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LINKPlanner - New Features and Capabilities Webinar

14th April 2020

Agenda

- **Supported Products**
- **Online Map Changes**
- **Clutter**
- **Viewshed**
- **CBRS Export Tool**
- **Get in Touch**
- **Questions & Answers**

PTP Products Supported in LINKPlanner V5.x.x

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	Products	Bands
Sub-6GHz PTP	N500, PTP 450 PTP 450i & 450b PTP 670 PTP 700 PTP 550 PTP 550E ePMP 1000 & Force 1xx ePMP 2000 Force 300	220, 406-470, 700 & 900 MHz 900 MHz, 3.5, 3.6 GHz 3.5, 3.6, 4.9 – 5.8 GHz 4.8 – 5.9 GHz 4.7 – 5.8 & 7-8 GHz 5.1 – 5.8 GHz 4.9 – 6 GHz 2.4, 4.9 – 5.9 GHz 5.1 – 5.8 GHz 5.1 – 5.8 GHz
Licensed PTP	PTP 820/820i PTP 850E	6-80 GHz 80 GHz

PMP Products Supported in LINKPlanner V5.x.x

	Products	Bands
Point to Multipoint	N500 cnRanger ePMP 1000 & 11n Force 1xx SM ePMP 2000 & 11n Force 1xx SM ePMP 3000, ePMP 3000L & 11ac Force 300 SM PMP 450 PMP 450i PMP 450m PMP 450b PTP 670 HCMP PTP 700 HCMP	406-470, 700 & 900 MHz 2.3 – 2.6 GHz 2.4, 4.9 - 5.9 GHz 5.1 - 5.9 GHz 4.9 – 5.9 GHz 2.4, 3.5, 3.6, 5.4, 5.8 GHz 900 MHz, 3.5, 3.6, 4.9 – 5.8 GHz 3.5, 3.6, 5.1 – 5.8 GHz 3.5, 3.6, 5.1 – 5.8 GHz 4.8 – 5.9 GHz 4.7 – 5.8 & 7-8 GHz

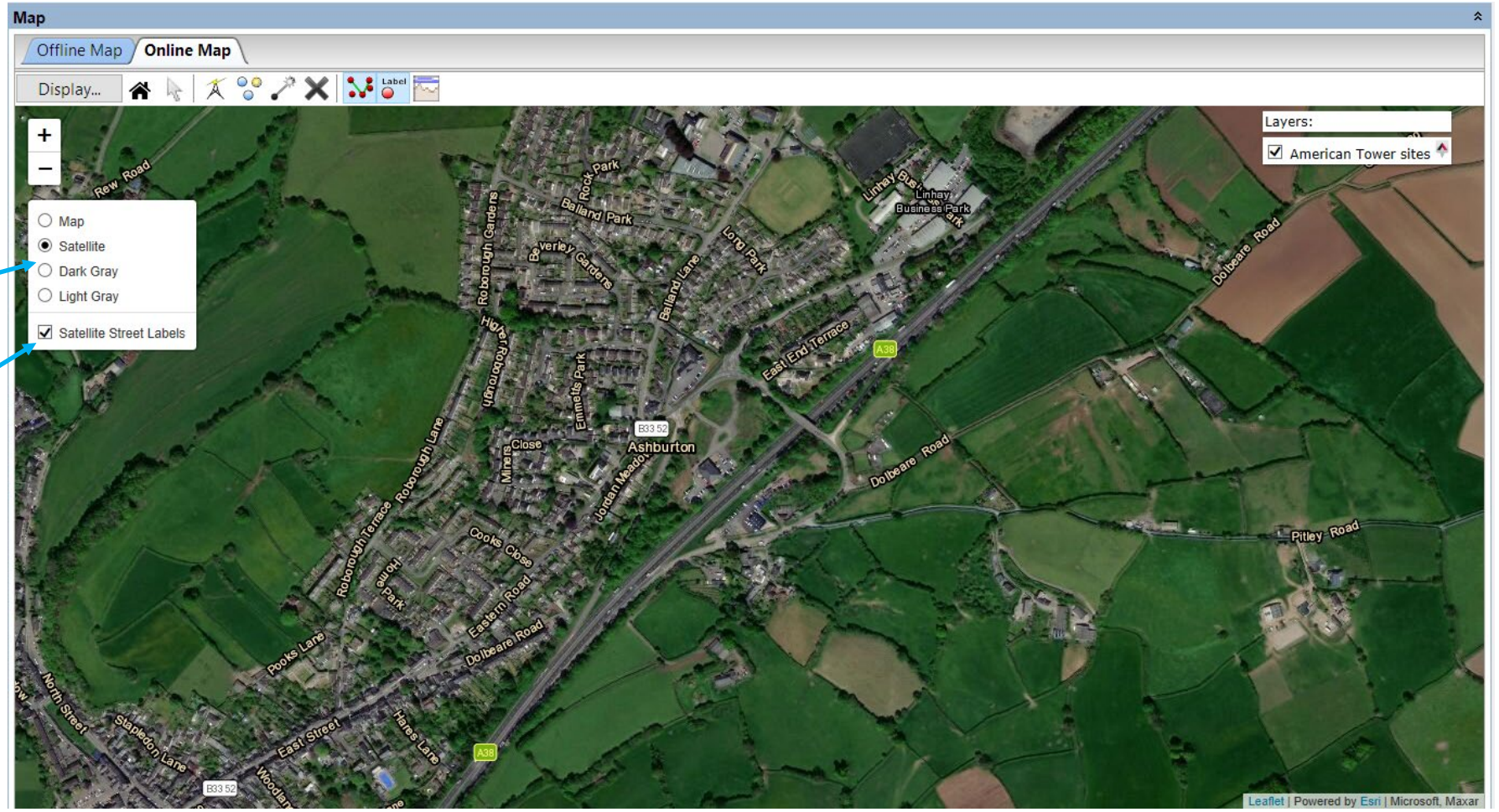
- **cnPilot WiFi products are available in LINKPlanner in the BOM Estimator**

Obsolete products

- **LINKPlanner upgraded to 64 bit in V5.0.0 from 32 bit in earlier releases**
- **The following obsolete products are still supported in V5.x.x releases**
  - PTP 250
  - PTP 450 (5 GHz)
  - PTP 650
  - PTP 800 and PTP 800i
  - PTP 810 and PTP 810i
- **The following obsolete products are still supported in V4.9.1 and earlier releases**
  - PTP 300
  - PTP 400
  - PTP 500
  - PTP 600

Online Map changes

- **LINKPlanner now uses ESRI Maps**
- **Google removing support for Windows IE**
- **Choose the layer to display**
- **Switch on or off Satellite Street Labels**



Clutter Data Sources

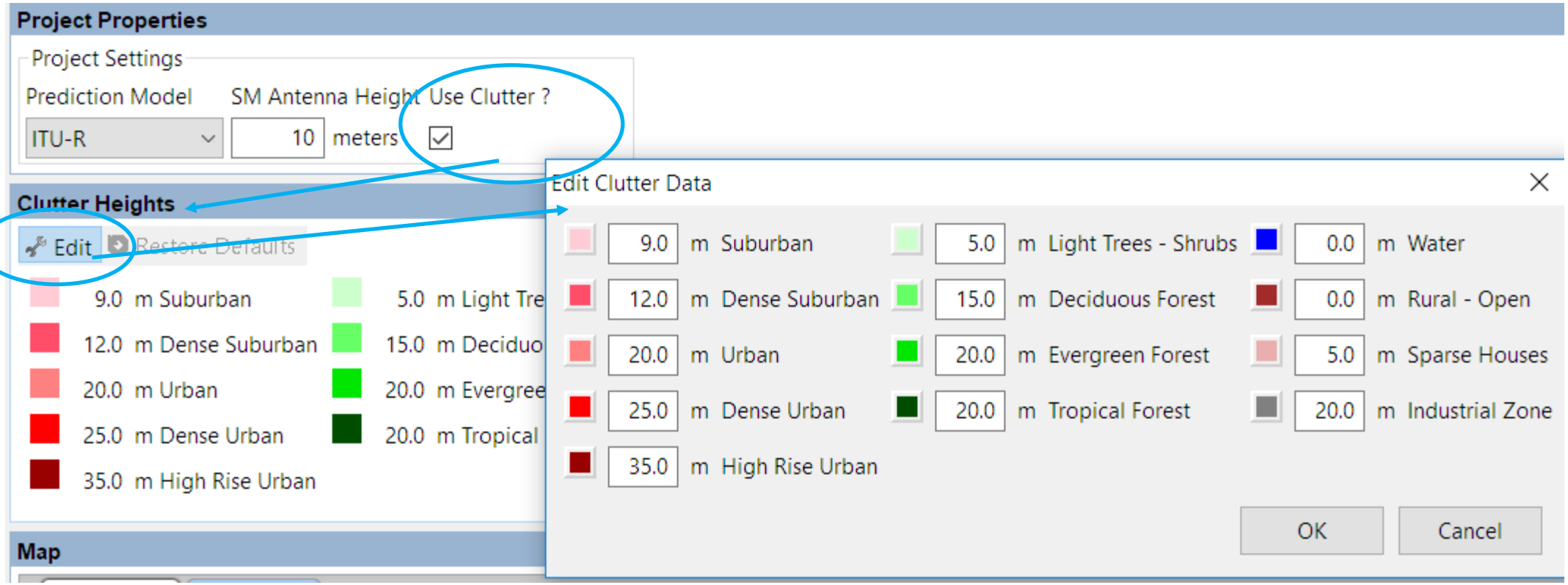
- **United States**
  - NLCD 2016 Land Cover (for more information, visit https://www.mrlc.gov/data/nlcd-2016-land-cover-conus)
  - Coordinate Resolution: 30 meters
  - Data Sources: Landsat ETM, Landsat TM, DEM, USGS/EROS
- **Europe**
  - Corine Land Cover (CLC) 2012 (for more information, visit https://land.copernicus.eu/pan-european/corine-land-cover/clc-2012?tab=metadata)
  - Coordinate Resolution: 100 meters
  - Data Sources: Photointerpretation of satellite images by the national teams of the participating countries
- **Rest of the World**
  - GLOBCOVER 2009 (for more information, visit http://due.esrin.esa.int/files/GLOBCOVER2009_Validation_Report_2.2.pdf)
  - Coordinate Resolution: 300 meters
  - Data Sources: MERIS FR

Clutter Data Sources

- **The clutter heights are classified by land use instead of height**
- **Consider changing the default heights for the project clutter**
  - If the local area's clutter heights don't correlate with the default heights
- **Note that some of the clutter may already be incorporated in the terrain data**

- **Review default heights for all project clutter at the project level**
- **Review clutter type at the link level by editing link profile**
- **Check the clutter heights first, then add obstructions**

Editing Clutter Heights and Colors



Antenna Height and clutter

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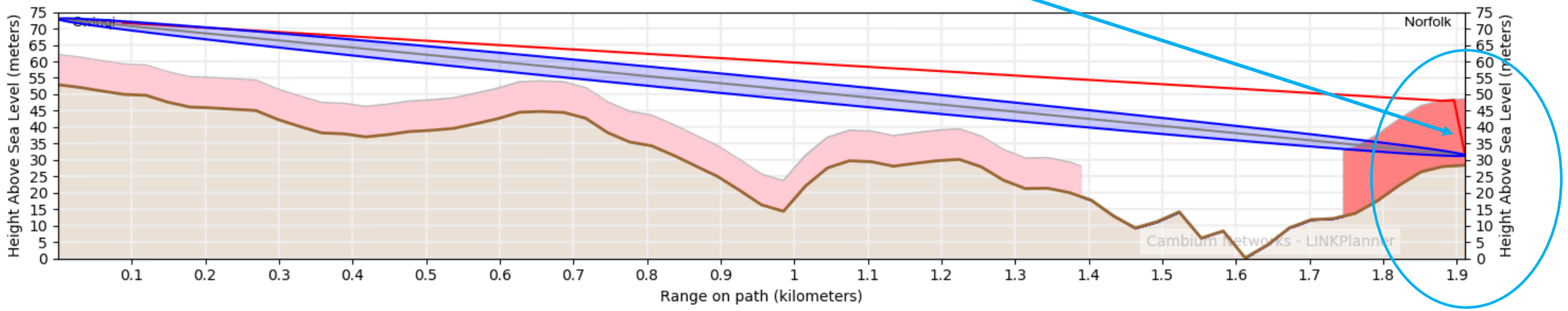
Antenna Configuration

Antenna Selection	Antenna Height	Antenna Azimuth	Antenna Tilt	AP Antenna Gain
Cambium Networks 8° ePMP Force 300-25 (22.9dBi)	3 meters	293.0°	48.9° (uptilt)	15.1 dBi
	(Max height at site is 10.0 m)	(23.0° from boresight)		

Power

EIRP	Power	User Limit ☐	Interference? ☐
52 dBm	29 dBm		
	(Max Power is 29 dBm)		

Profile: 1.9 kilometers, Non Line-of-Sight



- **Antenna heights are relative to ground level NOT clutter level**
- **This may result in significant obstructions if local clutter is higher than antenna height**

Check Fresnel Zone clearance

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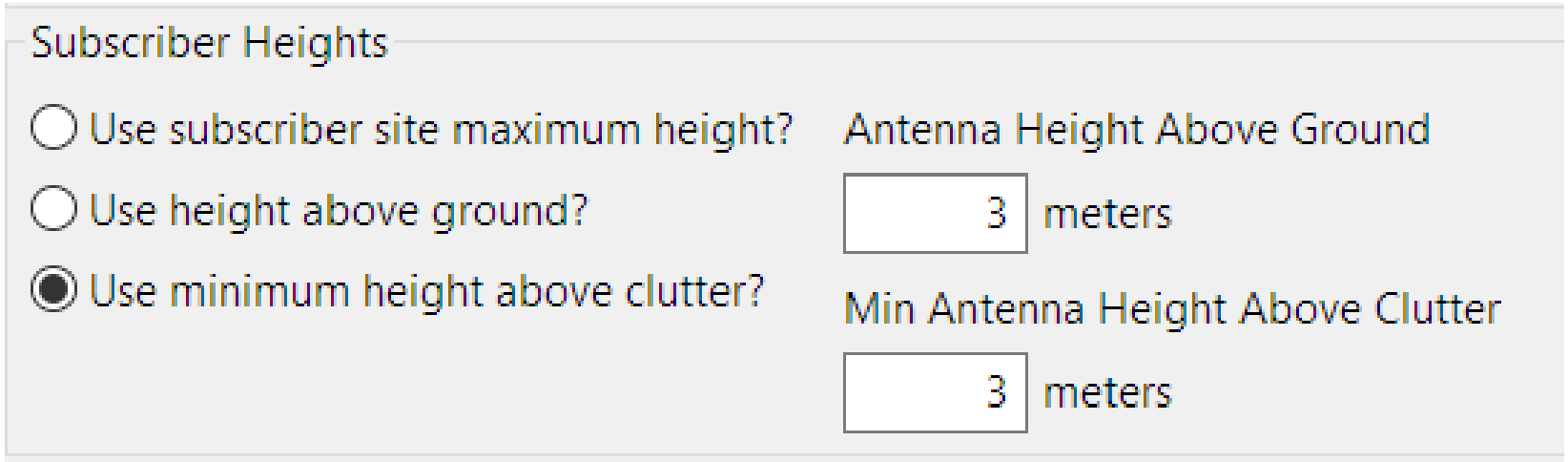
Hubs | Access Points | PMP Links

SM Name	AP Name	Range (km)	Fresnel Zone Clearance (m)	Excess Path Loss (dB)	SM Clutter Type	SM Height (m)
Mater Dei Hospital	St. Philips : 1	1.160	-22.1	54.0	Industrial Zone (20.0)	3
Fort Manoei	St. Philips : 2	2.342	-21.7	53.0	Industrial Zone (20.0)	3
Windsor	Swieqi : 2	1.974	-20.0	52.3	Urban (20.0)	3
Gzira	St. Philips : 1	1.769	-18.3	53.6	Urban (20.0)	3
T2	St. Philips : 2	3.032	-18.1	37.6	Urban (20.0)	23

- **Use PMP Links view to quickly check for obstructed paths using Fresnel Zone Clearance and Excess Path Loss columns**
- **See SM Height relative to Clutter Height at SM location**
- **Use group edit to change SM Height**

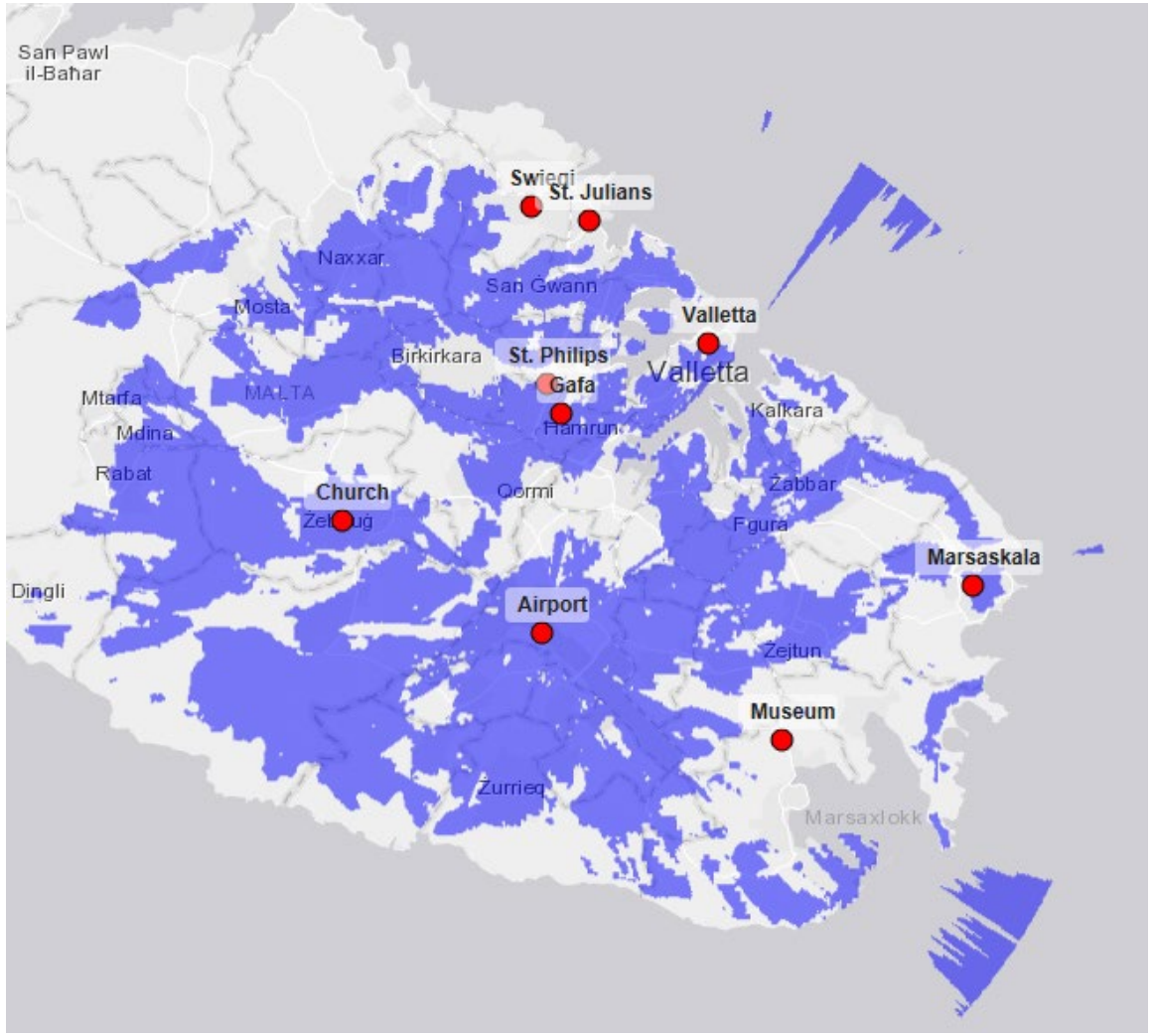
Best Server SM height options



- **Subscriber site maximum height – uses the height set in the Subscriber Sites table, if no height is defined it will use the height above ground value**
- **Height above ground – uses a constant value for all subscribers**
- **Minimum height above clutter – uses antenna height above clutter where that value is higher than height above ground. If there is no clutter uses height above ground. If using this value important to ensure both heights are configured correctly.**

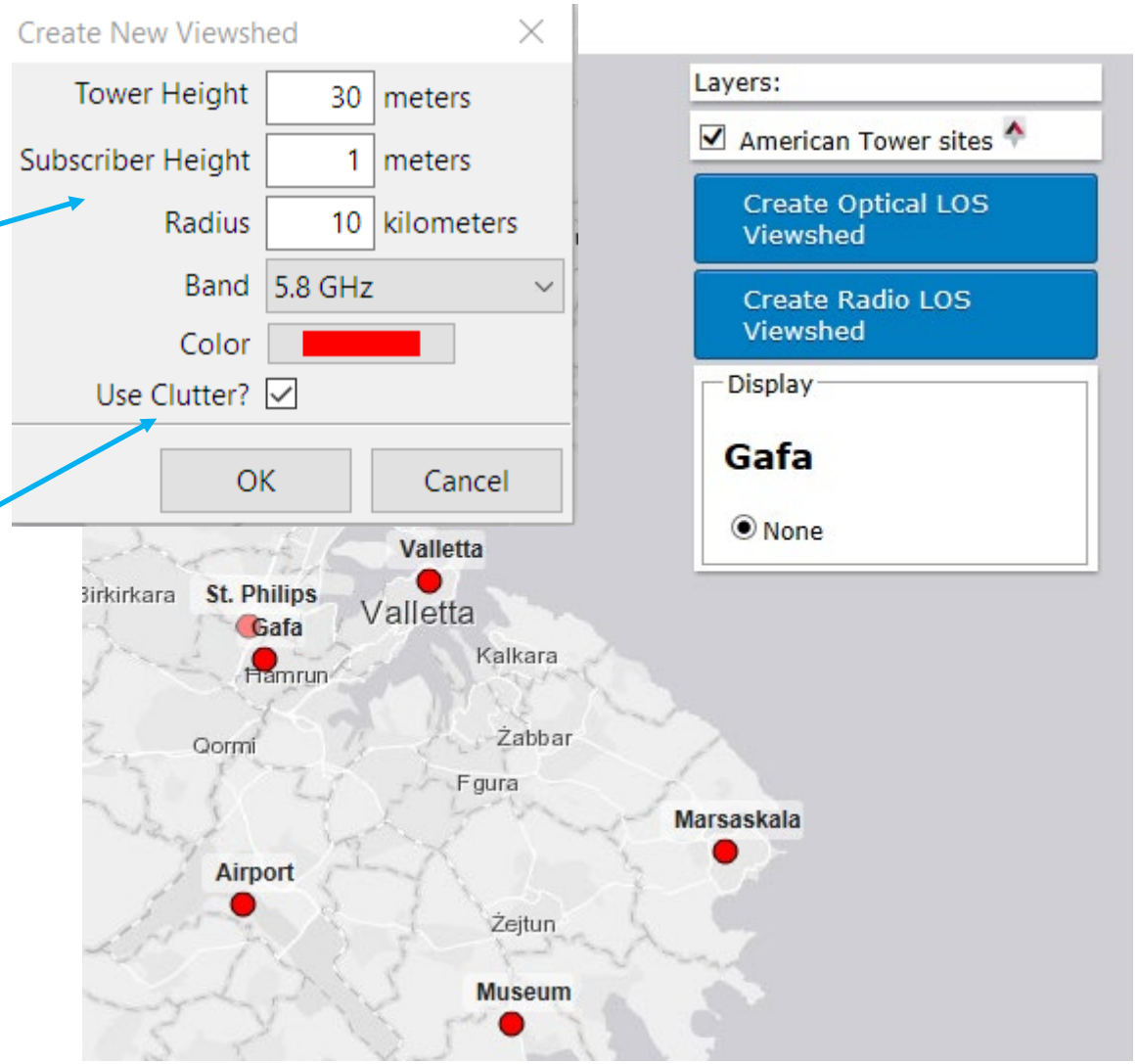
Viewshed

- **What is a Viewshed?**
  - An indication of which areas can be “seen” from a network site, given a tower height and subscriber height.
  - Quickly compare different site options and see potential holes in the coverage.
  - Optical Viewsheds only consider the direct path. They are typically faster to calculate but may be optimistic.
  - Radio Viewsheds also take into consideration the Fresnel zone and are therefore frequency dependent.
  - They don’t consider antenna patterns or radio equipment parameters.



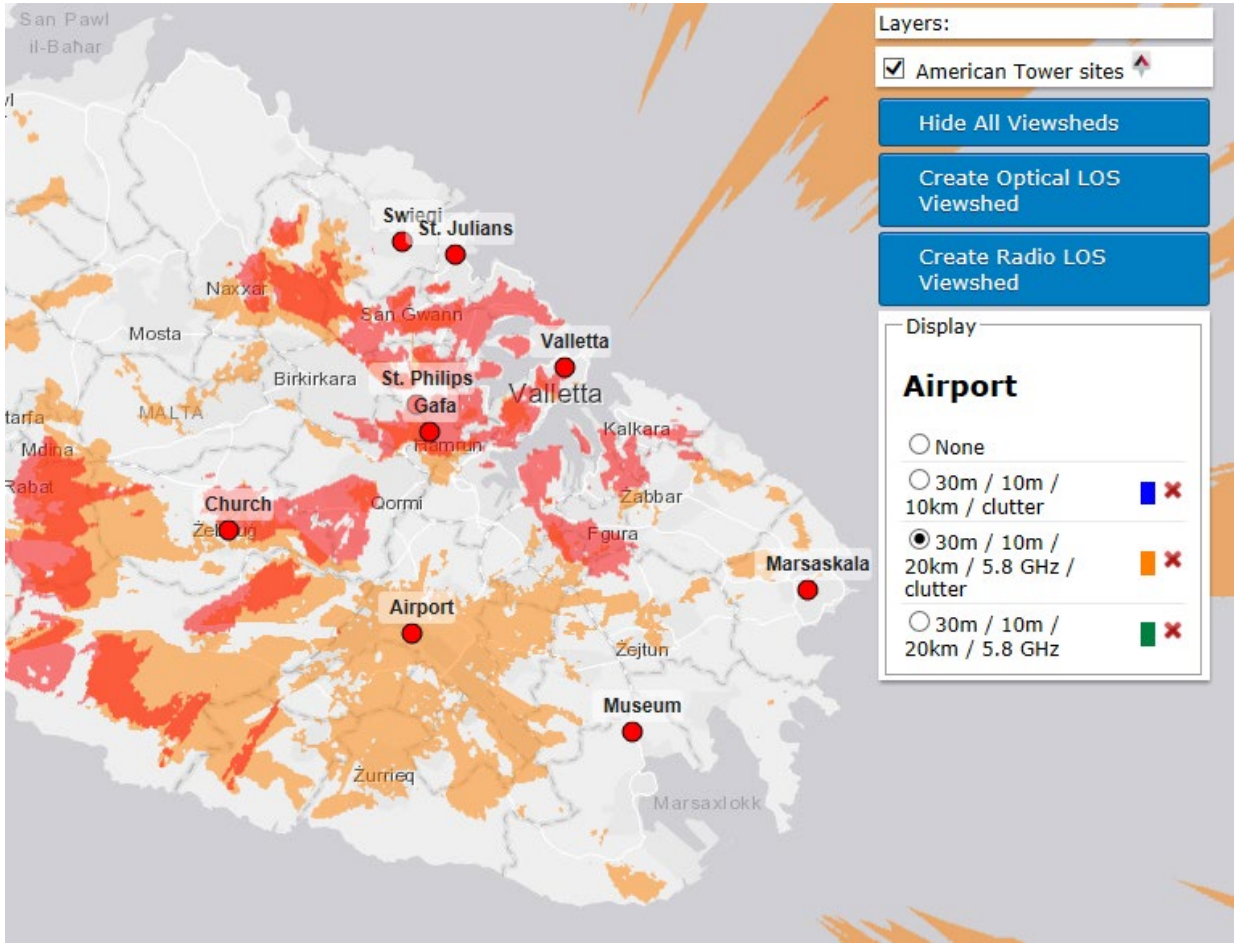
How to create a viewshed

- **Select a network site**
- **Pick either**
  - Create Optical LOS Viewshed
  - Create Radio LOS Viewshed
- **Set the parameters**
- **Note if “Use Clutter” is selected Subscriber Height is height above clutter NOT height above ground but Tower Height is always above ground**
- **Frequency is only used for Radio viewsheds**



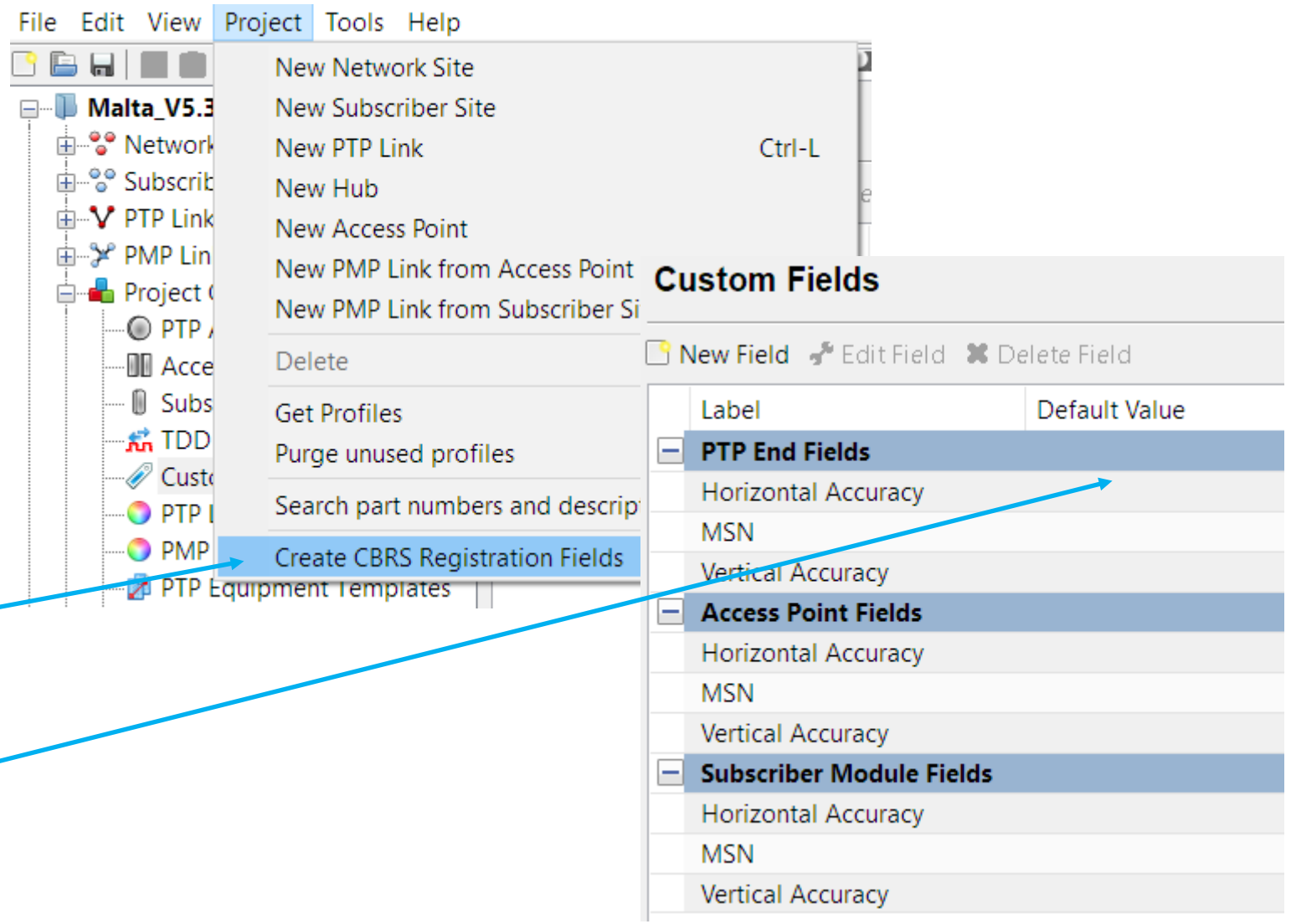
Managing viewsheds

- **Viewsheds from different sites can be displayed simultaneously**
- **Only one viewshed per site can be displayed**
- **Use the radio buttons to choose which one to display**
- **Use the × to delete a viewshed**
- **The information next to each viewshed shows Tower height, subscriber height, radius, frequency (if Radio) and clutter (if clutter was selected) as well as the color**



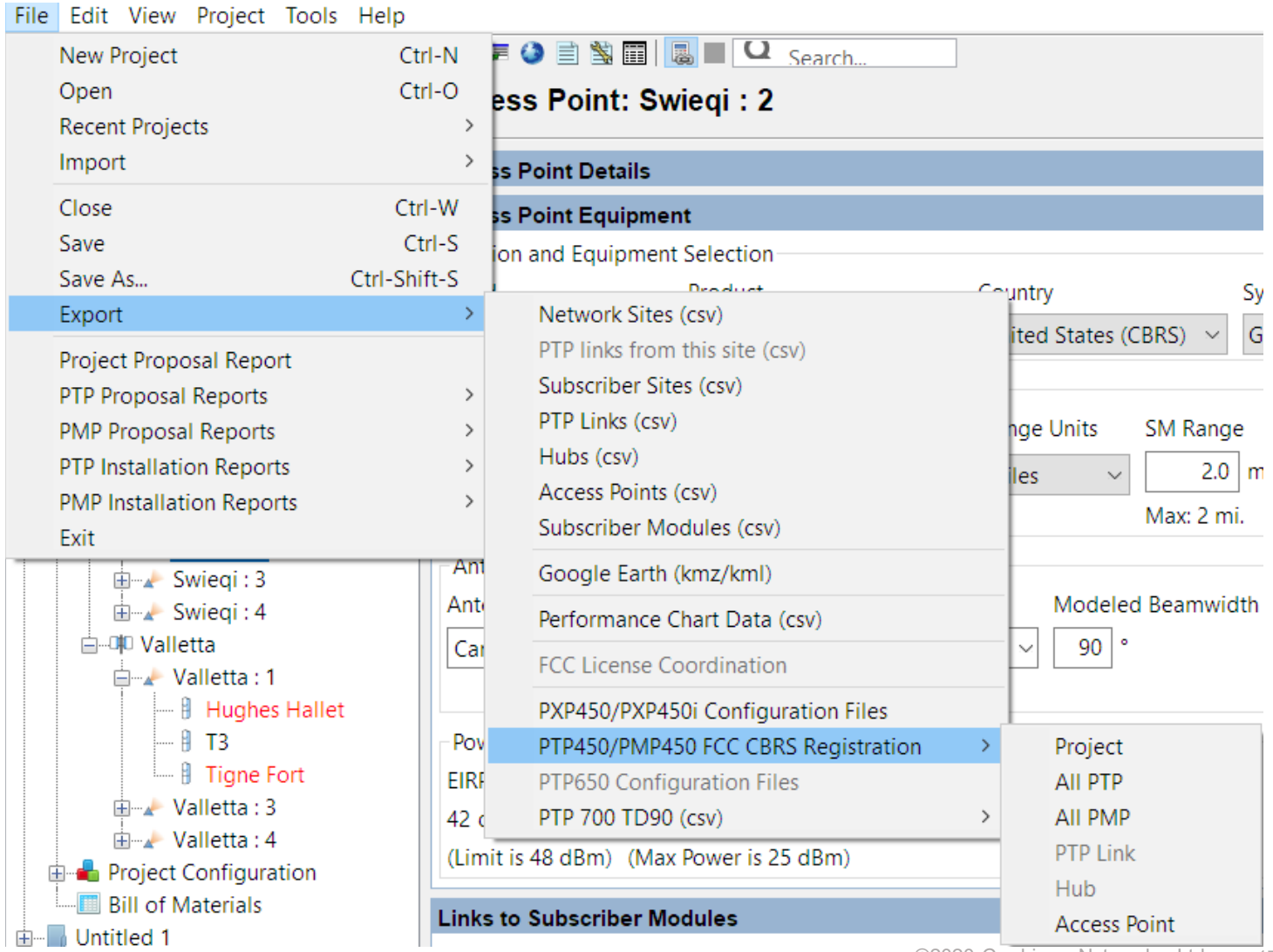
CBRS Export - Configuration

- **The CBRS SAS registration spreadsheet can be exported from LINKPlanner**
- **Ensure that all APs or PTP links that need to be exported are configured to 3.6 GHz and have the country set to United States (CBRS)**
- **To add the extra fields select Custom Fields and then create the fields**
- **Set default values if required**



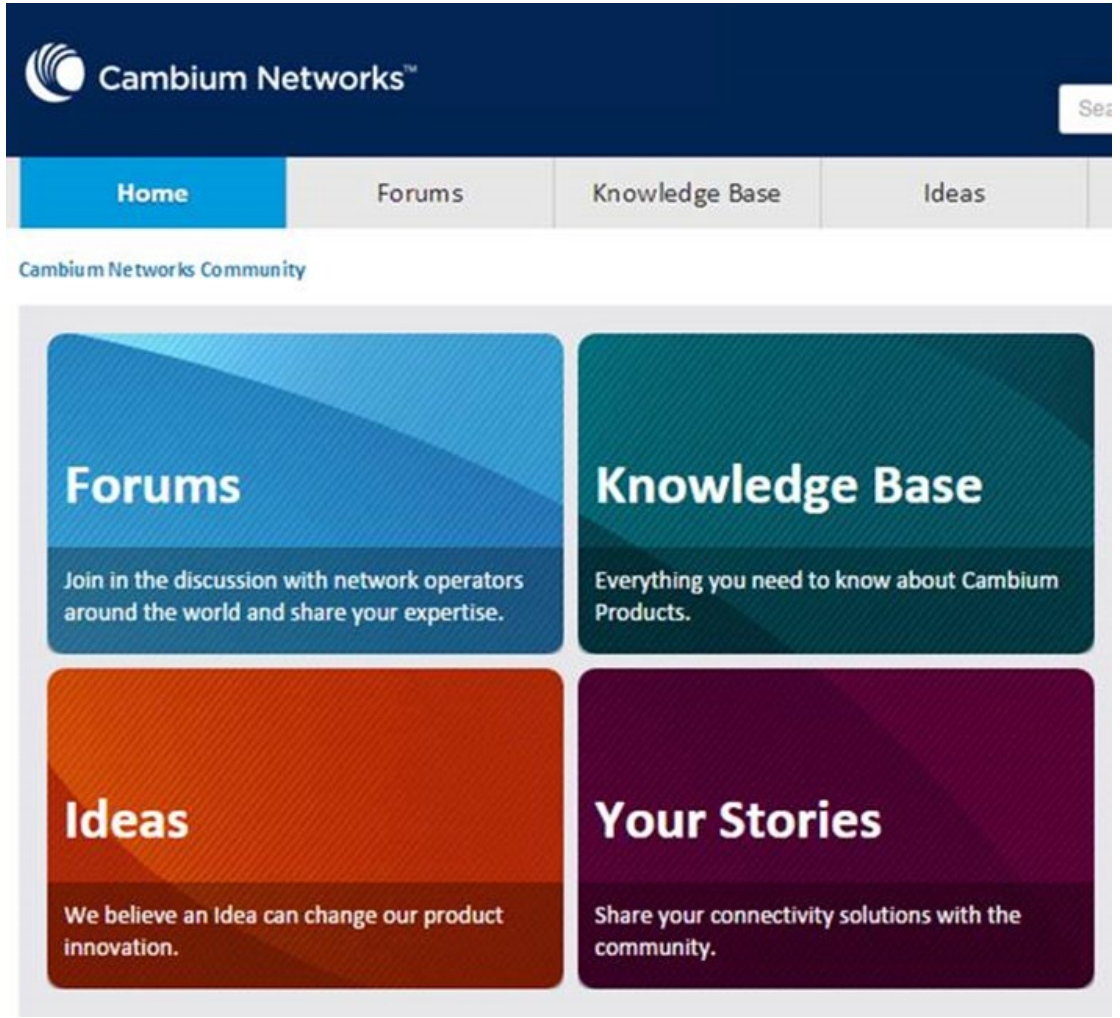
CBRS Export

- **To Export the spreadsheet follow the route shown**
- **Each PTP link or Access Point will create its own spreadsheet but multiple can be exported at the same time**
- **Choose the folder for the spreadsheets to be placed in**
- **Check the spreadsheet and update any fields as required before uploading to cnMaestro**



Cambium Community

- **Learn from network operators around the world**
- **Community Forum**
  - Products
  - Network planning
  - Languages
  - Business issues
- **Knowledge Base with technical detail documents**
- **Submit development ideas**
- **Real-world connectivity stories**



Social Media

- **Follow Cambium Networks to get the latest information**
- **Facebook**
- **Google+**
- **Instagram**
- **LinkedIn**
- **Twitter**
- **Weibo**
- **YouTube**

Next Week's Customer Webinar

- **Tuesday, April 21 at 9:00 AM CDT**
- **Disaster recovery communications solutions, best practices for temporary networks, including hospitals and schools**
- **Guest speaker Chris Hillis, co-founder of Information Technology Disaster Resource Center (ITDRC)**
- **Register at:** https://attendee.gotowebinar.com/register/7416615353651528205

LINKPlanner Feedback

Check the Community Forum to see if someone's already asked your question:

- **Cambium Networks Community >**

  Forums > Planning & Management > LINKPlanner

For a more private discussion

- **Send an email to linkplanner@cambiumnetworks.com**

Questions

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