

ABSTRACT

Logistics within the military environment is one of the most important requirements for the continuity of military operations. With the development of technology in the field of automation, dangerous military operations can be handled by special vehicles. These vehicles are not only more efficient, but also have the potential to save human lives. Currently, UGV (Unmanned Ground Vehicle) is one of the answers to carrying out such dangerous operations.

This research focuses on the navigation and autonomous control system of an Unmanned Ground Vehicle, as well as addressing the limitations of conventional radio technology by adding a 4G LTE communication system. The prototype developed is designed to perform missions such as patrols, surveillance, and logistics operations in combat zones. The UGV can operate autonomously or manually with remote operator control. An operator can directly control the UGV, and in situations where manual control is not required, the UGV can perform missions autonomously on its own.

The design objectives aim to achieve the reliability of the UGV's communication system and the accuracy of the autonomous navigation system in performing waypoint-based navigation. Using data analysis based on the Haversine formula and Root Mean Square Error, it was found that the UGV's accuracy reached an average of 94.25 (± 2.7)%, and the 4G Long Term Evolution performance achieved latency below 100ms at a distance of 2000m.

Keywords: *unmanned ground vehicle, control, teleoperation, autonomous, 4G LTE*