

# wavezebra

## 3D Antenna Visualization and Field Analysis

### WHAT IS *wavezebra* ?

*wavezebra* is a software system for interactive viewing and analysis of the radiation pattern of antennas. In *wavezebra* the expertise of Wavecall, the developer of the renown radio wave prediction tool WaveSight is combined with the advanced 3D Viewing of Zebra, developed by DiscMap.

### WHY *wavezebra* ?

The environmental impact of the electromagnetic fields generated by Base Telephony Stations is becoming a major issue in some countries because of the growing number of antennas. For this reason it is essential to be able to calculate and visualize the strength of the electromagnetic fields close to the antennas.

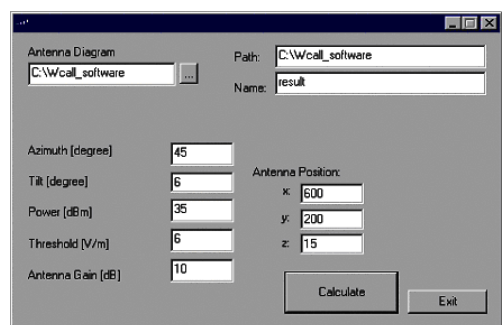
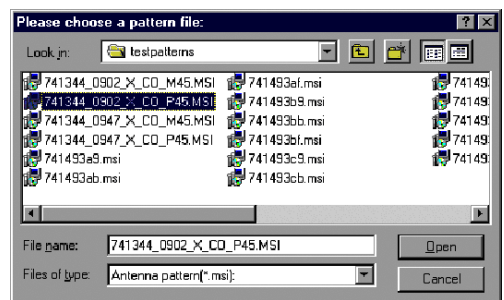
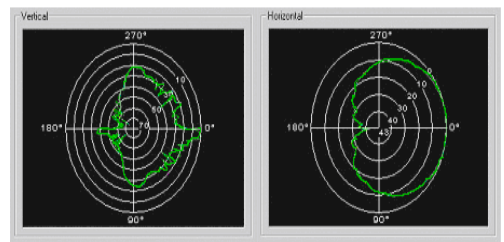
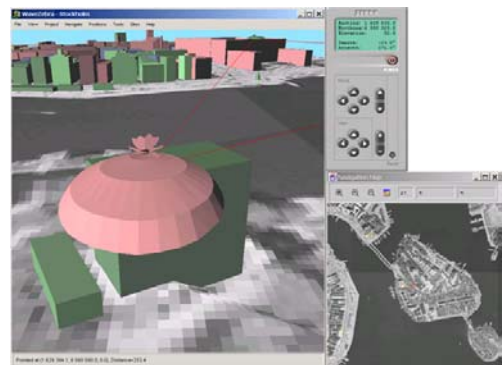
The purpose of *wavezebra* is to visualise the pattern of antennas in the area near the site in an interactive 3D environment, based on existing geographic databases, and to provide tools for analysis by sectioning in 2D.

The users of *wavezebra* can be operators of mobile telecommunication, consultants related to infrastructure planning, owners of sites and real estates, authorities related to environment and any other organisation requiring analysis of antenna radiation patterns.

### HOW DOES *wavezebra* WORK?

Antenna manufactures deliver the radiation pattern by means of horizontal and vertical cuts. In most cases the full 3D radiation pattern is not available.

A classical method to interpolate the full 3D pattern is to add the antenna gain in the horizontal and vertical cuts. The comparison with field measurements has shown the

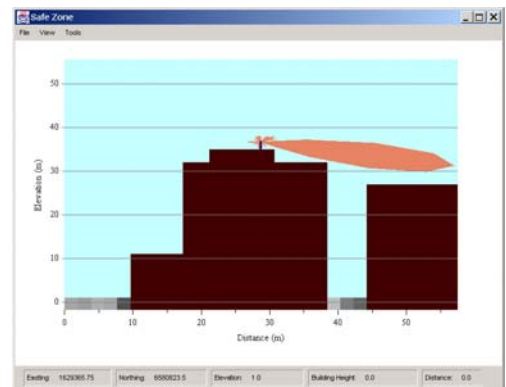
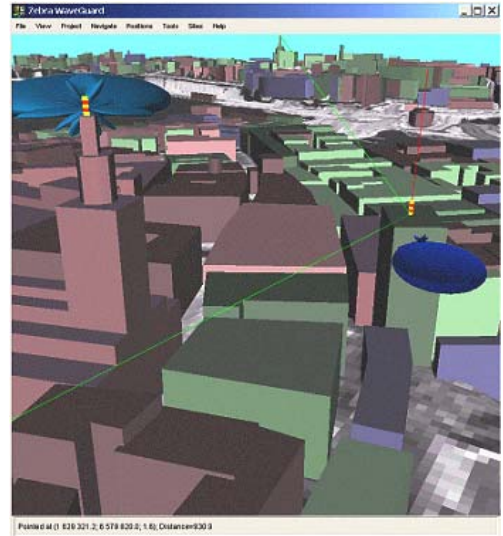


limitation of this method, especially for directive antennas that are either electrically or mechanically tilted. Based on this knowledge Wavecall implemented a new method of interpolation to best match the measurements, based on a recently published article. The improvements obtained were in the range of 4 dB in mean error and 3 dB in standard deviation.

The core of the operation of *wavezebra* is the 3D viewer, which visualises geographic data together with the antenna pattern in three dimensions. *wavezebra* allows for interactive free flying, jumping and change of viewing and aspect. *wavezebra* also fully integrates a navigation window in 2D. Movements, co-ordinates and measurement tools are available at all times in all windows.

*wavezebra* is project-oriented. Parameters and data follow the project throughout the work. Antenna data is imported, edited and exported in connection to the site data. Sites can be added and moved using the mouse. Line of sights can be displayed.

In the Field Diagram, the field level can be calculated in the vertical, horizontal and antenna direction, as well as in arbitrary selected planes. The result is directly printable together with all available information in an optional scale. Co-ordinates are available in the window at all times.



**Wavecall** is a Swiss registered company fully dedicated to radio wave propagation. Its foundation is based on the concepts developed during Ph.D. work sponsored by well-established tele-communication industrials. Wavecall research team has published more than 50 technical papers in the domain of propagation.

Wavecall's main product is Wavesight, a tool that predicts radio wave propagating in urban environment.

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**wavecall**  
*See your net-work*

**DiscMap** is a Swedish IT consulting company producing and marketing digital map databases and advanced 3D tools. The company was established in 1996 and has grown rapidly in the business of computerised mapping services to the European telecommunication and cartographic industries.

The Zebra tool for site acquisition in three dimensions is the flagship of DiscMap 3D technologies.

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