

Dynamic VR-application of a historical city train

Detlef Günther-Diringer *, Konrad Berner, Mathis Braun

Hochschule Karlsruhe – University of Applied Sciences – Detlef.guenther-diringer@h-ka.de

Keywords: VR, historical city model, 3D-visualization, game engine, GPS

Abstract:

Since 2010, the inner city of Karlsruhe has been characterized by numerous construction sites of the so-called “Kombilösung”. A subway under the pedestrian zone, accompanied by a new car tunnel, which is intended to relieve road traffic on the surface. A new surface tram line was installed in this inner city section, which was completed in 2021. In this way, an attempt was made to undo some of the urban planning sins of the 1960/70s, because this section of road, the so-called “Kriegsstraße”, was already used by a small railway up to the 1930s, known in Baden dialect as the “Lobberle” and popular with the citizens.

Based on the partially available historical 3D city model of the city of Karlsruhe (see Günther-Diringer, 2016) for the area of the Kriegsstraße (approx. 1.2 km length, travel time of the tram including three stops approx. 3 min) a 3D-360°-video film should be generated in the frame of the bachelor's thesis by Mr. Mathis Braun (bachelor's degree in geoinformation management). The video should be run GPS-controlled with the help of the game engine Unity synchronously with the ride in the new tram line on mobile devices in VR mode with a VR Cardboard or in normal 360°-video mode on tablet/smartphone.

For this purpose, the available historical 3D city model from 1915 was first extended by the south side of the street that separates Karlsruhe city center from the southern city areas. Depending on the availability of historical sources, LoD3 or LoD2 houses were constructed in Autodesk 3dsmax. The defined camera path was then generated in 3dsmax and rendered with a 360° stereoscopic video at 30 fps. This video was imported into the game engine Unity and correlated with GPS using C#-scripts, so that start and speed are parallelized with the current position of the real tram ride through the Kriegsstraße. This allows the user to compare the reality experienced in the tram directly with the scenery from 1915 and draw interesting conclusions about the development of the city.



Figure 1. Screenshot of the old main station in Kriegsstraße (left) and old postcard from 1913 (right).

References

Braun, Mathis (2022): Erstellung eines stereoskopischen 360°-Videos der Bahnstrecke der historischen Karlsruher Lokalbahn Lobberle in der Karlsruher Kriegsstraße um das Jahr 1915 verknüpft mit GNSS-Koordinaten. Bachelor-Thesis, Hochschule Karlsruhe (unpublished).

Günther-Diringer (2016): Historisches 3D-Stadtmodell von Karlsruhe. In: Kartographische Nachrichten 2/2016.