

ABSTRACT

Loran (*Long Range Navigation*) is a terrestrial radio system that uses characteristic of wave propagation on ground wave. Because using the ground wave propagation, the coverage of LORAN is very wide, that is expected this technology is suitable for the geography in Indonesia and can reduce the dependence on other countries, such as GPS (*Global Positioning System*), so that national defense can be increased. In one Loran system arranged by some subsystems in cell or usually called by chain. One Loran cell is arranged by one master station and more than two slave stations.

In this final project, design Loran transmitter using FPGA in IF level. Because of one loran cell use one master station and more than two slave station, so will be needed three FPGA for signal generators. One FPGA as a master station signal generator, and two other FPGA as signal generator in slave stations. In master station will be generated navigation pulse, paging and timing, but in this final project only generate navigation signal, while paging signal and timing signal will be discussed in other final project. In slave station also will be generated navigation signal. Synchronization between master and slave signal is much needed so that the receiver of loran can be received the signal from the beginning of the master signal, first slave signal and second slave signal. Time difference of the arrival between the pulse of master station a slave station is formed 1 GRI (Group Repetition Interval) that is detected by the loran receiver for establish the time difference. Base on the time difference, receiver can establish the position of its coordinate in earth.

The accuracy of LORAN-C pulse can be produced by implementation using FPGA by generate 300 μs pulse width, the delay between pulse 700 μs , and the period of 1 GRI loran- c is 32 ms. The characteristic of the signal that is produced by AM-DSB-SC (*Amplitude Modulation – Double Side Band – Suppressed Carrier*) modulation can reach maximum amplitude at $t = 65 \mu s$.

Key words : LORAN-C, Groundwave, Group Repetition Interval (GRI), Field Programmable Gate Array (FPGA).