

ABSTRACT

Ground Penetrating RADAR (GPR) is one of RADAR application development which used for landscape imaging. As RADAR in general, antenna is one of important part in GPR. Within this final assignment, an antenna is used simulating pulse transmission with 5 ns duration (center frequency: 200 MHz).

Antenna within GRP application expected to transmit pulses with minimum late-time ringing level. One of antenna being used for that matter is TEM horn antenna [11]. To overcome impedance matching problem with ground medium, modification being done by filling dielectric matter inside TEM horn antenna. Then 4 layer dielectric addition made as transition from antenna to medium to enlarge pulse amplitude which successfully transmitted within medium [9]. In simple way, dielectric layer profile is given in linier where value transmission from first dielectric layer to next layer constantly valued with identical gauge. Simulation done by FDTD (Finite-Difference Time-Domain) method which in application being done using FDTD3D software so that pulses which successfully transmitted by antenna within time domain can be observed.

The result of simulation shows that simulated TEM horn antenna design can transmitt pulses with small late-time ranging lever of 1,6% - 4,5%. By doing dielectric layers addition, it can improve peak to peak pulse amplitude which succesfully transmitted within medium of 0.38% - 8.34%. From result of input impedance analysis and VSWR, proved that both TEM horn antennas as UWB antenna with 162,39% and 213.15% fractional bandwidth. With small late-time ringing level and adequate bandwidth, then TEM horn antenna design which resulted eligible for being used as GPR antenna.

Keywords: GPR antenna, dielectric layer, peak to peak amplitude, late-time ringing, FDTD