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Intelligent Visualization of Geo-Information on the Future Web

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Visualization is a key component of the "Observation Web" and will become even more important in the future as geo data becomes more widely accessible. The common statement that "Data that cannot be seen, does not exist" is especially true for non-experts, like most citizens.

The Web provides the most interesting platform for making data easily and widely available. However, today's Web is not well suited for the interactive visualization and exploration that is often needed for geo data. Support for 3D data was added only recently and at an extremely low level (WebGL), but even the 2D visualization capabilities of HTML e.g. (images, canvas, SVG) are rather limited, especially regarding interactivity.

We have developed XML3D as an extension to HTML-5. It allows for compactly describing 2D and 3D data directly as elements of an HTML-5 document. All graphics elements are part of the Document Object Model (DOM) and can be manipulated via the same set of DOM events and methods that millions of Web developers use on a daily basis. Thus, XML3D makes highly interactive 2D and 3D visualization easily usable, not only for geo data. XML3D is supported by any WebGL-capable browser but we also provide native implementations in Firefox and Chromium.

As an example, we show how OpenStreetMap data can be mapped directly to XML3D and visualized interactively in any Web page. We show how this data can be easily augmented with additional data from the Web via a few lines of Javascript. We also show how embedded semantic data (via RDFa) allows for linking the visualization back to the data's origin, thus providing an immersive interface for interacting with and modifying the original data.

XML3D is used as key input for standardization within the W3C Community Group on "Declarative 3D for the Web" chaired by the DFKI and has recently been selected as one of the Generic Enabler for the EU Future Internet initiative.