## *ABSTRACT*

*The laser uplink satellite communication system is a communication system that uses light from a laser as the transmitter to send data from the ground station to the space satellite at high speed. The laser satellite communication system has the advantages of low power and wide bandwidth, making it superior to conventional satellites. Laser satellite communication uses wavelength and atmospheric loss to understand the impact on the performance of long-distance communication systems from the ground station to the space satellite. Therefore, this study will observe the influence of wavelength and atmospheric loss on the laser on the performance of the laser satellite communication system from the ground station to the space satellite. This system also allows for increased transmission distance and compares signal quality with conventional satellites. This study uses the OptiSystem 21 simulation software. The atmospheric loss used is between 20 dB to 30 dB and the wavelengths used are 850 nm, 1310 nm, and 1550 nm. The parameters to be analyzed are Bit Error Rate (BER), Received Optical Power, and Received Optical Spectrum. The results show that the received power increases with increasing atmospheric loss. The received power reaches -50 dBm at all three wavelengths with an atmospheric loss of 30 dB. BER, Received Optical Power, and Received Optical Spectrum decrease as atmospheric loss decreases.*



***Keywords: Atmospheric Loss, Bit Error Rate, Ground Station, Laser, Wavelength.***