door shut interlock, the LED numerical control window, the firmware and the START button are operational.
4. The white cord is the platform 120 VAC power.
5. Two storage shelves are shown below the chamber.



Containment level 3 door closed

This is a sliding vertical door with a snug fit and labyrinth seals forcing escaping UVD radiation to make at least 3 right angle turns and then will only “see” the rear wall of the garage.



Containment level 3 door open

This vertical manual sliding door can be closed or opened in under 1 second. Here it is in the OPEN position revealing the Level 2 containment door.

All surfaces potentially along the path of escaping UVC are non-reflective black. The objective is to absorb as much escaping energy as possible and reflect very little.



The Rear of the Structure with the Chamber Door Open

1. Only the top right portion of the structure is used to contain the UVC chamber.
2. The shelves below are for storage of typical garage gardening tools, windshield washing liquid and all the rest that gathers in a garage.
3. This door has two containment surfaces. Level one is the surface behind the solar sensor while level 2 is located behind it.



Inside the Chamber

1. Irregular surface reflective Aluminum foil on 6 surfaces reflects the UVC in a complex reflective way. The intent is to encourage penetration around cellular phone push buttons.
2. Left side is the solar array sensor in a wooden holding frame.
3. Right side but back of chamber is the black UVC lamp with twelve 254 nm LEDs.
4. Miniature Canadian Flag on a holding rack getting exposure to UVC to encourage discolouration or red fading.



Fully powered platform solar sensor output

UVC, like electricity, can't be seen but we can see the voltage produced by the solar sensor inside the chamber when the UVC Lamp is energized.

In this case, it is 7.35 Volts.

This value is not very significant as the object being decontaminated casts a dark shadow on the sensor as it is partially blocked. The object shape and location inside the chamber will be different with each decontamination object. Hence, the 7.35 volts only shows that the 0.0 volts prior to turning the UVC lamp on had increased to 7.35 volts in this unique case. This means that the UVC lamp is most certainly activated and producing UVC radiation but nothing more.



Power used by Wattmeter.

No power delivered to anywhere else in the platform than the Wattmeter itself. It is drawing 0.3 Watts.



Power used by the platform without turning on the UVC Lamp

The overhead power for everything in the platform but the UVC Lamp is 4.8 Watts



Platform Power with the UVC lamp energized

17.8 Watts less the overhead of 4.8 Watts says the UVC lamp is drawing 13 Watts of power.



This Home UVC Decontamination
Chamber has passed its
Commissioning Testing and is ready
for production decontamination.

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owner