RhinoSolar
by RhinoTerrain

REAL 3D SOLAR INSOLATION COMPUTATION

Solar irradiation

RhinoSolar™ reveals the solar potential of city's infrastructures.

The solar irradiation, or insolation, is the solar energy received by a surface per unit area and per unit time (day, month, year), ie $Wh.m^{-2}$.

Turning this energy into electricity is a major challenge for cities looking for a quick and efficient transition to sustainable energy systems.

RhinoSolar™ computes the 3 components of insolation:

- **direct** irradiance: the unobstructed radiation that reaches a surface directly.
- **diffuse** irradiance: the solar radiation scattered in the atmosphere.
- **reflected** irradiance: sunlight reflected off by non-atmospheric things such as ground.

The global solar irradiation is the sum of these three components.

In addition, **RhinoSolar**™ can manage the impact of cloud cover.

Exact 3D intersection

RhinoSolar™ takes into account the whole 3D visibility complex.

This means that for each ray sun, an exact 3D intersection is evaluated to compute the solar irradiance. This computation takes into account all geometrical objects of the scene.

This **exact 3D intersection computation** lets you add all potential masks to your study, including **relief** and **vegetation**.

Sunshine duration

RhinoSolar™ can also compute sunshine hours for a given location and period. Sunshine duration data characterize the climate of sites and constitute a starting point for climate and temperature studies.

Less computation time

Solar irradiance estimation involve massive 3D intersection evaluation and accurate irradiance computation. **RhinoSolar**™ operates multi-core calculation and spatial optimisation in order to speed up computation time on huge 3D models.
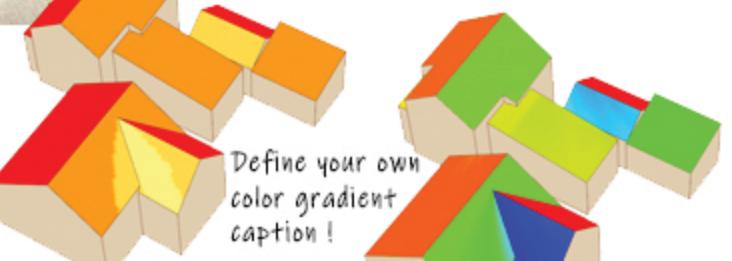
Outputs

RhinoSolar™ offers you many ways to expose resulting computations:

- **CSV files** export: the easiest way to manage results in a spreadsheet
- **SQLite database** export: the high-reliability, embedded, full-featured and public-domain SQL database engine
- **3D model texturing**, with the use of fully configurable color gradients
- **GeoTiff image** export of top view insolation
- **Shapefile** export of polygons
- **Embedded inside your** CityGML model

RhinoSolar™ roofs texturing of a CityGML 3D model courtesy of

GRANDLYON
la métropole

RhinoSolar™ works in WGS84 coordinates. Calculating the exact position and inclination of the sun at any time, it can calculate solar irradiation anywhere in the world.

Define your own color gradient caption !

RhinoSolar™ results overlapping OpenStreetMap(R) data, viewed in QGIS
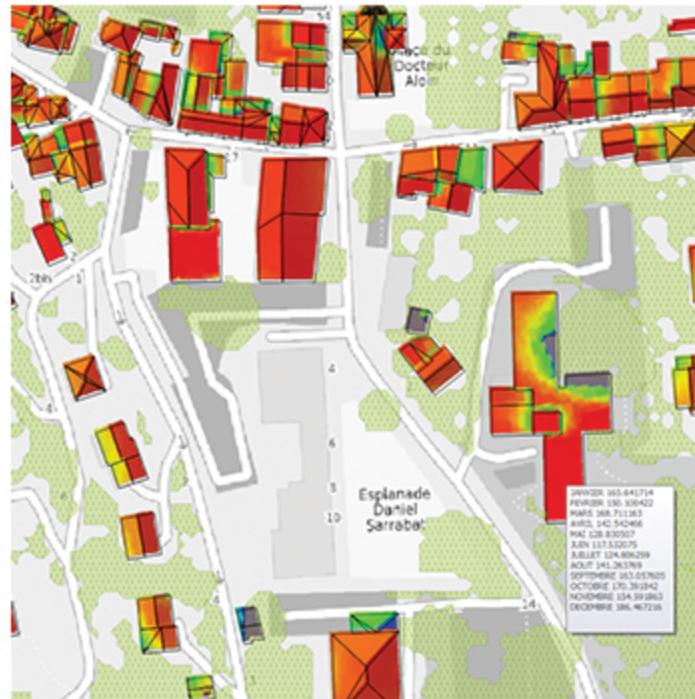
RhinoTerrain
Terrain modeling & City builder software

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discover how our software can help you to get the best from your 3D data !

RhinoCity

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& Terrain modeling & City builder software

RhinoTerrain was created in 2008 by experts in geomatics and computer graphics. We won OSEO 2008, a French national competition which rewards innovative technology companies. Since then, we have been developing and expanding our suite of geo-modeling solutions.

Our team of highly skilled experts provides services in different disciplines, including architecture, urban planning, industry, and academic research.

All these skills contribute to a new generation of 3D geo-modeling tools dedicated to geo-referenced and standardized (CityGML) 3D data production.

We guarantee accurate results in record time owing to the optimal use of multicore processors combined with double precision calculations.

Fully integrated with **Rhinoceros,** the most versatile 3D modeler in the world, our flexible and responsive tools can efficiently compute massive amounts of geometric data.

64 VERSION **BITS** *only*

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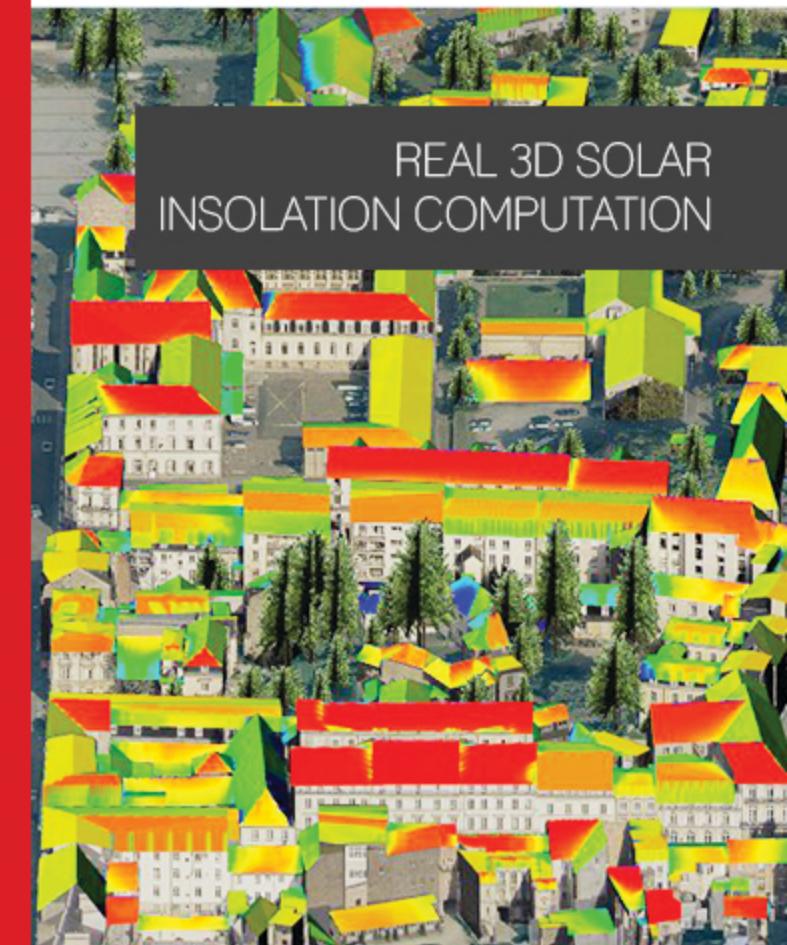
Solar insolation computed over a CityGML 3D model: courtesy of Rennes Métropole

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