



Full Length Review Article

DESIGN AND FABRICATION OF SELF AIMING AND ENGAGING GUN (SAEG)

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ABSTRACT

This project involves the complete system design and construction of a SAEG to replace an armed guard. We aimed to develop a compact and highly mobile defence system that allows operational flexibility. The SAEG can autonomously track and shoot at moving targets, while also allowing a user to remotely access and control the gun via computer. The mobility, hardiness, and functionality of this system allows a reliable replacement for human beings in harsh and hostile environments; ultimately sparing a life. Thus we had developed a device which helps in defence field for protection from enemy in boundary areas and to achieve low cost automation.

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INTRODUCTION

This project describes the planning, design and implementation of a semi-autonomous SAEG. A SAEG is a gun that is automatically aimed and fired at targets that are detected by sensors. The earliest functioning military SAEGs were the close-in weapon systems point-defense weapons for detecting and destroying short range incoming missiles and enemy aircraft first used exclusively on naval assets, and now also as land-based defenses. We are replacing gun with laser module due safety purpose. SAEG with face detection is a turret based weapon system that can neutralize targets with user control, within its range. This model consists of mount with two servo motors for tilt and pan, a target detector (a camera) and an air soft-gun. There are many ways to use a real SAEG: anti-air defense, anti-vehicle defense (at checkpoints) and anti-personnel defense. This system falls under the third category. This device has a laser mounted on top of a mechanical assembly as a weapon which is triggered by an electronic relay. The laser will have the ability to move in the theta and pi directions, which will be controlled by two servo motors connected to microcontroller board. The camera is mounted and is used to get the real time image and it will transfer it to a computer where an image processing algorithm calculates the position of target.

This calculation is then sent to the microcontroller board and then the motors orient the laser at appropriate coordinates. Once the laser is pointed towards the target, it will shoot on it. A mat lab program is responsible for performing all image tracking tasks. A USB webcam and the image acquisition toolbox allow mat lab to capture a video stream and analyze frames to ascertain velocity vectors.

Existing System

The armed guards are used for the monitoring and to detect as surveillance for country boundary and terrorist attacks.

Drawbacks of existing system

- Human loss on attacks in border.
- Human beings it is difficult for surveillance.
- Terrorist crossing boundary in night times.

Proposed System

Here a different type of sensing is done by image processing of the surveillance using camera module and laser is uses to locate the enemies for attack.

Advantages of proposed system

- Save soldiers life
- More efficient surveillance

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Functional Diagram of Saeg

The implementation of MSP 430 launch pad is an easy to use flash programmer and debugging tool for the MSP430G2XX valve line microcontrollers. We connect with two hobby servo motor is uses error sensing feedback signals to determine and control the position of a motor shaft. In motor Torque is the maximum power a servo can produce, and speed is the time it takes to move the output shaft from one angle to another. This time taken is known as transit time of servo and usually measured per 60°; i.e. the transit time is calculated on the amount of time a servo takes to move output shaft 60° from existing position. This board consists of inbuilt 7805 regulator with filter. Input of the regulator is given through BAT IN (Battery In) terminals. ON/OFF switch is used to ON/OFF the BAT IN to the regulator. When the switch is ON the regulator gets input voltage. The regulated output is taken from two connectors and the BAT IN voltage also taken out.

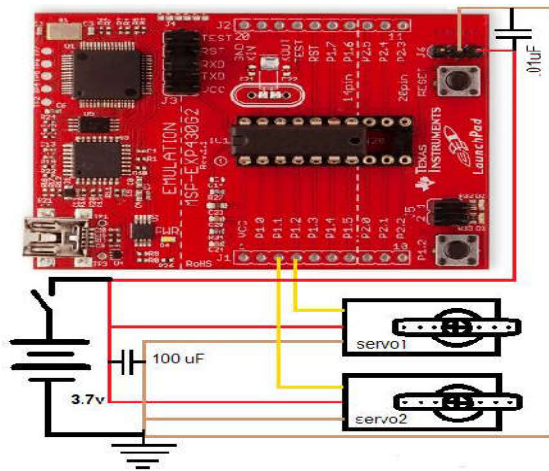


Fig 1. Msp430 Circuit Diagram

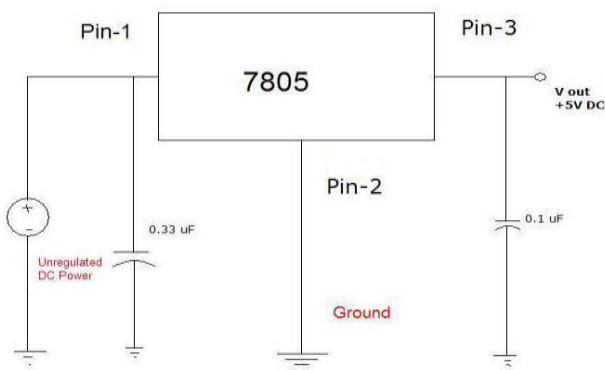


Fig 2. 5v power supply circuit diagram

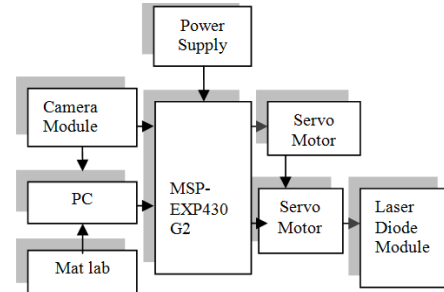
Working Principle

In this project MSP430 microcontroller and camera module is connected to computer were Energia ide is used to upload the programs to the microcontroller. Using MATLAB image processing with help of camera module the surveillance is done. The two servomotors give 180 surveillance over the boundaries. All the operations controlled by microcontroller. This system was operated without human interface.

This helps us to eliminate the unauthorized entry in army boundaries and give hundred percentage efficiency to the system. Mainly the programming helps the system to eliminate the unauthorized entries through the camera interfaced system.

Block Diagram

Robot Section

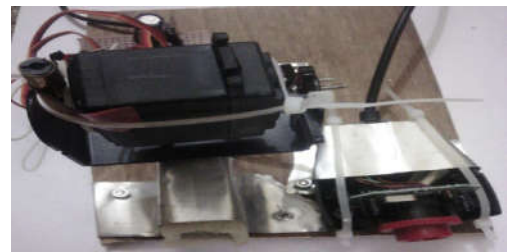


RESULTS AND CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries. FABRICATION OF SELF AIMING AND ENGAGING GUN (SAEG) is working with satisfactory conditions. We have done to our ability and skill making maximum use of available facilities. In conclusion remarks of our project work; let us add a few more lines about our impression project work. Thus we had developed a device which helps in defense field for protection from enemy in boundary areas and thus we know how to achieve low cost automation. The system can be improved in many ways. One way is that can be connected with satellite introduced for the same system such that the efficiency volume of system can be improved and thus the closed loop control gets maintained.

Project Model

The practical experimental setup to show the clear work of SAEG and its compact size to handle and low cost automation



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