



## SIMPLIFY OUTDOOR MESH NETWORK DESIGN WITH ARUBA® OUTDOOR RF PLANNER

Designing an RF network can be a complicated task, even for experienced systems integrators and network architects. Aruba Outdoor RF Planner makes it easier and quicker to accurately design 802.11n mesh networks to meet customers' business and technical requirements.

Outdoor RF Planner is a free, web-based application that is purpose-built for outdoor applications. Systems integrators can use the graphical topology planning tool to fully visualize the wireless mesh network, including RF coverage heatmaps, client access and mesh links. Outdoor RF Planner provides expert mesh network design guidance and eliminates the need for time-consuming manual calculations.

### Visualize RF coverage outdoors

Outdoor RF Planner makes it vastly simpler for systems integrators to visualize RF coverage for the mesh backhaul and plan for client coverage and data rate. Gone are the days of puzzling through antenna pattern plots, two-dimensional drawings and complex calculations.

Outdoor RF Planner uses proprietary process to superimpose full three-dimensional (3D) antenna patterns onto Google Earth representations of outdoor terrain. Integrators can choose different antenna patterns and transmit power levels to visualize the expected 3D coverage for each network design. With Outdoor RF Planner, the resulting maps are based on actual antenna patterns for greater accuracy.

Designers can see the RF design in 3D, both from a plan view and an elevation view. Designers can use elevation views to visualize the vertical coverage from high mounting locations, such as rooftops and towers.

### Rapid design for outdoor networks

Outdoor RF Planner accelerates the design process for outdoor mesh networks. In many cases, systems integrators can cut planning time from weeks to days or even hours. The planning tool is designed to be used by both RF engineers and network engineers and can provide a wealth of planning information before making any onsite visits or surveys

As a web-based application, Outdoor RF Planner puts the complexity in the cloud – not on the engineer's computer. Outdoor RF Planner makes the mesh network calculations using an innovative on-the-fly scaling method. Designers can easily change the RF parameters, and the design is uniformly – and quickly – scaled.

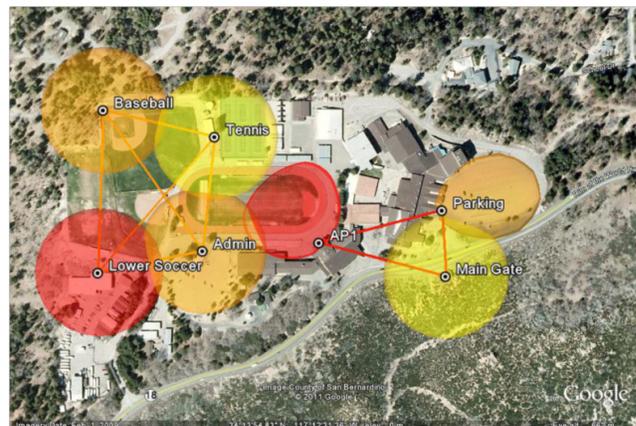
### Ease troubleshooting

Using Outdoor RF Planner can help integrators to avoid common mistakes in outdoor mesh network design. For instance, a designer may specify a high-gain antenna to provide coverage, but when the network is deployed, the RF coverage is not reaching where it's needed.

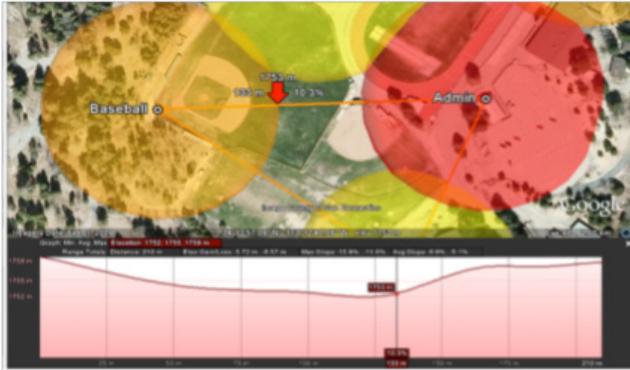
Integrators can avoid such problems by getting a full 3D view of the vertical coverage during the design phase, and seeing the effects of adjusting the antenna direction and mechanical downtilt to deliver optimal coverage.

### The Aruba difference

- Visualize outdoor 802.11n mesh network coverage
- Generate outdoor RF coverage estimates
- Rapid, accurate outdoor mesh network design
- Web-based application works with Google Earth



*Designers can easily visualize both the Wi-Fi client coverage and the mesh backhaul links.*



Designers can see a full elevation profile for the mesh links so they can avoid mistakes commonly made when determining the vertical coverage

### Reporting and inventory

Outdoor RF Planner produces detailed reporting that can be used for planning and ordering Aruba mesh routers and antennas. The reports show the mesh network model, including country, design margin, location details, APs and antennas selected, antenna heading, and mesh roles. In addition, the report details the mesh links, which are color-coded for associations according to data rate.

In addition, Outdoor RF Planner provides a bill of materials for the APs and antennas, which simplifies ordering the equipment.

### Using Outdoor RF Planner

Creating an outdoor coverage plan for a site begins with developing model of the mesh network. You can use Outdoor RF Planner to simplify the process of specifying the country, the client types, AP locations, altitude parameters and whether the environment is noisy or quiet.

You can also set a design margin as a general design safety factor. For instance, you may want to use a higher design margin in an area with trees than an open field.

2.4 GHz Client					Include: <input checked="" type="checkbox"/>
Name:	Mode:	Supported:	Output Power:	Antenna Gain (dBi):	
laptop	802.11b	<input checked="" type="checkbox"/>	17	0	
	802.11g	<input checked="" type="checkbox"/>	15		
	HT20	<input checked="" type="checkbox"/>	15		
	HT40	<input checked="" type="checkbox"/>	12		
5 GHz Client					Include: <input checked="" type="checkbox"/>
Name:	Mode:	Supported:	Output Power:	Antenna Gain (dBi):	
laptop	802.11a	<input checked="" type="checkbox"/>	15	0	
	HT20	<input checked="" type="checkbox"/>	15		
	HT40	<input checked="" type="checkbox"/>	12		
4.9 GHz Client					Include: <input type="checkbox"/>

Client models describe the typical clients in an AP grouping. Client power can be defined by band and mode, and antenna gain can be defined by band.

You can also add image overlays to the network model, such as CAD drawings and facility maps, to assist in accurate location of the Aruba AirMesh APs. APs may be placed manually on the map, or GPS locations can be imported into the project file to automate this task.

Name:	Latitude:	Longitude:	Altitude:
			(meters above ground)
Folder: General			
AP1	34.23164181985135	-117.2087733394202	3
Admin	34.23155247064574	-117.2103057329319	3
Tennis	34.23279402138653	-117.2101468955888	3
Parking	34.2319943939599	-117.2071533506771	3
Baseball	34.23308449709172	-117.2116141501722	3
Lower Soccer	34.23131529253693	-117.2116826577112	3
Main Gate	34.23127422983857	-117.2070983171842	3

Locations represent any specific point on the map. A location may be an access point or antenna or a convenient label like tennis court or baseball stadium.

From there, you can use Outdoor RF Planner to select the Aruba APs, antennas and mesh roles. You may choose a default model for the APs and antennas or customize the values as needed. The number of available radios

will depend on the Aruba AP selected, and the band and mode assignments are based on the AP model. Channels can also be assigned for planning purposes.

## Set Default AP Values

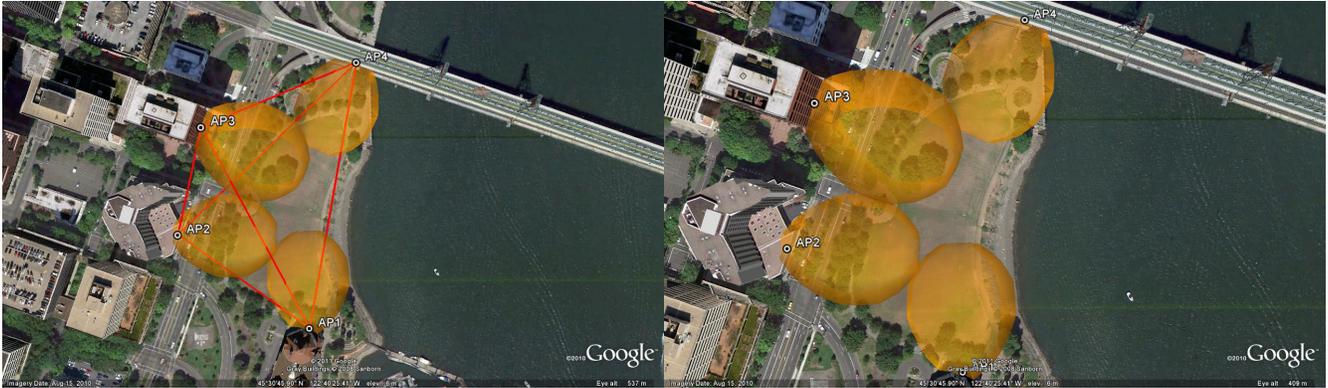
Set Default AP Model:

	Radio 0	Radio 1	Radio 2	Radio 3
Band Assignment:	<input type="text" value="802.11bgn"/>	<input type="text" value="802.11an Group 4"/>	<input type="text" value="802.11an Group 4"/>	<input type="text" value="802.11an Group 4"/>
Mode:	<input type="text" value="HT20"/>	<input type="text" value="HT40"/>	<input type="text" value="HT20"/>	<input type="text" value="HT20"/>
Channel:	<input type="text" value="1"/>	<input type="text" value="149"/>	<input type="text" value="157"/>	<input type="text" value="165"/>
Antenna:	<input type="text" value="ANT-2x2-2005"/>	<input type="text" value="ANT-2x2-5005"/>	<input type="text" value="ANT-2x2-5614"/>	<input type="text" value="ANT-2x2-5614"/>
Heading:	<input type="text" value="0"/> °	<input type="text" value="0"/> °	<input type="text" value="0"/> °	<input type="text" value="0"/> °
Downtilt:	<input type="text" value="0"/> °	<input type="text" value="0"/> °	<input type="text" value="0"/> °	<input type="text" value="0"/> °
Cable Loss:	<input type="text" value="0"/> dB	<input type="text" value="0"/> dB	<input type="text" value="0"/> dB	<input type="text" value="0"/> dB
Role:	<input type="text" value="-Select Role-"/>	<input type="text" value="Client Coverage"/>	<input type="text" value="Mesh Point"/>	<input type="text" value="Mesh Point"/>
Power Reduction:	<input type="text" value="7"/> dBm	<input type="text" value="6"/> dBm	<input type="text" value="8"/> dBm	<input type="text" value="8"/> dBm

*You can use the default AP values, or customize as needed. Channels can also be assigned for planning purposes.*

You also can define the mesh associations. Outdoor RF Planner makes it easy to simultaneously inspect 3D client coverage with the 2D representation of the associated backhaul network. You can adjust the design margin to show the RF coverage with reduced power.

You may generate client coverage models based on TCP throughput or by signal level, which is typically used for voice over IP (VoIP) analysis. In addition, you can model channels based on a signal level for overlap or interference analysis.



*Outdoor RF Planner displays 3D models of the coverage areas by the user-selected 802.11n throughput,*

Outdoor RF Planner automatically conducts a series of checks, including verifying each mesh association for valid signal strengths at both ends of the connection, beamwidth alignment, Fresnel zone and earth bulge for long-distance links, and that the associated data rate for the mesh link is above the minimum rate specified.

Once you have completed the design specification, the Web-based software will process the file, which you can then download as a KMZ file. You can view the final results in Google Earth. Designers can also run through the planner again to refine the heatmaps and coverage as needed.

### **Take advantage of this free planning software**

Outdoor RF Planner is a free planning tool designed to help system integrators design and deliver high-performance Aruba mesh networks more easily and faster. Systems integrators can leverage this tool to take the guesswork out of mesh network design, cut the time to deployment and ultimately build a network that will delight customers.



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