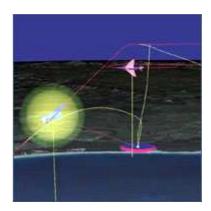# Defence, peace, safety & security
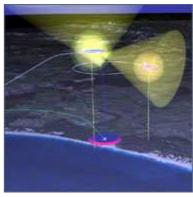
CSIR develops a 3D viewer library

CSIR engineers are developing a 3D viewer library called Sentience3D. The project aims to help developers of computer simulations in building the visualisation tools they need to achieve the required level of situation awareness in their virtual environment. Sentience3D makes use of open source building blocks and is itself moving towards a Lesser General Public License (LGPL).

Researcher Bernardt Duvenhage says the optronic sensor systems research domain is driving a collaborative effort to develop the 3D viewer library.

Sentience3D targets the improvement of perception and awareness of the simulation traces and results, and from there the name. "Sentience 3D augments the natural ability of a user, developer or client to follow and then evaluate simulation traces. This also has the benefit of instilling credibility in the simulation results," he says.

Duvenhage explains that situation awareness is about the perception of environmental elements, the comprehension of the meaning of these, and the ability to extrapolate their status in the near future. Having an adequate level of situation awareness is usually very important for decision makers in fields such as aviation, air traffic control, and military command and control. It is, however, of equal importance to have a high level of situation awareness when attempting to make sense of and use computer simulation traces and results.

A 'faster than real-time' (FRT) viewer image, developed by the CSIR's aeronautics group

"The current simulation applications are mostly constructive and information-rich synthetic battlefields, but Sentience3D can support many types of synthetic environments," says Duvenhage.

Sentience3D provides an interactive virtual environment with real-world terrain support similar to what is offered by an application like Google Earth.

An online or offline simulation trace may then be used to populate this environment with representations of all the simulation entities. The virtual environment may also be augmented with additional information such as entity relationships and meta-data.

Having Sentience3D open source allows the library to be used by a wider community, which is encouraged to contribute the reciprocal of its gained expertise back into Sentience3D. Sentience3D is currently being funded, developed and used by various research groups within the CSIR for developing their simulations and delivering visual interfaces and visual analysis tools.

Duvenhage adds, "Sentience3D is unique in that it will be released under an LGPL type licence. Also, it is being developed in-house in an iterative agile fashion that affords us the opportunity to quickly adapt to the growing visualisation requirements of the user group." An LGPL type licence would allow a developer to use Sentience3D to build a commercial application or component for the simulation without having to pay licensing fees.

The 3D visualisation capability, he continues, has been gaining momentum within the CSIR defence domain for many years. "Sentience3D is the latest collaborative effort with a renewed drive to create an open source and easily accessible toolkit," he says, adding that a technical preview of the first development iteration is available and is already being used by some researchers to provide visual simulation feedback to international clients.

- Mzimasi Gcukumana