ABSTRACT

Utilization of solar energy using solar panels can convert solar energy into electrical energy. The Sun can release 3.86 x 1026 joules every second. About 1kW/m2 of the solar energy received by the Earth can be sufficient 10000 times the energy needs on earth if solar energy is able to be utilized throughout the earth's surface. That is, covering 0.1 percent of the Earth's surface with solar panels that have an efficiency of 10 percent, can meet the world's current energy needs.

Generally solar panels are installed facing the sun, solar panels will produce optimal electrical energy when sunlight is positioned perpendicular to the solar panel. The sun moves from east to west, then at certain times the output produced by solar panels is not optimal. To answer the problem of optimizing energy from sunlight captured by solar panels, it takes a solar tracking system to optimize the working system of the solar panel. Therefore, in this final project will be made " Development of Solar Tracking System Based PID Controller". In this system, the solar panel will move automatically following the direction of sunlight based on readings from the photodiode sensor. This system uses a dual axis motion model that aims to make solar panels move from west-east and north-south.

This system is equipped with PID control in order to obtain a better and controlled panel movement output. The results of this study showed that the IMU sensor used had an average reading error rate of 1.89% (Yaw) and 4.96% (Pitch). Meanwhile, when the tracking system is active, the battery performance increases by 8.7% and the panel performance increases by 19.87% compared to when the tracking system is off.

Keyword: *Solar Panel, Tracking, Dual-Axis*