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Remote Controlled Autonomous Weapon Desıgn And Implementatıon

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ABSTRACT: *In this study, an autonomous weapon design and application that distinguishes friend and foe according to camera images with image processing using artificial intelligence placed on a tank that is moved by remote control has been carried out. For this, the body of the tank was made with a 3D printer and a computer-connected Arduino-controlled 6v 250 RPM DC Motor was used for pallet movements. For the movement of the turret part, the df05bb servo motor was used by making the software that makes automatic target detection with artificial intelligence. The ignition system is provided with a laser beam.*
At the end of this study, the target was introduced as friend or foe with artificial intelligence software. If the enemy is detected, the system automatically locks on the target according to the information given, and opens fire and neutralizes the target.
Key Words: *Autonomous weapeon, Servo engine, Artificial intelligence, Tank, Camera*

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I. INTRODUCTION

The possibility that life-or-death decisions may one day be made by machines that are not under the direct control of humans should be taken seriously. In recent years, we have been witnessing rapid advances in drone technology and increasing autonomy in drones. Respectable people such as Stephen Hawking, Elon Musk and Steve Wozniak insist that the use of artificial intelligence or autonomous weapons in wars should be banned[1]. In the near future, with the development of drone, robotic and unmanned technologies, we will see many autonomous systems in operations such as cargo and courier[2]. An autonomous robotic system, by sensing its environment, plans how to move in this environment and acts in accordance with the plan it has set forth with its controllers. As a final step, it communicates with the robots in the environment and shares its status and receives information about the status of the robots in the environment[3]. Emerging technologies have always been central to military strategy. The innovations that emerged changed the equation of wars. [4]. The Oxford dictionary has defined the word autonomous as "having the freedom to govern itself or control its own affairs[5]. Human operator must select the attack and press the button. This is in contrast with fullyautonomous weapons that interpret the pre-programmed goals into tasks and achieve them without requiring any further human intervention[6]. The robots have an automatic mode but are currently controlled by humans, in other words, they are still semi-autonomous[7]. The AWS must be able to first identify a military target, and second to assess whether the destruction of this target could result in a definite military advantage[8]. The obligation to carry out legal reviews of new weapons under article 36 of Additional Protocol I to the Geneva Conventions is important for ensuring that a State's armed forces are capable of conducting hostilities in accordance with its international obligations[9].

II. WHAT ARE DRONES, AUTONOMOUS WEAPONS AND KILLER ROBOTS?

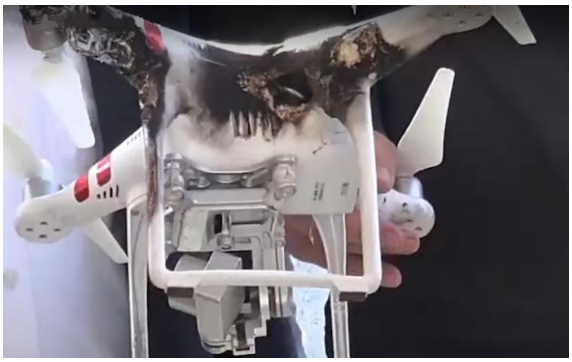
Drones are aircraft that are remotely controlled by humans; some may carry weapons (usually missiles) that can be unleashed by human control. An autonomous weapon is any device that automatically selects a target and engages the mission (For example, it selects the target and attempts to destroy it). This includes systems such as self-targeting onboard machine guns and various onboard anti-missile systems used in the Korean DMZ (Korean Delimitarized Zone). Replacing the human-controlled drone unit with a fully automatic system is rapidly becoming technically possible, and this has become the subject of discussions at CCW (United Nations meetings on "Conventional Weapons" in Geneva) "Lethal Autonomous Weapons Systems" (LAWS: Lethal. Autonomous Weapon Systems) is heading towards it. The term "killer robot" describes a class of weapons that includes wheeled or legged vehicles, ships, planes, submarines, and even artificial flying insects[10].

Şekil 1. Autonomous systems

III. WHAT IS A LASER GUN

The use of lasers capable of killing people is prohibited by international agreements. This is because such weapons are likely to cause inhumane levels of suffering[11]. ARMOL can even melt steel in a few seconds, detonating weapon-laden drones in the air. ARMOL, which can be mounted on ships or land vehicles and can be locked by tracking targets, can also be used for the destruction of suspicious packages[12]. Thanks to the heat generated on the target by the laser weapon system, melting and burning occurs in the outer surface, electronic parts and battery part of the UAVs. The fact that laser gun turrets can be controlled independently of each other with the new generation AIC allows each turret to destroy a separate target in swarm UAV attacks. With the new generation AIC, it is aimed to increase the efficiency and expand the target set by directing the laser towers to a common target[13].

Figure 2.a) Representative Laser Weapon



2.b) Destroying the UAV with a laser weapon

Gunpowder, which has been used militarily for hundreds of years, gradually ceases to be an alternative, while directed energy technologies are beginning to shake the throne of chemical energy-based systems, including gunpowder. In conclusion, the only thing that is certain so far is that the transition process in question will be a more radical revolution than smokeless powder[14].

IV. HOW DO LASER GUNS WORK

Figure 3. Using the laser gun

Laser weapons play a major role in battlefields. The working logic of laser weapons is that if the electrons in certain materials are fed with enough energy, they can emit light waves. These fed substances are further strengthened and have the opportunity to act in the form of a small beam in the form of a beam[15].

V. USED MATERIALS

As required materials 1.75mm 100 meters Filament, 3 pcs Arduino Uno, 1 pcs 12v 1.3 Ah dry battery, 4 pcs 6 V 250 RPM DC Motor, 1 pcs DF05BB Pan Tilt Kit, 1 pcs L298N Dual Motor Driver Board with Voltage Regulator, 1 pcs 1 Channel 5 V Relay Board, 1 Red Dot Laser 650nm-5 mW is used.5.1. Arduino Uno.
ATmega328 microprocessor: ATmega; It is a high performance, low power consumption 8 bit microcontroller. It has different sizes of SRAM, EEPROM and FLASH memory. It is possible to write/read 10000 times to FLASH memory. It has a powerful instruction set of 131, most of which work in a single cycle. It supports speed up to 20 MHZ. When the ATmega is put to sleep, the clock stops and sets various flags to remind you what state it was in before the ATmega went to sleep. In sleep mode, the ATmega draws only 0.1 uA of standby current. The 5V Voltage Regulator is a circuit element that allows us to get a fixed 5 volt voltage and has 3 legs. Arduino is an open source development platform where systems that can interact with their environment can be designed easily. Therefore, the user can make adjustments as he wishes. Thanks to its analog and digital inputs, analog and digital data can be processed. Since it can work with sensors, data from sensors can be used. Outputs to the outside world (sound, light, movement, writing, painting, etc.) can be produced[16].

Figure 4. Arduino Uno

VI. CONCLISION

Tank pallets were produced with a 3D printer and assembled with the necessary screws and metal spacers. The codes are written with Arduino and Microsoft Visual Studio (C#).

Figure 5. Tank Parts Printed on the Printer

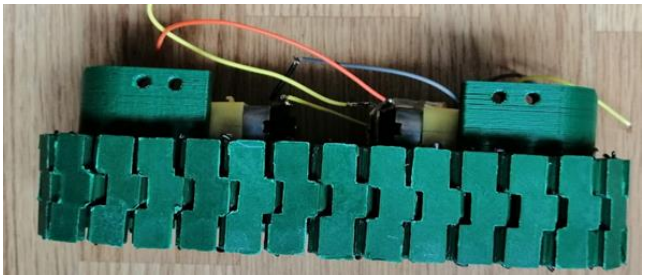


Figure 6. Combining Tracks with Motors

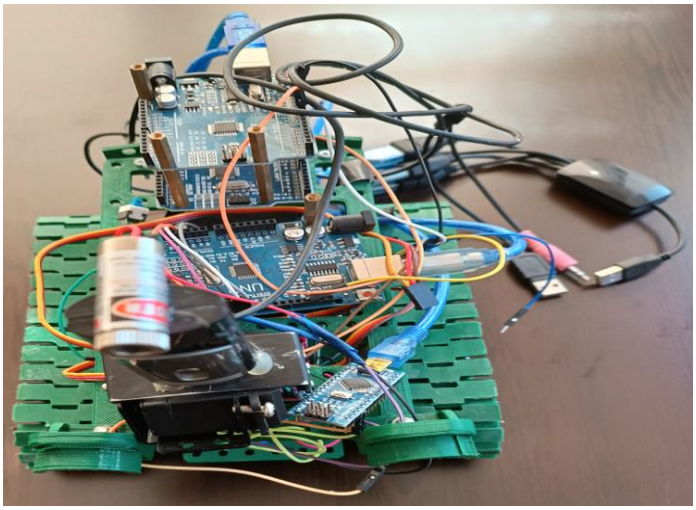


Figure 7. Autonomously operating weapon mounted on a tank

At the end of this study, target control was carried out by placing a laser gun on a computer-controlled tank. The gun placed on the tank has the potential to track 3600 targets. The target is defined as friend and foe using image processing technique. If the image from the camera image is the enemy, the weapon autonomously activates the laser weapon and fires to destroy the enemy.

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