# ABSTRACT

Nanosatellite is a small satellite with minimum dimension is U1 or 10×10×10 with maximum weight is around 10 kg and have spesific purpose or mission depends on its payload. One of satellite mission that is developed in Telkom University is Remote sensing. In the remote sensing system image file that's taken by optical sensor is processed before it's sent. Image processing is very important thing to do. The reason for image processing can be view from many perspective, as example is from image security. From security point of view it is known that the distance between satellite and earth is very far away and it's use a resource that are public use. So, Satellite data is very fragile and can be taken easily by third party.

One of the way to secure data from third party is encryption. Encryption system will scramble image data that will be sent by satellite. There are many method for data encryption. But, because of the image size for satellite is quite big the algorithm that is suitable with satellite system is encription based on chaotic map. And Baker map is one of the example of chatic encryption.

In this final project improved key space Baker map algorithm has been simulated, measured, and implemented on FPGA. Based on the measurement it can be concluded that this method is fit to be implemented on nanosatellite system because it needs only 0.05 second to do the encryption. This method also have a quite big key space that is $10^{300}$ so it is unbreakable by brute force attack. Besides, because the PSNR on the image before and after encryption and decryption process stay the same this algorithm has a good noise resistance and fit to be implemented on channel or system with many noises.

**Keywords :** nanosatellite, image encryption, FPGA, chaotic encryption, Baker map, Improved baker map.