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FRAUNHOFER INSTITUT OF OPTRONICS, SYSTEM TECHNOLOGIES AND IMAGE EXPLOITATION IOSB

INTERACTIVE VISUALIZATION OF INTEGRATED GEODATA (IVIG)

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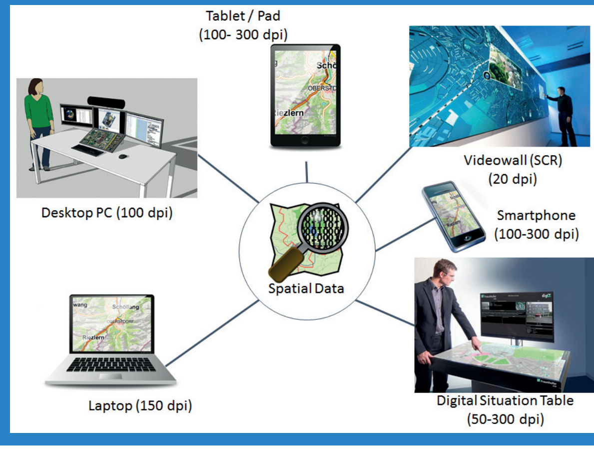
Initial situation

The integration and optimal use of numerous sources of information is the basis for the evaluation of a crisis situation and its efficient management. This requires a presentation of the information obtained from different data sources such as current aerial photographs, maps, and various sensors. The geo and meta data can be stored on a local system or are available via the network in individual forms. In a crisis, experts with different roles work together (such as firefighters, rescue personnel). Depending on these roles, everyone needs a rolespecific view. In addition, a wide range of display systems are used - from handheld computer to multi display teamwork station. However, when getting data from multiple, different sources, today's systems are not able to always depict them uniformly and harmoniously. There exists an information barrier.

Solution

A geographical information system (GIS) with an adaptive human machine-interface was developed at the Fraunhofer IOSB to support users with analysis functionality, decision support, and management support depending on the available data and the problem to be solved.
The system supports Open Geospatial Consortium-based web services. OGC is already legislatively anchored across Europe in the civil sector. There are also open-source data such as OpenStreetMap data and STANAG support. The system allows an automated fusion and visualization of geo data from different civilian and military sources. Visualization is here adapted to the boundary conditions of the user.



Geodata visualization

Generic OGC-styled layer descriptors (SLDs) are used for role- and hardware-specific visualization. SLDs make it possible to take into account the display resolution as well as the role and task of the user when visualizing the geodata. The implemented GIS architecture enables a high refresh rate of the data for each user. The client-server architecture also allows running calculations on the servers that place a strain on hardware and thereby supports the efficient use of under-performing terminal devices. With SLDs, it is possible and much easier to update the depiction of the geodata without manipulating the source data itself. Here, data sources can be OGC based services, as across Europe demanded by the »INSPIRE« guideline. Or delivered by the German implementation »GDI-DE« (Geodata Infrastructure Germany), as well as additional embedded proprietary services.

External raw data redesigned using own SLDs.

Architecture

A suitable architecture was designed to make data available to the user. Central element here is the back-end, which holds all geodata for multiple clients. The back-end offers additional functions such as a central configuration and a central security concept to allow only authorized users access to the data. Because all data, including their chronological sequence, are stored, it is possible to go back in time and to analyze older data. Input / output adapters are used to read dynamic data such as GPS tracks into the system or deliver this data. Interaction with the system via novel input methods such as hand gestures, gaze control, and touch are already implemented in the architecture.

Two different suites have been developed for data visualization. One consists of a viewer based on the ESRI runtime, which can be used on desktop PCs as well as large video walls. The other is in the form of a client, based on various web technologies, and can be used on mobile devices such as smartphones and tablets. Such a system provides comprehensive support for emergency personnel, at the situation center for crisis management and for staff working outdoor for situation assessments and their exchange of information.