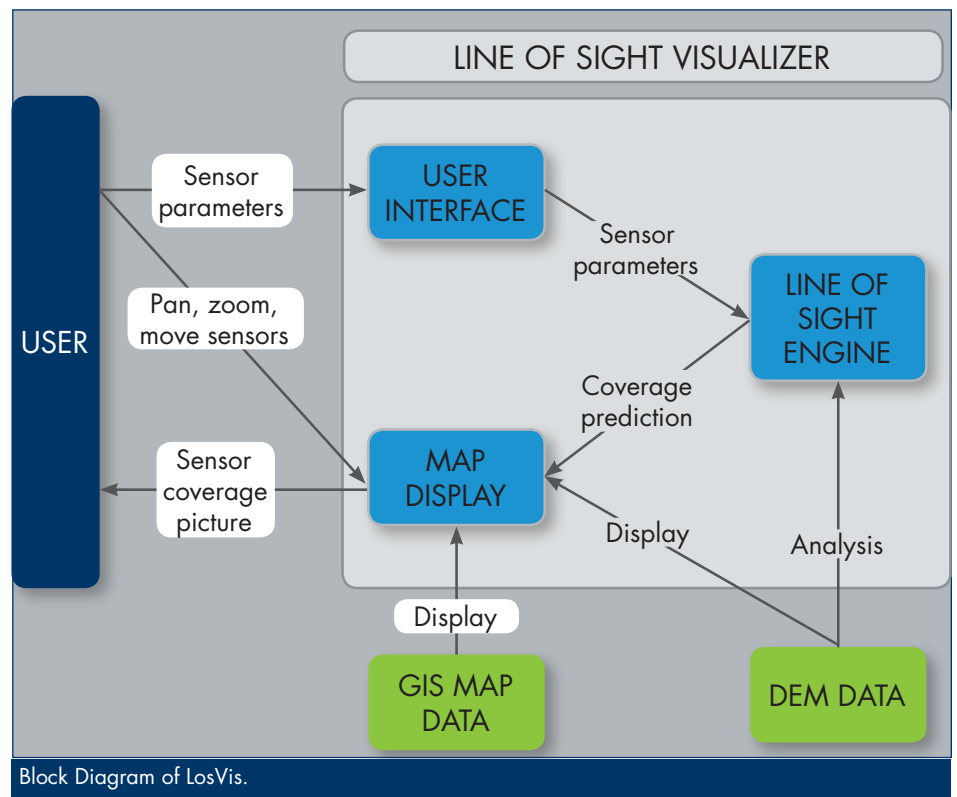


Focus on CSIR

The Line-of-Sight Visualiser

Site-selection made easy

The height above the earth's surface at which objects would be visible to radar or optronic sensor systems, is limited by the earth's radar or optical horizon as well as by the surrounding terrain relief. The coverage obtainable from a defined location is of critical importance to many long range sensor deployments. During planning, as well as operation, calculating and visualising this coverage in an intuitive way can assist greatly in decision making and situational awareness.



Block Diagram of LosVis.

The CSIR Line-of-Sight Visualiser (LosVis) software application is a tool that:

- Enables interactive line-of-sight prediction primarily for sensor site selection,
- Utilises a fast map display and line-of-sight calculation engine from Carmenta*, realising almost real-time viewshed analysis.
- Uses high resolution Digital Elevation Models (DEM) for the area of interest,
- Produces and visualises intuitive sensor coverage diagrams,
- Can integrate with additional Geospatial Information System (GIS) layers with contour lines, surveyor beacon locations and other information, which helps the user to quickly find good candidate locations for sensors.

- Makes use of layers to provide locations of roads, rivers, towns, borders, airfields, harbours, border posts, military installations, etc. to provide context and to assess the quality and appropriateness of coverage patterns obtained.
- Requires only a mid-range laptop computer to operate in near real time.
- Can be operated independently in the user environment and even in mobile laboratories and systems on field deployments, in conjunction with the CSIR situational awareness display software

Applications

Finding optimum deployment sites for sensor systems and determining how many sites

and sensor systems are required to form a sensor network capable of providing continuous coverage over the wide areas of responsibility is typically required for air defence, air traffic control, border safeguarding and peace support operations.

In these sectors the tool can be utilised by:

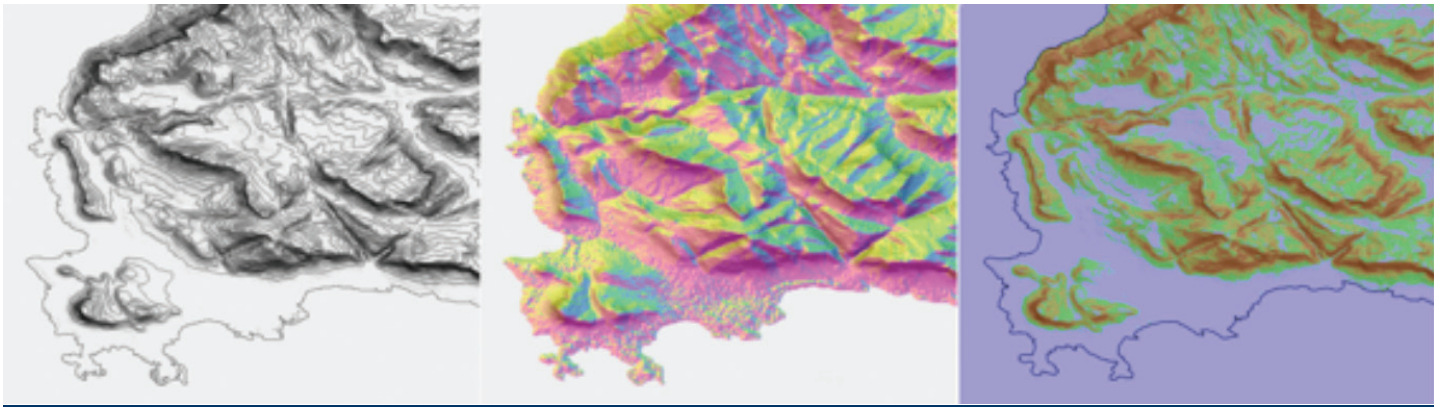
Buyers — such as sensor acquisition project teams.

End users — such as sensor deployment planning personnel.

Operators — radar operators may compare predicted coverage to a radar clutter map.

R&D personnel — such as radar or optronic domain specialists.

* Carmenta is a software company offering high-performance geospatial (GIS) products and solutions -see <http://www.carmenta.com>



Terrain analysis layers showing terrain contours, aspect and slope

Features

Fast coverage prediction updates: Less than 2 seconds to calculate and visualise.

Sensor range and field-of-view: Up to 500km for long-range sensors with adjustable field-of-view.

Sensor count: Up to 50 simultaneous sensors.

Line-of-sight to fixed height mode: Single colour visualises coverage to a specified fixed target height.

Required height for line-of-sight mode: Specified colours visualise coverage to specified target height levels.

Atmospheric refraction: 4/3 earth model and optical model.

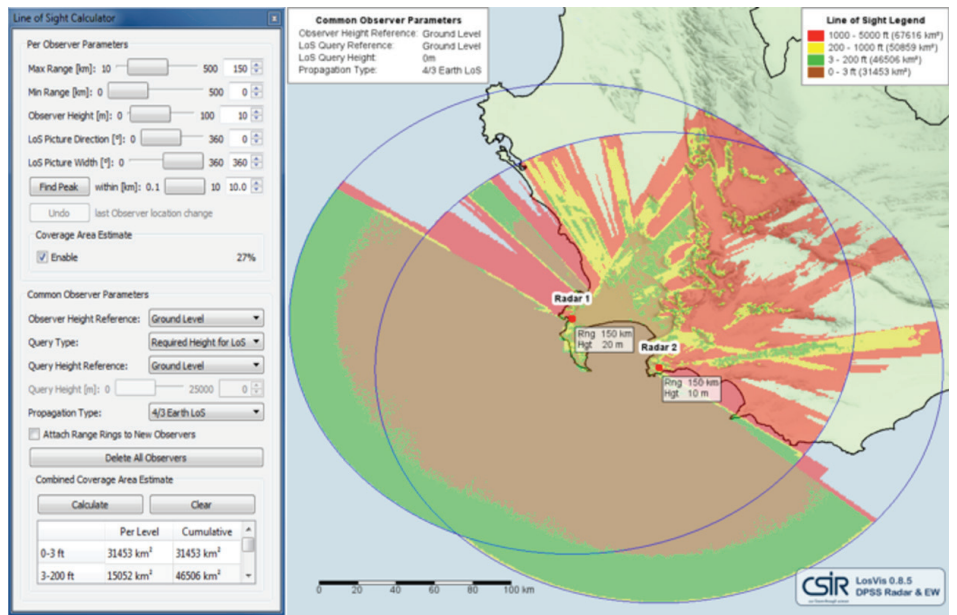
Peak find: Locate highest point on terrain within a specified radius for sensor site selection.

Coverage area estimate: Automatically calculate coverage area as a percentage for selected sensor.

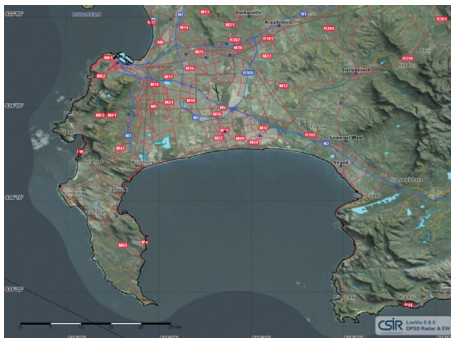
Combined coverage area estimate: Calculate combined coverage for multiple sensors per specified target height level.

Human interface and outputs

An intuitive user-interface that is developed in the Qt framework allows the user to navigate the map display and manipulate sensor parameters. An example of a combined coverage picture as shown.



Combined coverage prediction for two radars



A subset of contextual background layers in LosVis.

Import and export for Excel and Google Earth: Import and export sensor parameters in Comma Separate Value (CSV) format for Excel or Keyhole Markup Language (KML) format for Google Earth. Export sensor coverage picture to standard image formats for importing as an overlay into Google Earth.

Map annotation: Rulers, placemarks, paths, polygons and range rings can be used to annotate map.

Multi-unit support: Specify range units as kilometres, miles or nautical miles and height units in metres or feet.

Contact details
Brian Burmeister
 dpss@csir.co.za