VIPER

VOLUMETRIC INTEGRATIVE PROPAGATION
ENGINE FOR RAY-TRACING

Next-generation propagation modeling and simulation for reliable and efficient network connectivity in a 5G world.

HII's VIPER has the ability to perform true 3D propagation modeling and simulation which means we can accurately predict the behavior of dense 5G deployments essential to creating smart cities and internet-of-things. Transmitters and receivers can be modeled anywhere within an environment, and their intricate interactions can be simulated and modified. Whether customers are interested in small-cell base stations, Low Earth Orbit satellite constellations, government/commercial spectrum sharing arrangements, or vehicle to transportation networks, VIPER can adapt and modify its analysis scenarios and parameters to provide accurate and reliable answers.

An Innovative Solution

VIPER is:

- A full 3D analysis using Vulkan game engine
- A GPU-based propagation model capable of efficiently simulating complex wave interactions
- Cloud scalable and stand alone installable

VIPER models:

- Full 3D wedge and surface diffraction
- Curved surface reflection
- Atmospheric refraction
- Weather specification at voxel resolution

VIPER uses:

- Geometric scalability that provides deterministic simulation of real-world situations at lightning speed

Use Cases

VIPER can be used for:

- 5G Deployment
- Spectrum Sharing
- Inter-antenna Coupling
- Return Stroke Lightning in Urban Area
- Indoor Private Network Configurations
- Hazards of Electromagnetic Radiation to Personnel (HERP)
- Hazards of Electromagnetic Radiation to Fuel (HERF)
- Hazards of Electromagnetic Radiation to Ordnance (HERO)

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Flexible Scenario Engineering

Reduced Time

Traditional propagation models take 2D shortcuts to approximate real RF propagation. VIPER's unique processing methodology combines the broad coverage of stochastic heat maps with the specificity of deterministic ray tracing, but at speeds that neither older method can match.

High Fidelity Data

The best scenario analysis depends on quickly retrieving the best data available. VIPER combines HII's full library of sub-meter LiDAR data with default or user-modified radio characteristics, guaranteeing accurate modeling of the RF environment and potential interference sources.

Full 3D Environments

VIPER supersedes TIREM, our industry-standard propagation analysis tool, by calculating RF propagation through a real-world environment. VIPER integrates terrain based analysis (line-of-sight, high point retrieval, path profiling, area coverage) with analysis of geoclimatic factors and fully 3D environmental characteristics, including real-world building geometry and materials.

Dynamic Reconfiguration

VIPER can be utilized for simulations from small-scale, arbitrary scenarios to global-scale measurements, using variable geometry formats. VIPER's propagation model is specifically designed to be part of the model based design engineering (MBDE) and model based systems engineering (MBSE) lifecycle.

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