

Investigate Ground Plane Effect on Bistatic Impulse Radiating Antenna (IRA) and Sphere Scattering Scene

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This paper extends an initial investigation described in detail in a previous paper. This investigation consists of a sequence of six case studies of the received response to compare the sphere scattering signatures under varying conditions. Through these case studies, we gain a better understanding of the effect of a simulated perfect ground on the scene and two possible variables to mitigate the effect of ground bounce. The three figures below show: a) the scene configuration, b) the transient early time response, and c) the late time transient response containing the scattering from the sphere.

The basic scene consists of a transmit IRA located on the xy plane and a receive IRA located at a height above the transmitter. A sphere is located at the origin, a distance above the plane and a distance away from the IRAs. This study compares the effect of three variables: ground plane, raise and tilt. Ground plane is simply the comparison between the results of the simulation with and without a perfect electric conducting (PEC) ground plane located in the xy plane. The second variable, “raise”, means that the Tx IRA is raised up above the xy plane such that the focal point is in line with the front and center point of the sphere. The third variable is tilt, and it again relates to the Tx IRA. Tilted means that the Tx IRA is slightly tilted up from the xy plane such that the focal point is directed to the front and center point of the sphere.



