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TECHNOLOGY

How COVID-19 is driving tech improvements to make safer civic spaces.

andemics are becoming more frequent in the twenty-first century. During the twentieth century, there were three influenza pandemics with tens of thousands of victims (1918, 1957, 1968) (CDC, 2020). In the last 20 years, four similar viral pandemics have occurred (SARS- 2003, Swine Flu- 2009, MERS- 2012, COVID- 2019) (CDC, 2020). Preparation for the current and the next pandemics are no longer a question of "if," but "when."

While 2020 has turned most of us into germophobes, there are real risks that technology can help reduce—and in a sense come to our rescue. Whether it's in the hope for the fast development of a vaccine or in the myriad of ways that it can help make us feel safer during the pandemic, there is a general concept that technology will lead the way. There are many innovative new or repurposed technologies that really do offer hope. There are others that need to be tested before they are implemented, relied upon, and fail. In either case, technology will play a very important role in how life returns to normal.

As the COVID-19 pandemic continues to disrupt nearly all aspects of life, from working and learning remotely to delivering and receiving healthcare virtually, we at HMC Architects are looking at this disruption as an opportunity to learn and grow. By discovering and generating new knowledge and insight, we are determined to help our clients amid this crisis by exploring their current pain points, streamlining their processes, and identifying solutions to improve their organizational metrics. As part of this ongoing study, we are devoted to share our results with the industry on five main areas of Technology, Adaptability and Flexibility, Regulatory/Budgetary/Institutional Impacts, Space Needs Restructuring, and Impact to Wellness/Mental Health. In this article, we cover our findings on technology's role in making civic spaces pandemic ready.

METHOD

A group of representatives from different public agencies, including fire, police, sheriff, city and county administration as well as architects from HMC and consultants from public safety and engineering companies were invited to attend a virtual focus group to discuss and share insight. Prior to the focus group session, a short online survey was sent to the group for their review and evaluation of short- and longterm impacts of COVID-19 on their current and future facility operation and design.

RESULTS/DISCUSSION

Airborne infections require us to re-think how we treat air and air systems in our buildings. Spaces could be sanitized while occupied using an ionized hydrogen peroxide (IHP) system added to a standard heat, ventilation and air conditioning (HVAC) system. "This technology creates a cloud of hydrogen peroxide which is 80 to 90 percent effective in killing micro-organisms. (Parker, 2020)" Since the technology is airborne, it does not require direct visual access that other technology does. IHP technology is currently being implemented in healthcare environments but could also be used in high-transmission spaces such as jails and prisons.

In spaces where the risk is reduced, air filtration could be used to filter out microbes within the air system. Instead of returning air to a space after it is filtered, it could be exhausted, and new outside air brought in. Purge settings can be used at night and on weekends to bring in more fresh air. Ultraviolet (UV) lights can be added to return ducts to inactivate viruses during the day. Humidity controls may be revised to provide a less microbe supportive (40 to 60 percent) relative humidity. Similar to entering a restaurant or grocery store, air curtains (with suction duct on the floor) could be installed in between spaces to allow air isolation between two sensitive spaces (see diagram at right).

Toilets are an identified infection spreading vector. Water spray from a toilet flush has been shown to cover almost an entire single use toilet room. While it is unknown at the moment if COVID-19 can be spread from toilets, it is known that feces does carry the virus and that feces is "aerosolized" when a person flushes with the toilet lid up (Wan, 2020). Smart toilets require a lid to be closed prior to flushing and surfaces within the toilet sanitized for the next use. This added technology could reduce the spread of the COVID-19 virus and other human-to-human diseases as well.

View a video on the importance of closing the toilet lid HERE: <u>https://www.youtube.com/</u> watch?v=HY-Y8hH_wTc_

Cameras already provide security around many public buildings. As pandemic events become more frequent, additional technology could be added to assist in responding to the



(McKinsey- Advanced Industries Practice, 2020)

need to keep building occupants safe from outbreaks. Heat sensing infrared cameras could be installed outside of buildings to allow security to identify individuals not allowed to enter a building (Morrissey, 2020). This level of early risk reduction would take out the symptomatic infected occupants and reduce the likelihood that others inside a building would be infected. This technology would help prevent outbreaks of flu, common colds, and other bacterial and viral infections that cause elevated temperature. It would also maintain privacy of the individual since the test could be conducted without identifying the person. An automated door opener can be programmed to open when the temperature check has been completed and the data is within range.

Pattern recognition software can be utilized within video recording software to confirm that a person is wearing a mask and spaced an appropriate distance away from others (Morrissey, 2020). This technology is already being deployed on construction sites where safety among a large workforce is important. Beyond the use of online services, there are also many opportunities to utilize drones, robots, and kiosks to inform and serve the public.



Supervisors would be notified, and staff would be reminded of the current requirements.

One concern is to identify where an infection is going next so that a person can take steps to stop the spread. Mobile tracking apps could be utilized by staff inside of a public building. These apps are able to identify equipment to be sanitized and notify any person that came in contact with an infected person without added privacy concerns (Morrissey, 2020). Wearable sensors are also being used when mobile apps are not feasible. These allow more privacy since they are only recording the sensor that comes in contact with someone and are only downloaded if a positive infection is confirmed. Both technologies provide a way to stop the spread of communicable disease while addressing obvious privacy concerns.

Beyond the use of online services, there are also many opportunities to utilize drones, robots, and kiosks to inform and serve the public. Kiosks can be used to provide an in-person experience for people with limited communication bandwidth. Similar to the design of public agency websites, these kiosks need to be designed with the public in mind. There are robots that roam buildings and public spaces and inform people if they are not meeting social distancing rules, while also using UV lights to disinfect surfaces (Morrissey, 2020). Spot is a dog robot that has been deployed in Singapore to inform citizens when they are not following social distancing rules (Morrissey, 2020). It is a light touch effort but seems to have positive benefits that allows peace officers to focus on other items.

Meet Spot, a social distancing dog robot HERE: <u>https://www.youtube.com/</u> watch?v=pz7A8Umw5zY_

Within the public agencies that are responsible for reviewing and inspecting construction sites, there is an effort to find new ways to address the public need while also keeping staff and construction sites safe. Permit applications and documentation are transitioning quickly to online platforms. Permit officials are now allowing 360-degree photography and video to replace in-person inspections (Goodman, 2020). This will allow construction schedules to stay on track during a disruption.

With current technology, public agencies already accept payments for taxes and services; resolve court cases, renew driver's licenses, request services; apply for business licenses and permits, and find where to go to resolve issues to name a few. One important part of this ongoing change is to encourage those who would typically forgo online for an in-person visit. Safe, searchable, and discoverable online services that take advantage of universal design principles (see image on next page) may encourage this atypical usage. The availability of community Wi-Fi, local mobile apps, kiosks or decentralized internet cafes could also increase the percentage of citizens using these online services.

The move to online public services has allowed many public agency staff to take advantage of work from home during the pandemic crisis. A survey of American companies found that 74 percent were planning to move at least 5 percent of their staff to remote working and around 25 percent were planning to take 20 percent of their staff remote (Goodman, 2020). Similar statistics found among civic agencies indicate that this disruption is more than likely a permanent change.

Videoconferencing, email, and text messaging have allowed staff to stay connected while continuing to complete their work. Information technology (IT) security has been an issue and will need to be strengthened if public agencies are allowed to fully take advantage of this work-from-home revolution. The security of public, sensitive information being shared across networks is critical if work from home is going to be deemed a success (Zoua, 2020). Network security will also require updates to avoid service disruptions as the nature and timing of use changes.

Some technologies will need more data before they become standard. For example, there are technologies that provide antimicrobial



(Centre for Excellence in Universal Design, 2012)

coatings on high-use objects like door handles. While a promising concept, the execution of these products has yet not been met with wide industry acceptance. Some may use carcinogens, while others wear off too easily.

SUMMARY

The short term primary change that is necessary before people return to their places of work is the reduction of infection. Buildings can assist with the detection and elimination of viral spread using new and existing technology. Privacy can be maintained as long as people are willing to follow health guidelines. Technology will assist in the policing of these efforts to allow our public servants to focus on the big picture issues facing society.

The opportunity that this crisis provides is the ability to transform how work happens and to make society more efficient. Citizens who require in-person service due to limited availability or training of online platforms will be served more efficiently since the overall workflows will be reduced. Routine tasks will become simple online or kiosk transactions. Some in-person activities will become digital events that can be facilitated without the need to travel. Staff will be allowed to maintain flexible work hours and locations based on their ability to complete their work. Finally, family life will improve for many, as parents will spend more time at home with their children.

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