

HERE

Geodata Models

HERE Geodata Models is a set of global, scalable, high precision 3D datasets derived from terrestrial LiDAR (Light Detection and Ranging) and other remote sensed content that can greatly simplify 5G wireless network planning and maintenance.



HERE Technologies has performed groundbreaking work in 3D mapping, and has developed sophisticated algorithms to extract 3D geometry, features, and attributes from base elemental content such as terrestrial LiDAR, satellite imagery and aerial imagery to provide high precision, scalable, richly attributed datasets.

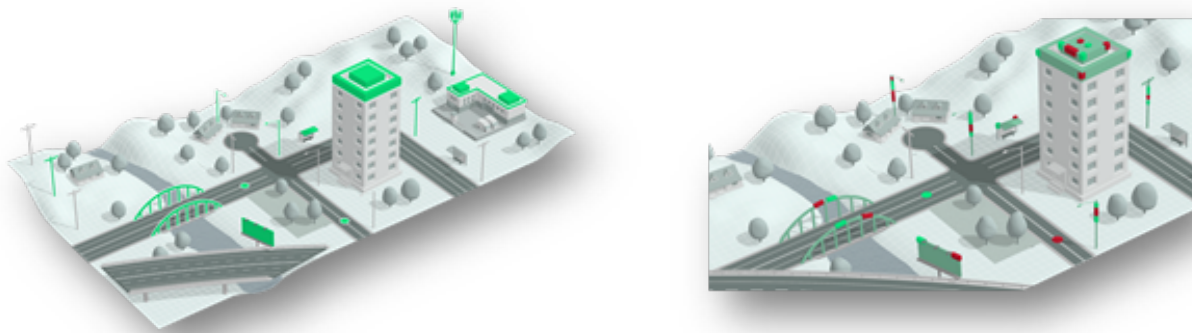
Applications

HERE Geodata Models addresses key challenges of wireless network planning:

Optimal placement of RF Equipment

In the new 5G network topologies that reduce the emphasis on macro cells and move towards larger numbers of small cells (on the order of 4-10x densification per km²), mobile network operators need to gain efficiencies in their deployment models in order for the business case to add up. Managing the cost component of 5G deployment is a key challenge because of the network topology and its associated spike in OpEx.

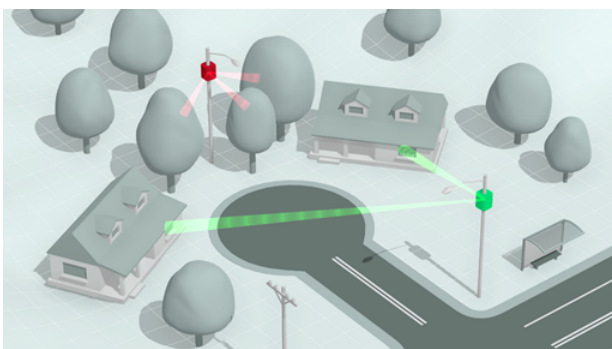
The HERE Geodata Models set consists of 3D map objects (and associated geometry) such as Digital Terrain Models and buildings as well as 3D vector objects such as utility poles, streetlights, trees, and foliage. When used in concert with other environmental attributes, HERE Geodata Models makes it possible to determine the optimal x, y, z real estate location for placement of small 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 these bands 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.

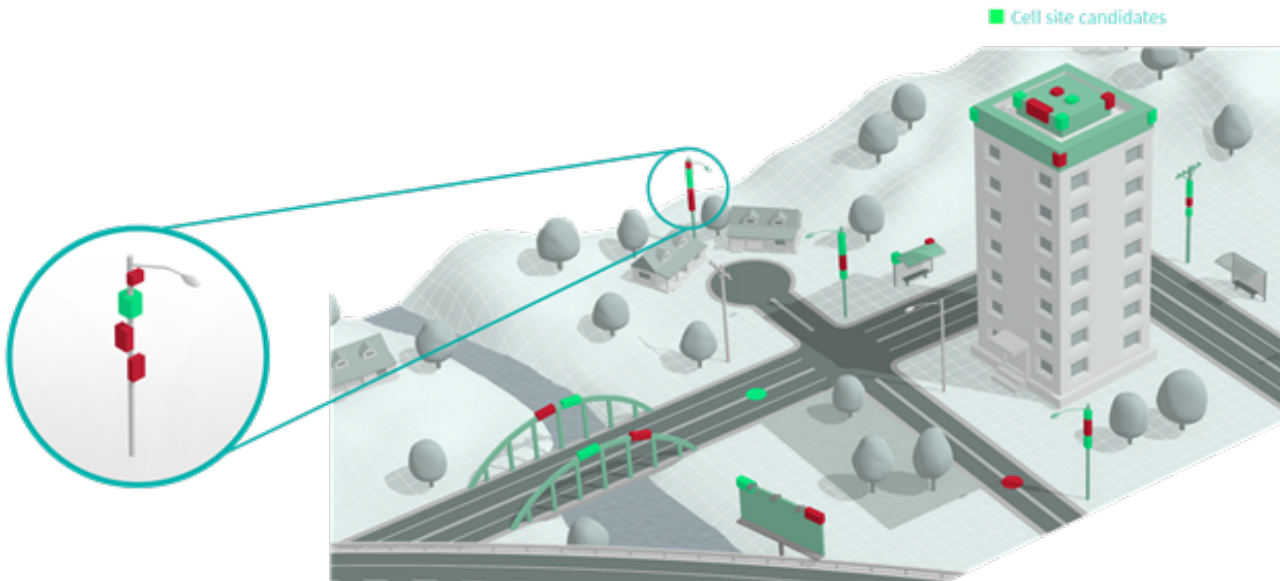
A particularly challenging characteristic of high frequency spectrum is the fact that they do not penetrate solid objects very well. Propagation of 5G signals at mmWave range, requires line of sight transmission paths and it is highly vulnerable to attenuation from solid ground level objects such as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



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) planning 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 a potential 5G small cell real estate location. This could be a pole, the side of a building, or some other ground level structure such as a billboard or overpass. This digital representation of the small cell 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 of performing these tasks digitally, from a centralized location, 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 into service.

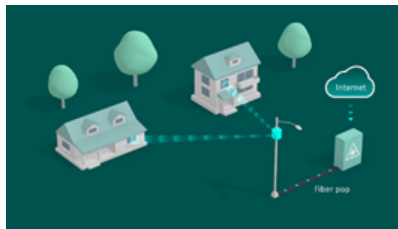


Use Cases



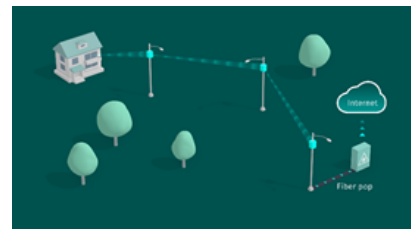
Mobile Broadband

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



Fixed Wireless Access

Internet access to homes using wireless mobile network technology rather than fixed lines. More than 1 billion homes worldwide still find themselves without a regular broadband connection, 5G will provide an effective solution.



Wireless Fronthaul

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

Unique Selling Points

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, and small deployment OpEx by up to 40%, addressing some key MNOs concerns when deploying 5G networks.

Scale: With an initial footprint covering portions of 70+ 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 40+ cities	sections of 25+ cities	sections of 7+ cities

Availability

- HERE Geodata Models commercial availability targeted for Q1 2020
- HERE Geodata Model samples are available today for evaluation, demos, pilots, and proofs of concept

Product Specifications

	3D building objects	3D pole objects	3D tree trunk objects	3D tree canopy objects	Digital Terrain Models (DTM)
Dataset Components	<p>Geometric representations of 3D building structures</p> <p>representations of 3D building structures</p> <p>Length, width, height</p> <p>Lat/lon position of building centroid</p>	<p>Geometric representations of utility poles, vertical sections of streetlights, and vertical poles supporting traffic</p> <p>Base radius, top radius</p> <p>Orientation angle</p> <p>Lat/lon position of pole objects centroid/ centerline</p> <p>Pole type</p> <p>Pole material</p>	<p>Cylindrical geometric representations of individual tree trunks</p> <p>Radius</p> <p>Lat/lon position of trunk centroid/ centerline</p>	<p>Geometric representations of tree foliage</p>	<p>Digital height maps of the bare earth</p>
Resolution and Accuracy	<p>x, y, z geometry: +/- 50 cm</p> <p>x, y position of centroid: relative accuracy <1m</p>	<p>height accuracy: +/- 50 cm</p> <p>radius accuracy: +/- 2 cm</p>	<p>height accuracy: +/- 50 cm</p> <p>radius accuracy: +/- 2 cm</p>	<p>geometric accuracy: +/- 50 cm</p> <p>height accuracy: < 1m</p>	<p><1m GSD resolution</p>
Data Formats	<p>SHP</p> <p>OBJ</p> <p>glTF</p>	<p>SHP</p> <p>OBJ</p> <p>glTF</p>	<p>SHP</p> <p>OBJ</p> <p>glTF</p>	<p>SHP</p> <p>OBJ</p> <p>glTF</p>	<p>GeoTIFF</p>

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