

- EO
- AEO
- RF
- GNSS
- RAY

SE-NAV



FAST

SIMULATING, ASSESSING AND IMPROVING GNSS RECEPTION IN CONSTRAINED ENVIRONMENTS

SE-NAV is a propagation simulator dedicated to the assessment of signals reception in stringent environment. This software predicts the performance of systems such as GPS, GALILEO, BEIDOU or pseudolites integrated into 3D virtual scenes representatives of real urban areas. SE-NAV provides user with output to estimate and to locally improve the signal reception in a given environment

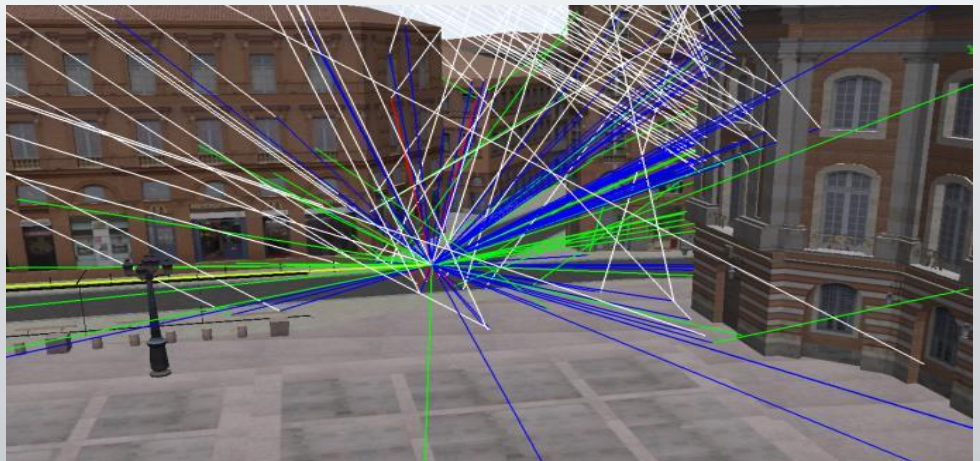
Features

- Deterministic Method
- Environment Modelling
- Multipath Modelling
- Simulation Modes
- User Friendly Interface

Use-Cases

- Aid for the development and the deployment of Localized Based Services (LBS)
- HW Receiver Performance Test
- Military applications
- R&D and/or measurement campaigns dealing with the propagation of navigation signals in urban environment
- Operational Conditions Maintenance of space and terrestrial systems

SE-NAV deterministically simulates the propagation of a GNSS signal in a 3D virtual scene. It provides the user with all the tools needed to assess availability, accuracy and performance of a radionavigation system



SE-NAV simulation in Toulouse downtown. White rays model the direct paths of the GPS satellites seen by the receiver. Blue, green and red rays are multipaths.

SE-NAV uses the deterministic method of Ray Tracing coupled with Geometrical Optics and Uniform Theory of Diffraction to compute the shadowing effects and the multipaths generated by the objects of the environment. Thanks to new computation techniques based on GPU resources, it returns performance assessment in record time

SE-NAV models GNSS constellations. It computes the orbits of satellites during the simulation from almanacs.

SE-NAV also defines terrestrial beacons to model indoor navigation or telecommunication signals propagation

Benefits

- Constellations
- Beacons
- SE-NAV models
- Ionospheric delay (Klobuchar and RTCA models)
- Tropospheric delay and losses
- 3D Scene
- Server



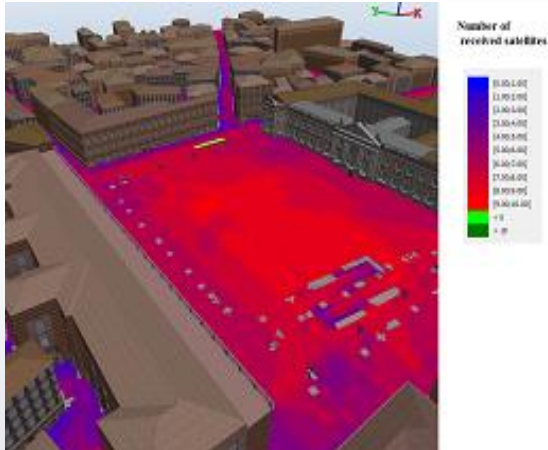
Import Files

- Almanacs (YUMA format)
- 3D terrains (SDM format)
- 3D antenna patterns
- In addition, SE-NAV is fully compliant with the data produced by SE-WORKBENCH™

System requirements



SE-NAV uses realistic synthetic environments to model the reception scene. Materials (permittivity, conductivity, thickness) can be defined through an ergonomic interface. A library of materials is provided and populated automatically. SE-NAV is fully compliant with the formats used by the SE-WORKBENCH

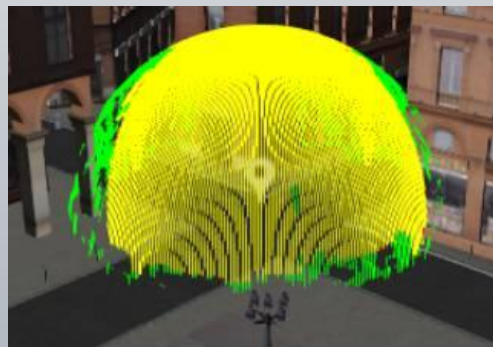


Sample of GPS coverage, computed by SE-NAV using a virtual 3D mock-up of Toulouse downtown. Blue areas indicate availabilities problem

SE-NAV provides server facilities to be controlled by an external client. An open protocol allows users to define a scenario and to start a simulation

SE-NAV can also be coupled with SPIRENT SimGen™

SE-NAV provides propagation information (masks, multipaths geometries and properties etc...) in real time to take into account the impact of the local environment in a SimGen™ simulation



LOS + NLOS visibility diagram. These diagrams can be imported in SPIRENT SimGen™ as Imm files.

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