

## ABSTRACT

Disasters in Indonesia often happen unpredictably causing losses and killing and/or injuring more people. A possible solution to overcome this problem is by implementing a disaster early warning system (EWS). However, EWS in Indonesia is still unoptimal in design and implementation due to the absent of clear standard-/guidance to follow across the country.

This undergraduate thesis studies EWS, of which the signal is broadcasted via Indonesia digital television (TV). To obtain good results, this thesis studies several EWS techniques applied in other developed countries, i.e., Japan, Korea, and united states of America (USA). This undergraduate thesis then models an EWS system as a system having 3 nodes, where each node represents (i) warning authority, (ii) broadcasting station, and (iii) TV receiver. This undergraduate thesis also evaluates the possibility of EWS system having 4 nodes to observe the further possible improvement. EWS performances evaluations are carried out using computer simulations based on (i) message delivery speed or latency and (ii) bit error rate (BER) performances.

The results of this study indicate that the EWS having 3 and 4 nodes are effective in terms of latency and BER performances. In general, EWS with 5 nodes has good BER performances, but the latency of  $T \geq t + 5\Delta t$  causing the EWS system has delay larger, which is depending linearly to the number of nodes. The results of this thesis are expected to help the development and implementation of EWS in Indonesia.

Keywords: Early Warning System, Digital Television, Broadcasting System