SIMULATE EXPOSURE TO ELECTROMAGNETIC FIELD

MITHRAREM

MithraREM is the result of the collaboration between two specialists, the CSTB (Scientific and Technical Center for Building) and Geomod, who have combined their respective expertise to develop a powerful electromagnetic field exposure simulation software.

The CSTB,renowned French expert with over 30 years of research into Electromagnetic, provides state of the art simulation engines in terms of both precision and performance.

Geomod,expert in geomatics and renowned for its high reactivity and the quality of its support, brings its expertise in development and integration.

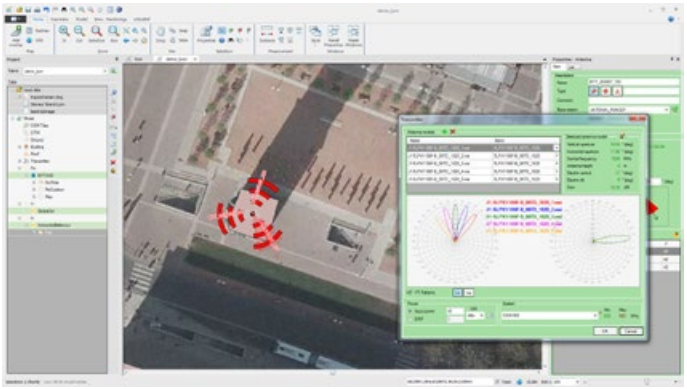
EASY CREATION OF THE MODEL

With a **simple and intuitive interface**, create your model faster :

- Convert your data in multiple formats from simple 2D model with extruded buildings to full 3D model with roofs.
- Create automatically and quickly your project from **SRTM** and **OpenStreetMap**.

MithraREM is based on a GIS: Cadcorp SIS. The Geographical Information System (GIS) brings accessibility and interoperability through advanced design, editing, analysis and rendering features. A wide range of more than **160 formats** are supported in both reading and writing, including SHP, MIF/MID, TAB, DXF, DWG, DGN, etc.

FULL SETTING OF ANTENNAS

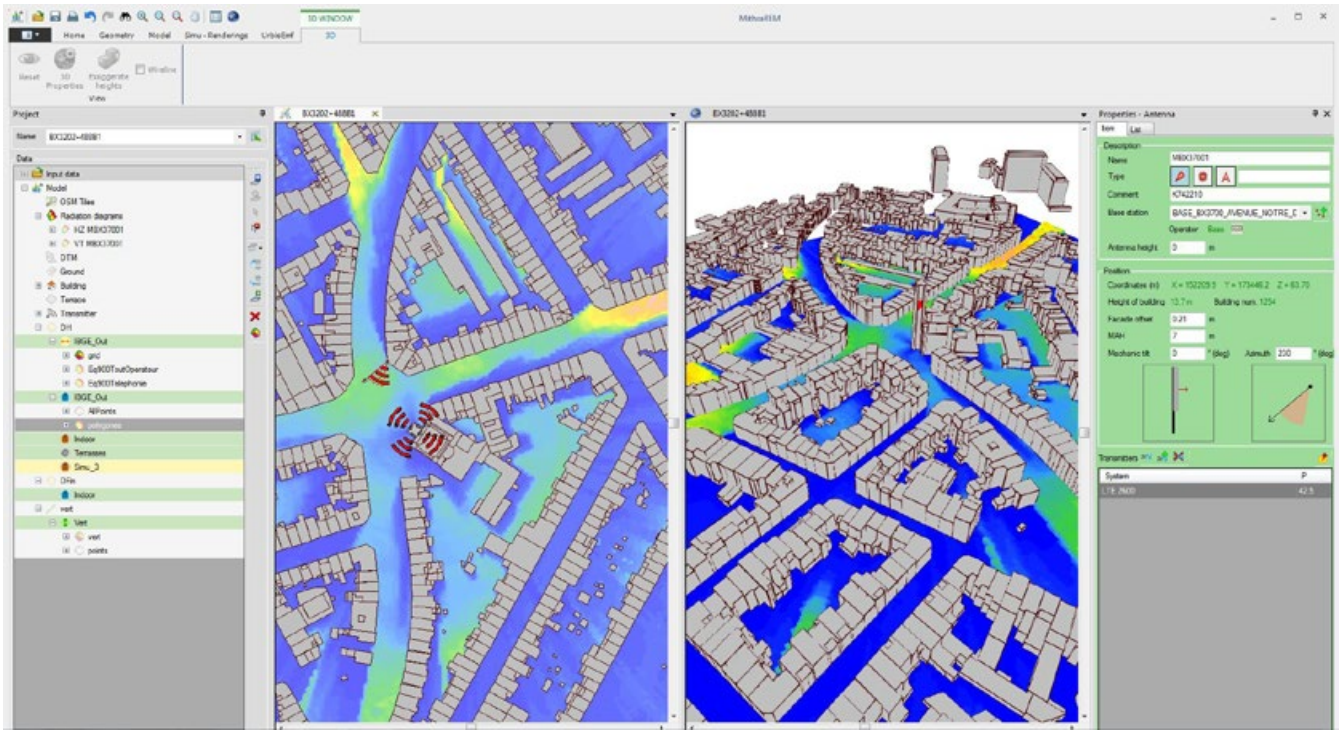


MithraREM is able to handle frequencies between 30 Mhz and 26 Ghz and includes:

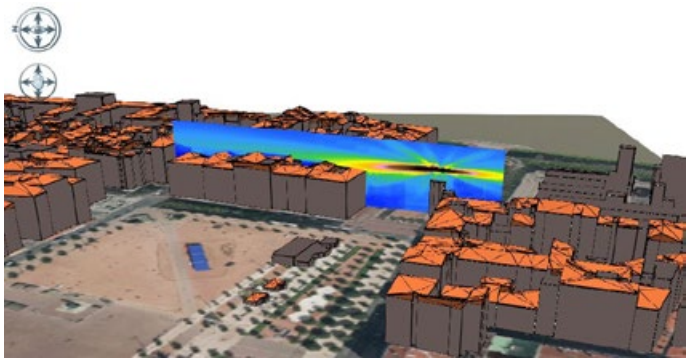
- Radio and television (Digital and Broadcast systems)
- Mobile telephony 2G, 3G, 4G, 5G (GSM, UMTS, LTE,NR)
- Wi-Fi

MithraREM calculates the impact caused by:

- New antennas deployment.
- Modification of an existing site: new technology, new antennas power, electric tilt, modification, etc.



SIMULATE EVERYWHERE



MithraREM can handle different type of projects, including simulation on a defined area close to a single antenna or current situation at city scale.

Various types of maps can be made:

- **Horizontal** maps (maps on the ground)
- **Vertical** sections
- **Facade / Building** maps (indoor or outdoor)
- **Terrace** maps (above the buildings)
- **Horizontal indoor maps in buildngs**, taking into account facade attenuation (**ANFR guidelines**)
- Tables of values on specific points

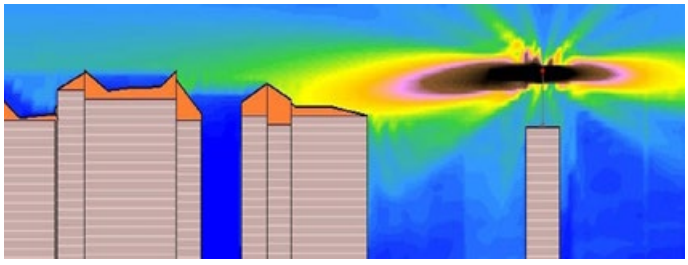
Updating results depending on a modification of the network is facilitated, no in-situ measurement is necessary. MithraREM imports the new antennas and restarts the simulations.

POWERFULL AND WIDE ANALYSIS

MithraREM can estimate several units like electric field **V / m** (or **V / m equivalent 900**), magnetic field **A / m** and intensity of electromagnetic radiation **W / m²**, percentage according ICNIRP guidelines, etc.

MithraREM has dynamic renderings. Simple checkboxes allow you to define all the parameters of a map: units, antennas, frequencies, color table, rendering type, precision. The map is updated in real-time when these parameters are changed.

The **contribution analysis** tool gives the details of field contributions in different categories: per antenna, per operator, per frequency and per technology.



DECISION AND COMMUNICATION SUPPORT

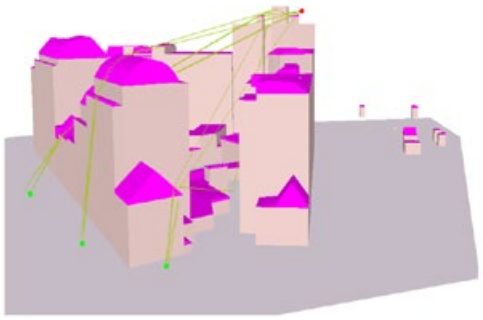
MithraREM can measure the impact of exposition in terms of populations.

MithraREM 2D and 3D maps are great communication vectors. They provide an objective advice in public meetings related to network deployment.

The very powerful and intuitive reporting tool helps to format maps before publishing them.

- Export in KMZ which allows visualization in Google Earth ™ and 3D viewer
- Export in dynamic PDF (with layers, diagrams and geo-referencing)
- Export in SHP, DXF, DWG, GeoJSon, for Geographical Information Software
- Export in CSV (file compatible with Excel) with the details of contributions per frequency, technology and operator

QUALITY AND ACCURACY OF SIMULATIONS



MithraREM is the most accurate and efficient software dedicated to exposure of electromagnetic fields.

MithraREM uses powerful algorithms based on an adaptive beam propagation. A geometric motor determines all the 3D contributions of the antennas and a physical motor calculates these contributions for each frequency band and each antenna, taking into account the materials encountered.

MithraREM has several calculation methods:

- **Indoor** methods estimate the field inside buildings, taking into account the attenuations as a function of the angle of incidence and materials.
- **Outdoor** methods estimate the field outdoors (balconies, terraces, etc) and on the ground.

MithraREM is adapted to the legislation of countries. It allows to create maps according to the limits of the international regulation (ICNIRP), the ANFR guidelines (France) and the Belgian ordinances of the Brussels region.

GEOMOD LYON
89 rue de la Villette
69 003 Lyon
+33 (0)4 37 56 10 99
mithrarem@geomod.fr

WWW.GEOMOD.FR @Geomod

geomod GENIUS GEOMATICS