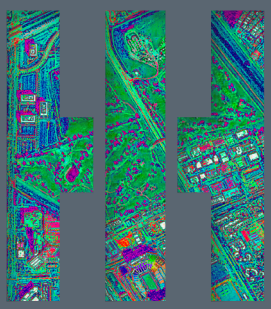

TIREM

OPTIMIZED ELECTROMAGNETIC ENVIRONMENT ANALYSIS

We are anticipating the future, where more and more systems depend on interference-free spectrum access.

Consumers today are connected like never before, and wireless providers are faced with increased demand for reliable, high-speed service for voice, data, video and more. As the electromagnetic environment requires more dynamic awareness, industry leaders will require fast, thorough, precise and reliable analysis.

The Industry's Leading Experts

With decades of experience in the field—and more than 100 spectrum and software engineers—HII is a leader in spectrum management and radio frequency (RF) interference analysis. Using leading-edge tools and data, we custom engineer analytical solutions for each analysis and configuration scenario. HII's insight can support commercial providers in building out their networks to maximize coverage and connectivity while avoiding radio frequency interference (RFI). HII knows the commercial world moves fast: we have unique experience coordinating spectrum sharing through rapid and flexible processing, and can produce thousands of analyses in a matter of days using distributed computing.

Superior Spectrum Analysis Tools

HII's Terrain Integrated Rough Earth Model (TIREM) is the premier propagation model in the United States and is available as an optional MATLAB component. TIREM uses physics-based algorithms to predict coverage for land mobile radios, point-to-point distances, and sensor acquisition ranges from 1MHz into the "spectrum frontiers" bands. The reliability of our analysis for ground and air transmitters and receivers rests on our full library of sub-meter LiDAR data.

TIREM integrates over one million calculations and uses multiple techniques, including free-space spreading, reflection and atmospheric absorption. TIREM examines terrain and elevation to calculate propagation over land-sea transitions, and calculates beyond-line-of-sight propagation due to knife-edge diffraction. Other enhancements include long-term fading models, our Spherical Earth Model, and options to combine atmospheric ray tracing with rain, dust and fog models.

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ABOUT US:

HII is an all-domain defense and technologies partner, recognized worldwide as America's largest shipbuilder. With a 135-year history of trusted partnerships in advancing U.S. national security, HII delivers critical capabilities ranging from the most powerful and survivable naval ships ever built, to unmanned systems, ISR and AI/ML analytics. HII leads the industry in mission-driven solutions that support and enable an all-domain force. Headquartered in Virginia, HII's skilled workforce is 44,000 strong. For more information please visit HII.com.

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Spectrum Software Lead
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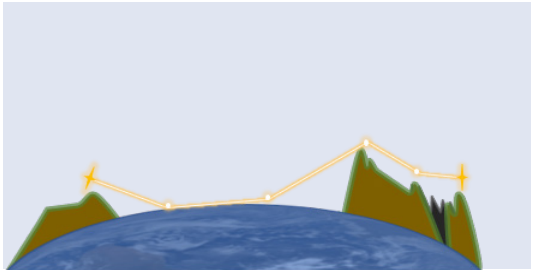
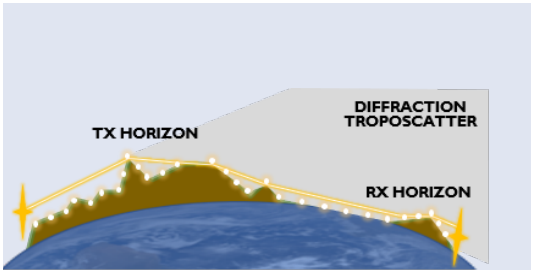
Deterministic Modeling

TIREM models near-field considerations, power, density and field strength equations. Its propagation models account for atmospheric conditions and calculate multi-path, deep fading loss due to Fresnel interference and knife-edge shadowing. TIREM analyzes long-term power fading for atmospheric conditions representing most parts of the world.



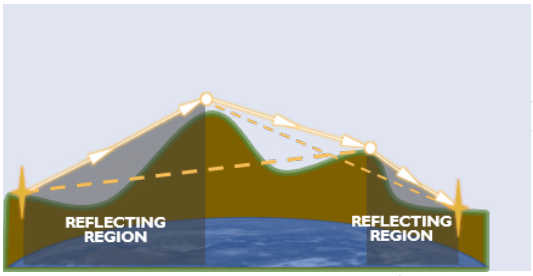
Land/Sea Path

TIREM examines the terrain type and elevation profile to automatically select the optimum model(s) for calculating propagation loss along the path. TIREM will omit models if the path is over homogeneous terrain, or combine the models for propagation paths that transition between land and sea. TIREM accommodates unlimited land-sea transitions along the path.



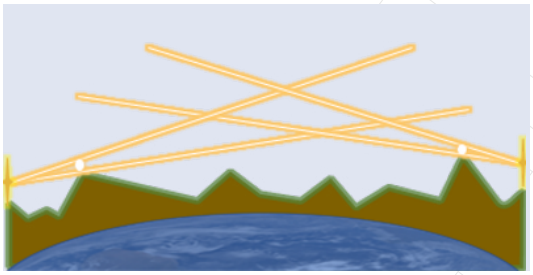
Profile Evaluation

TIREM analyzes the geometry of the profile, including the spherical earth model and selects all appropriate modes of propagation for paths with endpoints that are either within line-of-sight (LOS) or beyond-line-of-sight (BLOS). TIREM adjusts its analysis to compute propagation paths that fill the geometric shadows behind urban clutter and topographic features.



Knife-Edge Diffraction

Knife-edge diffraction is one of the physical phenomena that extend signal propagation beyond reflecting regions into the BLOS zone. TIREM models multiple knife-edge diffraction, which enables propagation analysis over varied terrain, above urban areas, and across wide distances.



Troposcatter

Troposcatter extends the propagated signal into the BLOS zone. The electromagnetic signal is reflected off the troposphere. TIREM models troposcatter as a function of frequency and other environmental and equipment factors, including atmospheric absorption in frequencies above 10GHz. The analysis capability includes variability as a result of the model's standard deviation from measured data.

TIREM fully integrates with other HII proprietary products like UrbanPropModel, MR Topo, and Forest for robust propagation modeling capabilities that operate across variated terrains. TIREM meets modern computing requirements. It integrates with MathWorks products, supports Python binding and is available for Windows and LINUX platforms at 32- and 64-bit architectures. TIREM includes empirical models for analysis without access to detailed terrain data. To learn more about our complete package of spectrum monitoring, modeling, and analysis solutions, or to connect with one of our experts, visit us at HII.com.

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