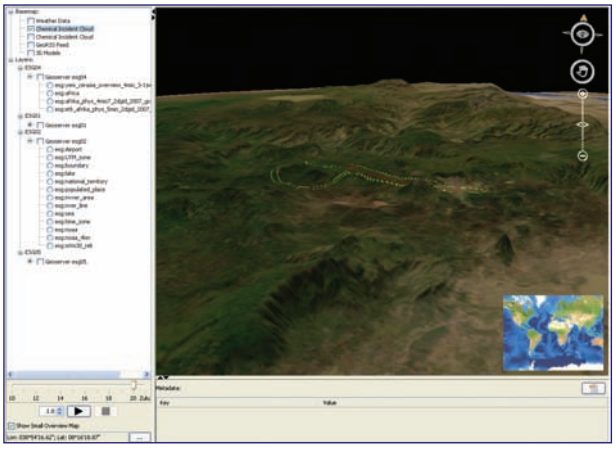
LUCIAD
high performance visualization

Case Study

GISP brings 3D situational awareness at the right place and the right time

LuciadFusion helps ESG in visualizing massive geospatial data streams via OGC Web Services into one common 3D operational picture



The Luciad technology enables high performance simulation of any incident over 3D terrain

Interoperability and operational effectiveness between C2 systems are two of the major challenges modern Net-Centric operations are facing. To test these systems, NATO and its coalition partners established the annual NATO Coalition Warrior Interoperability Exercise (CWIX) event. One of the German contributions for this year's event at Lillehammer in Norway consists of presenting a Geoinformation Service Point (GISP) prototype. Developed by ESG, the main task of GISP will be to provide a comprehensive portfolio of geospatial 2D and 3D data via OGC Web Services to all NATO test partners. ESG chosed Luciad as development partner because of its expertise in high performance visualization software components and strong commitment to open standards and Java based technology.

As a leading German system integrator for the military market and an active participant of the CWIX events during the last five years, ESG has built up a lot of expertise in providing geospatial information to military and civil missions and exercises. Their existing portable Mobile Geospatial Data Provisioning System enables users to quickly find and distribute available geoinformation via OGC Web Services and standardized file formats. However, the system is limited to displaying 2D information only. In order to test the capabilities and analyze the added value 3D information can bring to the geospatial part of the COP, the German Bundeswehr Geoinformation Office (BGIO) requested ESG to develop the GISP prototype as a 3D version based on the Mobile Geospatial Data Provisioning system.

GISP fully supports OGC standards

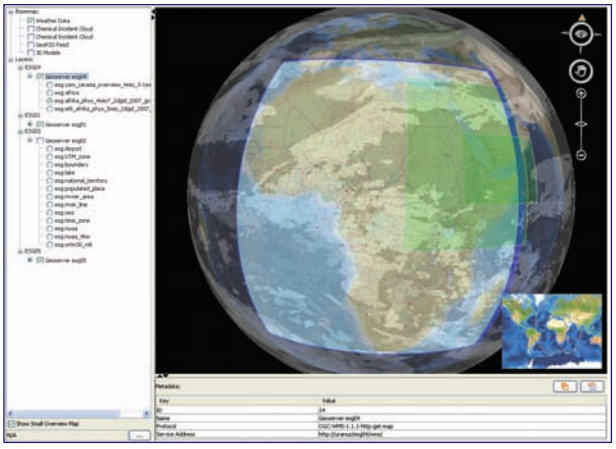
The GISP prototype provides geospatial data in a wide range from METOC (Meteorological and Oceanographic) data to terrain data of all kinds, including 3D information. Data and maps with different themes can be downloaded as datasets or consumed via an OGC compliant Web Service. ESG sees two types of end users who can benefit from GISP. First there are the geospatial experts, like the BGIO survey teams, providing real-time geospatial data to the system from the theatre of operations. BGIO consultants use the system to create, publish and search for geospatial products to advise the armed forces. Secondly, there are the clients or field users like C2 systems, and aircraft and military vehicles who can access the provided geospatial data. GISP can also be coupled to any other C4ISR system that supports the OGC standards e.g. WMS, CSW, WFS, WCS, etc ...

> Within only 3 months, LuciadFusion allowed us to efficiently fuse large datasets into a common operational picture, even over a small bandwidth network

LuciadFusion: Advanced streaming technology

Fusing detailed 2D and 3D data can be very challenging, and that is why the Luciad technology comes in the picture. On the server side of the GISP configuration runs LuciadFusion™. This high performance tile-based server software solution has been specifically designed for achieving smart on-the-fly fusion of large multi-domain spatial datasets in networked C4ISR environments. The platform acts as the central point in any scenario where multiple applications need to access multiple data sources. A specially created dataset of 250 Gigabyte is used during the GISP

To the commander's situational awareness is greatly enhanced by visualizing operational data at the right level of detail at the right time



LuciadFusion allows highly detailed background imagery from various datasets incl. OGC Web Services in a Common Operational Picture

ABOUT ESG

Founded in 1963, ESG Elektroniksystem- und Logistik-GmbH has become one of Germany`s leading companies for the development, integration and operation of software intensive, complex, technically advanced, and security critical electronic and IT systems. ESG provides logistics, system development and training and consultancy services for military, government and industry customers. Independent process and technology consultancy is one of ESG`s key areas of expertise. Among their customers, ESG counts many international companies in the automobile, aerospace and defense business.

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demonstration at Lillehammer, and consists of public elevation data from NASA and Blue Marble data (imagery of the earth). This information serves as a background image for the geospatial data coming from other OGC Web Services. GISP relies on LuciadFusion to merge the data from the OGC Web Services into the background terrain.

Thanks to the advanced LuciadFusion technology, the large dataset can be transported efficiently, even over a small bandwidth network to the client. The client (workstation, vehicle, portable device, etc...) receives only the requested fraction of the available data portfolio. Without this technology, showing background imagery with this high level of detail and precision would otherwise not be possible for the relatively thin client.

Browser based 3D viewer based on LuciadMap

At the client side of the GISP configuration runs LuciadMap™. This suite of high performance Java based visualization software components is integrated into the GISP Geoportal as a browser based 3D viewer. LuciadMap evaluates and visualizes the different geospatial data found in a search into one coherent, highly interactive joint operational display. The effectiveness of this portable GISP solution is thoroughly tested at Lillehammer during a simulated chemical incident resulting in a toxic cloud. The simulation runs over a period of 12 hours using real-time weather information and elevation data. 3D models of buildings in Open Flight format and an animated toxic gas cloud from a dispersion model are used. To make it even more realistic, a cloud cover will be positioned on top of the 3D viewing model.

The combined efforts of ESG and Luciad developing the GISP solution resulted in a robust networked geospatial data sharing solution. The feedback from the end users during and after the CWIX event at Lillehammer is providing both ESG and NATO with crucial information about the effectiveness and added value of a 3D viewer. Whatever the result, ESG strongly believes in this new interoperability approach since interacting with each other and sharing all possible information will lead to better situational awareness and faster decision making, which ultimately saves lives, resources and improves collaboration between nations.