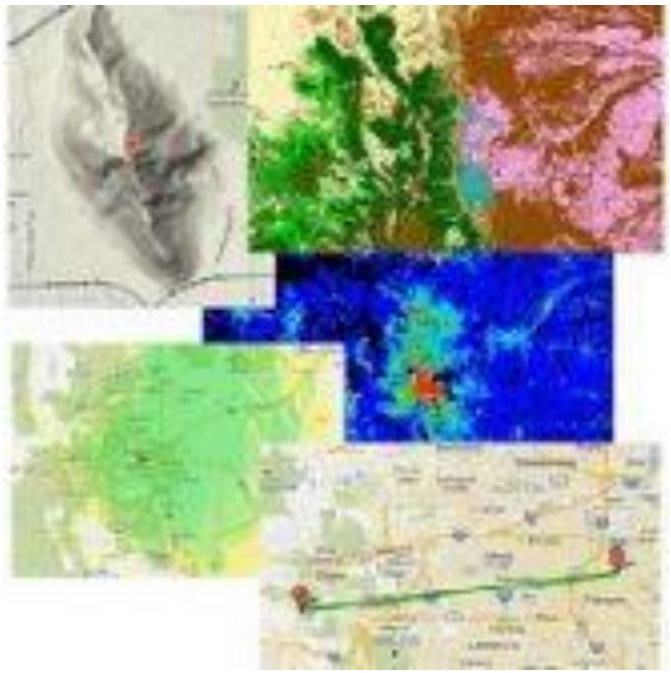


The Complete Guide to Nautel's Radio Coverage Tool

Agenda

- What's the Nautel RF Toolkit?
- How does propagation analysis work, and what are the limitations?
- What can the Nautel Radio Coverage Tool do?
- Where to find the Radio Coverage Tool
- Let's try it!
- Questions / Comments

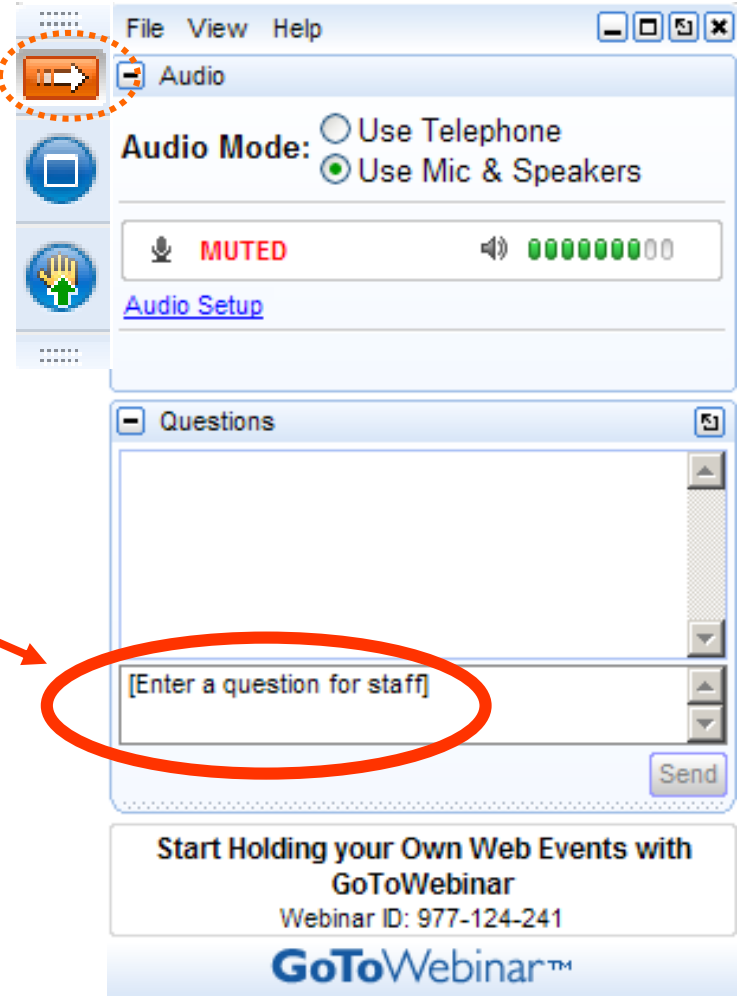
Chuck Kelly
Regional Sales Manager
Asia Pacific, Nautel

Roger Coudé
Developer, Radio Mobile

Your questions please?

(If you don't see the control panel, click on the orange arrow icon to expand it)

Please enter your questions in the text box of the webinar control panel (remember to press send)



SBE.

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What's the Nautel RF-Toolkit?

- As the title infers, it's a set of tools designed to help both technical and non-technical people easily understand complex systems.
- The Radio Coverage Tool allows users to analyze possible transmitter locations, tower heights, antenna gains and transmitter power levels for coverage.
- It's a free "what if" tool to help broadcasters understand the approximate coverage of a proposed station or change, or to determine the likelihood that a point to point link will be reliable.

Legal Stuff

The radio coverage tool is intended to aid broadcasters in analyzing the approximate coverage with various transmitter sites, power levels, antenna heights and antenna gain.

While the coverage tool is based on the well proven Longley Rice modelling techniques, and publicly available SRTM terrain data, it cannot be guaranteed and Nautel cannot assume any liability for the results.

Further, the coverage tool is not meant to be a replacement for coverage studies and other work done by professional consulting engineers. Please consult with a qualified engineer before applying for your license or ordering your equipment.

How does Radio Coverage Prediction Work?

- The Nautel Radio Coverage Tool is derived from the Longley-Rice “ITS” algorithm, and covers most VHF/UHF frequencies.
- See: https://www.its.bldrdoc.gov/resources/radio-propagation-software/itm/itm.aspx

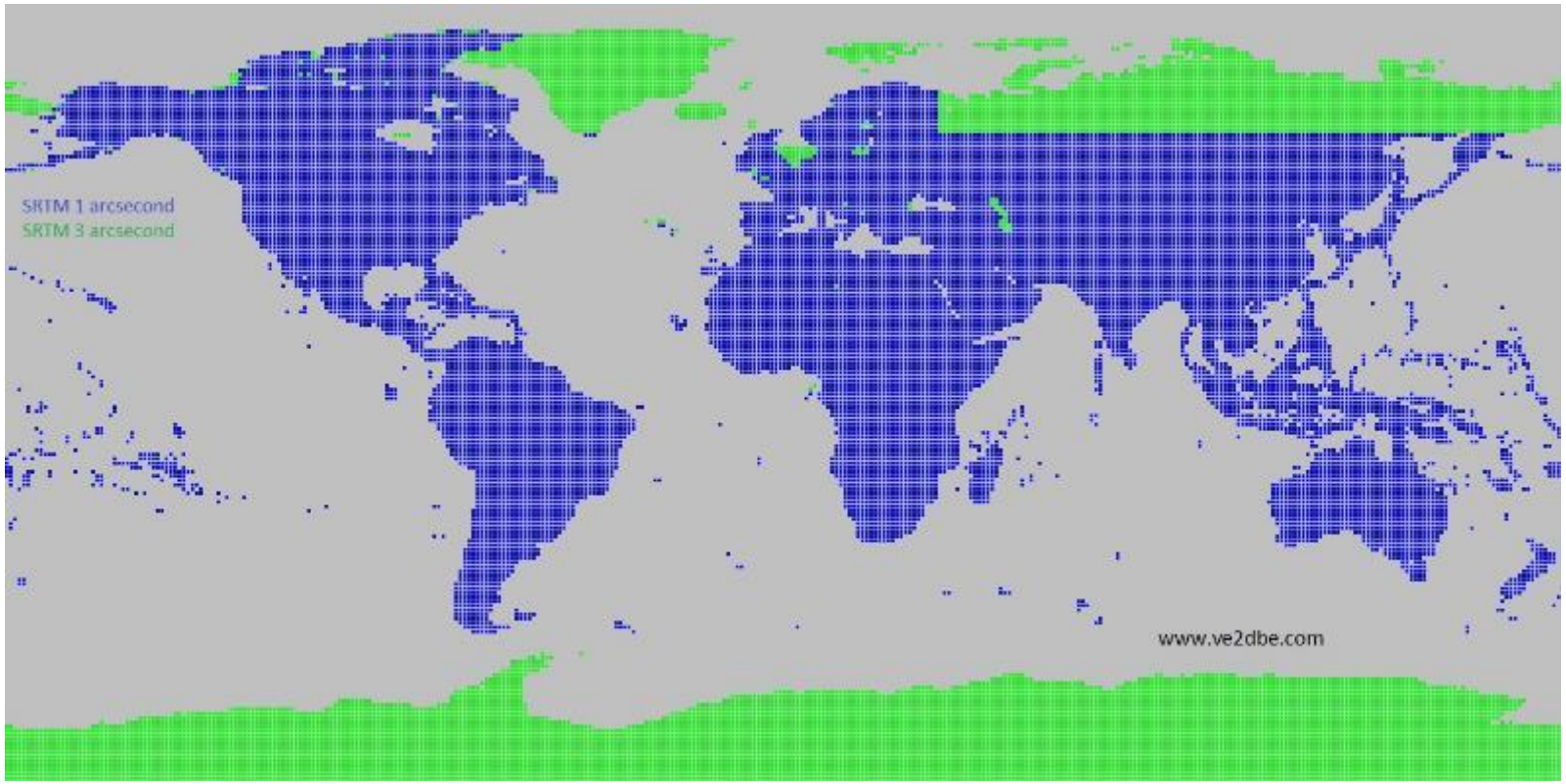
What are the databases the Radio Coverage Tool are based on?

The tool uses a digitized terrain database available from NASA called SRTM (Shuttle Radar Terrain Mapping).

From 60°N latitude to 60°S, the database has an accuracy of 1 arcsecond (roughly 30M).

Above and below that, the accuracy is reduced to 3 arcseconds (100M).

The database is about 465GB in size.



What are the databases the Radio Coverage Tool are based on?

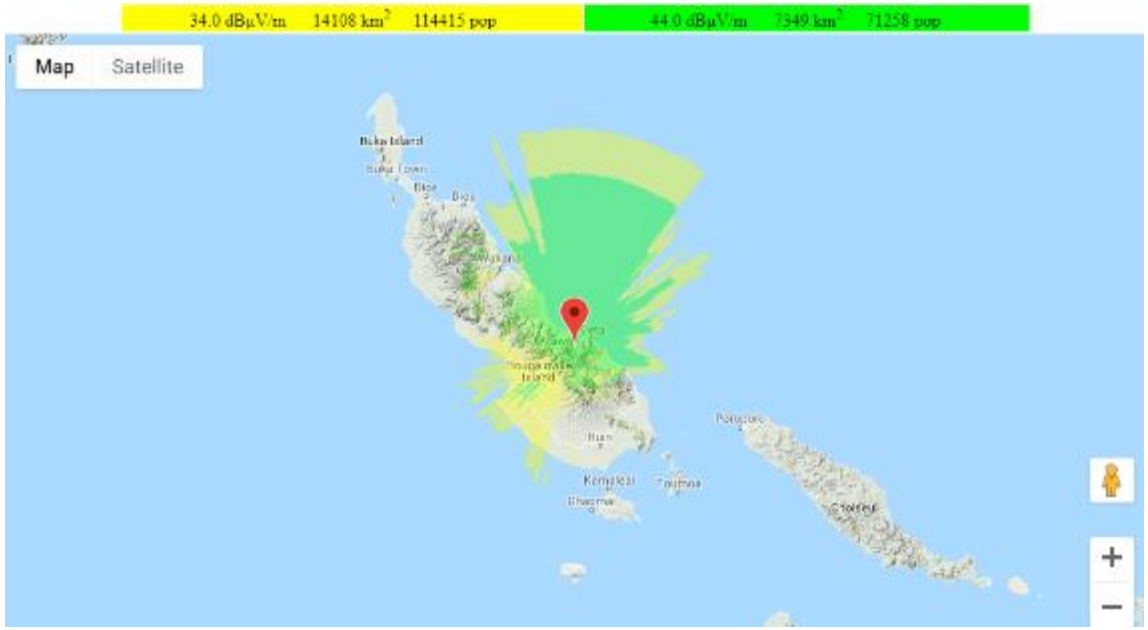
There are also other databases utilized:

- Ground Cover data helps the algorithm understand how the signal reacts with the ground. This data was last updated 5 years ago.
- Population data is sourced from the United Nations databases and is updates as updates are available.

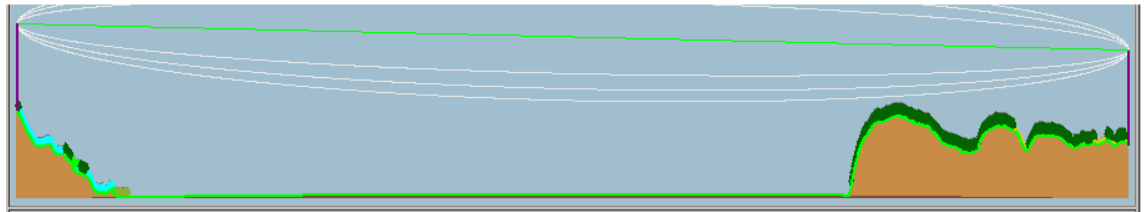
How does Radio Coverage Prediction Work?

There are two primary parts of the tool:

FM Radio Coverage Prediction



Point to Point Link Analysis for STL or RPU planning

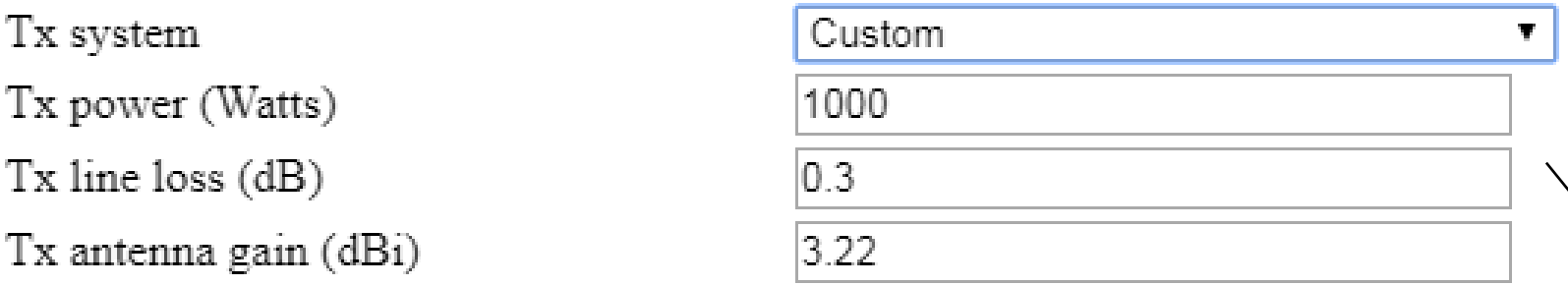


Radio link study 1			
My house (1)		(2) Aspotogan	
Latitude	44.670223 °	Latitude	44.535675 °
Longitude	-63.930641 °	Longitude	-64.072266 °
Ground elevation	92.2 m	Ground elevation	56.5 m
Antenna height	91.0 m	Antenna height	100.0 m
Azimuth	216.90 °	Azimuth	36.80 °
Tilt	-0.17 °	Tilt	0.00 °

Transmit presets available

Nautel simplified the complex choices for transmit settings into presets. We may add or change them as appropriate.

For Advanced Users only:

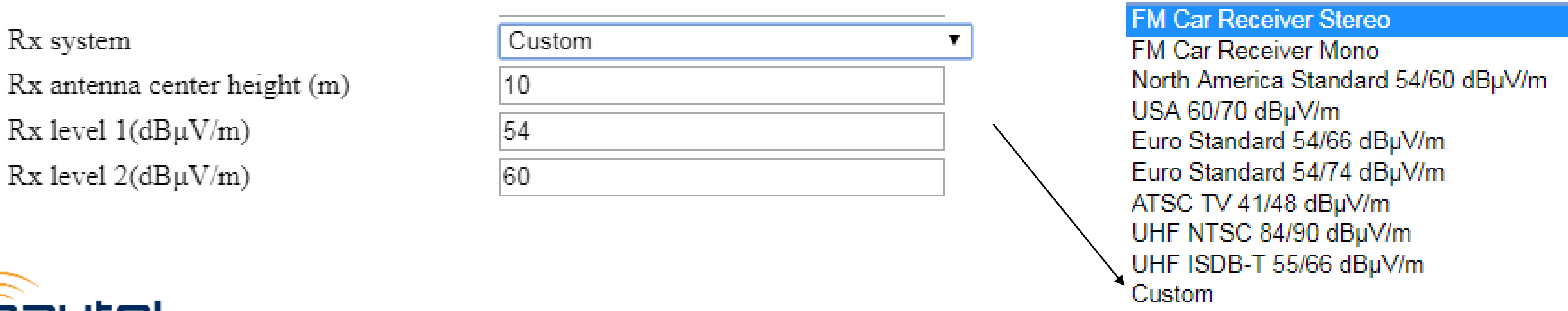


40 KW FM w/ 6 bay antenna
40 KW FM w/ 8 bay antenna
40 KW FM w/ 10 bay antenna
20 KW FM w/ 4 bay antenna
20 KW FM w/ 6 bay antenna
20 KW FM w/ 8 bay antenna
20 KW FM w/ 10 bay antenna
10 KW FM w/ 4 bay antenna
10 KW FM w/ 6 bay antenna
10 KW FM w/ 8 bay antenna
10 KW FM w/ 10 bay antenna
5 KW FM w/ 4 bay antenna
5 KW FM w/ 6 bay antenna
5 KW FM w/ 8 bay antenna
5 KW FM w/ 10 bay antenna
2.5 KW FM w/ 2 bay antenna
2.5 KW FM w/ 4 bay antenna
2.5 KW FM w/ 6 bay antenna
1 KW FM w/ 2 bay antenna
1 KW FM w/ 4 bay antenna
1 KW FM w/ 6 bay antenna
300 W FM w/ 2 bay antenna
300 W FM w/ 4 bay antenna
200 W FM w/ 2 bay antenna
200 W FM w/ 4 bay antenna
100 W UHF TV ATSC w/ 2 bay antenna
100 W UHF TV ATSC w/ 4 bay antenna
100 W UHF TV ATSC w/ 8 bay antenna
Custom

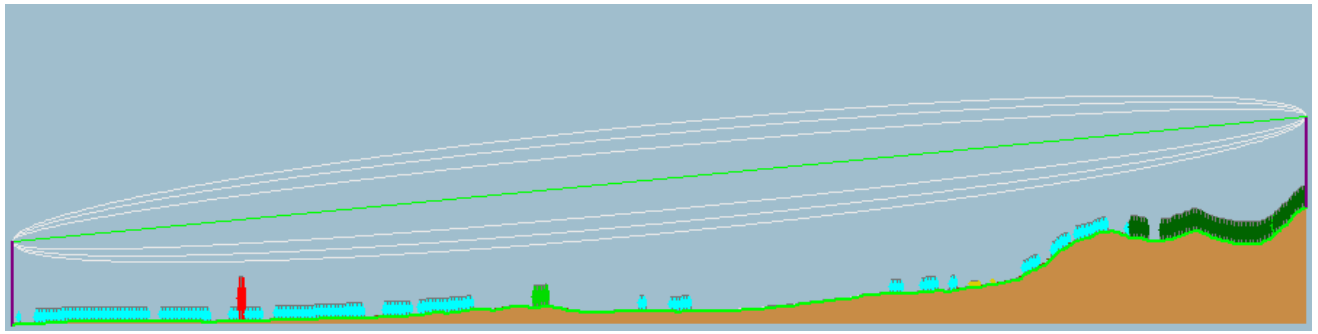
Receive presets available

Nautel also simplified the complex choices for receive contours into presets. We may add or change them as appropriate.

For Advanced Users only:



What do the Land Cover colors mean?



landheight.dat

Include land cover height

	Height (m)	Density (%)
00 Water	0	0
01 Evergreen Needleleaf Forest	15	100
02 Evergreen Broadleaf Forest	25	60
03 Deciduous Needleleaf Forest	15	100
04 Deciduous Broadleaf Forest	15	60
05 Mixed Forest	15	70
06 Woodland	10	70
07 Wooded Grassland	10	10
08 Closed Shrubland	1	10
09 Open Shrubland	1	10
10 Grassland	1	5
11 Cropland	1	0
12 Bare Ground	0	0
13 Urban and Built-up LO	10	100
14 Urban and Built-up HI	30	200

What frequencies does the Nautel RF Toolkit cover?

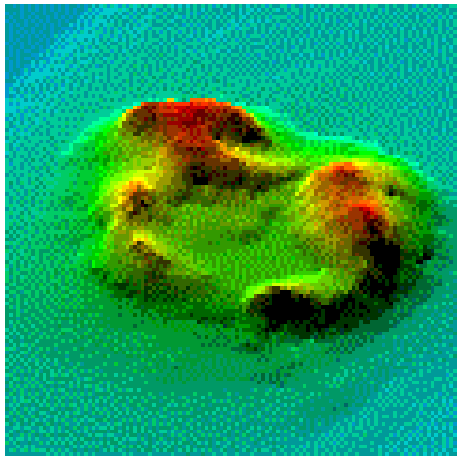
Coverage Maps

- 40 to 108 MHz
- 170 to 255 MHz
- 335 to 960 MHz
- 1.35 to 13 GHz

Point to Point Links

- 20 MHz to 13 GHz

How do I do more advanced things?



Can the RF Toolkit help analyze advanced situations, like directional antennas, other frequency bands, or SFN interference zones?

The Radio Coverage tool is based on Radio Mobile, a free program written for Windows by todays's guest, Roger Coudé. The program is available from http://www.ve2dbe.com/english1.html.

However, as there are many features that probably can be implemented by more advanced users using Radio Mobile, there is an active online group where users discuss the various ways Radio Mobile can be used: https://groups.yahoo.com/neo/groups/Radio_Mobile_Deluxe/info

How about AM?

Is there a RF Toolkit that can provide similar coverage maps for AM stations?

Unfortunately, our RF Toolkit only works in the broadcast allocations within the VHF/UHF bands. At this time, we don't have an answer for AM / MW frequencies.

Your questions please?

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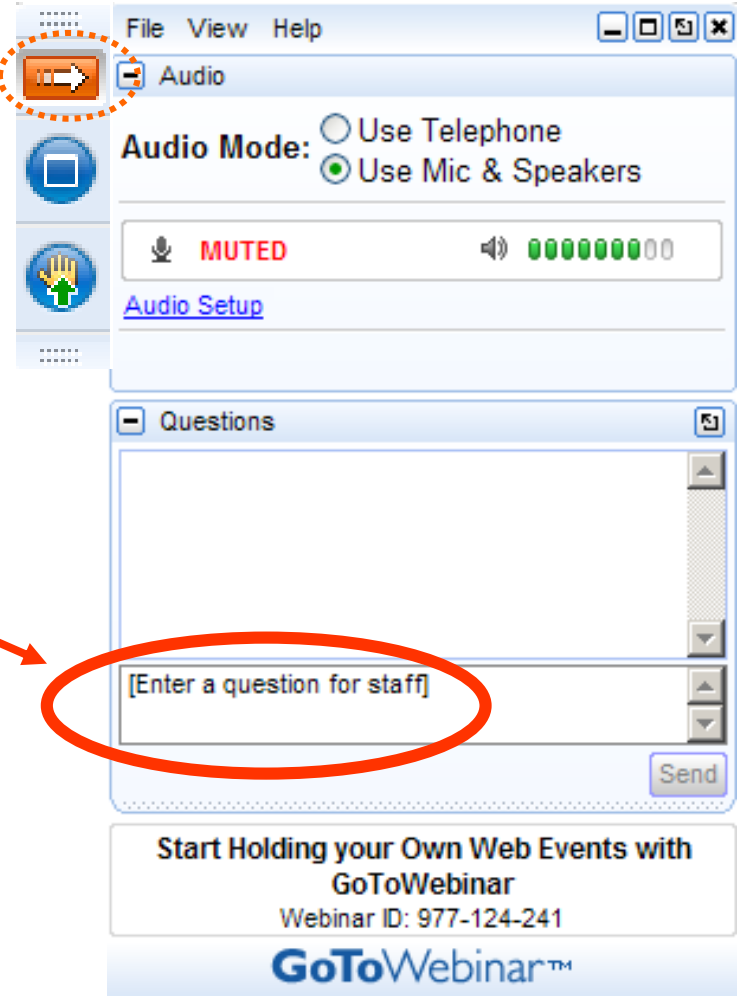
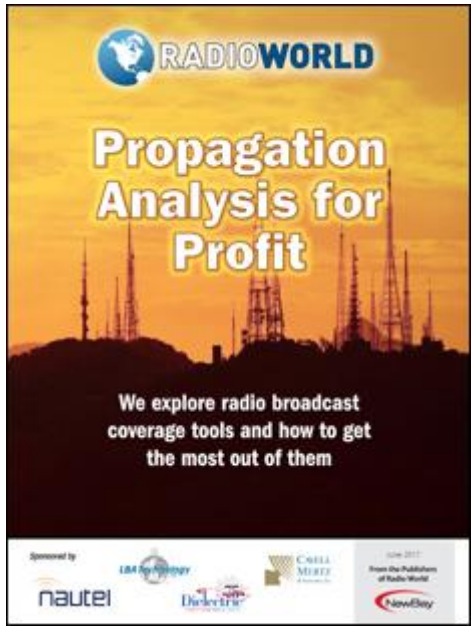
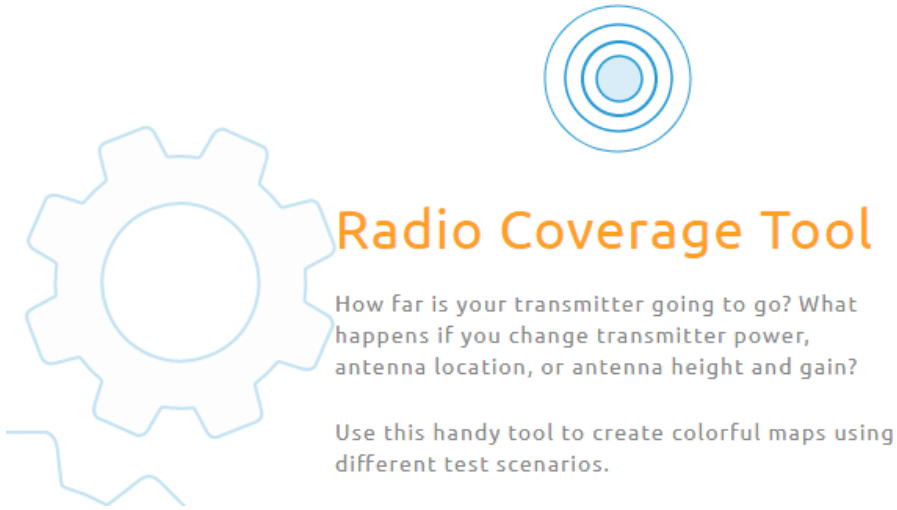


For additional information

Radio World eBook:
https://tinyurl.com/ycbke22u



Nautel's FREE RF Toolkit:
http://support.nautel.com/rf-toolkit/



Chuck Kelly: ckelly@nautel.com

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