ABSTRAK

Indonesia termasuk daerah rawan bencana gempa bumi karena Indonesia terletak di antara tiga lempeng tektonik dan di pulau Maluku sendiri memiliki 10 zona garis patahan. Pada tanggal 7 Desember 2016, gempa tektonik berkekuatan 5,3 SR melanda kabupaten Maluku Tengah dan sebagian wilayah Kota Ambon. BPBD Kota Ambon juga mencatat ada sekitar 88 kali gempa bumi yang terjadi selama 31 Oktober sampai dengan 01 November 2017. Dampak sering terjadinya gempa tektonik di pulau Maluku mengakibatkan efek domino, seperti tanah longsor di beberapa titik di kota Ambon. Data yang dihimpun BMKG Kota Ambon periode bulan Mei hingga Juni 2017 kurang lebih terdapat 124 titik bencana tanah longsor terjadi dan sebanyak 218 unit rumah terancam bencana tanah longsor. Penelitian ini bertujuan untuk merancang dan melakukan analisa pengukuran terhadap sistem pemantauan indikasi gempa bumi dan tanah longsor terintegrasi melalui Wireless Sensor Network (WSN) dengan menerapkan topologi bintang, teknologi Zigbee, teknologi WiFi Shield dan SIM-900 GSM/GPRS. Teknologi WSN diimplementasi untuk mengakuisi dan mendistribusikan data secara luas pada daerah rawan longsor agar dapat dipantau dan dikendalikan secara terpusat. Dengan mendeteksi indikator-indikator mencurigakan melalui node-node stasiun dan node coordinator, sistem memberikan informasi kepada nomor pemantau dan mengktifkan alarm peringatan. Sistem juga dapat diakses secara real time melalui aplikasi antarmuka website dengan mengakses Access Poin Wireless-LAN perangkat Arduino Wi-Fi Shield.

Kata Kunci : Gempa Bumi, Tanah Longsor, Wireless Sensor Network, GSM, WiFi.

ABSTRACT

Indonesia is an earthquake prone area because Indonesia is located between three tectonic plates and on Maluku island itself has 10 fault zones. On December 7, 2016, a magnitude tectonic earthquake measuring 5.3 SR struck Central Maluku district and parts of Ambon City. BPBD Kota Ambon also noted there are about 88 times the earthquake that occurred during 31 October to 01 November 2017. The impact of frequent occurrence of tectonic earthquakes on the island of Maluku resulted in a domino effect, such as landslides at some point in the city of Ambon. Data collected BMKG period of May to June 2017 more or less there are 124 points of landslide disaster occurred and as many as 218 housing units are threatened by landslide disaster. This study aims to design and conduct measurement analysis of integrated earthquake and landslide indication monitoring system through Wireless Sensor Network (WSN) by applying star topology, Zigbee, WiFi Shield and SIM-900 GSM / GPRS technologies. WSN technology is used to acquire and distribute data widely in landslide prone areas to be monitored and controlled centrally. By detecting suspicious indicators through station nodes and coordinator nodes, the system provides information to the monitoring number and enables warning alarms. The system can also be accessed in real time through the website interface application by accessing the Wireless-LAN Access Points of Arduino Wi-Fi Shield devices.

Keywords : Earthquakes, Landslide, Wireless Sensor Network, GSM, WiFi.