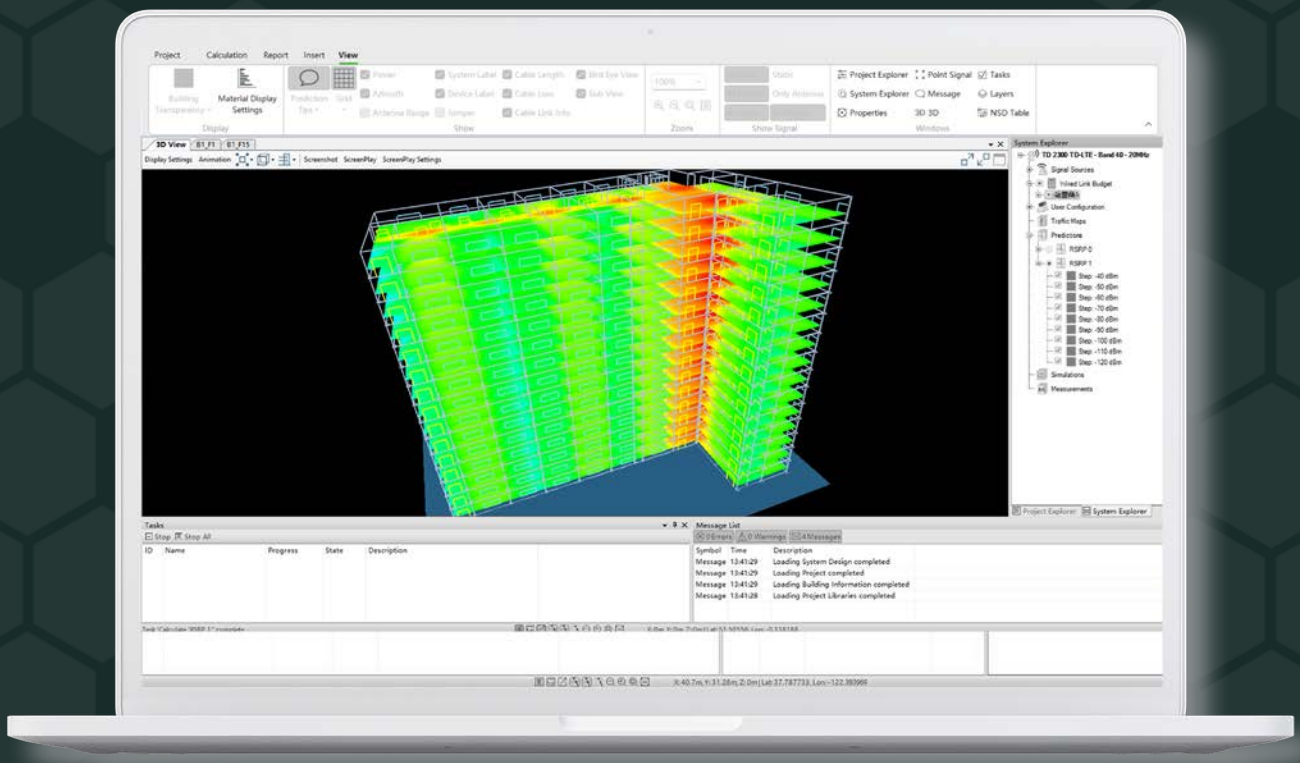
Ranplan In-Building

Advanced indoor wireless network planning and optimization software, featuring rapid 3D modelling



What is Ranplan In-Building?

Ranplan In-Building is the ultimate high-performance software for planning and optimizing large, complex indoor wireless networks.

With automated 3D modelling, an advanced propagation engine, and essential optimization modules, it ensures the quick, cost-effective design of reliable networks for diverse environments, including commercial buildings, hospitals, stadiums, and transportation hubs.

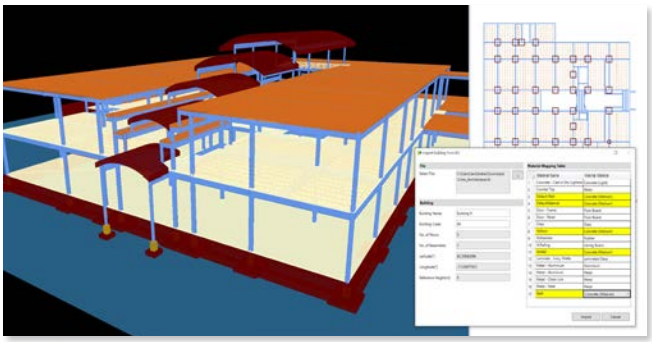
Key Benefits

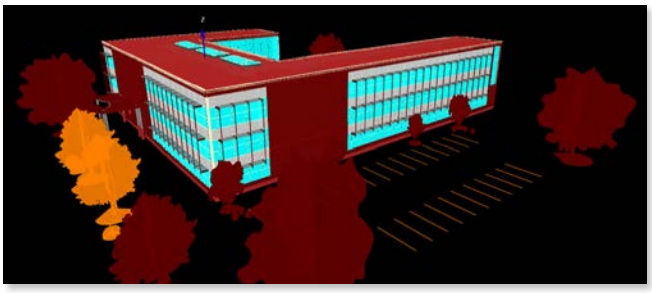
- Comprehensive 3D building modelling
- Supports indoor wireless solutions such as active and passive DAS, small cells, and Wi-Fi.
- Multi-technology support such as 5G NR, 4G (LTE), 3G, IoT, Wi-Fi 802.11x, and Public Safety.
- Design automation and optimization.
- Fast indoor 3D coverage and capacity predictions.

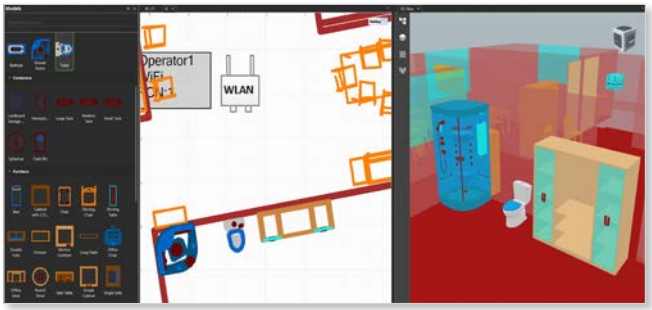
Automate 3D Building Modelling

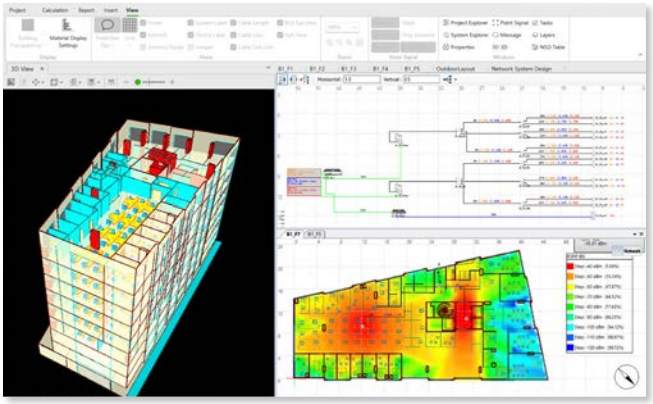
Streamline the design process for indoor networks with Ranplan's automation tools, significantly reducing both time and cost.

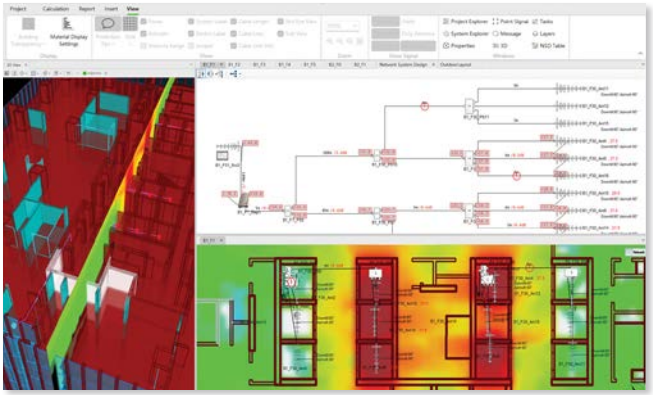
- **Import BIM Files:** Seamlessly import 3D building models from any BIM (Building Information Modelling) software.
- **Import LiDAR Scans:** Model 3D buildings and structures by importing IFC files from the Metaroom ® App.
- **Smart CAD Extract:** Automatically convert 2D/3D CAD files into rendered 3D building models.
- **Manual 3D Modelling:** Create comprehensive 3D models (stadiums, tunnels, stairwells, campuses) using intuitive tools.
- **Import 3D Mesh Files:** Accurately model structures such as curved rooftops, tunnels, and pillars by importing 3D mesh files.
- **Intelligent Floor Plan Recognition (IFR):** Convert background images into 3D vector building models.
- **Attribute Exact Building Information:** Precisely attribute building materials of walls, doors, windows, and interior objects to characterize their frequency properties.
- **Instance-Based BIM Models:** Import, create, modify, reuse and export building elements from a centralized library for accurate environment modelling.











System Planning and Evaluation

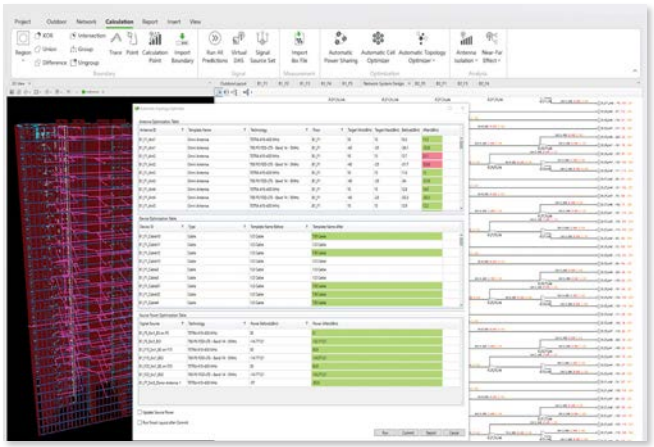
Precisely plan wireless networks that deliver reliable signal coverage, capacity, latency and reliability.

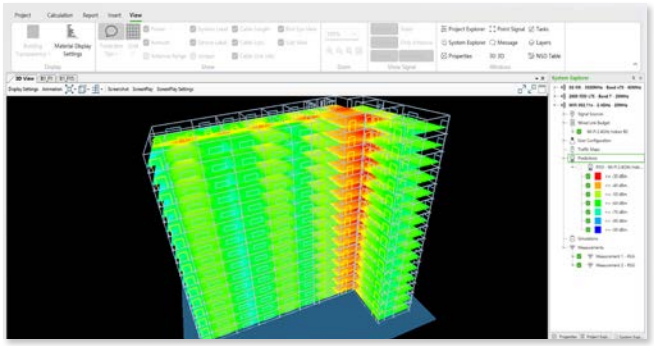
- **Multi-System Planning:** In-building network systems, including Active/Passive DAS, small cells, DU/RU, O-RAN, vRAN, and WLAN.
- **Multi-Technology Support:** 5G NR, 4G, 3G, 2G, TETRA, PMR, DMR, P25, IoT, Wi-Fi (including Wi-Fi 7).
- **MIMO Modelling:** Evaluate the uplink and downlink of 2x2, 4x4, 8x8, 16x16 antennas.
- **Massive MIMO and Beamforming Modelling:** Configure advanced antenna arrays in 2D and 3D.
- **Cable Planning:** Multi-strand fibre, coaxial, radiating and jumper cables.
- **Evaluate Network Performance:** Compare technologies, configurations and combinations of vendor devices before purchasing or deploying.
- **ROI Measurement:** Use results to measure Return On Investment (ROI) and decide which solution delivers a cost-effective network that meets coverage, capacity, and other KPI performance requirements.

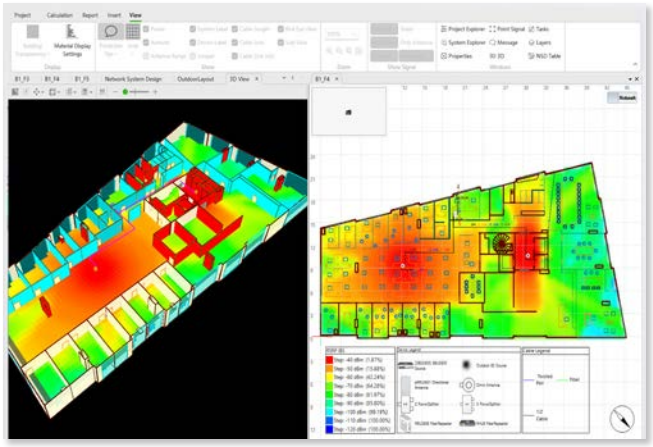
Network Optimization and Automation

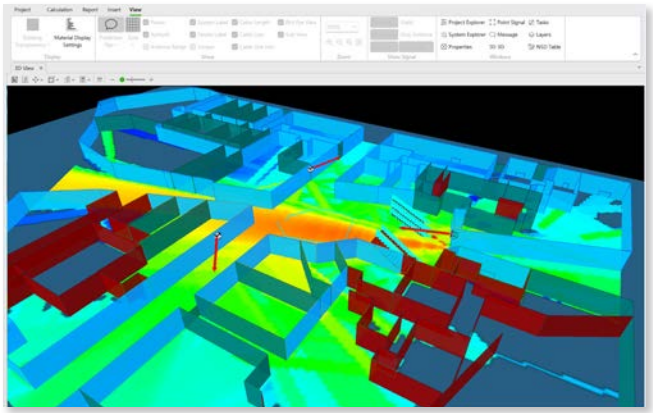
Intelligent algorithms recommend and automatically apply design changes, enhancing network performance before procuring or deploying equipment.

- **Intelligent Cell/Antenna Optimization (ICO/IAO)/ Automatic Cell Optimizer (ACO):** Automatically fine-tune the location, number, transmit power, and antenna configuration to achieve KPIs.
- **Intelligent Topology Optimization (ITO)/Automatic Topology Optimizer (ATO):** Efficiently create optimal network topology by optimizing cable routes.
- **Automatic Power Sharing (APS):** Automatically balance the power sharing between operators and systems.
- **Intelligent Network Profiler (INP):** Preset network system measurements (signal strength, coverage, leakage) to analyze performance and optimize design.
- **Intelligent Frequency Optimization (IFO):** Optimize channel allocation and transmission power to each Wi-Fi Access Point based on interference and coverage prediction.









3D Network Predictions

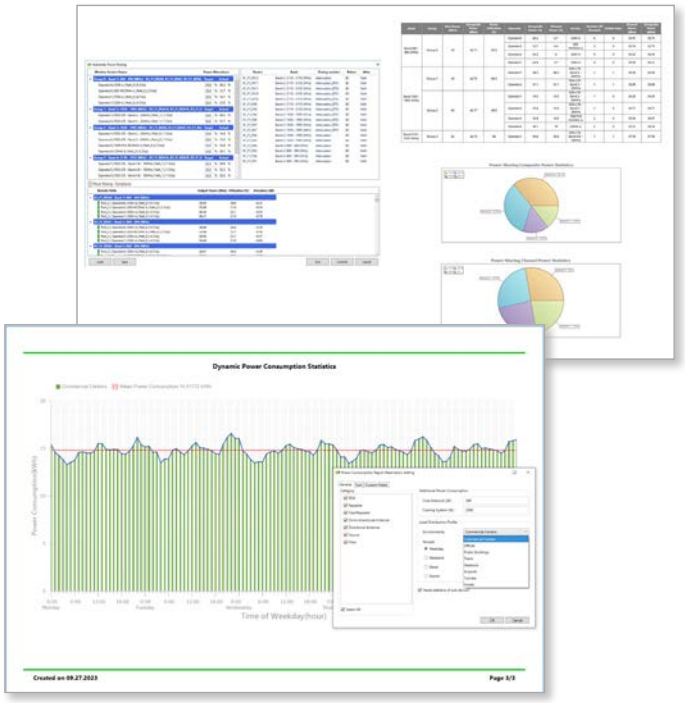
The true 3D ray-tracing, ray-launching propagation engine, Ranplan Maxwell generates realistic indoor network coverage, capacity, latency and reliability simulations to predict and determine the quality of service.

- **3D Coverage Prediction:** Advanced calculation accuracy to represent indoor and cross floor signal propagation.
- **3D Capacity Prediction:** Analyze network capacity based on traffic patterns to predict real-world performance.
- **Body Loss Zones:** Incorporate the impact of human bodies by defining specific zones within venues, enhancing prediction accuracy.
- **Advanced Antenna Support:** Includes beam selection and beamforming interference calculations for 2D/3D Massive MIMO antennas, and models Reconfigurable Intelligent Surfaces (RIS) for network optimization.
- **Field Measurement Calibration:** Ensures simulations align with real-world network measurements.
- **Energy Consumption Simulations:** Conducts detailed simulations with various distribution profiles to assess and optimize energy efficiency.

Customizable and Powerful Reporting

Monitor and track project progress using the customizable and automatically populated reports, ensuring designs are delivered on time, within budget and meet all KPIs.

- **Quick Access to Project Information:** Easily present information to customers and deployment teams.
- **One-Click Reporting:** Available in multiple languages.
- **Reporting Templates:** Includes Equipment, Cable Routing, Layout Plan, Antenna EIRP, Floor Equipment Statistics, Power Consumption, and Budget Reporting.
- **Real-Time Project Costs Reporting:** Project Budget Report, Antenna Link Budget Report, and more.
- **Project Compliance Reports:** EMF Compliance Report.
- **High Resolution PDF Printing:** Network System Design and Floor Layout Design, among others.
- **Export to IFC:** Share network plans in IFC format for easy visualization across 3D tools and platforms.



Technical Specifications

Minimum hardware requirements

Processor: Core i5 6th Generation, 2.0 GHz
Operating System: Windows 10 (64bit)
Memory: 8GB
Hard Disk Space: 50GB
Display: 1024 x 768

Recommended hardware requirements

Processor: Core i7 7th Generation, 3.0 GHz
Operating System: Windows 10 (64bit)
Memory: 16GB for medium projects /
32GB for complex projects
Hard Disk Space: SSD with minimum 100GB
For Stadiums: minimum 200GB
For HetNet projects: minimum 300GB
Display: 1920 x 1080
GPU: RTX graphic cards 3070 or above are recommended,
(For AMD CPU we recommend GPU with 4GB+ RAM)
API: OpenGL, OpenCL 1.2 or higher
Cloud/Virtual platforms: Microsoft Azure

Wireless Technologies Supported

5G NR Sub-6GHz and mmWave
4G systems (3GPP Release 17) LTE/LTE-A
3G systems HSPA/HSPA+/WCDMA/1xEV-DO/TD-SCDMA
2G systems GSM/CDMA/EDGE/GPRS/TDMA
Public safety systems P25/PMR/DMR/LMR/TED/TETRA
IoT systems LoRa/eMTC/NB_IoT/SIGFOX
Wi-Fi (IEEE 802.11b/n/g/j/ac/ad/ax/be)

About Ranplan Wireless

Ranplan Wireless pioneer software solutions for the design, optimization and simulation of in-building and urban outdoor wireless networks. Our open platform, intelligent automation and 3D ray-tracing simulations streamline the network planning process, expertly identifying potential issues and optimizing network performance for reliable connectivity. This results in an unparalleled quality of service, ensuring seamless and efficient wireless communication for end-users and business operations.