ABSTRACT

Tel-U Sat *is a* 1U CubeSat *which is designed to carry the mission of Earth's observation and communication with the content of a camera and other modules. To run the mission, the camera must always lead to the Earth. Therefore,* Tel-U Sat *requires sub-systems of* ADCS *in charge of control of a satellite forward position to the Earth at the angular movements of the roll, pitch, and yaw when it is a spaceship.* ADCS *sub-systems consists of several types of actuators. The type of actuator that can be used is quite one of them or a combination of Reaction Wheel, Magnetic Torquer and Thrusters, according to the needs and nature of the satellite.*

In Tel-U Sat*, actuators are used in the form of the reaction wheel. Because* Tel-U Sat *measures* 1U *and has a limited voltage, it is used micro reaction wheel that has a minimal dimension and uses a micro-sized motor. If the satellite is in an inappropriate position, the Reaction Wheel will make the satellite body move back to its original stance and position. The actuator works based on how much interference a satellite receives then moves by relying on a large spin and torque-speed to return to its reorganizations attitude. Micro Reaction Wheel is composed of flywheel attached to DC motor and Wheel Drive Electronic* (WDE).

The Micro Reaction Wheel has been designed to have a minimum speed of 64021rpm *with a voltage of* 8V *and a duty cycle of* 9.95% *or* 4.47% *and the maximum speed with a rigid of* 1,9V *and a* 7.55% *duty cycle or* 6.69%. *With these results, the Micro Reaction Wheel can generate a torque of* 0.74 mNm. *Consume battery energy at a maximum speed of* 16.667 mAh.

Keywords: *CubeSat 1U, Tel-U Sat, ADCS, reaction wheel, flywheel, active control*