ABSTRACT

Ground Penetrating Radar (GPR) is kind of radar that is used to detect and locate buried *metal* and *non-metal* objects. The transmitting antenna radiates electromagnetic impulses into the ground and hits the objects. The wave spreads out and travels downward. If it hits a buried object or a boundary with different electrical properties, the receiving antenna receives variations in the reflected return. From reflected signal information, the position and the type of the object can be obtained by signal processing.

Antenna is one of the important things for GPR application, due to resolution and penetration. GPR application needs different resolution and penetration depth. Both of these parameters can be reached optimum if they use certain impulse range. However, to have GPR application with certain impulse range, it has to use several antennas with several dimensions. So, it is expensive and unefficient.

This final project describes the design of logarithmic spiral antenna that can be used in GPR application for (0.6 – 2.4) ns impulse range by simulating it using Ansoft HFSS 9.2. The simulation result shows that to get the logarithmic spiral antenna which is appropriate to GPR is affected by the flare rate, spiral arms, spiral turns, and angular rotation that influences some antenna parameters, such as radiation pattern, impedance, gain, and VSWR. Logarithmic spiral antenna is also affected by the quality of output impulse that is transmitted by antenna. Ringing in impulse that decrease the performance can be minimized by antenna, so that antenna can transmit and detect object well, and it can produce different resolution and penetration depth with a transmit antenna.

Keywords : GPR, logarithmic spiral antenna, flare rate, impulse