What's New in Planet 6.0

Orchestrating Network Performance

Content

- Mentum Planet Roadmap

- User-friendliness

- LTE

- Call Traces

- Propagation Modeling

- Data Management

- Additional Features

- Windows Operating System Compatibility

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Planet Roadmap

Planet Roadmap

	2016				2017
March	**June**	**September**	**December**		**H1**

March	June	September	December	H1

Mentum Planet 6.0 – GA
➤ 64-bit software (with MapInfo 15.2.2)
➤ User-friendliness
➤ LTE Relay Nodes
➤ Unified Planning & Optimization
• *Interface with VistaNEO (OSS based algorithms)*
• *Call end types*
• *Support for IMSI for LTE*
• *Performance and scalability enhancements*
➤ User Permissions
• *Granularity of object permissions in Data Manager*
• *User Permissions for local Planet projects*
➤ Propagation
• *Prediction Previewer tool*
• *Universal Model v. 440*
• *ITU-R P.1546-5*
	Planet 6.0.1
	➤ Indoor/Outdoor Planning & Optimization
	• *Identification of buildings for which indoor systems are needed*
	➤ 3D Geolocation
	• *Computation of subscriber height for call traces*
	• *Call trace based network analyses in 3D*
	• *Merged predictions in 3D*
	• *Traffic Maps from call traces in 3D*
	➤ Support for masked Universal Model in Automatic Cell Planning
	➤ Miscellaneous Features
		Planet 6.0.2
		➤ Indoor/Outdoor Planning & Optimization
		• *Estimation of required number of indoor cells – without floor plans*
		➤ Miscellaneous Features
			Planet 6.1
			➤ Unified Planning & Optimization
			• *Planet as a thick client of VistaNEO*
			  • Visualization of call trace KPIs from within Planet
			  • Call search & visualization of call records
			• *Synchronization of additional parameters from Live Network*
			• *Integration of Configuration Management parsers in Planet and Data Manager*
			• *Live planning and optimization for GSM*
			• *Simplified optimization workflows*
			• *Automatic triggering of some optimization processes based on call trace file issue detection*
			➤ IoT
			➤ Mesh Networks
			➤ 5G – Propagation using mm waves
			➤ LTE Advanced
			• *CoMP*
			• *Combined Cells*
			• *TDD/FDD carrier aggregation*
			➤ New raster format - .mrr format
			➤ Automation & Scheduling in Planet
			• *Automation Cell Planning*
			• *Traffic Map*
			• *Concept of macros/workflows*
			➤ User-friendliness
			• *Integration of Metro Designer in Planet*
			• *Layer Statistics tool redesign*
			• *Traffic Map Generator redesign*
				Planet 6.2
				➤ Indoor/Outdoor Planning & Optimization
				• *Estimation of required number of indoor cells – with floor plans*
				• *Network analyses accounting for both outdoor and indoor cells*
				➤ Unified network planning, optimization, and troubleshooting
				• *Single desktop tool for planning, optimization, and troubleshooting*
				• *Geolocation Engine improvements*
				➤ 5G
				• *Massive MIMO*
				• *Lean Carriers*
				➤ LTE Advanced
				• *LTE-U / LTE-LAA*
				• *LTE Relay Node enhancements*
				➤ 3D
				• *Automatic Cell Planning*
				• *Interference Matrix, Neighbor List, PCI, Scrambling Code, etc.*
				• *Statistics*
				➤ Data Manager
				• *History of changes*
				• *Data Manager client user interface enhancement*

User-Friendliness

General

- Full 64-bit software – with integration of MapInfo 15.2.2 – 64 bit

- New, ribbon based, graphical user interface

  - Logical grouping of ribbons/functionalities for optimal efficiency

User Interface Terminology

Quick A

Ribbon Gallery

Ribbon Categories (Tabs)

Contextual Tab/Ribbons

Ribbon Group

Ribbon Floaty (Mini-toolbar)

Windows

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Network Analyses

- Introduction of the notion of analysis templates

  - Relevant settings displayed depending on layer selection

- Ability to edit the settings of existing network analyses

- Ability to copy network analysis

- Fast analysis setup based on

  - Active cell selection

  - Active analysis template

  - Active analysis area

- Check boxes to view/close analysis layers
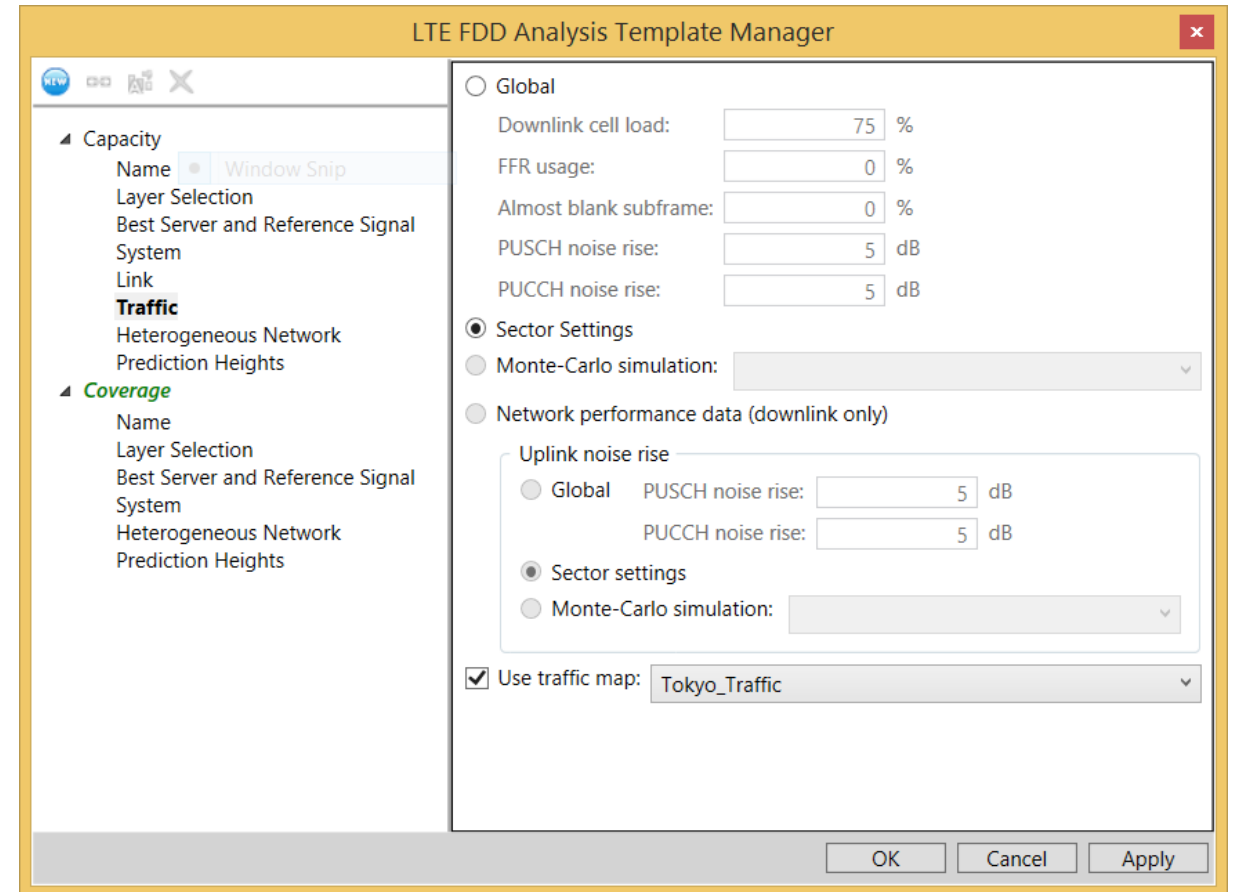
LTE Analysis Template Manager

Network Analysis and Monte Carlo Simulation Scheduling

- Ability to "queue" network analyses and Monte Carlo Simulations

- Ability to schedule when analyses and simulations should start

  - E.g., outside of working hours

- Available for all Radio Access Technologies

LTE Analysis Scheduler

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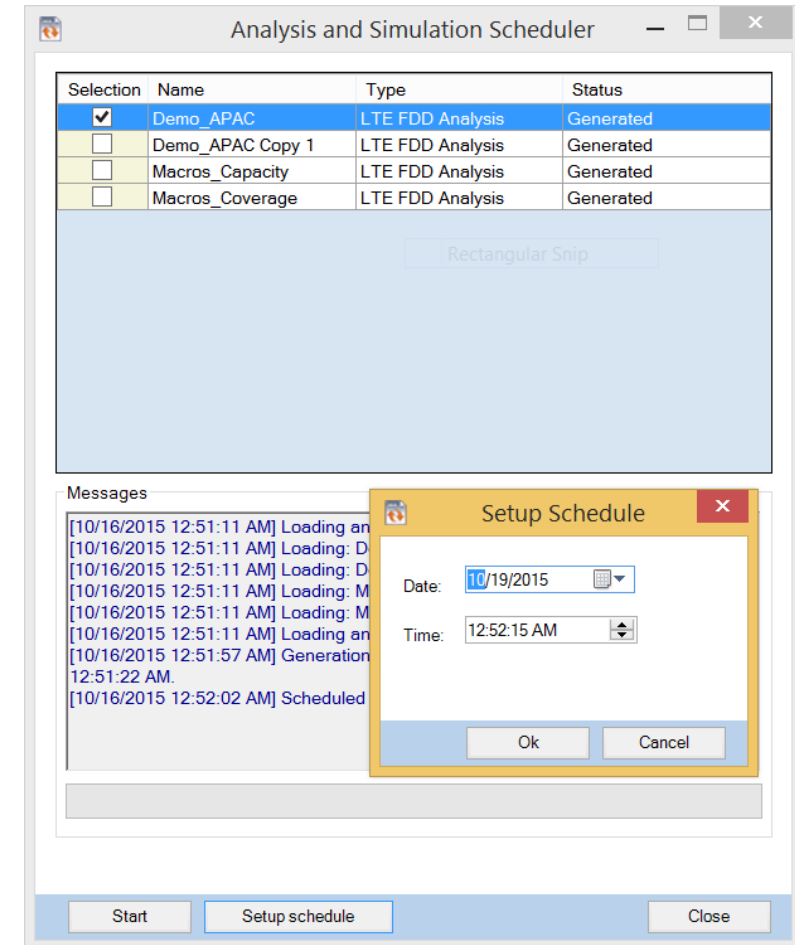
User-Friendliness (1)

- Ability to drag and drop sites/sectors/antennas

- Double-click from map window to open site editor

- Project Windows/Categories organized in tabs

- Introduction of contextual ribbons

- Ability to "easily" generate pdf/cdf curves from layer statistics tool

- Easy creation and update of Planet projects from third-party csv/Excel sheets in "flat" (generic tabular) format

- "Flat view" of the data Tabular Editor

User-Friendliness (2)

- Ability to have Planet projects without Geodata

- Ability to view antenna patterns within site editor

- Notion of active cells, active area, and active analysis template

- Ability to edit color profiles in color profile editor dialog

- Faster zoom in/out and panning

- Right-click menu items on the map based on selected items

- Ability to group drive test files

LTE

LTE

- Support of LTE Relay Nodes

- PCI plan analyses

- Support for static mode in Interactive Analysis tool

- New "power recycling" option to recycle power on PDSCH Resource Elements

- Nth RSRP layers instead of Nth Reference Signal Strength analysis layers

Background

- A Relay is a low-power LTE wireless access point connected to the core network through another LTE cell (Donor cell).

- Repeaters operate as "amplify-and-forward" devices,
  Relays operate as "decode-and-forward" devices,

    - i.e. the output power is independent of received power from the donor

- LTE Relays were introduced by 3GPP Release 10
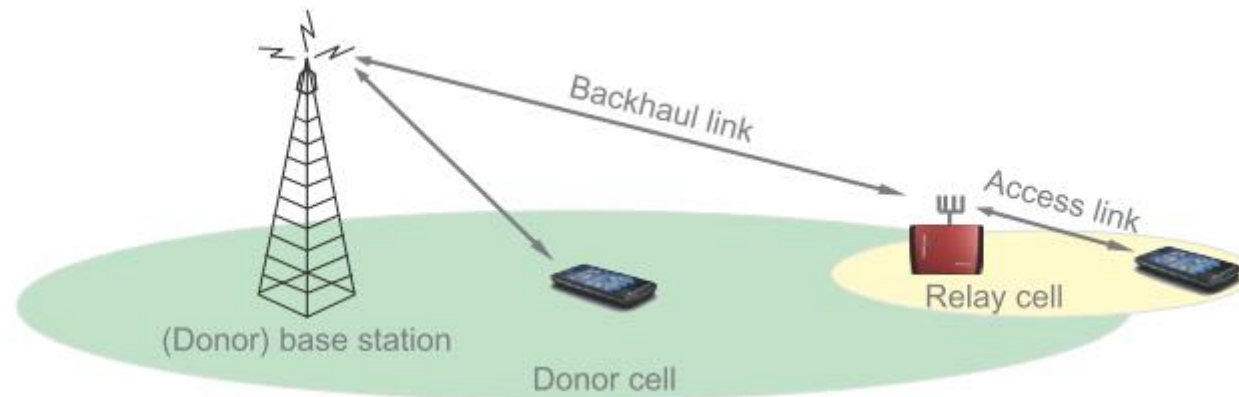
Relay Benefits

- Relays are seen by User Equipments as separate cells with their own PCID

- Virtually a small cell with full frequency reuse

  - Added capacity

- Upon adding Relays at hotspots, link quality is improved by reducing pathloss (higher probability of line-of-sight)

- For an operator, Relays offer the same benefits as small cells with less worries on backhaul planning

Relay Node Terminology

- Direct link:
  Link between the Donor eNB (DeNB) and UEs.

- Backhaul (BH) link:
  Link between DeNB and the Relay.

- Access link:
  Link between the Relay and the UE.

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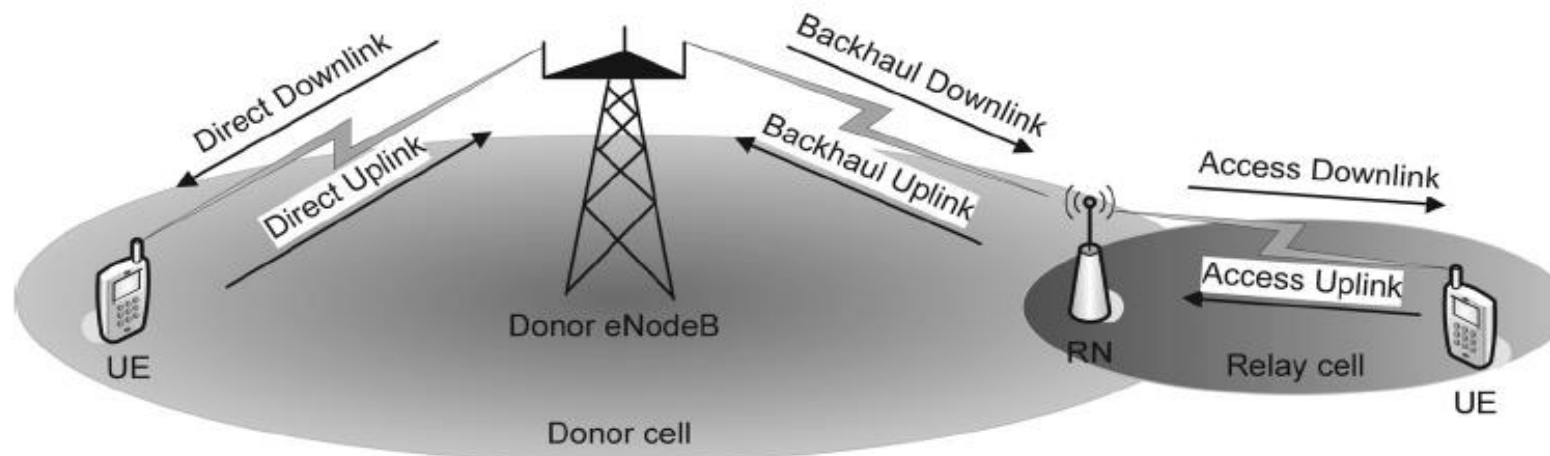
Relay Types

- Relays are classified as:

    - Inband

        - Backhaul and access links operate on same carrier
          Interference between links avoided by time-division

    - Outband:

        - Backhaul and access links operate on separate frequency bands
          No need to manage interference

        - Both links operate at the same time (Full duplex)
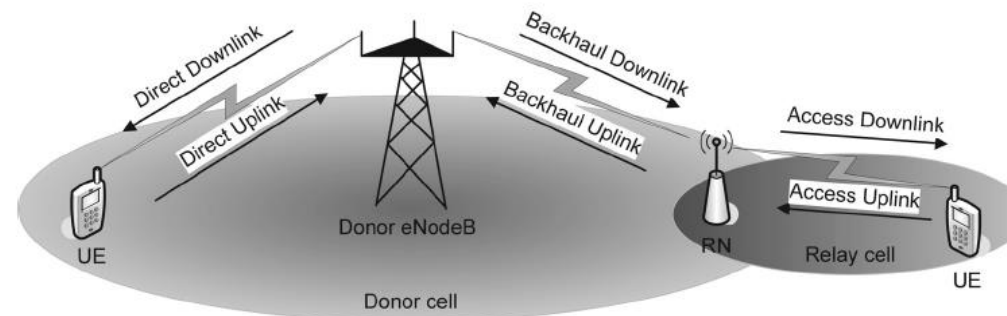
Relay Backhaul Link

- From the donor cell's perspective, a Relay is an LTE subscriber with a higher data rate demand.

- Relay backhauls consume resources from the same carriers activated by their donor cell.
  →They compete with direct link subscribers

- Relay backhauls usually have directive antennas towards donor cells, increasing backhaul spectral efficiency
  → reduce interference and resource consumption.

- The Relay's backhaul capacity acts as an upper limit to the amount of throughput a Relay could provide.

Relay Nodes in Planet 6.0 – General

- Support of out-band Relay Nodes.

  - The backhaul link and the direct link use the same carriers

  - The backhaul link and the access links cannot use the same carriers

- From the DeNB's perspective, a Relay backhaul operates as a fixed terminal, using the LTE radio interface

- Relays have the same sector settings as LTE cells and an additional tab for backhaul parameters

- Network Analyses and Monte Carlo Simulations compute backhaul quality KPIs

  - Computation of backhaul and access links

- ACP and ASCP support Relay Nodes

  - Filter Relay candidates of poor backhaul quality upon candidate selection.

Relay Nodes – Backhaul Link

- Backhaul Donor Cell can be

    - Automatically computed as part of analyses/simulations

    - Or set to a specific cell if known already

- Definition of resource loads from donor cell to be used for backhaul

- Separate antenna definition for backhaul and access links
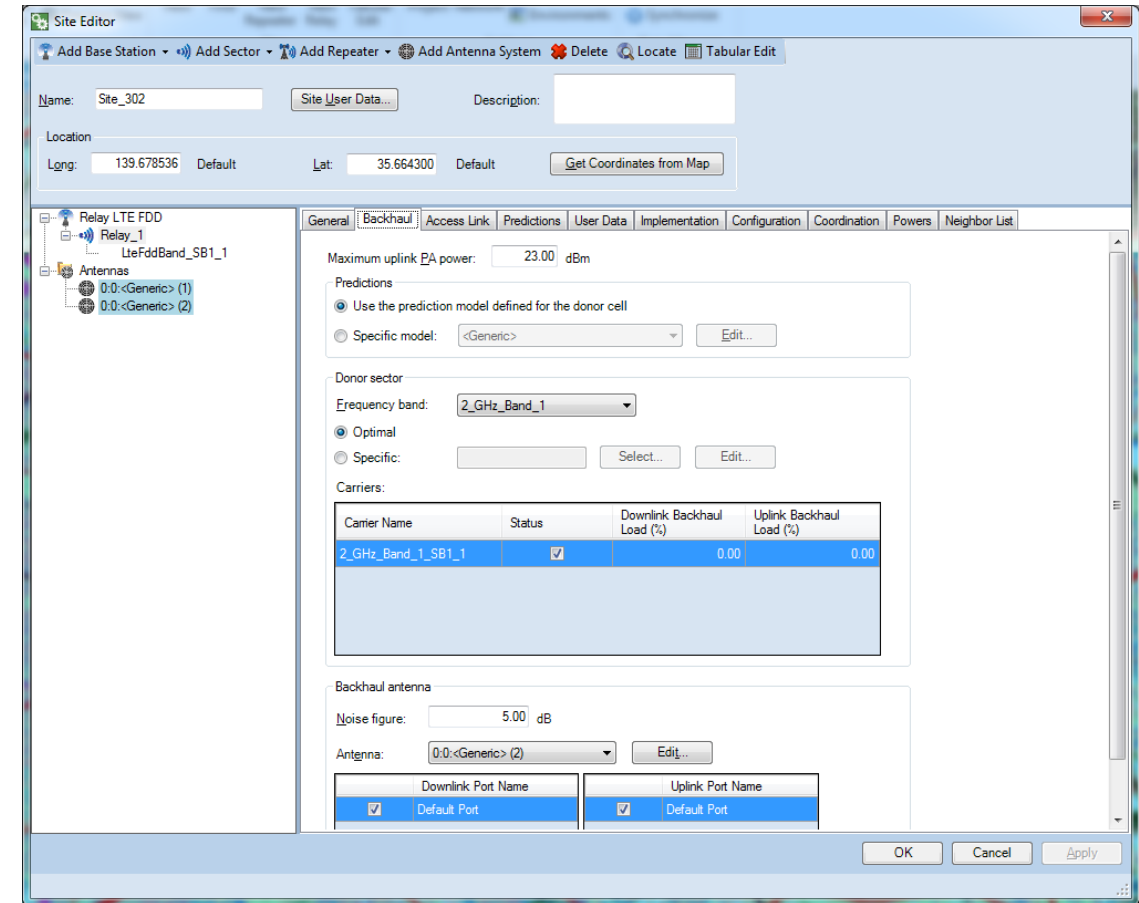
Relay Node – Backhaul Link Tab

Relay Nodes in Network Analyses

- There are two analysis components for Relays:

  - Backhaul Link analysis

  - Access Link analysis

- Analysis of the Relays' backhaul links is performed as part of regular LTE network analyses.

- If the Relay's donor cell is set to "Optimal", the analysis first computes the optimal donor cell based on RSRP or PDSCH C/(N+I)

Backhaul Quality Report

Relay Backhaul Quality Report

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Data Rate Layers Capped with Backhaul Link

- Option to cap data rate layers based on backhaul link resources
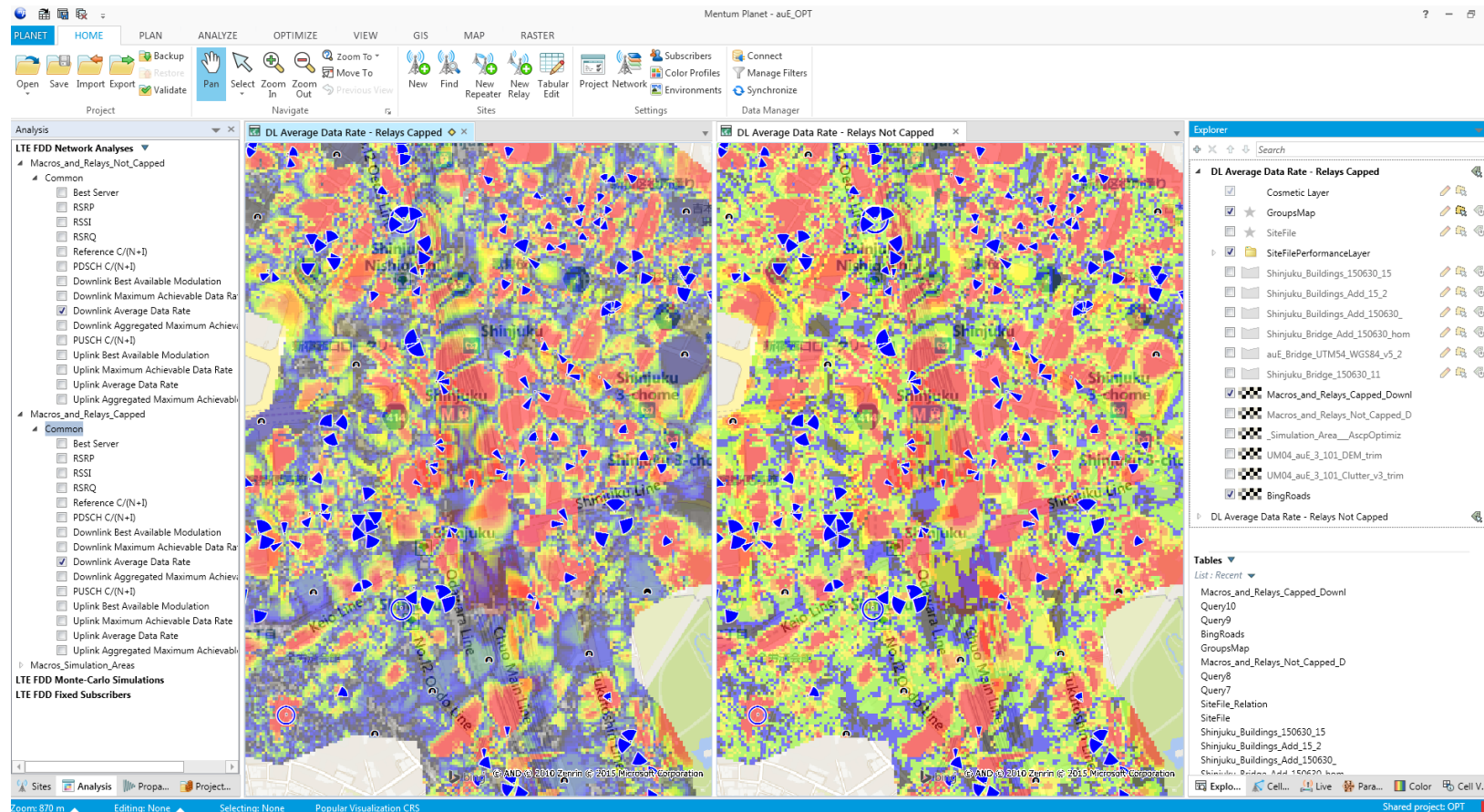
LTE Downlink Average Data Capped (left) and Not Capped (right) by backhaul resources

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Relay Node Addition – Interactive Cell Planning
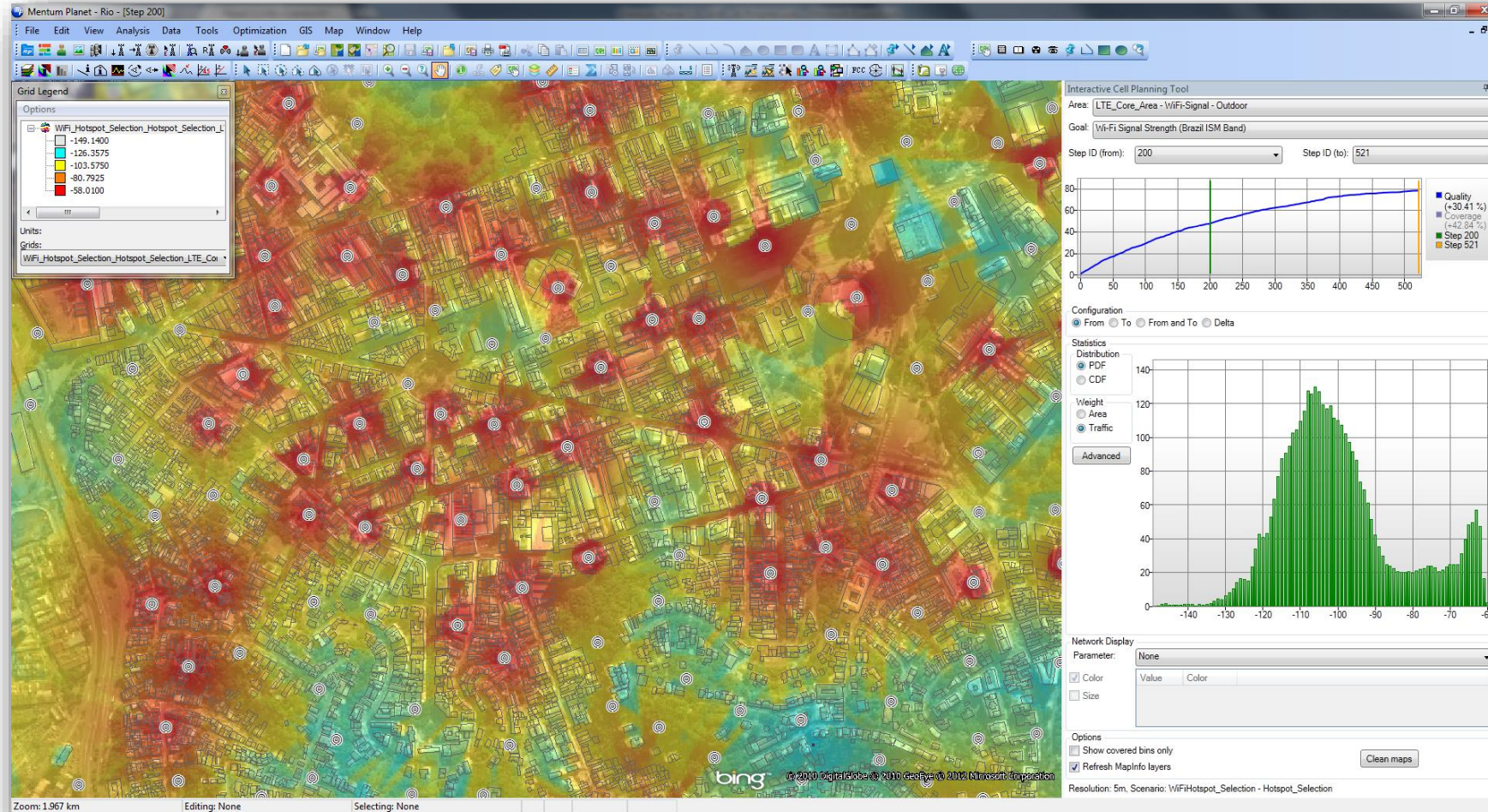
Relay Selection – 200 Hotspots

PCI Plan Analyses

- Ability to analysis existing PCI plans

  - To check (for instance) the quality of the PCI plan implemented in the network

- Ability to compare PCI plans

- Analysis of

  - PCI collision (direct neighbours with the same PCI)

  - PCI confusion (2nd order neighbours with the same PCI)

  - Downlink Reference Signal collisions

  - Uplink Reference Signal collisions

  - Secondary Synchronization Signal Sequences with high correlation

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PCI Plan Analysis Reports

Call Traces

Interface with VistaNEO

- Connection to VistaNEO for the ability to:

  - Generate network analyses

  - Generate Interference Matrices

  - Generate/optimize Neighbor Lists

  - Create Traffic Maps

  - Create surveys

- Data Filters

  - Time, call end type, call type, IMSIs, serving cells

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Call Trace Based Network Analyses

- Ability to generate network analyses based on call trace data stored in VistaNEO

- Selection of Call End Reason

  - E.g., dropped call, handover

- Time Selection

- IMSI selection

  - Including subscriber groups defined in VistaNEO

- Selection of Call Types

WCDMA Analysis Template Manager

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Network Analysis from VistaNEO – Example

Call Trace Based Traffic Maps

- Generation of Traffic Maps based on call traces stored in VistaNEO

- Selection of Call End Reason

  - E.g., dropped call, handover

- Time Selection

- IMSI selection

  - Including subscriber groups defined in VistaNEO

- Selection of Call Types

Traffic Map Generator – VistaNEO Filters

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Traffic Maps from VistaNEO – Examples (VoLTE vs. non VoLTE)

Call Trace Based Neighbor Lists and Interference Matrices

- Ability to generate Neighbor Lists and Interference Matrices based on call trace data stored in VistaNEO

- Ability to generate PCID, Scrambling Code (etc.) plans based on call trace data stored in VistaNEO

- Time Period Selection

Interference Matrix Generator

Interference Matrix – Example

Call Traces

- 3D geolocation

- Call End types

- Support for IMSI for LTE call traces

- Ability to import and geolocate call trace files in one user operation

- Improved methodology to leverage Timing Advance reports

- Improved reporting of CQI and data rate

- Addition of traffic volume (Erlangs and MB)

3D Geolocation

- Computation of probability density grid for different receiver heights

  - One grid per prediction height

- Computation of subscriber height

- Timing Advance / Propagation Delay filter in 3D

  - Distance from cell to location/height computed in 3D

- Fingerprinting algorithm in 3D

Min   Max
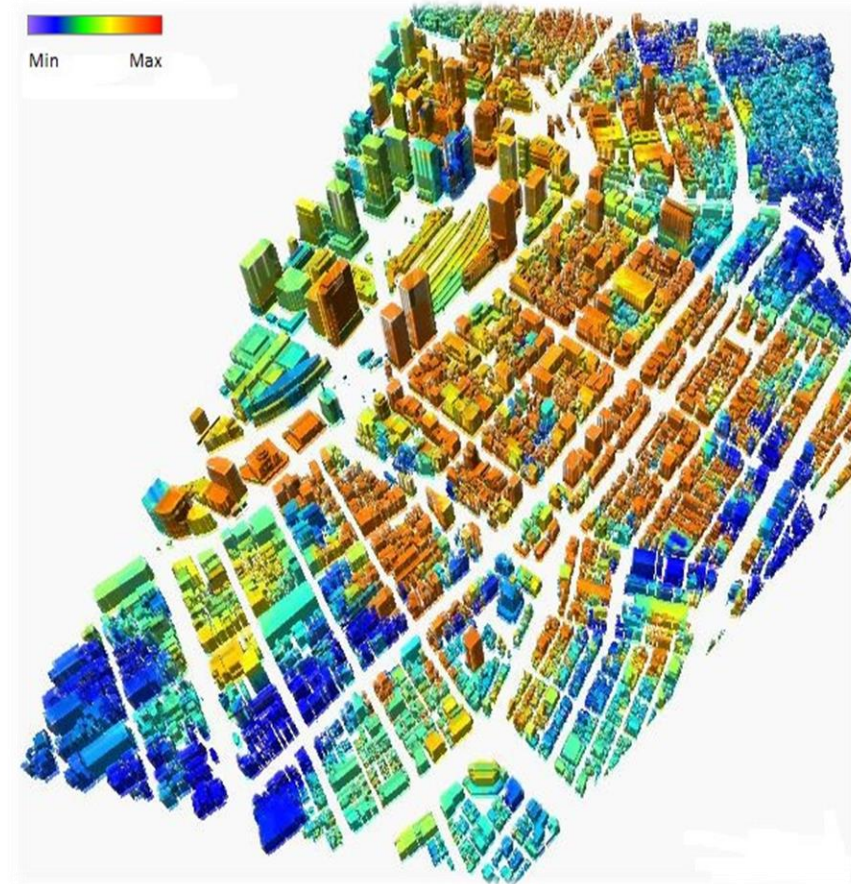
Traffic Geolocated in 3D

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3D Geolocation – Example

3D Geolocation Accuracy Improvements
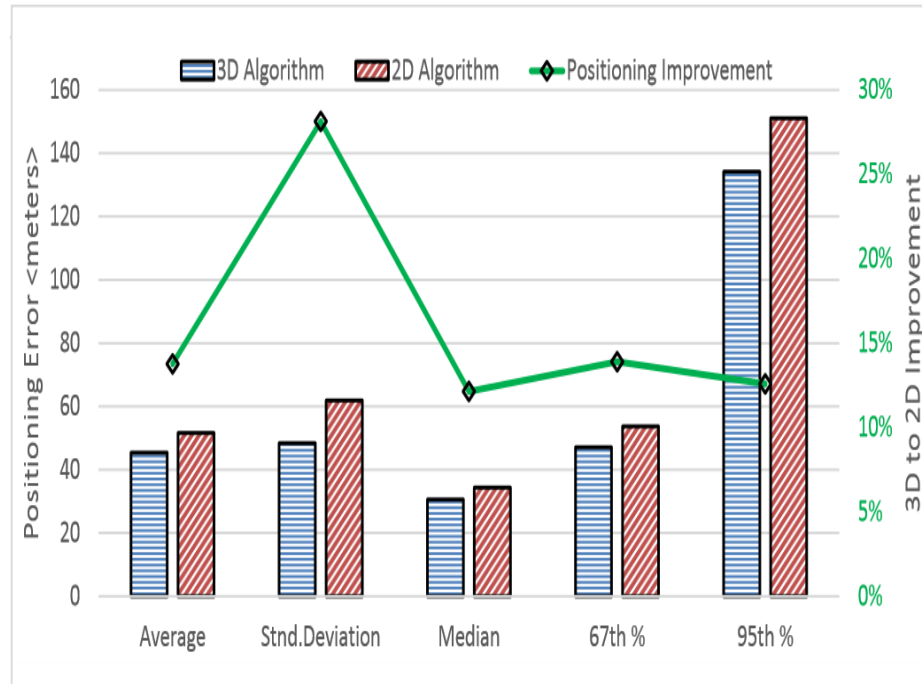
(a) Aggregated 3D vs. 2D Geolocation Performance
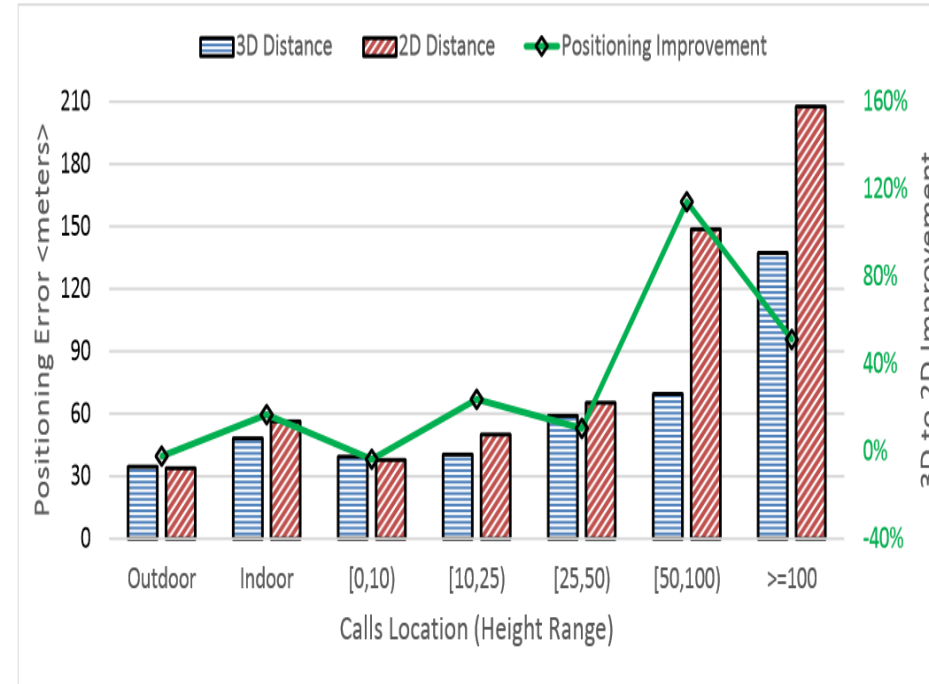
(b) Per Height Range 3D vs. 2D Geolocation Performance

Geolocation Accuracy Improved by 20 % for Indoor

Call End Types

- "Call End Reason" in Planet call trace format

  - E.g., Handover, blocked call, dropped call

- Call trace based network analyses

  - Ability to generate call end type density grids

  - Ability to limit analyses to specific call end types

  - Ability to limit analyses to specific call types (e.g., VoLTE)

Dropped Call Density Grid

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Geolocated Call Traces – Example – Subscribers "In Motion"

Propagation

Propagation

- Prediction previewer tool

- Introduction of ITU-R P.1546-5 propagation model

- Point to Point profile tool update

    - Ability to have Earth curvature with straight LOS

- Computation of recommended propagation distance

- "Generic" propagation model and antenna

- Introduction of Multipoint to Multipoint analyses

- New version of Universal Model

Prediction Previewer

- Quick computation/visualization of predictions

  - For existing sites or new sites

- Fast re-computation of predictions when moving sites or adjusting antenna height
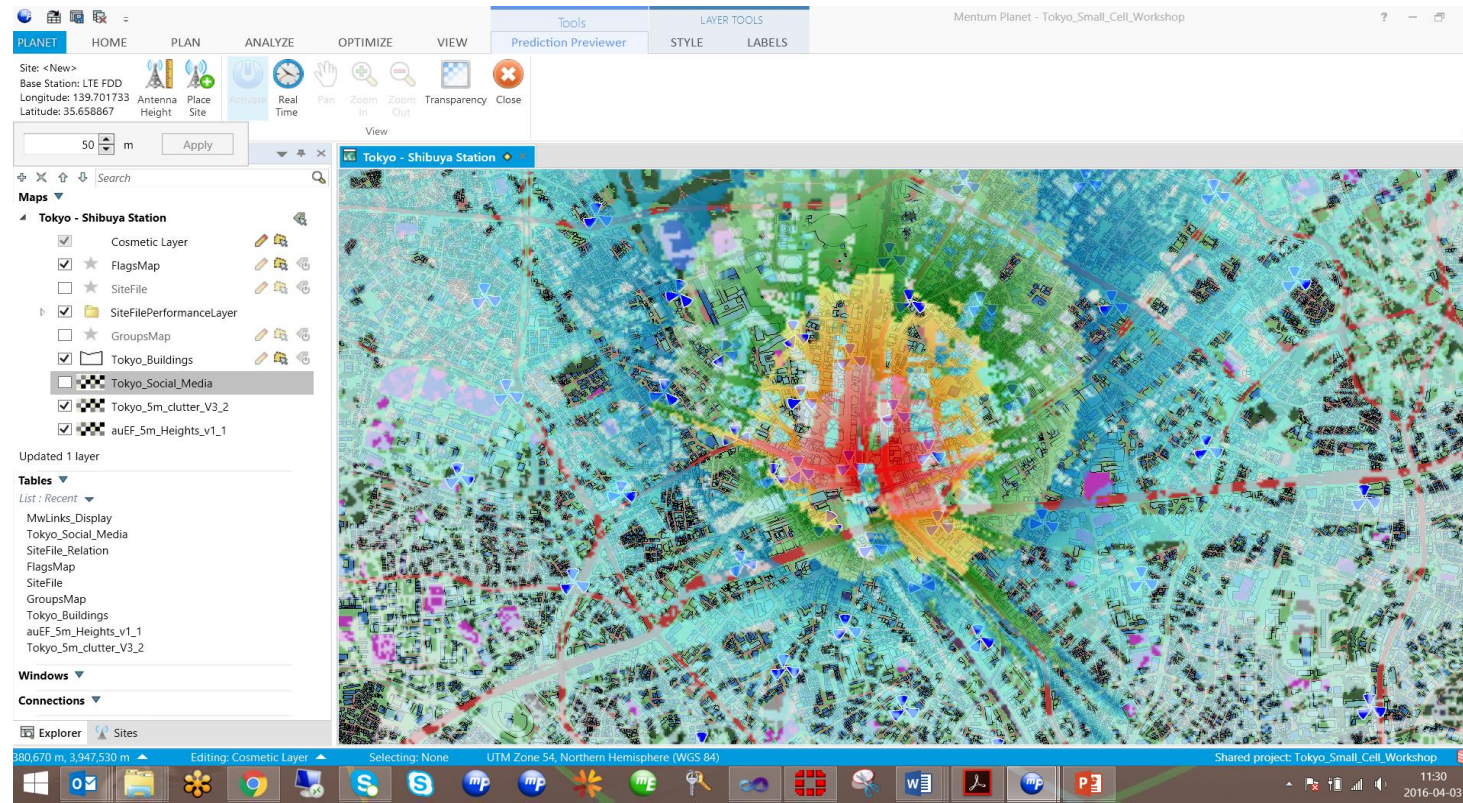
"Generic" Propagation Model

- The goal is to allow Mentum Planet users to be able to generate "decent" predictions out of the box

- Use cases related to users who want decent predictions out of the box

  - Brand new user who creates a Planet project

  - Migrated project from other radio planning/optimization software

  - Creation of a Planet project from file (e.g., Excel, csv)

  - No access to drive tests / measurements

- The back end is based on "Planet 3D Model"

  - Tuned for different frequencies

  - Tuned for different environments

  - Tuned for different cell types (e.g., macro vs. micro/pico)

- No need for Planet 3D Model license

"Generic" Antenna – General

- The goal is to allow Mentum Planet users to be able to use a "standard/generic" antenna pattern when users do not have access to antenna patterns

- Use cases

  - Brand new user who creates a Planet project

  - Migrated project from other radio planning/optimization software

  - Creation of a Planet project from file (e.g., Excel, csv)

- Default pattern based on 3GPP standard

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"Generic" Antenna – Details

- Single antenna port

- E-beamwidth can be used to select the antenna's beamwidth

  - Automatic computation/suggestion of e-beamwidth when selecting "Generic" antenna model

    - E-beamwidth = 360 if antenna is used by a single sector

    - E-beamwidth = 70 if antenna is used by multiple sectors

- Ability to define e-tilt and e-azimuth values
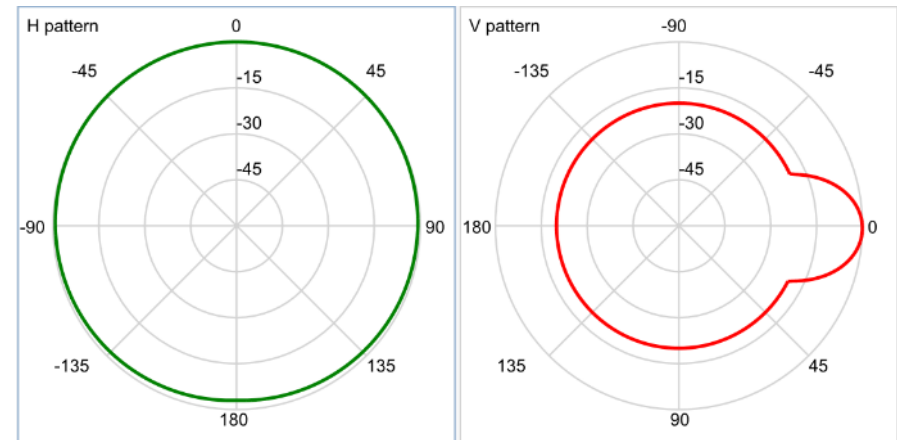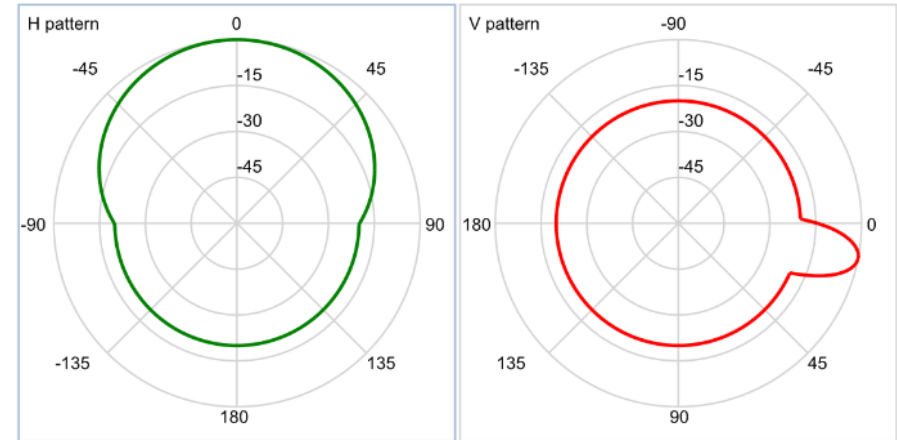
Computation of Recommended Propagation Distance

- Planet users typically set the same propagation distances for all the sites or for all the sites that belong to a given cluster

- The issue that:

  - If the distance is too large, then waste of time

  - If the distance is too small, then under-estimation of interference

- The goal is to recommend appropriate propagation distance values on a per site basis

Universal Model Multipath Component

- Generation of optional grids with Universal Model

- The **Rice Factor** is the ratio of the power from the direct path over the sum of the powers of all the paths

  - It indicates how close a receiver is to be in Line of Sight conditions

- The **Delay Spread** shows the time span during which most of the power arrives at a receiver

  - Receivers with values lower than the cyclic prefix may expect improvements when spatial diversity/multiplexing are used

- The **Angle Spread** shows the dispersion of the paths as they leave the transmitter to the receiver

  - It can allow fine tuning the antenna design

Universal Model Multipath Component
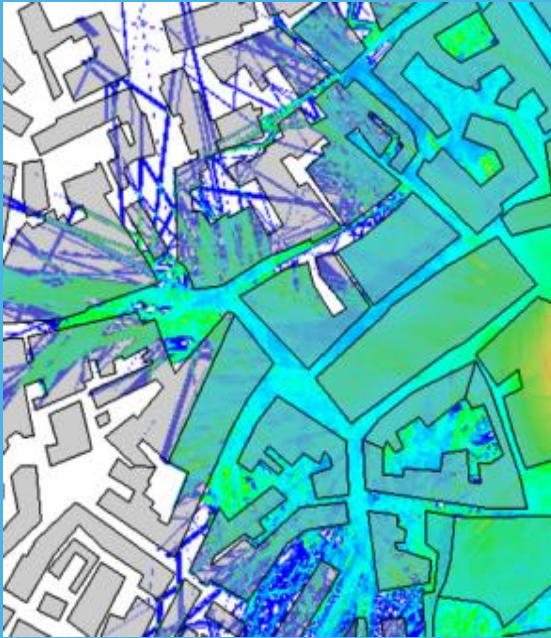
Rice fa...
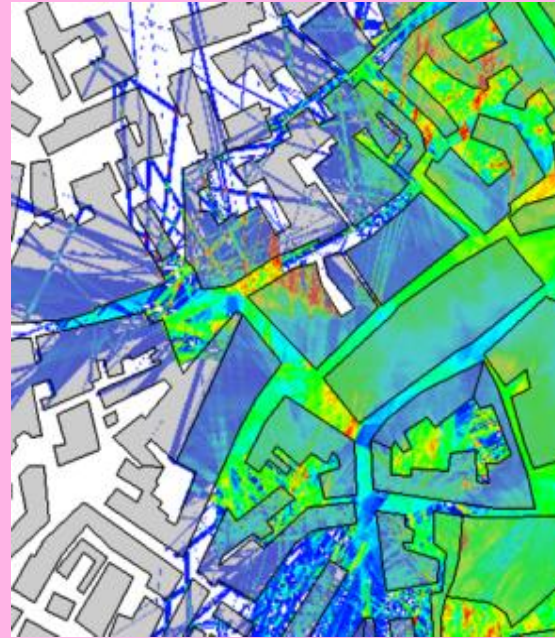
Angle-s...
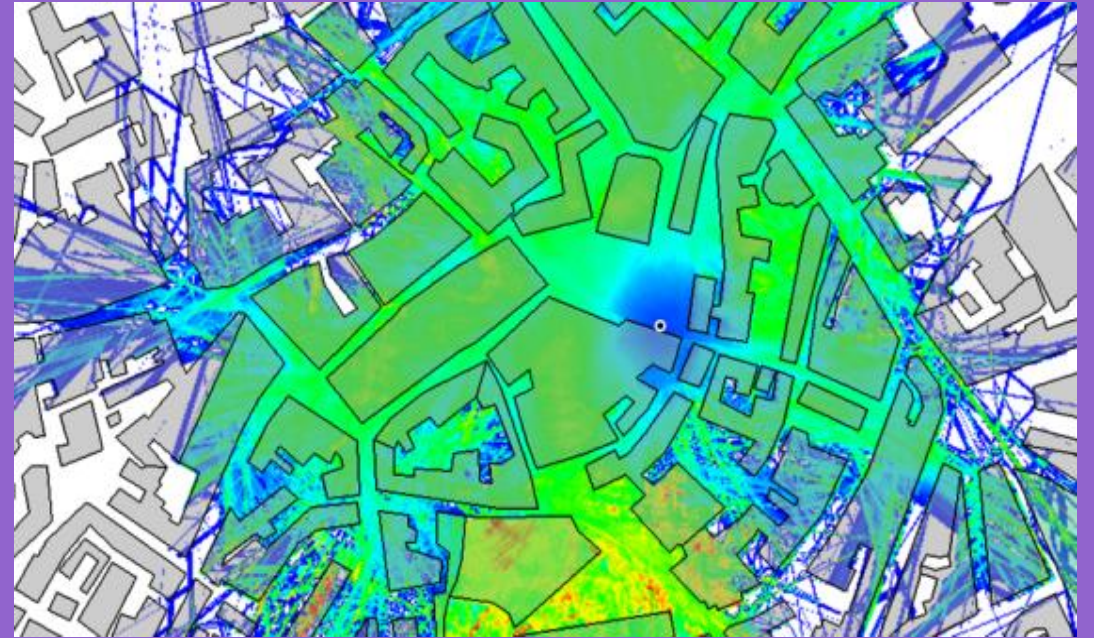
Delay-spread

Data Management

Data Management

- Support for site/sector/antenna attachments

  - Including pictures

  - Ability to "push/upload" attachments to Data Manager without Planet

- User Permissions

  - Granularity of object permissions in Data Manager

  - User Permissions for local Planet projects

- Data Manager status button

Data Manager Permissions – New Features

- Ability to control permissions for each project separately

- Addition of new file type permissions

  - E.g., antennas, link configurations, Base Stations

- Addition of new file permissions

  - E.g., antenna patterns, propagation models

Data Manager Console – Permissions

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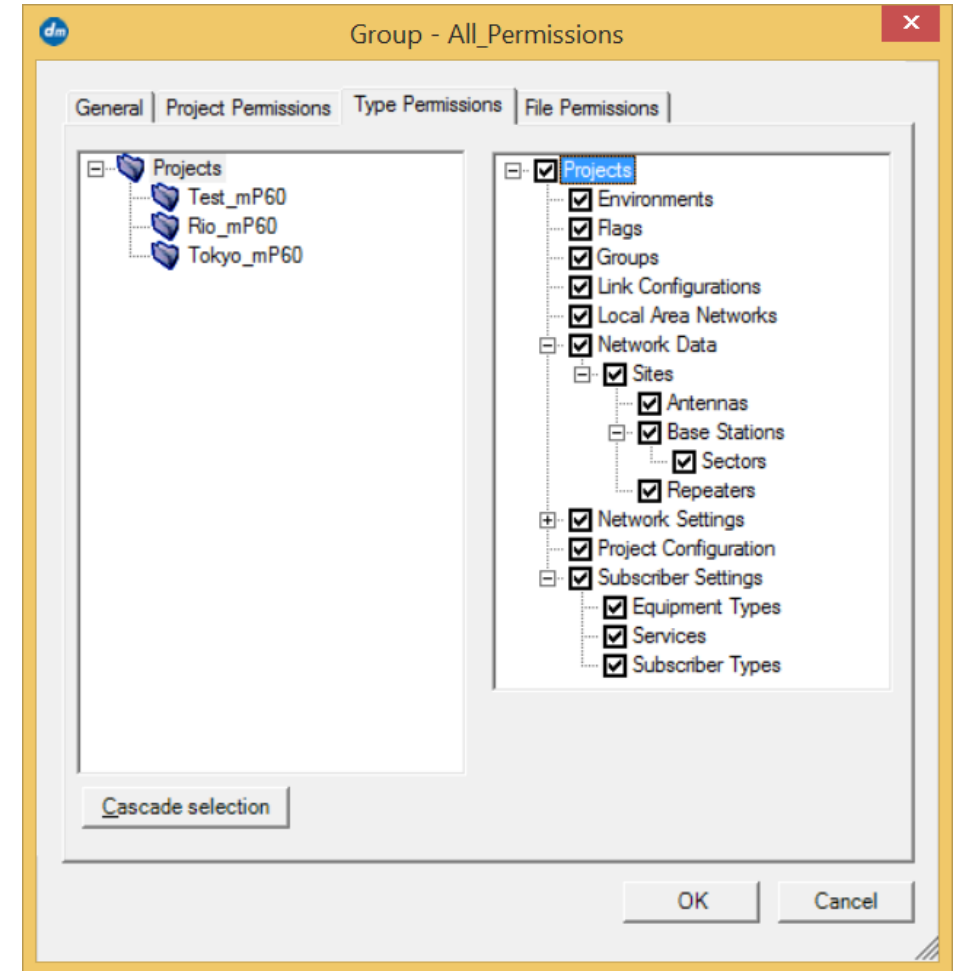
User Permissions – Local Planet Projects

- Option to apply user permissions to local Planet projects

  - Type permissions

    - All types

  - File permissions

    - Antennas and propagation models only
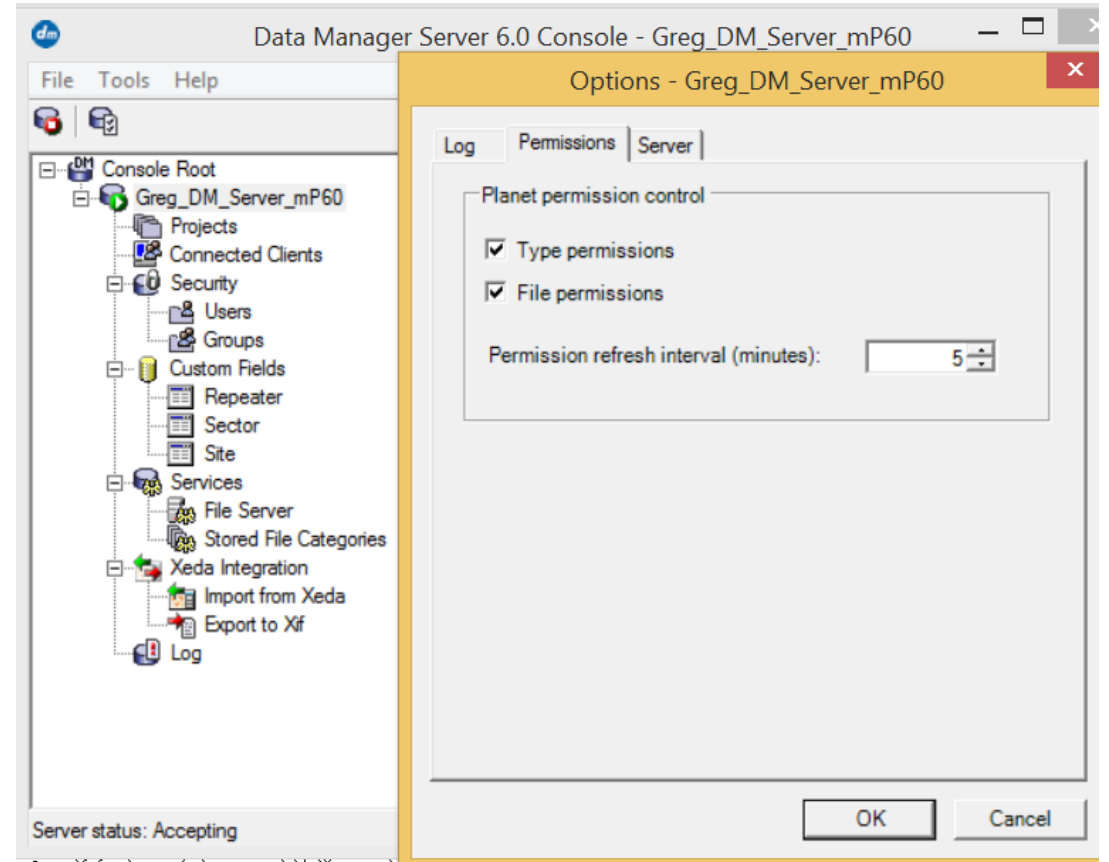
Data Manager Console – Permissions – Local Projects

Additional Features

Additional Features

- Interactive Analysis tool

  - Support for WCDMA/Cdma2000

    - Replacement of CPICH/Pilot pollution inspector and pixel info tool

- GSM network analyses

  - Now account for penetration losses defined in Environments table

  - Now account for slow/fast fading values defined in Environments table

- Automatic Cell Planning

  - Improvement in automatic creation of optimization area

Multi-Resolution Raster Format (.mrr)

- "mrr" stands for "multi-resolution raster"

- Tile-based raster format

- Multi-resolution format

  - Each tile has its own resolution

- Support for Unicode characters

- No limit on file size

- Ability to use 32-bits for values for each Bin

  - Increased resolution when needed (e.g., Traffic Maps)

- File size smaller than Vertical Mapper grids

1 Tile
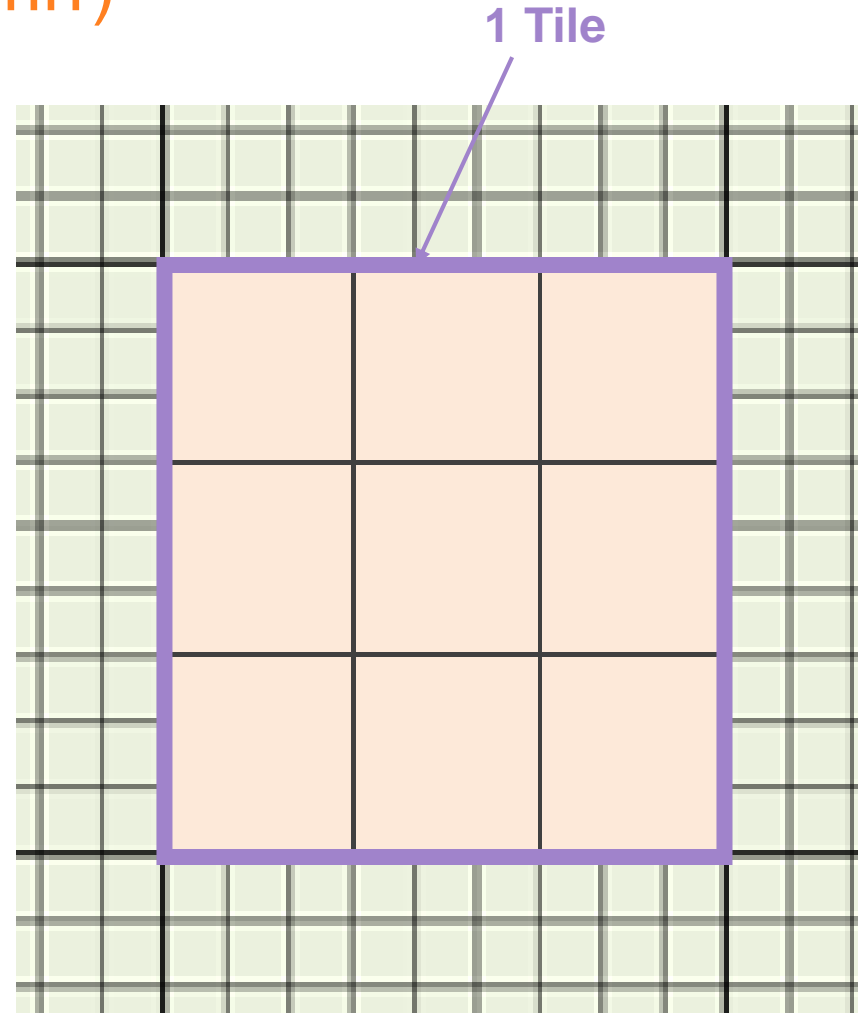
Multi-Resolution Raster Format – "Fields" and "Bands"

- A given .mrr file may contain multiple "fields"

  - And each field contains one or more "Bands" (also called "Data Bands")

- A field can contain the following data types

  - **Image**: An Image field contains a single band of color data

  - **Image Palette**: An Image Palette field uses a restricted color palette

  - **Classified**: A classified field has an integer index band that stores the class index for each cell

  - **Numeric (discrete)**: Contains bit (1/2/4) or numeric (integer, float, complex, date time) data bands

  - **Numeric (continuous):** A continuous field contains one or more data bands of any supported data type

Windows Operating System Compatibility

Windows Workstation Compatibility

Platform	Planet 5.7	Planet 5.8	Planet 6.0
Windows XP Pro 32 bits	✓		
Windows Vista 32 bits	✓	✓	
Windows XP Pro 64 bits	✓		
Windows Vista 64 bits	✓	✓	✓
Windows 7 Pro 32 bits	✓	✓	
Windows 7 Pro 64 bits	✓	✓	✓
Windows 8 / 8.1 Pro 32	✓	✓	
Windows 8 / 8.1 Pro 64 bits	✓	✓	✓
Windows 10			✓

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Windows Server Compatibility

Platform	Planet 5.7	Planet 5.8	Planet 6.0
Windows Server 2003 32 bits	✓	✓	
Windows Server 2003 & 2003 R2 64 bits	✓	✓	✓
Windows Server 2008 & 2003 R2 32 bits	✓	✓	
Windows Server 2008 64 bits	✓	✓	✓
Windows Server 2008 R2 64 bits	✓	✓	✓
Windows Server 2012 64 bits	✓	✓	✓
Windows Server 2012 R2 64 bits			✓

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Sentinel™ RMS Versions

Sentinel RMS	Planet 5.7	Planet 5.8	Planet 6.0
Sentinel 8.5.1	✓		
Sentinel 8.5.5		✓	✓

✓ Version used in the release

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MapInfo Professional™ Versions

MapInfo Professional	Planet 5.7	Planet 5.8	Planet 6.0
MapInfo Professional 12.0	✓		
MapInfo Professional 12.5 32 bit		✓	
MapInfo Professional 15.2.2 64 bit			✓

✓ OEM version in the release

Thank you!

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