



# AWE Communications

Architects of the Wireless Evolution

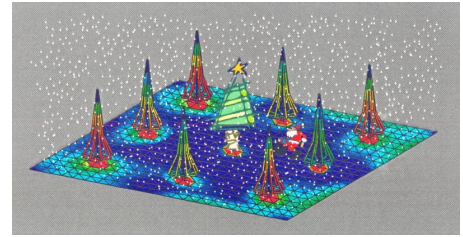
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## WINPROP NEWSLETTER

December 2002



(Simulation of electric current on an antenna array with 9 monopoles on a conducting surface – used to measure radio channels for MIMO and smart antenna applications)

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### Contents

- I. New Features of WinProp (in 2002)
- II. Planned features for 2003
- III. Free Tutorial about Wave Propagation and Radio Network Planning
- IV. New Location
- V. Christmas

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### I. New features of the *WinProp* software package

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During the year 2002, a lot of new features have been added to the *WinProp* software suite.

A list describing all new features, modifications and improvements related to *WinProp* can be obtained from <http://www.awe-communications.com/Docs/WinPropReleases2002.pdf>

Some of the highlights are:

- **Combined Network Planning**  
Propagation models for urban and for indoor scenarios are well-known. But which model should be used to
  - determine the interference between an indoor and an outdoor transmitter
  - compute the penetration into buildings (indoor coverage)
  - analyze the radiation from transmitters inside buildings in the outdoor environment?Here AWE's combined network planning (*CNP*) concept is ideally suited. The transition from outdoor to indoor (and vice versa) is considered in the wave propagation simulation by combining the indoor and the urban propagation models. So the user can use the well-known models to get maximum performance. Further information is available from: [http://www.awe-communications.com/cnp\\_ui.html](http://www.awe-communications.com/cnp_ui.html)
- **Delay Spread**  
Channel Impulse Response (CIR) Measurements from Nokia Research Center were used to analyze WinProp's delay spread (and path loss) prediction accuracy. A very good performance was obtained. The results were published together with Nokia at the IEEE VTC Conference in Vancouver. Further information is available at: [http://129.69.95.21/Winprop/Publications/vtc\\_02\\_fall.pdf](http://129.69.95.21/Winprop/Publications/vtc_02_fall.pdf)

- **Coordinate Systems**

WinProp supports now more than 250 coordinate systems (datum) with more than 20 ellipsoids. This allows a maximum flexibility for the usage of commercial databases from all over the world.

- **Rural Propagation**

Originally, WinProp was designed for the ray-optical urban and indoor propagation models based on vector databases. In the meantime WinProp is used for many different applications - so the logical step to extend the propagation modeling to pixel databases (rural or suburban) was done during the year 2002.

WinProp now offers a wide range of propagation models for pixel databases including the well known Okumura-Hata, 2-Ray-Model, Knife-Edge-Diffraction (Deygout, Epstein-Petersen), Ray-Optical Model, 3D Scattering Model, and Parabolic Equations (some more will follow during the year 2003). Many of the models can be combined (e.g. Hata together with Knife Edge (in the vertical plane) and 3D Scattering) to obtain very accurate prediction results.

- **CDMA/W-CDMA Simulator**

The dynamic CDMA- and W-CDMA simulator was improved and includes now a very realistic simulation environment. Several CDMA standards are pre-defined (e.g. UMTS-FDD and UMTS-TDD) and the user can additionally define further standards by defining all parameters of the currently selected standard.

- **EDGE/GPRS Simulator (Adaptive TDMA systems)**

Adaptive channel coding and modulation techniques are used in all newer wireless standards (e.g. GPRS, EDGE, EGPRS,...). Because WinProp computes a detailed description of the mobile radio channel (incl. power delay profile), this data can be used to simulate the selection of adaptive coding and modulation schemes. The planning engineer can now see at each location which data rate is achievable and what should be modified in the network to increase the max. achievable data rate.

- **Measurement Simulator**

This tool simulates a measurement route in a cellular network with fast fading effects. This is important to analyze handover and LCS (accuracy) in a mobile communications network.

- **Location Based Services**

For Location Based Services different tools were developed:

- Database correlation method (either based on measurements or on predictions)  
<http://129.69.95.21/Winprop/Publications/ew2002a.pdf>
- E-OTD Network Planning Tool incl. planning of LMUs.

- **GUIs**

For ProMan and WallMan a new zoom concept and additional display options are now available leading to a more convenient and intuitive user interface.

- **Vector Database Simplification**

Detailed databases are very important to obtain accurate predictions. But too many details increase the computation time significantly. *WallMan* includes a new feature to optimize vector databases for the prediction (eliminate irrelevant details, combine objects to reduce the number of objects,...). This leads to shorter computation times without a noticeable influence on the prediction results. The new feature is available in our evaluation version: <http://www.awe-communications.com/software.html> (*WallMan*)

- **Propagation Models available for external tools**

WinProp's innovative ray-optical propagation models are now available additionally as DLLs (plug-ins) for ATOLL (of Forsk) and ENTERPRISE (of Aircom). If you are interested we can send a demo version to you.

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## II. Planned features for 2003

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Many new features are planned for the year 2003 to extend the features of WinProp and to improve the handling of the software. The roadmap for the next two years is available and if you are interested, we can mail it to you. Some highlights of the roadmap for the year 2003 are listed below:

- **Integration of EMC analysis into ProMan**  
Up to now the EMC analysis was done in the stand-alone tool EMCMan. The functionality of the EMCMan will be included in ProMan to determine the EMC plots together with the network predictions. Further information about the EMC tool can be found at: <http://www.awe-communications.com/EMCMan.html>
- **CNP Extension Rural**  
The above mentioned CNP (Combined network planning) will be extended towards rural areas (and pixel databases). Up to now "only" vector databases (urban/indoor) can be used. The extension will include the rural and suburban environments with their topographical and clutter databases and will allow to compute the transition from rural to urban (and via Urban/Indoor CNP also to indoor) scenarios and vice versa
- **Smart Antennas & MIMO**  
Extension of the network planning module to consider smart antennas and MIMO systems based on ray-optical propagation models.
- **Satellites**  
Extension of the wave propagation models included in ProMan (rural, urban & indoor) for the satellite domain, e.g. for Digital Multimedia Broadcasting (S-DMB), but also for all other satellite applications (transmitter locations support now additionally satellite coordinates). Statistical satellite propagation models to determine CIRs is included.
- **Planning tool for S-DMB**  
Planning tool for S-DMB considering the satellite as well as the terrestrial repeater segment (and the interaction between both), taking into account the detailed modeling of the radio channel (e.g. channel impulse responses) and the system architecture (e.g. Rake receiver) of S-DMB.
- **3D View in ProMan**  
ProMan will display databases and prediction results (including propagation paths) in a 3D display (as already available in WallMan for building databases). This will help the user to understand better the propagation phenomena.
- **Open Interfaces to/from CDMA/W-CDMA Simulator**  
A new version of the simulator will be released in February 2003 which will include a power control (PC) algorithm similar to the real network (incl. time delays and control steps) and not only an ideally working assumption of the power control. This power control algorithm as well as the Radio Resource Management (RRM) module have an open interface and can be substituted by algorithms (in DLLs) developed by the user. This helps users to analyze their own algorithms for PC and RRM in a simulation environment.
- **HSDPA Simulator**  
HSDPA will improve UMTS and lead to higher data rates. The UMTS network simulator will be able to consider HSDPA mid of 2003.
- **Dynamic EDGE/GPRS Simulator (Adaptive TDMA systems)**  
The dynamic traffic generator used for the CDMA planning will be added to the EDGE/GPRS planning tool to simulate delays and QoS in packet switched data services.

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### III. Free Tutorial about Wave Propagation and Radio Network Planning

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At Jan/15/2003 AWE Communications offers a free tutorial in Barcelona, Spain with the title: **Wave Propagation Modeling and Network Planning for Cellular Wireless Networks**

The 4 hours tutorial will be held in the frame is of the 6thMCM COST 273 meeting in Barcelona, Spain. All participants of the COST 273 meeting are invited to join the tutorial. Registration for the meeting (registration fee is only EUR 60 for the meeting and the tutorial is free) and further information about the COST 273 project is available at <http://www.lx.it.pt/cost273/>



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### IV. New location of AWE's R&D , Technical Support, and Sales teams

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Due to a significant growth in our development team additional offices were required. On 01/01/2003 the R&D, Technical Support and Sales teams of AWE Communications will move to a new [location in Böblingen](#) (Administration, Financial Dep., and Purchasing will remain at the current location in Gärtringen).



If you want to call our R&D team or the support hotline you should use the new numbers

Phone: + 49 70 31 71 49 7 - 0  
Fax: + 49 70 31 71 49 7 - 12

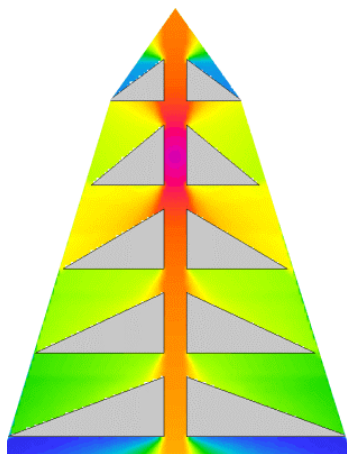
(the former numbers are still valid after 01/01/2003 and will be forwarded – but we recommend to use the new numbers after 01/01/2003).



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### V. Christmas

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(Ray-Optical Prediction (urban) with Waveguiding Effects in the GSM frequency band)

To close this newsletter, we would like to thank all our customers and partners for the good collaboration. We also really appreciated all the feedback that helps to improve AWE's software products.

We wish you and your family

**Merry Christmas and  
a Happy & Successful New Year**

Best regards,

*AWE's WinProp Team.*

