Summary

In 2018, MX3D 3D printed a bridge out of stainless steel. The current planning is to place the bridge in the Red Light District of Amsterdam in the end of September 2020. This is an extremely crowded area. Part of this bridge is a sensor network that gives insights on the structural integrity of the bridge and the state of its surroundings. Due to the sensors collecting data that could be led back to individuals on the bridge, people need to be informed about the data collection.

The thesis revolves around the question: ***What is the best way to inform people about the smartness of the Internet of Things MX3D Smart Bridge in a crowded area within a public space of a smart city that fulfils all regulations?***

Different groups of people should have their opinion taken into consideration when designing the signage. MX3D is involved as maker of the bridge, financer of the signage, and takes into account the opinion of the architecture of the bridge. The municipality has a say as the host, and the people on site are the people that will have direct interaction with the bridge once it is placed. This last group involves tourists, people on outdoor recreation in the area, and the residents that live near the bridge. The residents will interact with the bridge almost daily.

Because of the data protection law of the European Union, the General Data Protection Regulation (GDPR) (European Union, 2016), people that walk over the bridge must have the chance to be informed about the sensors that collect pseudonymized personal data before stepping on the bridge, even though all sensor data will come across anonymous to the researchers. This concerns camera and microphone data.

There are many other sensors present at the bridge as well. Because they do not collect personal data, there are no regulations and there is no obligation to inform passersby about these sensors. However, several initiatives on European (EUROCITIES, 2019b), National (Rathenau Instituut, 2017), and local level (Bureau Tada, 2020) created values to guide people on how to responsibly inform the public about the 'smartness' of an object. These values, along with the principles of the GDPR (Article 5), have been reduced to eight core values: Transparency & Autonomy, Safety & Security, Privacy, Accountability, Inclusiveness, Control, Public Value, and Human Dignity.

The regulations of the GDPR, eight core values, and preferences of the different parties involved form the basis of the design requirements. From there, the suggested design solution is to place a sign in the curl on the right side at each end of the bridge. This sign contains all information to comply with the GDPR, and a minimal amount of general information about the bridge. The signs will be clearly visible during the day, when it is not yet extremely crowded in the area. People can be aware of sensors being present on the bridge, that they collect data that is perceived as anonymous, and that the data is collected for research purposes without having to stop walking. If they want to, there is an opportunity to be informed about general and contact information at the location as well.

When it is dark outside, and many people occupy the area, the sign will be less visible. To create awareness about the sensors when there is less opportunity to read the sign, lights can be placed in the handrails of the bridge that go brighter when a person passes. By connecting the data of the 40 strain gauges located under the bridge with the lights, the LEDs can light up only where a person is located on the bridge, creating an interaction between people and the bridge. This allows people to be aware of the bridge sensing the presence of sensors without the need to read the sign. If somebody then wishes to know more, they can still consult the sign.
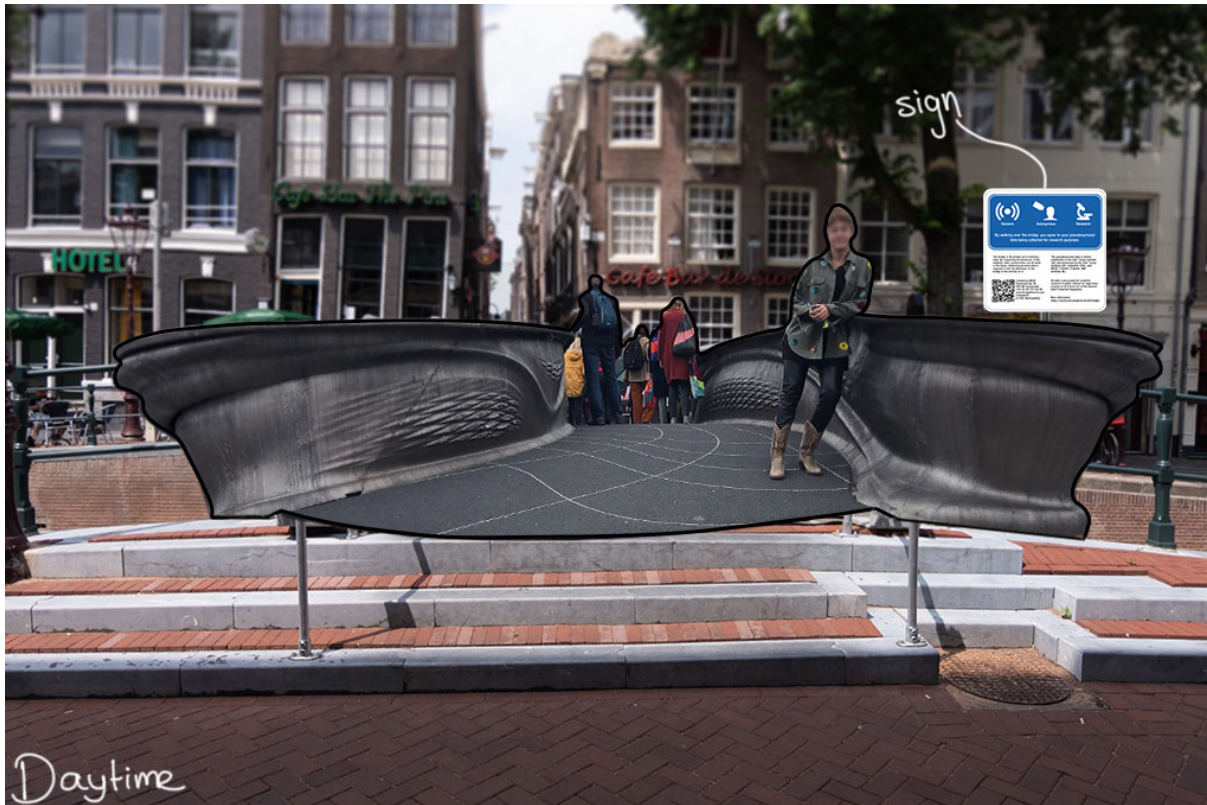
Depiction of what the final signage would look like on the MX3D Smart Bridge in Amsterdam during daytime. Picture bridge, edited: (opmerkelijk, 2018).
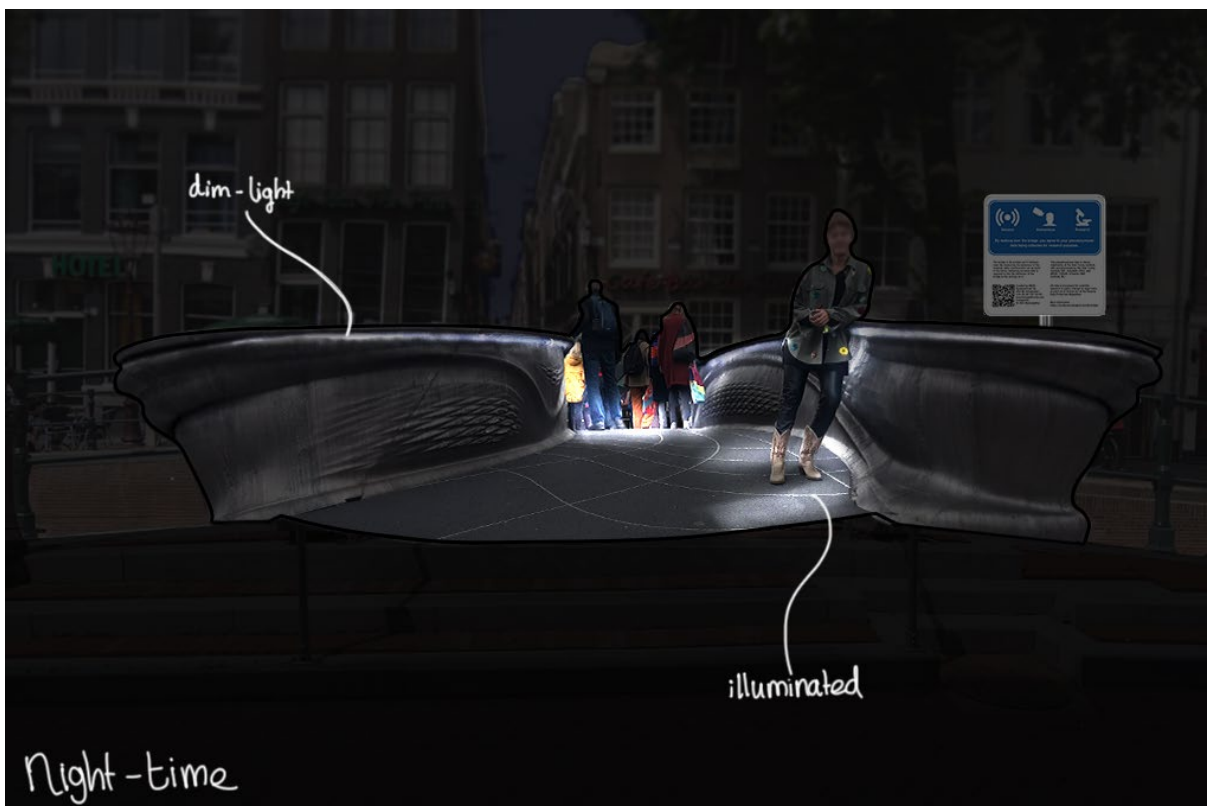
Depiction of what the final signage would look like on the MX3D Smart Bridge in Amsterdam during night-time. Picture bridge, edited: (opmerkelijk, 2018).

Source: opmerkelijk. (2018). Vitamine D(esign). Retrieved from https://opmerkelijk.pixelsmagazines.nl/2/vitamine-d/