

Missile Sensing Vision Laser Shooter

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Abstract— In today's world, there is rarely any scientific field which is not influenced by laser technology. After 60 years of regressive research and experimentation on laser, it has finally found its place in the field of the defense applications like Mid Infrared Advanced Chemical Laser (MIRACL), Air Borne Laser (ABL), Laser guided weapons etc. The laser guardian forces always tried to use new gadgets and weapons for reducing the risk of their casualties and to defeat their enemies with the development of sophisticated technology, it mostly relies on the high-tech weapons or machinery being used. It has concluded to be very useful where safety and security are top priorities. The Rover will have a set of sensors to observe the environment, and will either autonomously make decisions about its behavior or pass the information to a human operator at a different location who will control the vehicle through teleoperation. This system presents different kinds of robotic technologies being used in all the three main forces, Navy, Army and Air. For detecting missile here, we use missile sensing guided system through UV. After detecting the missile through ultra-sonic radar we can lock on and engage a target and speed to a target and destroy it in seconds. Although there are quite many limitations for using laser technology in the area of Military and Defense, still there is high area of scope of future development in this field. So, Scientists are developing new Defense System, which will increase the security of nations against foreign threat, we focus our attention on the use of robots in war and peace as well as their impact on society.

Keywords—laser technology, gadgets & weapons, , rover, robotic technologies, ultra sonic radar.

I. INTRODUCTION

The Missile Sensing Vision Laser Shooter [1] is an innovative device that combines missile detection technology with laser shooting effects. It's designed to enhance the gaming experience and create a more immersive and interactive environment. It's a cool concept for those who love futuristic gadgets and gaming. The Missile Sensing Vision Laser Shooter is equipped with advanced sensors that can detect incoming missiles or projectiles. Once detected, it activates laser shooting effects, giving users a thrilling and realistic experience [2]. It could be used in various gaming scenarios, such as virtual reality games or laser tag arenas. The combination of missile sensing and laser shooting adds an extra level of excitement and immersion to the gameplay [3]. It's definitely a unique and innovative concept that could take

gaming to the next level! Laser-based directed-energy weapons have been under development for defense purposes, particularly for the destruction of incoming missiles [4]. Various practical challenges, such as directing a laser over a large distance through the atmosphere, complicated the implementation of these systems. Optical scattering and refraction would bend and distort the laser beam, making it difficult to aim and reducing its efficiency. Missile, Rocket-propelled weapon designed to deliver an explosive warhead with great accuracy at high speed.

The underlying assumption with the current concept of laser weapons is that the entire weapon platform must be deployed in space because this is the most technologically feasible and cost-effective approach. But several other options are conceptually possible [5]. One alternative architecture involves placing the laser device on the ground and employing optical systems, which are basically large mirrors, to relay the laser beam to the target. Another option that merits consideration entails using a combination of space-based lasers and optical relay mirrors in order to reduce the number of costly laser platforms. The most common method of guidance is to use some form of light, such as infrared, lasers, or radio waves, to guide the missile onto its target. Radar Use in Missile Defense. Radars are used in missile defense both for detection and tracking of threats. An important parameter in selecting a radar for missile defense is resolution.

II. LITERATURE SURVEY

The technology used in [6] is Radio Nodes. The purpose of radio nodes is receiving data from sensors and sends it to WANs. This paper presents an overview of defense related applications of wireless sensors networks. As technology increasing day by day everything is wireless. In a military applications also wireless sensor networks are widely using. The elements contain in this paper are Sensing unit, Processing unit, Communication unit, and Power unit. In [7] Laser technology was addressed. Laser technology is widely used in military, industrial manufacturing, electronics, holography, spectroscopy and other fields. Military laser technology covers many aspects of military operations, such as reconnaissance warning, weapon guidance, high-power laser weapons, communication etc. The elements contain in this paper are Energy source, Laser medium, and Optical resonator. Military operations often demand a secure and timely transmission of a massive amount information from one place to another. Laser beam is used as a laser weapon. For tracking missiles, warships, fighter aircrafts are military vehicles. In [8] various

techniques for Laser communication, Laser range finders, Laser sensors, Laser weapons, and Infrared sensor is used to identify missile are described. Lasers are of interest to the navy and observe as potential shipboard weapons because they have potential advantages for countering some types of surfaces, air and ballistic missile targets. Laser powered can be fired again and again until the ship as long as has the fuel to generate electricity. This are more used in near-shore operations where rockets, missiles, mortars could be fired at navy ships [9].

III. PROPOSED SYSTEM

Missile Detection and Automatic Destroy System

This proposed system uses an ultrasonic module interfaced to a microcontroller of 8051 family. An ultrasonic transducer comprising of a transmitter and receiver are used. The transmitted waves are reflected back from the object and received by the transducer again. The total time taken from sending the waves to receiving it is calculated by taking into consideration the velocity of sound. The block diagram of Missile Detection and Automatic Destroy System is shown in fig.1

Then the distance is calculated by a program running on the microcontroller and displayed on a liquid crystal display screen interfaced to the microcontroller through ZigBee Wireless communication [10]. The circuit is used to receive the reflected signals of 40 KHz from the missile object, to feed that to a program of the microcontroller and to switch on appropriate load while the program is executed at the microcontroller. When the microcontroller receives the signal from ultrasonic receiver it activates the door gun by triggering the gate of MOSFET through a transistor or relay. The sensor is fitted on antenna and is rotated and controlled by stepper motor through 360 degrees. If there is any target within the detection range, the application will turn the launcher to the nearest detected target and fires. The Block diagram of Unmanned ground vehicle is shown in fig.2.

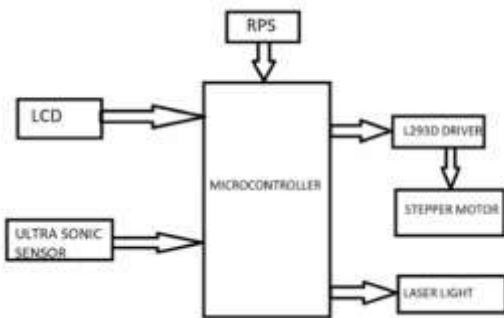


Fig. 1. Block diagram of Missile Detection and Automatic Destroy System.

Unmanned ground vehicle (UGV)

An unmanned ground vehicle (UGV) is a vehicle that operates while in contact with the ground and without an onboard human presence. UGVs can be used for many applications where it may be inconvenient, dangerous, or impossible to have a human operator present. Generally, the vehicle will have a set of sensors to observe the environment,

and will either autonomously make decisions about its behavior or pass the information to a human operator at a different location who will control the vehicle through teleportation.

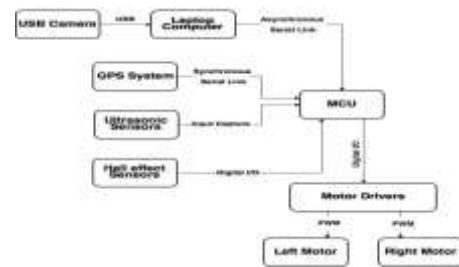


Fig. 2. Block diagram of Unmanned ground vehicle.

The UGV is the land-based counterpart to unmanned aerial vehicles and unmanned underwater vehicles. Unmanned robotics are being actively developed for both civilian and military use to perform a variety of dull, dirty, and dangerous activities shown in fig.3.



Fig. 3. UGV machinery

Missile sensing, vision, and laser shooters play a pivotal role in modern defense systems, ensuring superior accuracy and target acquisition capabilities. The primary objective of missile sensing technologies is to detect and track incoming threats with unparalleled precision. By employing advanced sensors, these systems can identify hostile missiles from a distance, enabling rapid response and interception. The objective here is to incapacitate or destroy incoming missiles using directed energy, harnessing the power of lasers to neutralize targets effectively. Furthermore, laser shooters contribute to a proactive defense strategy, enabling preemptive strikes against potential threats.

In summary, the objectives of missile sensing, vision, and laser shooters converge on enhancing national security by providing robust, swift, and precise defense mechanisms. One of the most significant advantages of laser weapon systems is their precision and accuracy. Lasers can be directed at specific targets with minimal collateral damage, making them ideal for surgical strikes and neutralizing threats in densely populated. Various practical challenges, such as directing a laser over a large distance through the atmosphere, complicated the implementation of these systems.

The block diagram for a Missile Sensing Vision Laser Shooter consists of several key components shown in fig.4. First, we have the missile sensing module, which detects incoming missiles using advanced sensors. Next, the vision module processes the sensor data and provides real-time visual feedback. Then, the laser shooter module uses precise targeting

algorithms to lock onto the detected missiles. Finally, the shooter module activates the laser, which emits a powerful beam to intercept and destroy the incoming missiles. Together, these components work in harmony to provide an effective defense against missile threats.

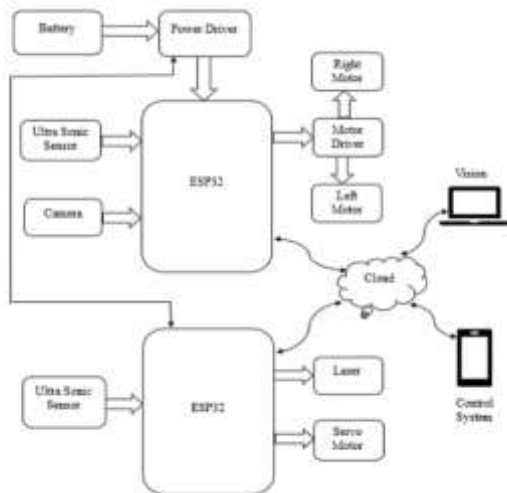


Fig. 4. Block diagram of proposed system.

Working Principle

The Missile Sensing Vision Laser Shooter operates on a principle of laser-based detection and interception.

It involves several key components:

- **Laser Sensors:** High-powered laser sensors are strategically positioned to scan the surrounding airspace continuously. These sensors can detect the presence of incoming missiles by bouncing laser beams off their surfaces and measuring the return time.
- **Target Identification:** Once a missile is detected, the system's onboard computer rapidly analyzes the data from the laser sensors to identify the threat's speed, trajectory, and other critical parameters. This allows for precise tracking of the incoming missile
- **Laser Targeting:** The Laser Shooter uses its laser emitters to lock onto the incoming missile. These lasers are extremely accurate and can maintain a tight focus on the target throughout its flight path.
- **Laser Interception:** When the missile is within range, the Laser Shooter fires a powerful laser beam directly at the missile's critical components, such as its guidance system or warhead. This intense energy disrupts or destroys the missile, rendering it harmless.
- **Real-time Feedback:** Throughout the process, the system continuously monitors the missile's position and adjusts the laser's focus to ensure a successful interception. Real-time feedback and rapid calculations enable precise targeting even against agile and evasive threats.
- **Safety Measures:** To prevent unintended damage or collateral effects, the Laser Shooter is equipped with safety protocols to ensure that the laser is only fired when there's a clear line of sight to the target and no risk to friendly forces or civilians.

Fig.5 & Fig.6 shows the Lasr-beam weaponry and the flow chart for the proposed system.



Fig. 5. Laser-beam weaponry.

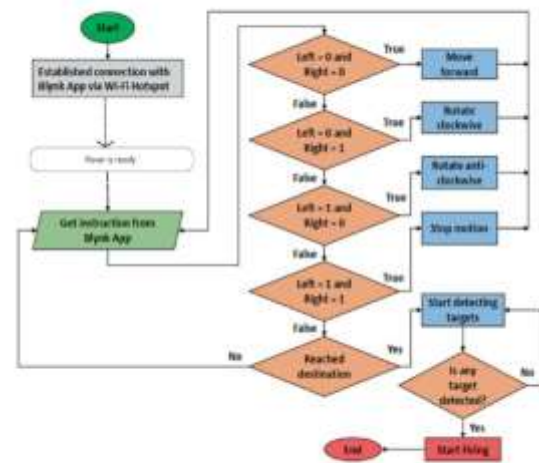


Fig. 6. Flowchart of proposed system.

IV. RESULTS

The result of using Missile Sensing Vision Laser Shooter is highly effective and accurate targeting, with improved precision and reduced collateral damage. It provides enhanced situational awareness and rapid response capabilities, making it a valuable asset in military defense systems and various combat operations. The advanced tracking capabilities and extended range of laser shooters ensure a higher success rate in engaging targets. Overall, the use of Missile Sensing Vision Laser Shooter significantly enhances combat effectiveness and contributes to the overall mission success.



Fig. 7. Internal connections of rover.

The fig.7 shows the internal connections of rover where the connections help to run the rover.



Fig. 8. Connections with motor driver

The fig.8 shows the connections with motor driver where the connections help to run the wheels.



Fig. 9. Outer part of a rover.

The fig.9 shows the outer part of a rover and it runs through the motor driver and with the help of all the connections it works and detects the missile and laser will be shot.



Fig. 10. When an object hit

The fig.10 shows the laser light when an object is detected. The laser light is shown when the ultrasonic sensor detects the object.



Fig. 11. View of blynk app and template.

In the fig.11 we can see how our rover is operated through a blink app which is IOT application.

V. CONCLUSION

In this paper, we have discussed about laser technology for tactical military. Laser technology has a need of today's battlefield, it requires the ability to detect the target at longer distances and exchange massive amount of information in a secure and within seconds. Lasers have the activity that involve the high energy weapons in wars. This technology acts as powerful fight weapon to the war when used as battlefield.

The conclusion of the system is that it's all about creating advanced technology to detect and shoot down missiles using vision and lasers. It involves using computer vision and sensors to spot the missiles and then using laser-based weapons to take them out. It's a super cool system that could make defense systems even better.

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