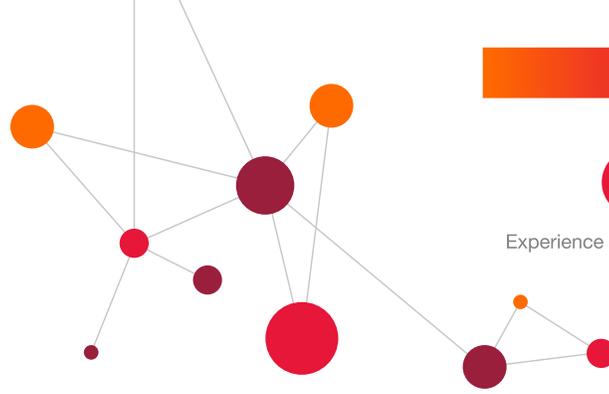


Hidden City: Innovating urban transformation



Kiruna municipality in Sweden and CGI are testing and using an innovative mixed reality platform that digitally maps, documents and interacts with underground infrastructure.

Background

Kiruna is a town in the northern most part of Sweden that sits directly atop one of the world's largest iron ore deposits. For many years, the mine near the city helped the town flourish. However, as the mine expanded and digging went deeper, the removal of ore started to head in the direction of the city. Legislation prohibits mining to occur beneath populated areas due to the risks of ground degradation. As a result, the Swedish government developed a plan to move the entire town 3.2 kilometers to the east.

The "Hidden City" concept

During the initial phases of the Kiruna relocation, a CGI expert from Kiruna devised an innovative concept called *Hidden City* that uses Microsoft HoloLens augmented reality in combination with geographic information system (GIS) equipment and data to digitally map and visualize the underground infrastructure. The project is pioneering the outdoor use of HoloLens, which by design, is made to be used indoors.

For Kiruna, *Hidden City* provides an accurate underground image before starting infrastructure repairs. Too often, installing or repairing underground infrastructure such as pipes or cables happens blindly. When available, maps may be inaccurate or outdated. As a result, what workers uncover at a site often does not match the drawings, causing frustration, time and cost inefficiencies, service interruptions and even traffic delays. There is much to gain from managing underground infrastructure with greater precision.

Hidden City soon will be implemented for the whole city of Kiruna, including the old city that is not affected by the move.

How it works

Hidden City uses data on the exact specifications of pipes in conjunction with a precision GPS that relies on satellite systems to keep track of what types of pipes are laid and where. The data is input into the HoloLens and projected onto a grid on the ground. This helps visualize what is underground without actually digging.

The technique of adding images to reality through HoloLens makes it possible to visualize, for example, water or power lines underground.



Potential uses for Hidden City

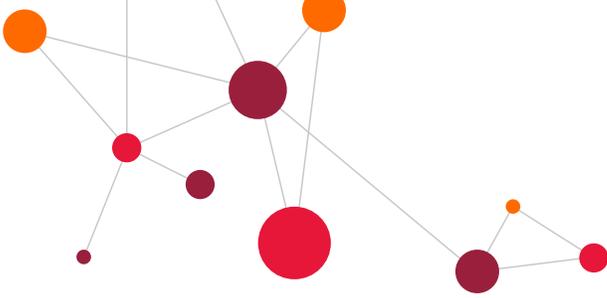
- Enable stored data and measurements collected to ultimately serve as a model for the digital mapping of cities around the world, helping with their utilities infrastructure planning, installation and maintenance
- Demonstrate proposed renovations
- Display property lines
- View pipes/wires inside the walls of homes

Recognition

Hidden City was a finalist in the "innovative idea" category of the [World Smart City Awards 2018](#) and finalist for the "best innovator" award at the Kiruna City business awards.

Kiruna and CGI also have been featured by Microsoft in its customer story: "[Moving a city with the help of Microsoft HoloLens](#)"

For more information, contact info@cgi.com



Hologram technology adds realistic visualizations to the "real" image the eye sees. In combination with careful positioning, this becomes a very effective tool. Leaks become easier to locate to enable digging with greater precision than before.

Developing new capabilities

Hidden City, which debuted in September 2017, was brought to life by CGI's HoloLens development group in Umeå, Sweden. Some recent developments with this innovative solution include:

- Implementation on iPads and iPhones
- Deployment of Leica high-precision GPS
- Creating the basis for the digital twin as a city control room

Additionally, with Luleå University of Technology in Sweden, CGI is participating in a 3 year research project working with secure and open Internet of Things (IoT) information to visualize IoT in society.



ABOUT CGI

Founded in 1976, CGI is among the largest IT and business consulting services firms in the world. Operating across the globe, CGI delivers end-to-end capabilities, from IT and business consulting to systems integration, outsourcing services and intellectual property solutions, helping clients achieve their goals, including becoming customer-centric digital enterprises.

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