Atoll Microwave

Backhaul Planning & Optimisation Software

version **3.4**

Advanced 5G Capabilities

End-to-end Backhaul Dimensioning and Capacity Planning

Advanced Backhaul Planning and Engineering Features

High Performance GIS

Forsk

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General Features

Atoll Microwave is a state-of-the-art point-to-point and point-to-multipoint backhaul planning and optimisation software. It allows designing large microwave link networks, according to ITU recommendations, industry standards, and operator guidelines.

Atoll Microwave is based on the leading Atoll platform which includes a high performance GIS and advanced data and user management features. Full integration of Atoll Microwave with Atoll radio planning modules allows immediate sharing of radio planning and optimisation data for backhaul planning.

Atoll Microwave also includes a Backhaul Capacity Planning module that allows network operators to model backhaul network topologies and to dimension backhaul links according to the mobile network traffic. The Backhaul Capacity Planning module enables the analysis of end-to-end mobile traffic routing and the optimisation of backhaul capacity. Atoll Microwave also supports non-line-of-sight backhaul enabling small cell planning and 5G network design activities.

Atoll Microwave is being used by a number of major wireless operators and equipment vendors worldwide.

GIS Features

- Optimised cartographic data management features with support of digital elevation models, clutter data (type and height), 3D building data (vector/raster), traffic data, scanned maps, vector data, population, and climate data
- Integrated cartography editor (vector/raster)
- Interface with GIS tools: MapInfo, ArcGIS, Google Earth
- Support for Web Map Services (WMS) and online maps (Bing, Open Street Maps, etc.)

User and Database Management

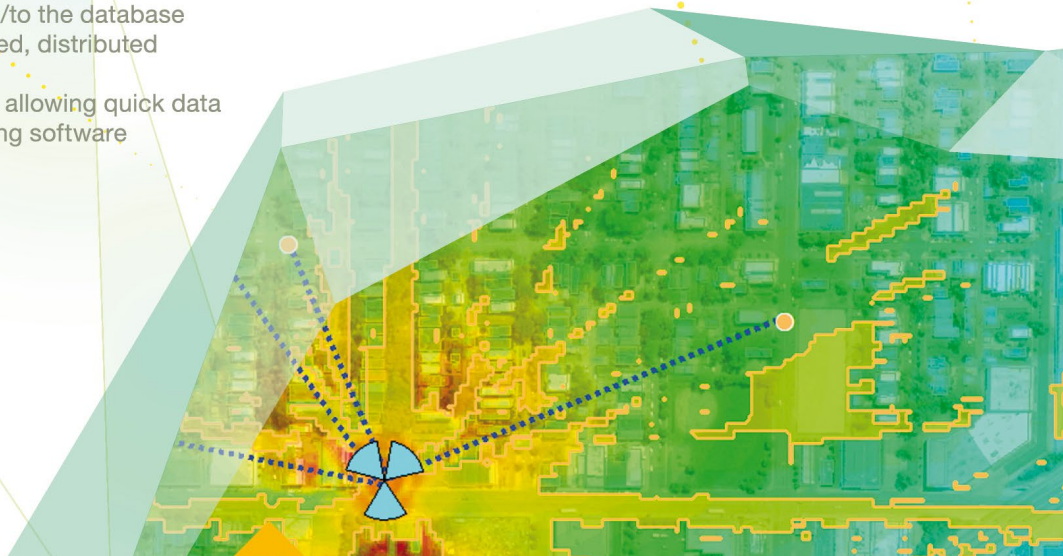
- Advanced administration module supporting data access and user privilege management
- Flexible database structure allowing integration of user-defined parameters and custom fields
- Multi-user support including database consistency management, data synchronisation, and user disconnection/reconnection from/to the database
- Support for standalone, centralised, distributed configurations
- Advanced import/export features allowing quick data migration from other radio planning software

Task Automation

- Scripting language allowing integration of user-defined macros
- User-defined calculation batch based on macros and scripts

Reporting

- Flexible report generator
- User-defined reports based on macros
- Export of custom reports in industry-standard formats



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Design and Analysis Features

Link Modelling

- Support of point-to-point and point-to-multipoint link
- Modelling of LoS/nLoS/NLoS links using radio, microwave, and mm-wave frequencies as well as wired transmission technologies (optical, copper links etc.)
- Support of ITU standard and user-defined frequency bands, high-low configurations, and channelisation plans
- Microwave radio and equipment modelling: vendor parameters, IRF, signatures, etc.
- Antenna modelling: vendor parameters including co¬and cross-polarisation, radomes, etc.
- Support for repeaters
- Support for space and frequency diversity
- Support for dual polarisation
- Support for ATPC
- Support for adaptive modulation
- Support for V-Band and E-Band links

Link Design

- LoS visibility plots
- NLoS coverage plots and multipath analysis
- Path profile analysis including Fresnel zone clearance with multiple K factors
- Off-path profile analysis of Fresnel zone clearance on the horizontal plane
- Propagation and link budget analysis
- Automatic antenna height optimisation
- Reflection point analysis and repeater design
- Link design rules for best frequency band assignment
- Link design assistant to solve planning issues

Quality and Availability Objectives

- Performance objectives based on ITU G-821, G-826, and G-828 recommendations
- Performance objectives for IP links based on ITU-T Y.1541 recommendation
- User-defined performance objectives and parameters

Link Performance Analysis

- Based on ITU-R P.530 recommendations up to 530-16.
- Support for Crane, Vigants, and K-Q models
- User-defined and ITU standard geoclimatic parameters
- User-definable reports including multipath, rain, and obstruction fading
- User-definable propagation model
- End-to-end multi-hop link analysis

Interference Analysis and Frequency Planning

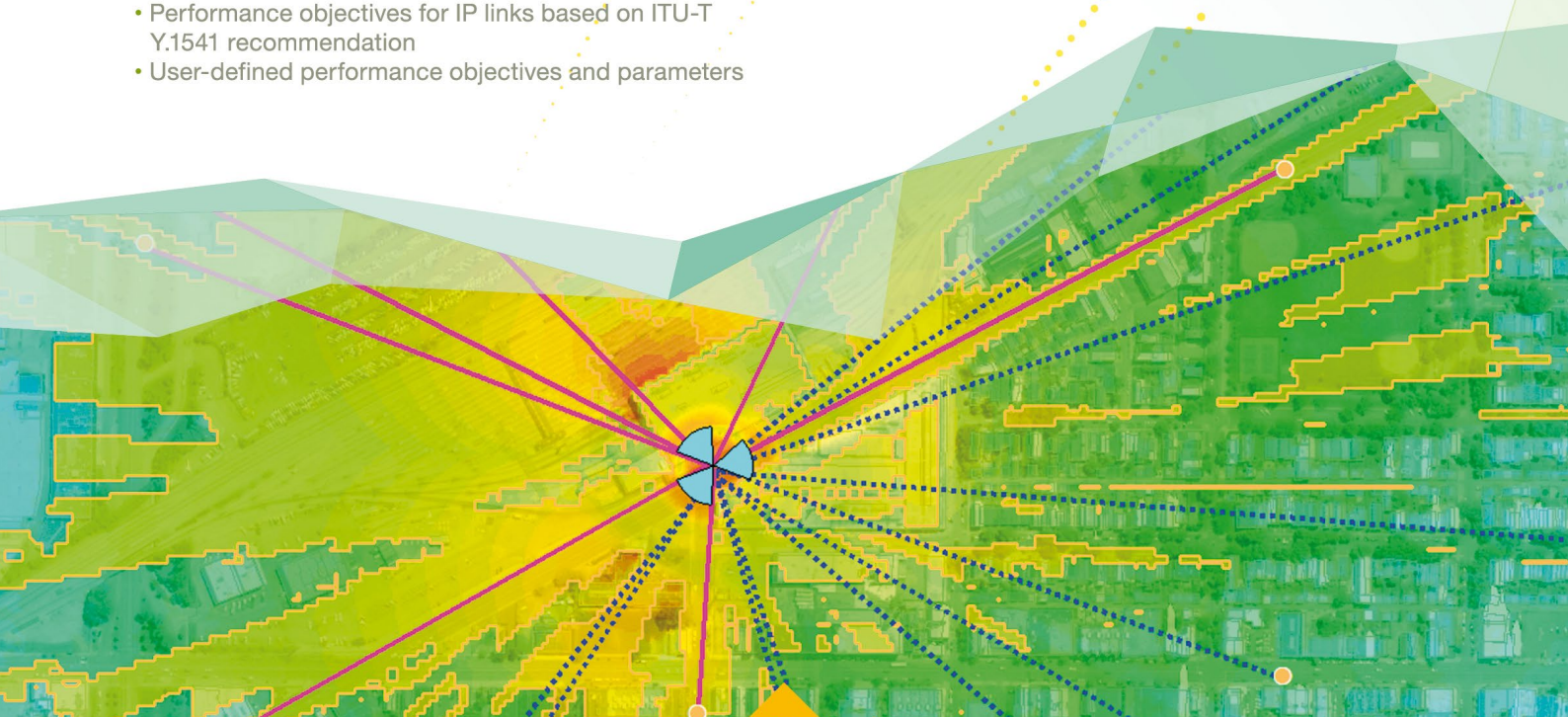
- Based on ITU-R recommendation 452-16 and previous versions
- Detailed interference analysis including interferer ranking
- Interactive automatic channels-to-link allocation
- Analysis of high/low conflicts
- Integration of interference impact into link reliability report
- Evaluation of link quality vs. performance objectives

Point-to-Multipoint Network Planning

- Modelling of PMP hubs and terminals
- Hub coverage predictions
- Hub-terminal connectivity analysis

Backhaul Capacity Planning

- Modelling of backhaul network topologies and traffic routing
- Backhaul network capacity planning and dimensioning
- Failure scenario analysis and audit



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