

## ABSTRACT

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In military operations such as combat training or actual combat, many aspects must be considered. One of them is the robustness of combat vehicles with a small damage coefficient, especially those that have an impact on the number of victims. Therefore, the driver and passenger safety factor as the main operator of the weapon system (alutsista) must be supported by the strength and durability of the weapon system. To check the safety factor of defense equipment, a tool is needed that can detect the impact of damage to combat vehicles in endurance tests and on the battlefield. The aim of this final project is to design and build a Smart Mannequin prototype that will assist in detecting how much vibration and conditions are in combat vehicle tests. In this test the MPU6050 and ESP32-CAM sensors were used which were attached to the Smart Mannequin, the use of the MPU6050 sensor aims to detect how much vibration is received with units of gravitational acceleration and the use of ESP32-CAM to monitor conditions inside the combat vehicle. The method used in this test consists of several steps that are carried out, namely preparing the sensor and microcontroller then retrieving sensor data on the microcontroller according to predetermined time intervals, then the data that has been obtained will be processed by the microcontroller to obtain calculation results based on the data measured and displayed through the screen in graphic form and also stored in the database with the aim of analyzing the results obtained. The test results on the Smart Mannequin prototype with vibration sensors and vision sensors were carried out on different track fields, the vision sensor displays real-time monitoring of conditions inside. The MPU6050 vibration sensor receives vibration input by combining accelerometer and gyroscope values with units of  $m/s^2$ .

*Keywords: Smart Mannequin, IoT, Defense equipment, Sensors*