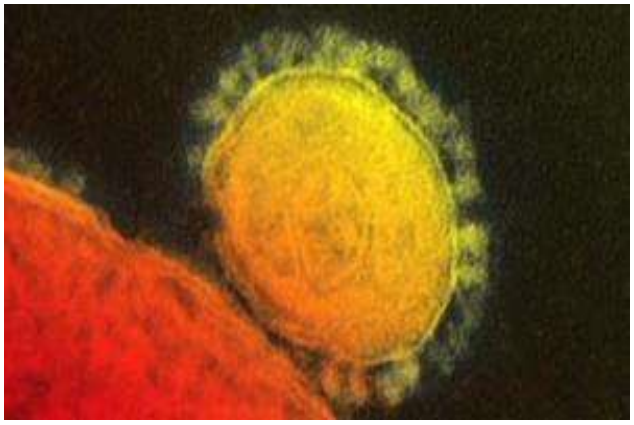
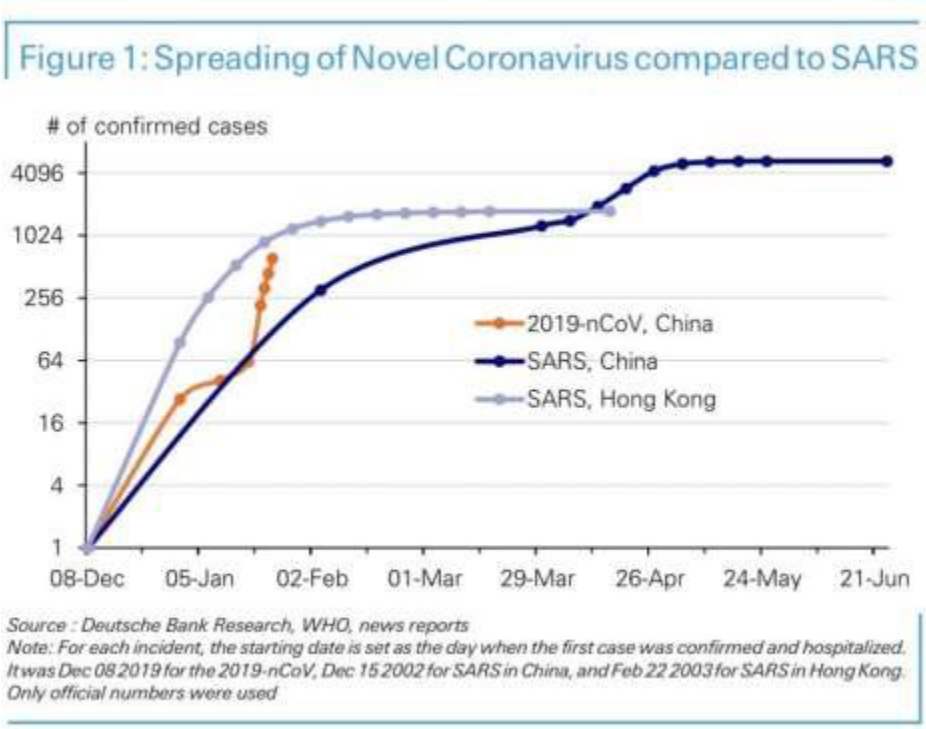
2020年全球冠狀病毒爆發

來自中國的新型冠狀病毒的爆發和迅速傳播引起了世界範圍的關注，因為該病毒具有高度傳染性，並通過受污染的表面和通過個人接觸在空氣中傳播。



早期數據資料表示，感染率高於2002年和2019年SARS的另一種新型冠狀病毒感染率。



流行病學家已經確認這種新型冠狀病毒的來源是中國城市武漢的一個野生動物市場，那裡的商販出售臭味的屍體和活體動物，包括蝙蝠、大鼠、鴕鳥、鱷魚和刺猬。武漢病毒學研究所從患者樣本中確定，蝙蝠冠狀病毒的匹配率為96％。2002年爆發的SARS冠狀病毒也起源於蝙蝠，並通過在中國市場銷售的貓科動物棕櫚果子狸傳播給人類。

這種最新形式的冠狀病毒可引起嚴重的急性呼吸道疾病，症狀為咳嗽、發燒和肺炎，類似冠狀病毒變種所引起的咳嗽、發燒和肺炎。2012年9月首次描述了“中東呼吸綜合症冠狀病毒”（MERS-CoV）。中東呼吸綜合症冠狀病毒的流行導致49%的死亡率。令人擔憂的是，鑒於高感染率，新病毒可能具有同樣高的死亡率，特別是在那些免疫系統受損的人中。

美國幾個城市的數十人受到感染的主要原因是與來自亞洲的遊客接觸。 洛杉磯、舊金山、亞特蘭大、西雅圖、紐約等主要城市的衛生部門正在對航空旅客進行篩查。 已對26個州的100餘人進行了調查，並接受病毒監測。疫情不斷擴大，引發了與中國有交流計劃的全國學校和大學的擔憂。CDC確認沒有可用的疫苗，並建議採取常規衛生預防措施以降低感染風險。

在人口稠密的城市、公共場所和交通中心，空氣傳播的病毒可能會集中於此，感染的風險最高。特別危險的是公共休息室。在沖廁時吸入霧化受污染的糞便可以確認MERS的傳播。氣溶膠在空氣中持續存在較長時間。旅客和衛生保健工作者的感染風險最高。

FDA批准的顛覆性技術有助於病毒感染風險降至最低

HGI已經開發了一系列創新的消毒設備（Odorox®系列產品），這些設備由高能紫外線光化學作用，就像太陽的作用一樣。這些設備可以安全地殺死99.99％在空氣、表面和織物上的病毒、細菌、黴菌和其他病原體，可使用在小到辦公室或大到數十萬平方米（百萬平方英尺）。 HGI的專有技術可通過產生有效的大氣羥基進行消毒，是一種強大的大氣消毒氧化劑。

空氣中的羥基是理想的消毒劑。它們與廣泛的化學物質發生反應，並且比臭氧、漂白劑或其他消毒劑快一百萬倍。它們的反應速度如此之快，以至於在幾秒鐘內就被消耗掉了，因此它們永遠不會積累。形成的有機過氧和氧消毒化合物的級聯反應也非常迅速。揮發性有機副產物在通過設備回收後迅速分解。室內環境迅速耗盡了天然羥基，並累積了不健康的化學物質、細菌和病毒。Odorox®技術消除了這種堆積，並恢復在室內的安全平衡。

太陽紫外線能量對大氣中氧氣和水的作用下不斷產生大氣中的羥基。在白天，平均每立方厘米室外空氣中有200萬個羥基。

（D. E. Heard，“大氣測量分析技術”，布萊克韋爾出版社，2006年–英國利茲大學教授）。 它們通過分解天然和人為污染物並殺死微生物來保持空氣安全呼吸。它們通過稱為“裂解”的自然過程對空氣和表面進行消毒，其中的羥基與細菌、病毒和其他病原體的細胞壁和膜中的脂質、蛋白質、碳水化合物和其他有機化學物質發生化學反應，並破壞其結構。細胞的內部內容物洩漏並且破壞了生物。殺死微生物的機制不是生物本身，因此細菌或病毒無法產生任何的免疫力。

Odorox®在堅硬和多孔表面以及空氣中對多種微生物的殺菌率始終超過99.9％。 霧狀微生物的殺菌率在幾個小時內在4-5（99.99%至99.999％）的測量範圍內異常高，提交給FDA的Odorox®MDU/ Rx™設備研究所示如下圖。 這對於病毒性疾病的傳播特別有效，因為傳播的主要載體是吸入霧化病毒。

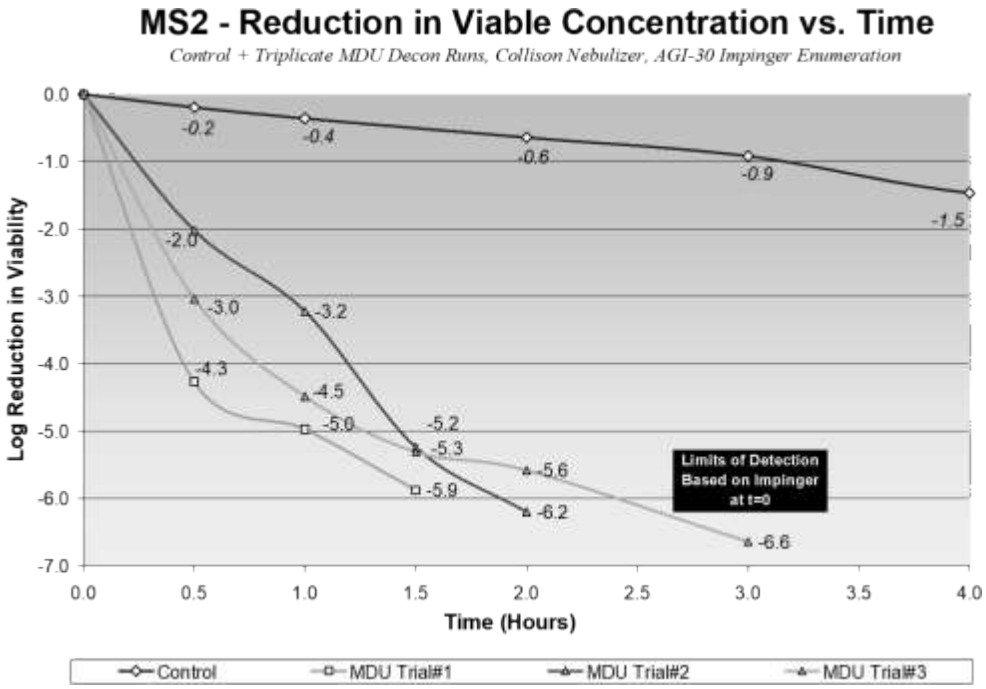
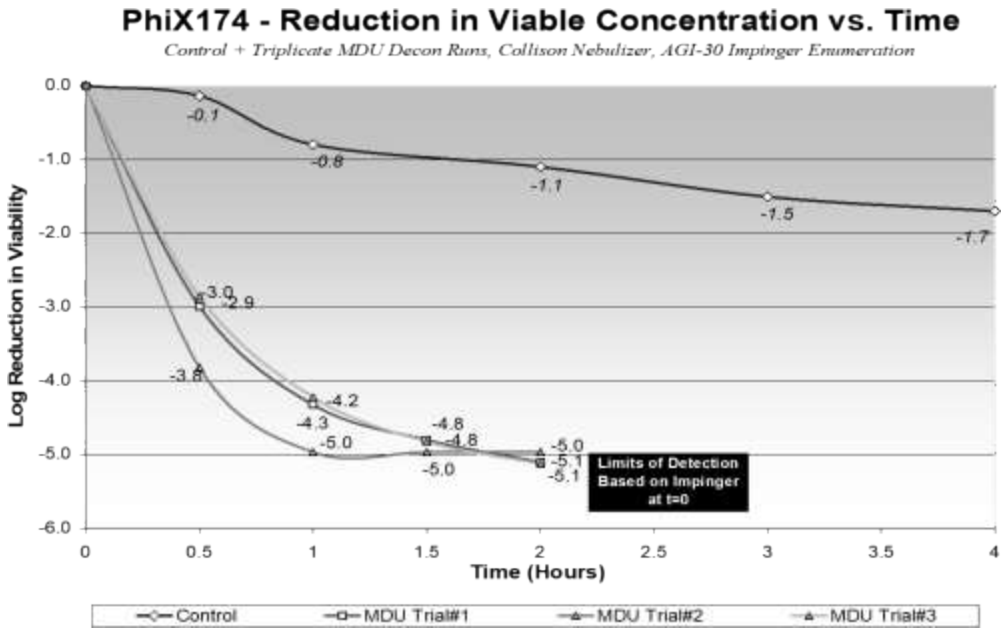


圖8：*噬菌體MS2控制和MDU/RX試驗日誌降低活濃度。*



殺菌紫外線（UV-C）燈已用於表面消毒多年。UV-C燈的功率不足無法生成羥基，羥基的形成需要更高的UV能量。UV-C燈只能幾英寸的範圍內並且在低流速下有足夠的暴露時間時，才能對表面進行消毒。它們不能有效地對空氣消毒，因這些空氣迅速循環流動。

HGI的Odorox®UV技術非常獨特：與殺菌UV-C技術完全不同。Odorox®設備在專利的反射室內可產生更強烈的高能紫外線輻射。為特定的應用和空間定制了不同的模型，以確保羥基水平與自然界中發現的安全水平相匹配。Odorox®設備已獲得ETL安全標誌，MDU / Rx™模型已獲得FDA批准，可用於醫療機構的空間（510k＃133800，2014年）。

Odorox®可攜式設備可使用在27到540平方米（300到6,000平方英尺）的房間，也可整合到現有的供暖和通風系統中。Odorox®商業設備設計用於處理多達數千立方英尺的大空間，並具有集成的交互式控制和傳感器，可測量和控制羥基的水平，從而確保安全的水平。

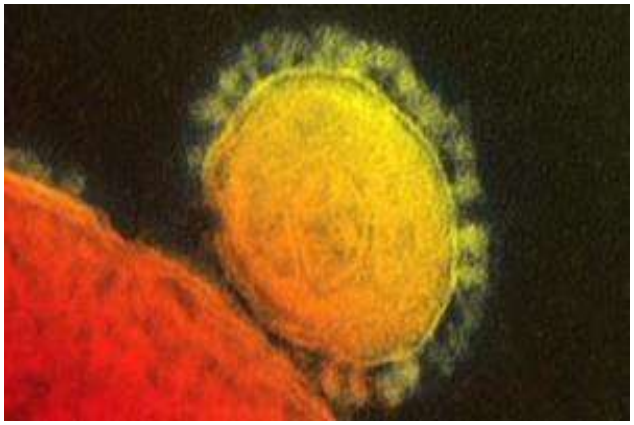
HGI的Odorox®設備在美國製造。HGI可以快速設計和實施定制的解決方案，以有效處理預防冠狀病毒污染和傳播風險的公共場所。HGI可以幫助當局迅速實施解決方案，對醫院、機場、車站、學校、大學、診所和其他公共場所的空氣和表面進行消毒。

康妮·阿拉普斯博士
普林斯頓大學有機化學博士
普羅米修斯有限公司總裁
HGI科學顧問委員會主席

欲瞭解更多資訊，請caraps@hgiind.com

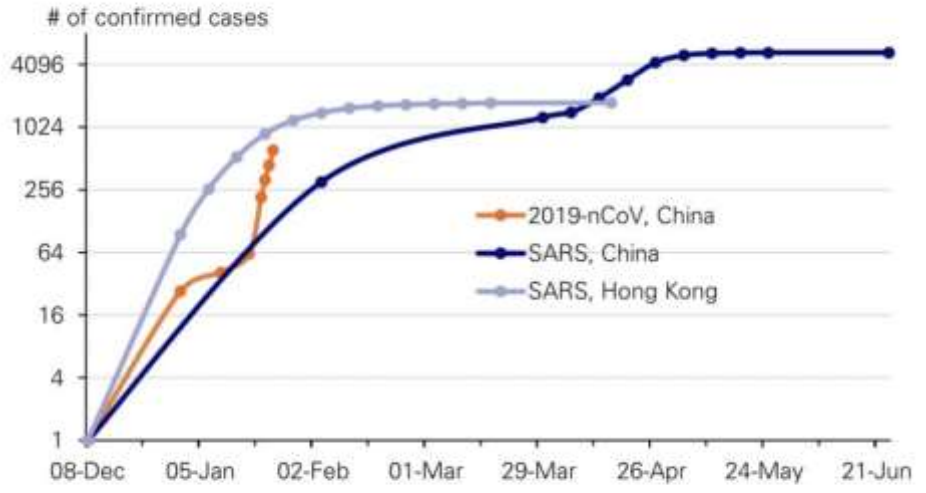
Global Coronavirus Outbreak 2020

The outbreak and rapid spread of a new coronavirus from China has caused great concern worldwide as the virus is highly contagious and spread in air, from contaminated surfaces and via personal contact.



Early data indicates that the infection rate is higher than that measured for another virulent coronavirus called SARS in 2002 and 2019.

Figure 1: Spreading of Novel Coronavirus compared to SARS



Source : Deutsche Bank Research, WHO, news reports
Note: For each incident, the starting date is set as the day when the first case was confirmed and hospitalized. It was Dec 08 2019 for the 2019-nCoV, Dec 15 2002 for SARS in China, and Feb 22 2003 for SARS in Hong Kong. Only official numbers were used

Epidemiologists have confirmed the source of the new coronavirus as a wild animal market in the Chinese city of Wuhan where vendors sell dozens of carcasses and live animals including bats, rats, ostriches, crocodiles and hedgehogs. The Wuhan Institute of Virology has determined from patient samples that there is a 96% match to bat coronavirus. The SARS coronavirus outbreaks of 2002 also originated in bats and spread to humans via palm civets, cat-sized mammals sold in Chinese markets.

This latest form of the coronavirus causes severe acute respiratory illness manifested as coughing, fever and pneumonia similar to that caused by the variant of the coronavirus called "Middle East Respiratory Syndrome Coronavirus" (MERS-CoV) that was first described in September 2012. The MERS coronavirus epidemic resulted in a fatality rate of 49%. There is concern that, given the high infection rate, the new virus may have a similarly high fatality rate, particularly among those with compromised immune systems.

Dozens of people in several US cities have been infected principally by exposure to travelers from Asia. Health authorities in major cities like Los Angeles, San Francisco, Atlanta, Seattle, New York are screening airline travelers. Over 100 people in 26 states have been investigated and are being monitored for the virus. The expanding outbreak has sparked concerns at schools and universities across the country that have exchange programs with China. The CDC confirms that there is no vaccine available and recommends routine sanitary precautions to minimize the risk of infection.

Risk of infection is highest in densely populated cities, public areas and transportations centers where the airborne virus can become concentrated. Of particular risk are public rest rooms. MERS transmission has been confirmed by inhaling aerosolized contaminated stool when flushing an open toilet. Aerosols persist in air for extended periods of time. Travelers and health care workers are at the highest risk.

Disruptive, FDA Approved Technology Can Help Minimize Viral Infection Risk

HGI Industries has developed a range of innovative sanitizing devices (Odorox® line of products) that are powered by high energy ultraviolet photochemistry, just like the action of the sun. These devices kill 99.99% of viruses, bacteria, mold and other pathogens in air, on surfaces and fabrics safely, in areas as small as an office or as large as hundreds of thousands of square meters (millions of square feet). HGI's proprietary technology sanitizes by generating effective levels of atmospheric hydroxyl radicals, nature's powerful atmospheric sanitizing oxidant.

Airborne hydroxyls are the perfect sanitizing agent. They react with a broader range of chemicals and are over one million times faster than ozone, bleach or other sanitizing agents. They react so fast that they are consumed within a few seconds, so they never accumulate. The cascade of organic peroxy and oxy sanitizing compounds formed also react very rapidly. Volatile organic by-products are rapidly decomposed as they are recycled through the device. Indoor environments are rapidly depleted of natural hydroxyls and build up unhealthy levels of chemicals, bacteria and viruses. Odorox® technology eliminates this build-up and restores nature's safe balance indoors.

Atmospheric hydroxyl radicals (hydroxyls) are continuously produced by the action of the sun's ultraviolet energy on oxygen and water in our atmosphere. There are, on average, two (2) million hydroxyls in each cubic centimeter of ambient outdoor air during daylight hours.

(D. E. Heard, “Analytical Techniques for Atmospheric Measurement”, Blackwell Publishing, 2006 – professor at the University of Leeds, UK). They keep air safe to breathe by decomposing natural and man-made pollutants and killing microorganisms. They sanitize air and surfaces by a natural process called lysing, where the hydroxyls react chemically with the lipids, protein carbohydrates and other organic chemicals in the cell wall and membranes of bacteria, viruses and other pathogens and disrupt their structure. The interior contents of the cells leak and the organism is destroyed. The mechanism for killing microorganisms is not biological, so the bacteria or viruses cannot develop any form of immunity.

Odorox® measured kill rates across a broad range of microorganisms on hard and porous surfaces and in air are consistently over 99.9%. Kill rates for aerosolized microorganisms are exceptionally high in the measured range of 4-5 log (99.99 to 99.999%) within several hours, as shown below from a study of the Odorox® MDU/Rx™ device presented to the FDA. This is particularly effective for the spread of viral disease as the main vector for transmission is inhalation of aerosolized virus.

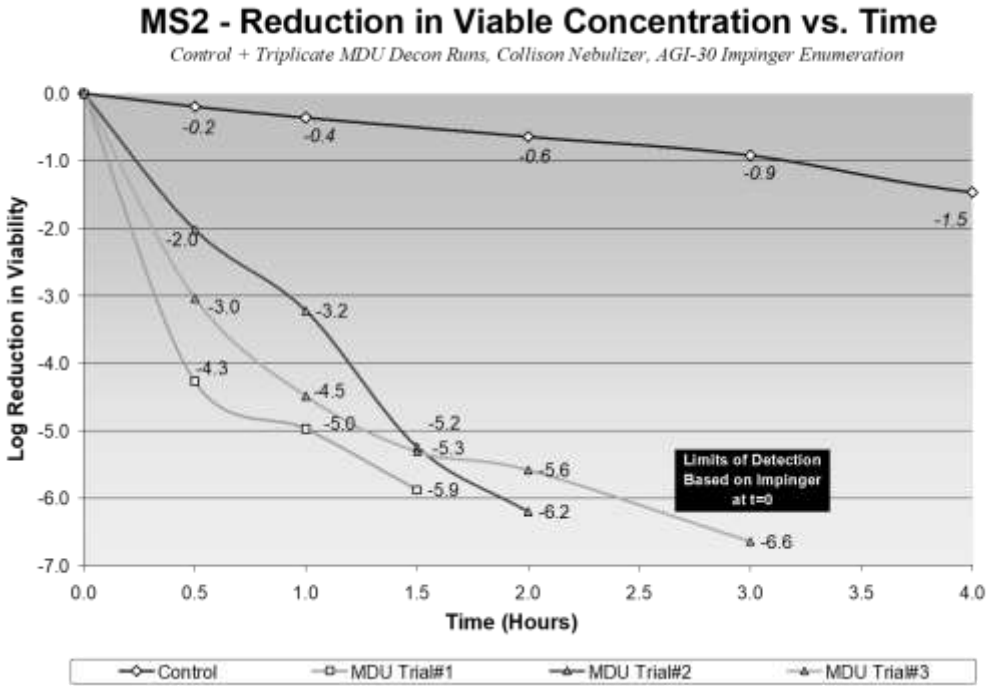
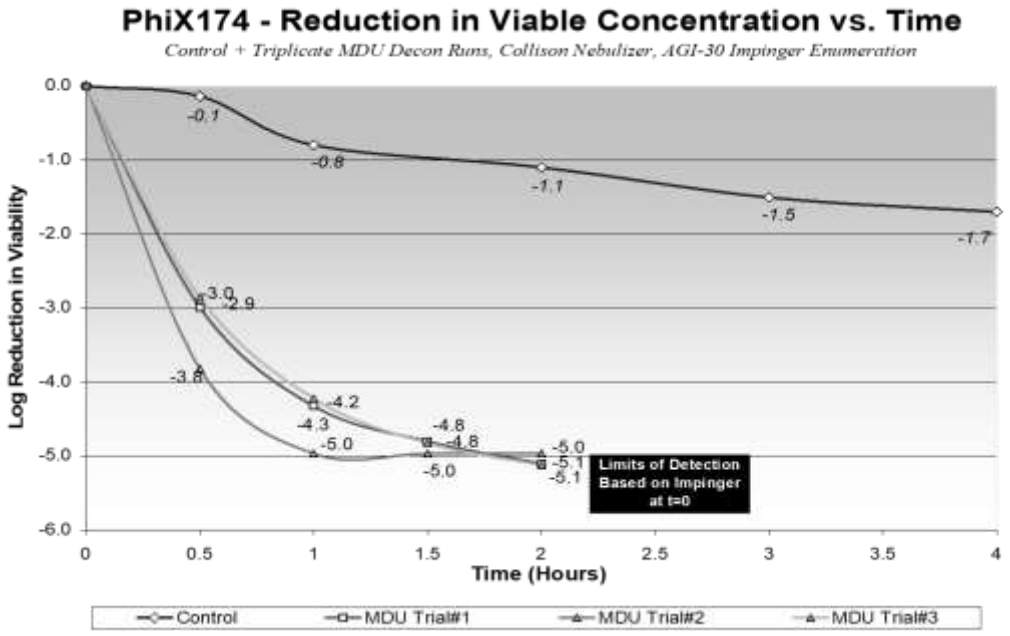


Figure 8: *Bacteriophage MS2 Control and MDU/RX trial Log Reduction in Viable Concentration.*



Germicidal ultraviolet (UV-C) lights have been used for years to sanitize surfaces. UV-C lights have insufficient power to generate hydroxyls, whose formation requires higher energy UV energy. UV-C lights are only able to sanitize surfaces and biologicals within a few inches of their source and only when there is sufficient exposure time achieved by low flow rates. They are ineffective sanitizing air that circulates rapidly past their source and do not sanitize surfaces.

HGI's Odorox® UV technology is unique: it is completely different from germicidal UV-C technology. Odorox® devices generate more intense and high energy UV radiation within a patented reflection chamber. Different models are customized for specified applications and volumes of space to ensure that hydroxyl levels match safe levels found in nature. Odorox® devices have received the ETL safety mark and the MDU/Rx™ model has been approved by the FDA for use in occupied spaces in medical facilities (510k #133800, 2014).

Odorox® portable devices can treat rooms from 27 to 540 square meters (300 to 6,000 square feet), either as standalone units or by integrating into existing heating and ventilation systems. Odorox® commercial devices are designed to treat large spaces - up to thousands of cubic feet - and feature integrated, interactive process controls and sensors that measure and control the levels of sanitizing oxidants ensuring consistent, safe levels.

HGI's Odorox® devices are manufactured in the United States. HGI can rapidly design and implement custom solutions that effectively treat public places at risk of coronavirus contamination and propagation. HGI can help authorities to rapidly put in place solutions that sanitize the air and surfaces in hospitals, airports, train stations, schools, universities, health clinics and other public places.

Dr. Connie Araps
PhD Organic Chemistry, Princeton University
President Prometheus Strategies, LLC
Chair, HGI Scientific Advisory Board

For more information, please contact Dr. Araps at caraps@hgiind.com

