

# Wireless Network Design and Optimization



A successful network rollout or upgrade involves a number of complex tasks including radio coverage prediction and data analysis before and after installation. Operators are challenged with:

- Improving time to market
- Continuously monitoring the network for quality of service
- Responding quickly to changing traffic patterns, voice and data
- Managing variance in traffic mix and bandwidth demand
- Tracking and managing high value assets
- Viewing multiple technology layers
- Reducing cost of deployment and lowering risk of project
- Determining trade-off between network performance and associated cost and revenue
- Lowering capital and operational expenses
- Optimizing cost of networks through lifetime

Andrew Corporation offers a wide range of tools, services, and solutions that facilitate the optimization of networks throughout their lifecycle and help operators speed deployment, reduce costs, and ensure a high quality of service.

**Odyssey™** is a true multi-platform radio planning solution, offering...

- Superior propagation prediction
- Faster implementation of wireless technology for 2G, 2.5G, and 3G networks
- A field proven solution

**Radio Network Design Parameters**  
(Site Candidates, Topology, Clutter Data, Etc.)

**Radio Network Design Criterion**  
(Cost, Coverage, Time, Etc.)

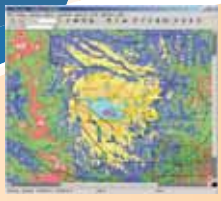
- Automated Cell**
- Efficient autom...
  - Optimizes cell simultaneously
  - Seeks solution performance in key performan...

Collect Continuous Wave Data  
(**Invex3G®**)

Initial radio coverage prediction  
(**Odyssey™**)

Examine alternative network configurations based on cost, time and coverage  
(**Optum™**)

Optimum Network Design



Measurement-based Prediction (**MbP™**) software greatly increases prediction accuracy

Radio Coverage Plan

Apply real drive test data to the predicted data  
(**MbP™**)

# Radio Network Planning and Optimization

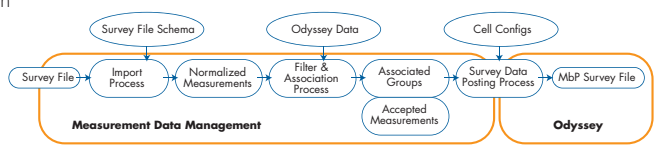
Store and normalize measurement data  
(**MDM™**)



Collect network performance data  
(**Invex3G®**)

**Measurement Data Management (MDM™)**

- Reuses existing drive test data
- Imports survey files from multiple sources
- Updates drive test data to synchronize with network parameter changes
- Normalizes survey data to provide a common set of metrics for MbP prediction software
- Filters and associates normalized data with coverage prediction parameters



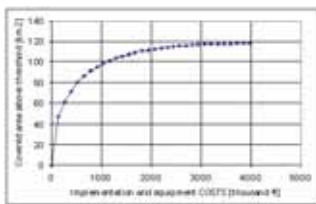
## Optimization Solutions

Andrew's industry-leading mobile network design and optimization tools and services enhance, synergize, and streamline the entire lifecycle of wireless networks; from cell planning to network deployment, measurement/benchmarking, and optimization.

## Planning (Optum™)

Automated network evolution process  
plan and site parameters

that maximizes an overall  
index (OPI) composed of several  
key indicators (KPI)



## Program and Project Management (Omnix™)

- Shortens time to deploy for new installations
- Saves money on cell site and infrastructure costs
- Reduces project risks by helping to eliminate human error
- Tightens asset tracking and inventory management

## Rollout/Upgrade (Omnix™)

Monitor statistical data  
and configure RET antennas  
from anywhere  
in the world  
(ANMS™)

Remotely adjust  
antenna tilt  
(Teletilt®)



Optimized Network

Drive/Walk Testing



## Test Drive and Benchmarking Tools (Invex3G®)

- Supports all major mobile wireless technologies including 2G, 2.5G, 3G – HSDPA
- View their service from the perspective of the subscriber
- Analysis provides critical quality-of-service measurements including failed originations, dropped calls, and call quality

## Quality of Service (QoS)

New technologies and services can introduce serious performance issues. Advanced performance metrics are crucial for effectively monitoring and responding to problems before they impact subscriber experience. Andrew's measurement-based prediction and measurement data management tools allow operators to import multiple sources of network

performance data into their network coverage prediction analysis. Examples of data types include in-building and pedestrian user experience, network element performance (such as Node-B and OMC data), coverage and interference statistics.

Once networks are analyzed, operators can respond quickly to changing traffic

patterns by using Andrew's Decibel® line of base station antennas equipped with Teletilt®, Andrew's remote electrical tilt (RET) antenna system. A perfect complement to Decibel antennas, the Teletilt system not only enhances short-term revenues but also lowers long-term capital and operating expenses while helping reduce customer churn.

## Optimization Solutions that Work for You

Andrew provides its customers with the tools, services, and solutions necessary to optimize their networks at any time during the network's lifecycle. Andrew's network and cell planning tools, RET solutions, and evolving automation methods deliver business effective information that greatly improves the quality of service for new and existing networks. From radio network coverage enhancement to a full suite of optimization products, Andrew offers a clear advantage to wireless operators worldwide.

- Odyssey™—cellular radio planning software
- iQ.link®—microwave design software
- Optum™—automated cell planning tool
- Omnix™—program, project, and asset management tool
- Invex3G®—wireless network drive test system
- MbP™—measurement-based prediction tool
- MDM™—measurement data management tool
- ANMS™—Andrew network management system
- Teletilt®—remote electrical tilt antenna system



One Company. A World of Solutions.

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