HERE

Geodata Models

HERE Geodata Models is a set of global, scalable, high precision indexed datasets derived from terrestrial LiDAR (Light Detection and Ranging) and other remote sensed base elemental content that can greatly simplify 5G wireless network planning, design and maintenance.

HERE Technologies has performed groundbreaking work in 3D mapping, and has developed sophisticated algorithms to extract 3D geometry, features, and attributes from a combination of HERE collected and partner sourced point clouds and imagery to provide high precision, scalable, richly attributed datasets.

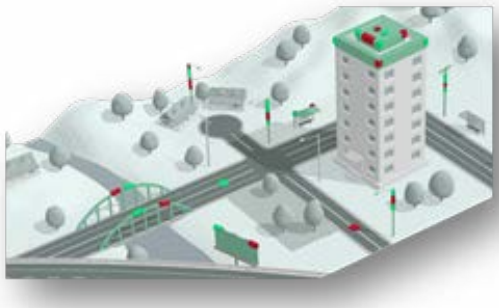
Applications

HERE Geodata Models addresses key challenges of wireless network planning and design:

Optimal placement of RF Equipment

In the new 5G network topologies that supplement macro cell coverage with a much larger number of small cells (on the order of 4-10 densification per km2), mobile network operators and site location aggregators need to gain efficiencies in their deployment models in order for their business cases to add up. Managing the cost components of 5G network planning, particularly cell site candidate real estate assessment (poles, rooftops, billboards, etc.) is a key challenge because of 5G network topologies and their associated spikes in OpEx.

The HERE Geodata Models set consists of 3D map objects (and associated geometry), such as Digital Terrain Models and buildings, as well as 3D vector objects such as utility poles, lamp posts, trees and foliage. When used in concert with other environmental attributes, HERE Geodata Models makes it possible to determine the optimal x,y,z real estate location for placement of small and macro cell antennas, to maximize RF signal propagation range while reducing time to service.

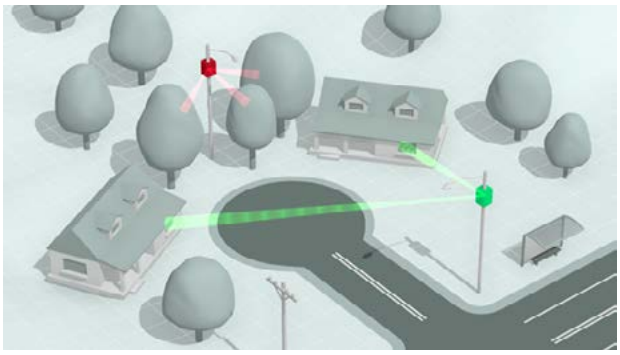


Effectively Mapping Lines of Sight

5G networks will operate in spectrum across a broad set of frequency ranges. For very high frequency bands in particular, sometimes referred to as mmWave spectrum, the anticipation is that they will be capable of incredible data bandwidth. However, high frequency band signals tend to have limited reach and may only be able to propagate a few blocks before requiring regeneration.

A particularly challenging characteristic of high frequency spectrum is the fact that they do not penetrate solid objects very well. Propagation of 5G signals at mmWave range, requires line of sight transmission paths and it is highly vulnerable to attenuation from solid ground level objects such as buildings, vehicles and surroundings, including foliage from trees.

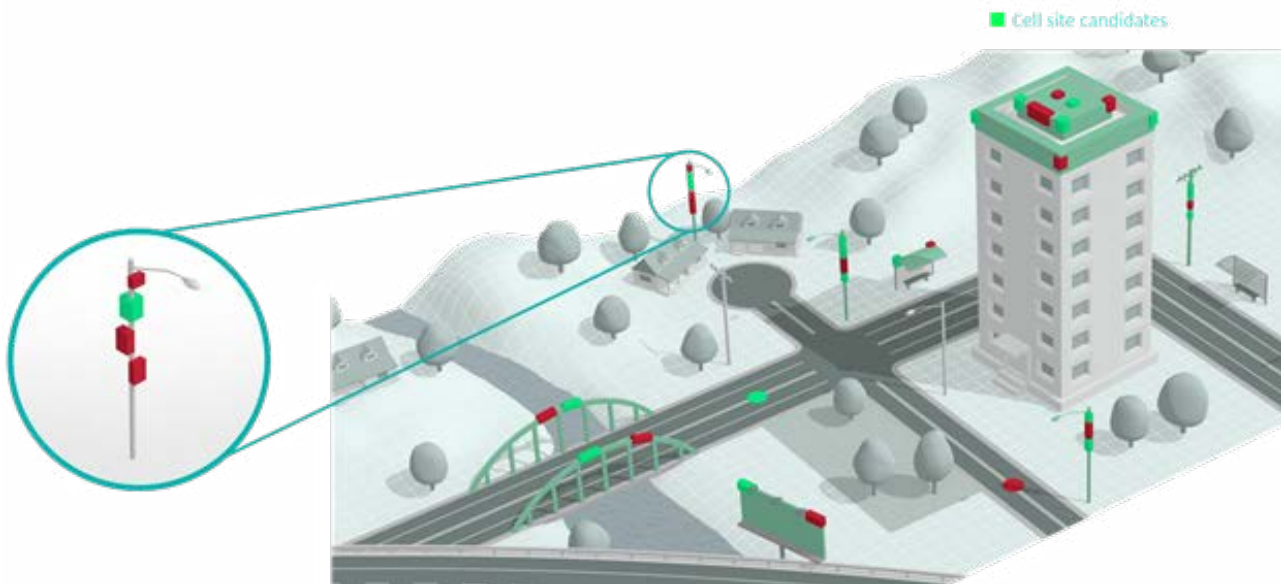
Midband frequency spectrum networks deploying Massive MIMO and beam forming technology face similar challenges where precise line of sight mapping is required.



Through its extensive geographical data expertise, HERE can extract features and 3D derivative objects such as poles, tree trunks, tree canopies, and buildings lending a new level of precision to Radio Frequency (RF) design, modelling and simulation for 5G mmWave networks that far surpasses the accuracy of conventional GIS data.

Digital Site Survey

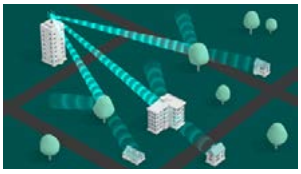
The Digital Site Survey concept leverages the high detail, high precision attributes and metadata inherent to HERE Geodata Models to visually represent a digital twin of potential 5G small cell or macro cell real estate location. This could be a pole, the rooftop, the side of a building or some other ground level structure such as a billboard or an overpass. This digital representation of the cell site candidate location can then be remotely assessed and characterized from a central location, determining for instance, environmental context such as adjacent solid objects that could occlude a 5G signal, measuring the radius and height of a pole, or even placing a virtual camera in order to show the PoV of a small cell antenna to perform a coarse assessment of sight lines. The benefit to MNOs and site location aggregators of performing these tasks digitally is a lowering of OpEx by reducing the number of physical site surveys required, as well as a meaningful reduction in the amount of time it takes to bring an individual small cell or macro cell into service.



Use Cases

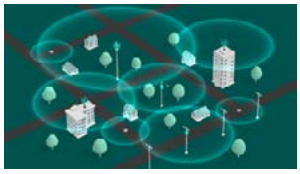
Fixed Wireless Access

To provide internet access to homes using wireless mobile network technologies rather than fixed lines. More than 1 billion homes worldwide still find themselves without regular broad band connection, 5G will provide an effective solution.



Massive MIMO (Beam Formed Signals)

Uses phase aligned antenna arrays to focus an RF signal into a beam, rather than a 360 broadcast (flashlight or spotlight rather than a laser). Massive MIMO is supported in both midband RF spectrum and mmWave RF spectrum.



Mobile Broadband

Supporting internet on the go with ultra-fast speeds for content streaming, gaming, video chatting and to enable the smart home concept.

Wireless Fronthaul

Wireless Fronthaul Provides a wireless solution for aggregated data/internet traffic transport where fibre optic access is either inaccessible or cost prohibitive.

Why HERE Geodata Models?

High Precision: HERE Geodata Models with sub-meter 3D geometry and geospatial accuracy takes precision to a new level far surpassing conventional GIS datasets. This gives the product a clear and distinct advantage in a space that puts great emphasis on precision in geometry and x/y placement of 3D objects.

Data richness: While most competitors rely almost solely on satellite imagery to derive their datasets, HERE Geodata Models leverages the largest, freshest terrestrial LiDAR library in the industry with high resolution aerial and satellite imagery, and combines them with HERE's engineering expertise to turn these base elemental content libraries into high precision 3D building objects, poles, trees, and digital terrain models.

Time and cost efficiencies: HERE Technologies' Geodata Models is a unique dataset for performing centralized, digital 5G network planning, reducing time to service by weeks/months/quarters. In addition, it supports small cell candidate real estate assessment and characterization, potentially reducing OpEx by up to 40% and addressing some key MNOs concerns deploying 5G networks.

Scale: With an initial footprint covering portions of 88 global cities across The Americas, EMEAR and APAC, HERE Geodata Models will rapidly expand to provide broad global coverage based on the 5G service rollout plans of Mobile Network Operators.

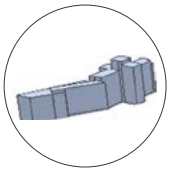
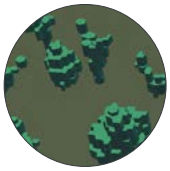
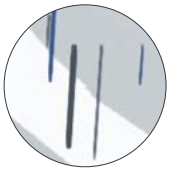
Initial Coverage

Americas	EMEAR	APAC
sections of **41** cities	sections of **37** cities	sections of **10** cities

Availability

- HERE Geodata Models commercial availability targeted for April 1, 2020
- HERE Geodata Model samples are available today for evaluation, demos, pilots, and proofs of concept

Product Specifications

	Basic 2.5D Geometry	Standard 3D Geometry	Premium 3D Geometry
Applications	RF Propagation Modeling & Simulation Line of Sight Modeling & Simulation	RF Propagation Modeling & Simulation Line of Sight Modeling & Simulation	RF Propagation Modelling & Simulation Line of Sight Modelling & Simulation Digital Site Survey
3D Buildings	x/y centroid 2DFP polygon Height		
3D Poles	x/y centroid Height		
3D Trees	x/y centroid Tree height 2DFP polygon representing tree canopy 		
Digital Terrain Models (DTM)	Elevation Height Map	Elevation Height Map	Elevation Height Map
Data Formats	.shp for 3D objects GeoTIFF for DTM	.shp for 3D objects GeoTIFF for DTM	.shp for 3D objects GeoTIFF for DTM
Precision & Resolution	±1m geospatial and geometric Sub-1m resolution for DTM	±1m geospatial and geometric Sub-1m resolution for DTM	±1m geospatial and geometric Sub-1m resolution for DTM

About HERE Technologies

HERE, a location data and technology platform, moves people, businesses and cities forward by harnessing the power of location. By leveraging our open platform, we empower our customers to achieve better outcomes - from helping a city manage its infrastructure or a business optimize its assets to guiding drivers to their destination safely. To learn more about HERE, please visit **here.com** and **360.here.com**.