

## ABSTRACT

*The development of telecommunications continues to grow one of them for the field of navigation, namely the Global Positioning System (GPS). GPS is used for tracking/monitoring systems to ensure human safety and to efficiently initiate search and rescue in the event of an emergency. The lack of safety at the mining company led to numerous cases stating that the miners were missing and could not be found. Especially in open-pit mines. The use of a GPS tracker as a monitoring tool is still less effective because the GPS tracker must be connected to the GPS module and has other components that must be added in order to work properly. Because of the many components that must be connected makes gps trackers difficult to wear on clothing. In addition, gps tracker has a solid shape and can break if exposed to rocks. Because it requires an antenna that is used as GPS and only needs to connect with the GPS module without any other components and also has a cloth shape that will not break if hit by rocks.*

*In this Final Project has been designed and realized wearable textile antenna that works at a frequency of 1,575 GHz for GPS applications. wearable textile antenna is a useful device to simulate electromagnetic waves into the air and can be integrated into clothing and the human body. But the use of antennae on the body greatly affects the condition of the human body. Therefore, sar simulation is needed so that the antenna can be safely used. The material used in designing wearable textile antenna is textile material that matches the clothes of mine workers. The substrate uses aramid fabric because it is heat resistant and also wet. Patches and groundplanes use knitted conductor cables or copper woven. The design used is a hexagonal patch and uses defected ground structure (DGS) method on the groundplane. On the substrate is stacked 3 layers of aramid fabric combined into one.*

*The result of this Final Project is that the simulation and manufacturing process is measured in 2 conditions, when the usual conditions and on-body. Simulation results when the usual conditions obtained the value of Return Loss -20.34 dB, VSWR 1.21, Bandwidth 238 MHz and Gain 3803 dBi. The simulation result when on-body measured antenna at a distance of 2 mm and obtained return loss value -15.61 dB, VSWR 1.39, Bandwidth 185 MHz, Gain 1200 dBi and SAR 1.59 W/kg. As for the results of manufacturing when keadaan usually obtained Return Loss -52.8 and VSWR 1.001. The result of on-body manufacturing obtained Return Loss -12.4 and VSWR 1.56.*

**Keywords:** *wearable textile antenna, GPS, DGS, mine workers, hexagonal.*