

5G NR and Its Implications for Digital Maps Used in RF Planning



The Promise and Market Opportunity of 5G

The 3rd Generation Partnership Project (3GPP) accelerated the release of the 5G New Radio (5G NR) standard to provide an upgrade path for LTE operators. The first part of the RAN standard called Non-Stand Alone (NSA) – meaning it can be implemented over an existing 4G network – was agreed in December 2017. The Stand Alone (SA) standard was finalized in June 2018.

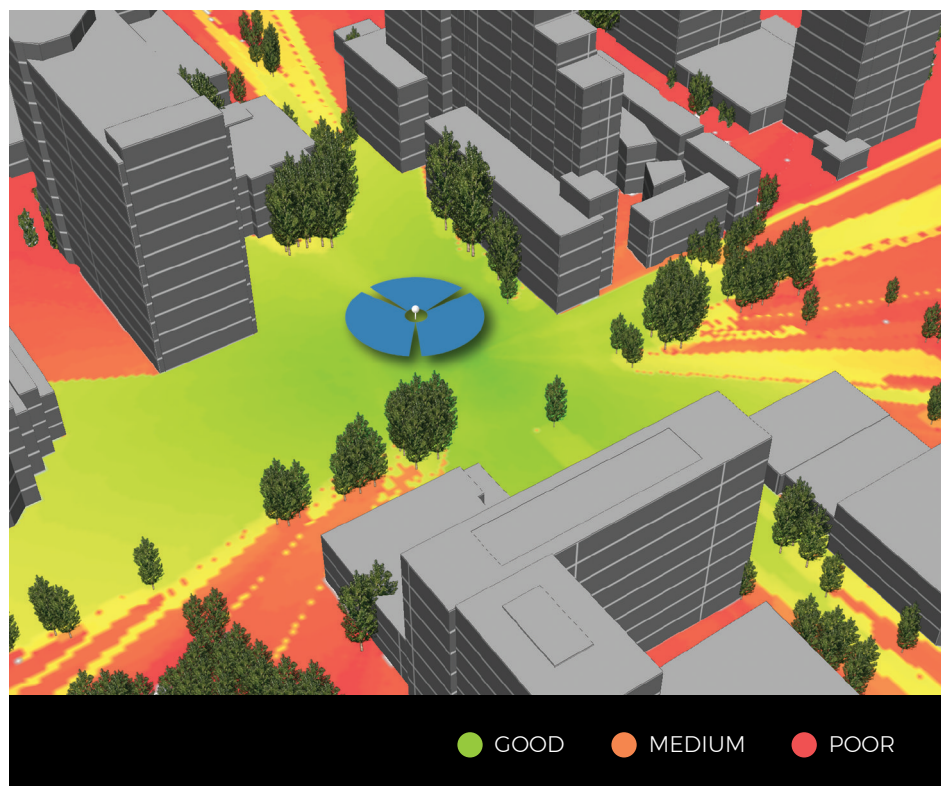
5G NR was created to provide advanced capabilities beyond 4G LTE.

Key enhancements include:

- increased speed (20 times the peak data rate)
- lower latency (10 times lower)
- greater spectral efficiency (3 times improvement)

Key Considerations for RF Planning

5G networks will use much higher frequencies – including those in mmWave bands – capable of transferring greater amounts of data. However, the RF propagation of these higher frequencies is greatly impacted by manmade and natural obstructions.



5G RF Propagation

5G RF planning requires precise 3D building and tree models, especially when mmWave frequencies are being modeled.

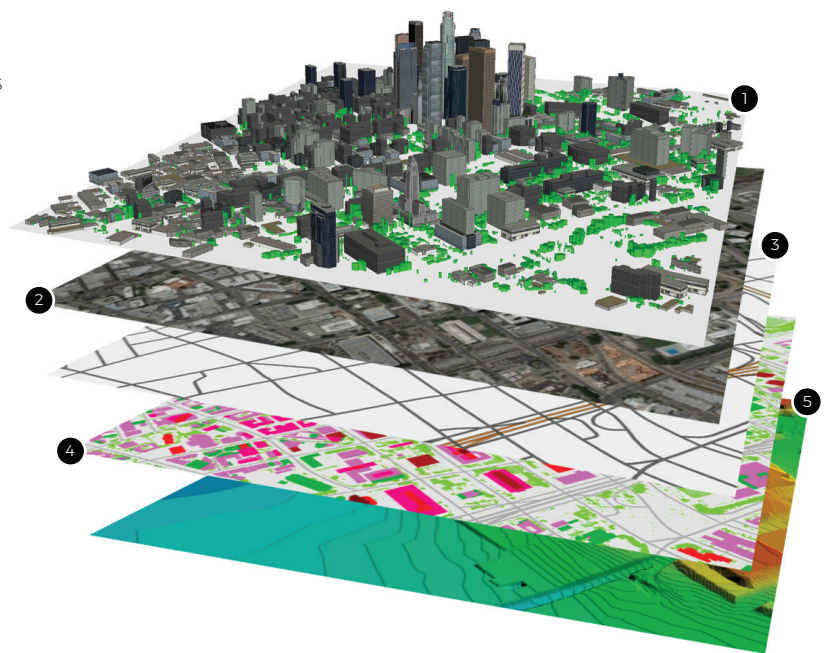


Solving the Digital Map Production Challenge for 5G Using AI

Unlike past network technologies, where 3D data was only used to model certain morphologies (e.g., dense urban) or for certain antenna configurations (e.g., small cells), 5G requires large volumes of 3D digital maps for RF planning.

To meet the coverage challenge presented by large areas of high-resolution 3D building and tree models, LuxCarta has developed production methods based on artificial intelligence. Specifically, geodata production is performed using deep-learning techniques that create data faster with greater product consistency than previously possible. This innovation provides wireless operators, and the vendors that support them, with improved access to recent vintage 3D data to accurately reproduce their planning environment.

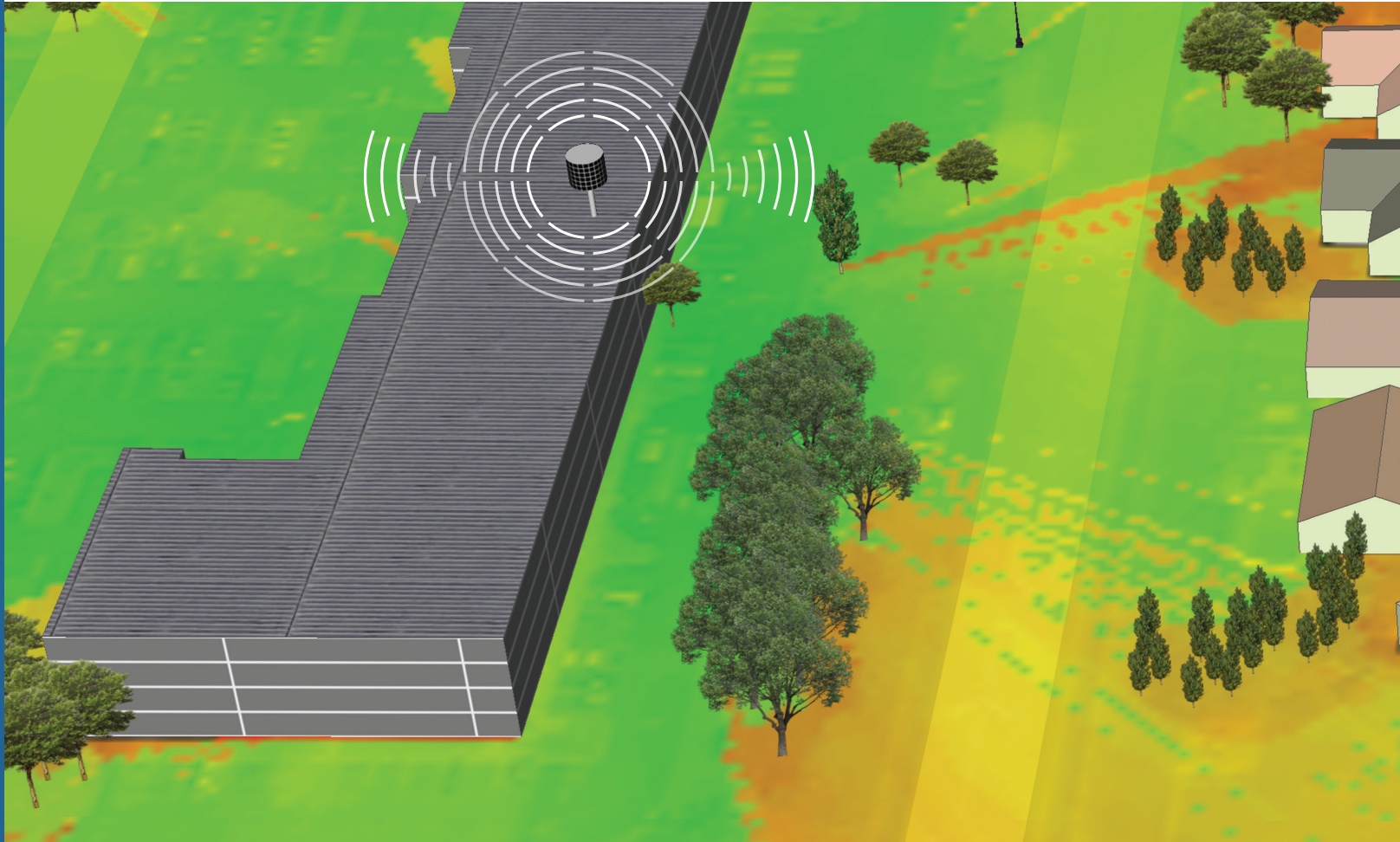
- ① **3D Buildings and Tree Models** – derived from stereo satellite imagery, building/tree footprints and associated heights. Critical for 5G planning
- ② **Orthoimage** – a georeferenced high-resolution image tied to the data
- ③ **Vectors** – represent transportation network and water features
- ④ **Clutter** – land-use classified into water, vegetation, open and urban classes
- ⑤ **DTM** – derived from stereo satellite imagery, the digital terrain models provide a 3D model of the surface of the Earth



Why LuxCarta for 5G Digital Maps?

- Innovator of the new individual 3D tree model, as well as tree canopy height
- Active in pre-standard trials and the largest commercial rollouts of 5G
- 3D production of 1000+ km² per day
- World's largest inventory of 5G telecom geodata
- While others promise, we have ALREADY delivered on 5G

Your Global Partner of High-accuracy Digital Maps for 5G Planning



LuxCarta focuses on the creation and delivery of geospatial products for the global telecom market. We have been serving the needs of the telecom ecosystem for over 20 years and have invested substantial R&D resources to meet the challenges posed by 5G rollouts. Our customers are supported by skilled geospatial experts in their time zone through five corporate offices around the world.

To learn more about our 5G geospatial products for RF planning visit luxcarta.com or contact us: sales@luxcarta.com



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