

## USE CASE

**ISOTROPE RELIES ON EDX SIGNALPRO AND CIRRUS DATA TO STREAMLINE THEIR OPERATIONS, WIN MORE BUSINESS, AND IMPROVE THEIR BOTTOM LINE WHILE PROVIDING FIRST-IN-CLASS SOLUTIONS FOR THE RAIL SECTOR.**

# The Challenges

Radio network planning for the railroad sector presents a **variety of unique challenges**.

The need for detailed geodata as well as granular study results means that traditional mobile/cellular planning techniques are unreliable when it comes to the design and implementation of trackside networks.

Isotrope is a telecommunications engineering firm that supports the design and construction of radio networks, specializing in the development of trackside broadband networks for railroads.



EDX's versatile set of solutions helps Isotrope overcome these challenges by allowing them to:

- 1** Quickly set up and create detailed models of service areas, anywhere
- 2** Run performance analysis to each point along the precise path traveled by trains
- 3** Perform studies over large linear areas to ensure coverage along the right-of-way

# Detailed Geodata, Instantly

One of the critical components of successful trackside network design is highly detailed geodata (terrain and clutter morphology). Propagation conditions on broadband trackside networks are **strongly influenced by clutter** such as buildings, catenary poles, and foliage on, and adjacent to, the railway.

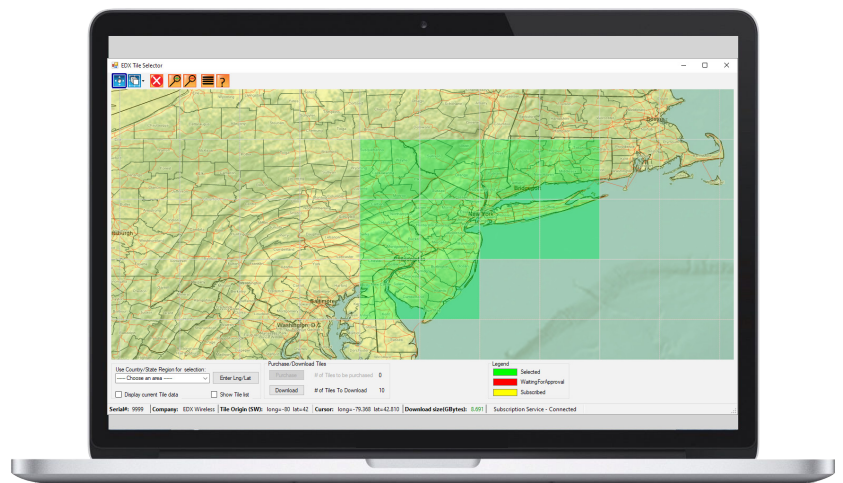
This level of detail is typically not included in generalized clutter and building data that's often used for traditional public-safety radio or cellular network planning. For example, a track right-of-way cutting through a dense urban area is often merely categorized uniformly as "urban" with no detailed representation of the track or adjacent clutter.

Isotrope uses EDX's Cirrus data service, which **eliminates the need to research, source and manually manipulate low-quality databases.**

Cirrus offers high-resolution clutter and terrain, for immediate download, available for the US and internationally.

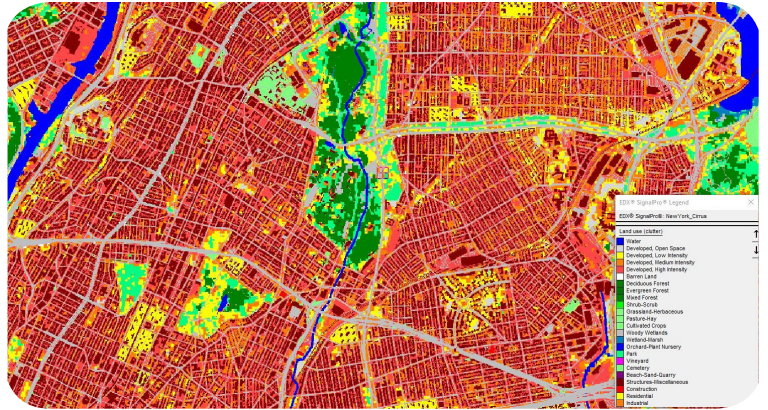
When a new project area is identified, Isotrope's engineers simply open the application, highlight the area of need, and **get an immediate download link for the geodata** for use in their project.

The Tile Selector application **provides instant access** to high-resolution data.



**The Cirrus clutter data is updated regularly and compiled from the most resolute sources** available, featuring building footprints at 1 meter resolution in dense urban areas.

The ability to instantly access current high-resolution data makes it easy for Isotrope's engineers to **respond quickly to new opportunities** and focus their efforts on designing networks and responding to new RFPs, rather than finding and preparing geodata.



The high-resolution data of Cirrus

## The Cost of Free Data

### 1) Downloading & Converting

A typical download and conversion process:



The cost of manually manipulating USGS and other low quality databases in the average network design is high. You are wasting money every step of the way due to inaccuracy.

### 2) Manual Manipulation

**20 SITES**  
15 min./site

=

**\$750**  
\$150/hour

**VS**

Cirrus' **instant access** eliminates the need to download and convert data from other sources. This means more time to focus on new opportunities and gives you a competitive advantage with improved responsiveness to customer requests and RFPs.



Per Service-Area  
Cirrus Price

=



Cirrus ROI

1m/30m Hybrid Clutter provides land use data with resolution as high as 1m, eliminating the need to manually manipulate databases.

**\$500**

A service data subscription to Cirrus starts at \$500.

**+25%**

Become more time efficient, pay less.

# The Right Modeling Technique

The traditional radio network planning techniques of land mobile networks in the commercial (cellular), public (public safety) and industrial bands do not provide the level of detail and accuracy needed when designing and implementing trackside networks.

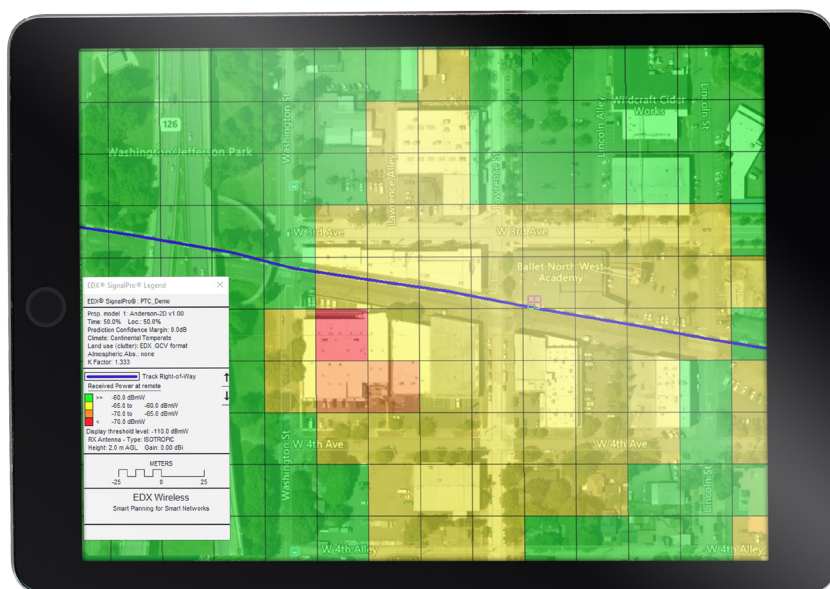
These traditional design methods are “grid-based” and statistical in nature. While mobile network planning is areawide and can be modeled statistically with lower resolution terrain and clutter, trackside broadband networks are affected by the details of the propagation within the right-of-way. Communications with the train must work where the train is; there is no room for error or unpredicted variability in trackside network planning.

Up-to-date, high-resolution terrain and clutter data is critical to a successful trackside network design.

A typical land mobile network is planned using area-wide studies where the service area (such as a city, county, or state) is divided into a uniform grid, and performance predictions are made to each point within the grid.

The grid boundaries never line up exactly with the track right-of-way, particularly when the study needs to cover a rail corridor across an entire county or state. Moreover, the conventional wide-area grid resolution is necessarily low because it must cover an entire area.

This image shows an area coverage study at a 30-meter resolution overlaid on a section of track through the city.

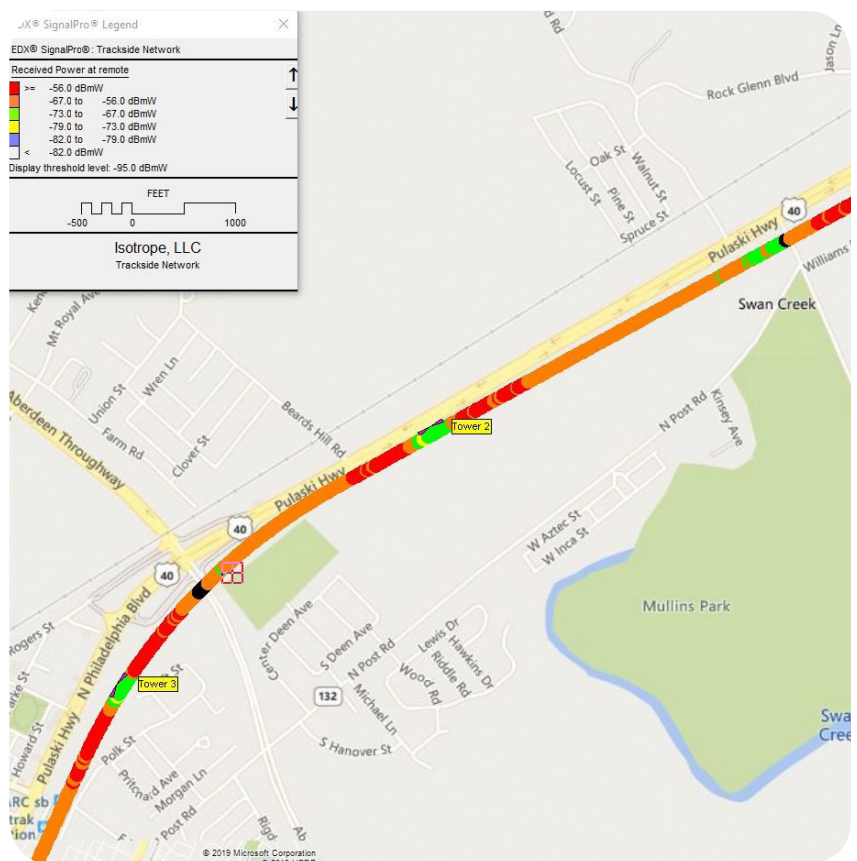


This level of planning is much too coarse to show potential shadowing issues and temporary drop-outs that may occur as the train passes by buildings and other clutter directly adjacent to the track.

EDX SignalPro solves this problem with route-based studies. Isotrope uses the route study method to import the precise path of the tracks which need to be covered and **run performance predictions at a desired point-spacing** along the exact centre of the route. If needed, the study can also be run for points set at a desired distance on either side of the route as well.

SignalPro makes route study predictions by evaluating the precise RF paths from each base station to each point along the route, **allowing for much more granular results and in most cases faster calculation times** than traditional area studies.

The image shows some route study results from one of Isotrope's projects. The study is **performed at a very fine point-spacing** in order to accurately identify locations along the track where the signal could be blocked or degraded.



“The Large Study Grid feature of SignalPro v9 allows us to run one study at full resolution covering an entire service area, saving time by eliminating the need to run several studies for one project. Simply put, it’s awesome!”

- Steve Riggs, COO, Isotrope

## Very Large Study Grids

To properly complete a network design, Isotrope will often need to show coverage for a land-mobile system for the area surrounding the track's right-of-way.

In those cases, high-resolution results are needed but the study area may be quite large, particularly when working with the high-resolution Cirrus data.

	Previously	Signal Pro v9
Set up study grids	3 study grids @ 2 minutes = 6 minutes	1 study grid @ 2 minutes = 2 minutes
Run study	3 studies @ 3 minutes = 9 minutes	1 study @ 7 minutes = 7 minutes
Stitch studies together in 3rd party application	15 minutes	0
<b>Total</b>	<b>30 minutes</b>	<b>9 minutes</b>

The Large Study Grid feature available in SignalPro version 9 allows Isotrope to run one study at full resolution covering an entire railway, **eliminating the need to move the study grid between areas of interest**, run several studies for one project and “stitch” the studies together in a third-party application to generate a report.

The engineering time and capital saved from running one study versus several is significant and **greatly improves Isotrope’s customer satisfaction, not to mention their bottom line.**

## In the future

Isotrope continues to offer first-in-class service while partnering with EDX to ensure streamlined operations.

It is through partnerships such as these that both EDX and Isotrope continue to innovate for new and emerging technologies in the rail sector and beyond.



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