ABSTRACT

DESIGN OF STABILIZATION SYSTEM ON REMOTE WEAPON STATION USING INERTIAL MEASUREMENT UNIT

Aim direction is difficult to maintain when it comes to operating remotely controlled weapon system (RWS). The reason is that any disturbance occur in that platform will heavily affected position and orientation of a gun mounted on it. When a gun manually controlled by human, the disturbance can be compensated by its operator –often called a gunner–. When a disturbance comes at certain direction, gunner will try to move the gun to opposite direction thus make the aiming direction can be maintained.

This research is trying to mimicking this principle by designing a prototype, an automated stabilization system platform. This platform works using an inertial measurement unit, a sensor module that can be used to measure angles. If we have a certain angles acts as a set point, any change or deviation from that set point can be considered as an error. This stabilization platform will reducing the error on two axes of rotation (yaw and roll) by moving two dc motors on its respective axes. Fuzzy logic method is used to processing the errors as input and gives output in pulse width modulation which can control the velocity of the dc motors. Interfacing the sensors, gives feedback to monitoring pc, processing the fuzzy logic controller and drives the motor will be handle by a microcontroller which embedded on an Arduino *board.*

As result of this research, a prototype of a stabilization platform is successfully made. It's tested and reacts well to compensates error on yaw and roll axes. With some improvement such as upgrading the sensor and actuator as well as adding some input like motor positions and load current of the motors, this platform can be considered ready to implementing on a real, working remote weapon station.

Keywords: inertial measurement unit, remote weapon station, stabilization, fuzzy logic