

## ABSTRACT

*Singapore Amazing Flying Machine Competition (SAFMC) is a Quadcopter or drone competition organized by DSO National Laboratories, Science Center Singapore and supported by the Ministry of Defense Singapore (MINDEF). In development of quadcopter many problems are found, such as collisions or crashes against obstacles and other quadcopter on the fly.*

*Quadcopter has a special characteristic that has four pieces of motor propellers used. This final project discusses a PID control method for manipulating pitch and roll based on the proximity sensor as collision avoidance. The information obtained is then processed by PID control before entering the quadcopter flight controller. every quadcopter movement will be observed and evaluated to obtain stable movement. Use of wireless communication and telemetry data to facilitate the control of quadcopter with ground stations*

*Quadcopter tested by trial and error methods to get a stable quadcopter movement. The obtained results of experiment  $K_p = 1$ ,  $K_i = 0$  and  $K_d = 0$  with the measured maximum distance of 80 centimeters and the minimum 50 centimeters of the quadcopter indicate that the quadcopter will avoid the obstacles. Test results also showed that the longest flight time of the quadcopter without carrying the payload 9 minutes 2 seconds and carrying the payload 7 minutes 44 seconds.*

*Keywords: SAFMC, Quadcopter, Collision, Avoidance, PID, Pitch, Roll*