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(54) **REMOTELY CONTROLLED TURRET SYSTEM FOR MILITARY AND LAW ENFORCEMENT TRAINING**

(71) Applicants: **Joe Zarillo**, Hemet, CA (US); **Cody Stewart**, Hemet, CA (US)

(72) Inventors: **Joe Zarillo**, Hemet, CA (US); **Cody Stewart**, Hemet, CA (US)

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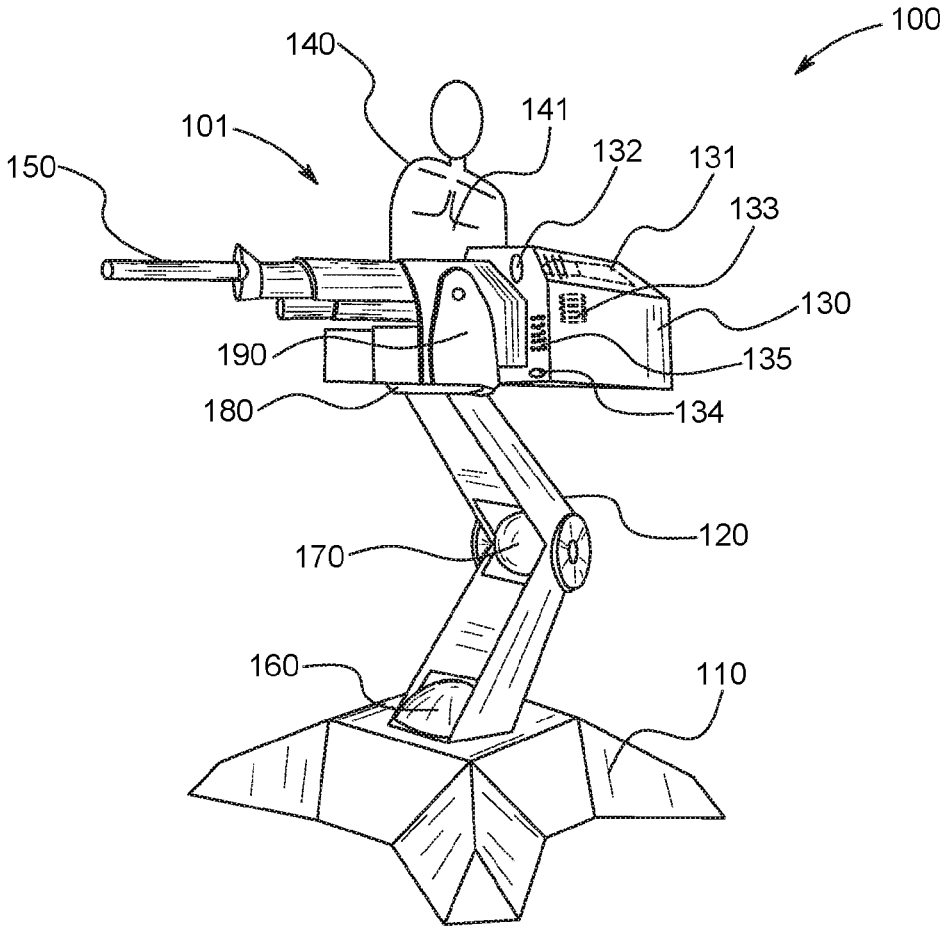
(57) **ABSTRACT**

A turret system in communication with a turret system control station, the turret system including a base, an arm connected to the base at a first end, a cradle connected to the arm at a second end, a gun connected to the cradle to shoot simulation ammunition stored in the cradle, and a computer system to communicate with and receive instructions from the turret system control station, from which a user may remotely control the turret system.



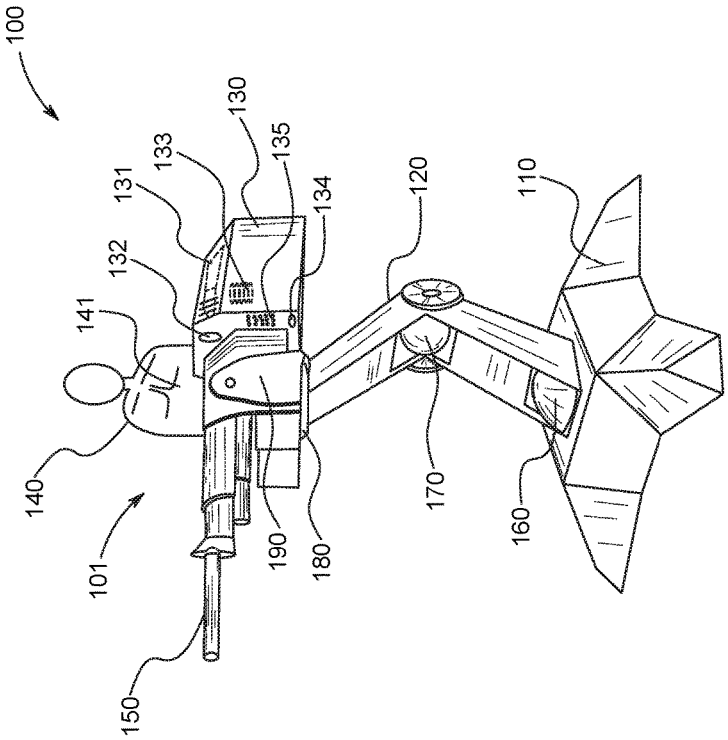

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FIG. 1

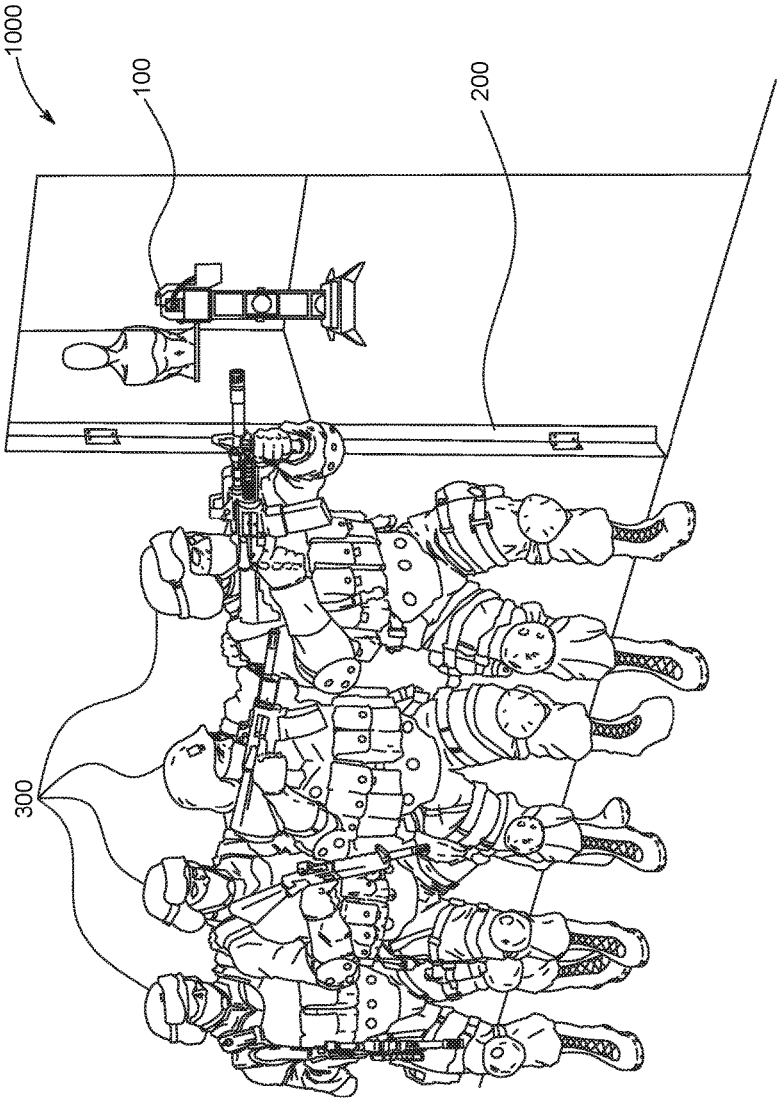

FIG. 2

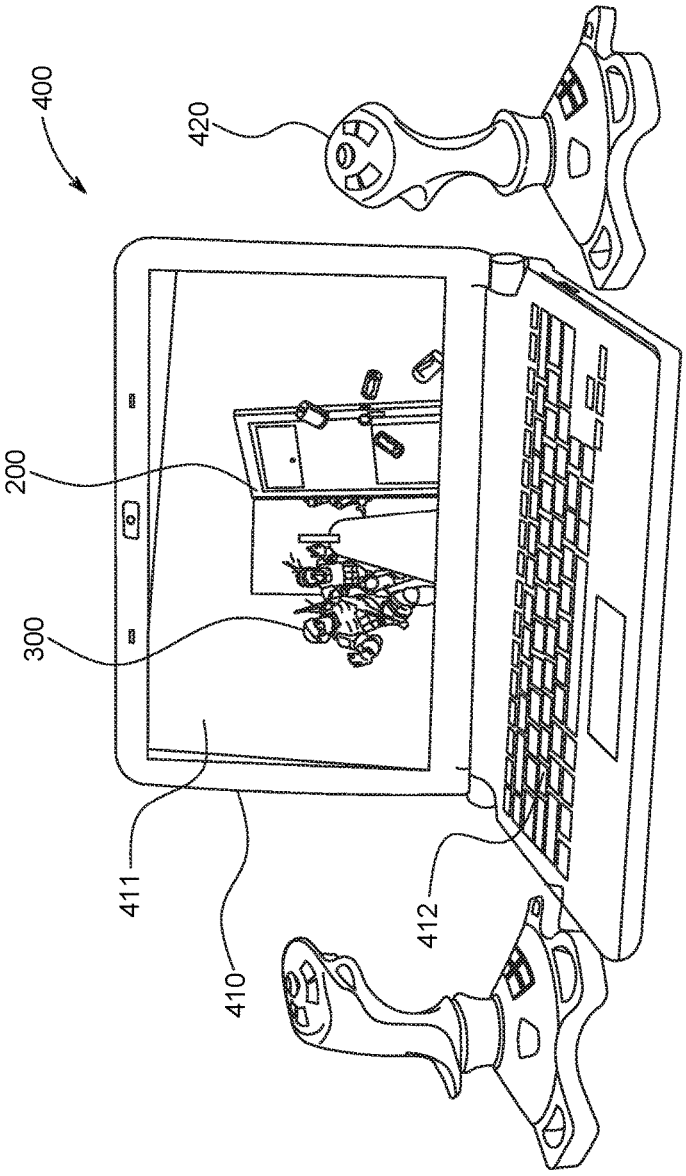

FIG. 3

REMOTELY CONTROLLED TURRET SYSTEM FOR MILITARY AND LAW ENFORCEMENT TRAINING

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present general inventive concept relates generally to a turret system, and specifically, to a remotely controlled turret system for military and law enforcement training.

2. Description of the Related Art

[0002] Guns are among the most common weapons used by the military and law enforcement agencies, as they subdue targets from an idealized distance. To improve accuracy when using a gun, one requires skilled aiming that is learned through practice and repetition. However, there are many risks in practicing with live ammunition, especially weapons that fire many rounds in rapid successions similar to burst guns.

[0003] Furthermore, military and law enforcement officers must train to use guns in stressful real-life combat situations, in order to more effectively perform their duties in the real world and while on duty.

[0004] Therefore, there is a need for a non-lethal training mechanism that simulates attack and defense scenarios in various situations.

[0005] Also, there is a need for a simulation practice model that promotes safe combat accuracy shooting training for armed forces and law enforcement officers.

[0006] Furthermore, there is a need for a training module that teaches military and law enforcement officers to shoot burst weapons in a more controlled manner, in order to diminish occurrences of friendly fire and other dangerous threats of injuries.

SUMMARY

[0007] The present general inventive concept provides a remotely controlled turret system for military and law enforcement training.

[0008] Additional features and utilities of the present general inventive concept will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the general inventive concept.

[0009] The foregoing and/or other features and utilities of the present general inventive concept may be achieved by providing a turret system in communication with a turret system control station, the turret system including a base, an arm connected to the base at a first end, a cradle connected to the arm at a second end, a gun connected to the cradle to shoot simulation ammunition stored in the cradle, and a computer system to communicate with and receive instructions from the turret system control station, from which a user may remotely control the turret system.

[0010] The turret system may further include an arm rotator disposed on the base to rotate the arm with respect to a horizontal axis, an arm extender to move the cradle and the gun up and down with respect to a vertical axis, a gun rotator to rotate the gun independently from the arm, and a gun pivoter to pivot the gun up and down with respect to the vertical axis.

[0011] The computer system may control the shooting of the gun, the rotation of the arm rotator, the movement of the arm extender, the rotation of the gun rotator, and the pivoting of the gun pivoter.

[0012] The computer system may perform the controlling based on instructions received from the turret system control station.

[0013] The turret system may further include a camera to capture images, wherein that the computer system transmits the captured images to the turret system control station such that the captured images a viewable on a display unit of the turret system control station.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] These and/or other features and utilities of the present generally inventive concept will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

[0015] FIG. **1** illustrates a turret system, according to an exemplary embodiment of the present general inventive concept;

[0016] FIG. **2** illustrates a combat scenario including the turret system, according to another exemplary embodiment of the present general inventive concept; and

[0017] FIG. **3** illustrates a turret system control station, according to another exemplary embodiment of the present general inventive concept.

DETAILED DESCRIPTION OF THE INVENTION

[0018] Various example embodiments (a.k.a., exemplary embodiments) will now be described more fully with reference to the accompanying drawings in which some example embodiments are illustrated. In the figures, the thicknesses of lines, layers and/or regions may be exaggerated for clarity.

[0019] Accordingly, while example embodiments are capable of various modifications and alternative forms, embodiments thereof are shown by way of example in the figures and will herein be described in detail. It should be understood, however, that there is no intent to limit example embodiments to the particular forms disclosed, but on the contrary, example embodiments are to cover all modifications, equivalents, and alternatives falling within the scope of the disclosure. Like numbers refer to like/similar elements throughout the detailed description.

[0020] It is understood that when an element is referred to as being "connected" or "coupled" to another element, it can be directly connected or coupled to the other element or intervening elements may be present. In contrast, when an element is referred to as being "directly connected" or "directly coupled" to another element, there are no intervening elements present. Other words used to describe the relationship between elements should be interpreted in a like fashion (e.g., "between" versus "directly between," "adjacent" versus "directly adjacent," etc.).

[0021] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of example embodiments. As used herein, the singular forms "a," "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms

"comprises," "comprising," "includes" and/or "including," when used herein, specify the presence of stated features, integers, steps, operations, elements and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components and/or groups thereof.

[0022] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which example embodiments belong. It will be further understood that terms, e.g., those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art. However, should the present disclosure give a specific meaning to a term deviating from a meaning commonly understood by one of ordinary skill, this meaning is to be taken into account in the specific context this definition is given herein.

[0023] FIG. **1** illustrates a turret system **100**, according to an exemplary embodiment of the present general inventive concept.

[0024] Referring to FIG. **1** the turret system **100** may include a body **101**, a base **110**, an arm **120**, a cradle **130**, a target **140**, a gun **150**, an arm rotator **160**, an arm extender **170**, a gun rotator **180**, and a gun pivoter **190**.

[0025] The body **101**, and other components of the turret system, may be constructed from metal, plastic, powder, rubber, and any other material known to one of ordinary skill in the art.

[0026] The base **110** may be a round, a tripod, a quadripod, or any other type of stable base known to one of ordinary skill in the art. The base **110** may be placed on a surface that is adequately stable to support a weight of the turret system **100**.

[0027] The arm **120** may be connected to the base **110** at a first end, and may be connected to the cradle **130** and/or the gun **150** at a second end.

[0028] The arm **120** may be connected to the base **110** at the first end via the arm rotator **160**.

[0029] The arm rotator **160** may rotate the arm **120** left or right, **360**-degrees horizontally on a plane parallel to the surface upon which the base **110** is disposed. When the arm **120** rotates, all of the components disposed at (i.e., above) the second end of the arm **120** (i.e., the cradle **130**, the target **140**, and the gun **150**) may also rotate therewith.

[0030] A motor (not illustrated) may be included within the base **110** to rotate the arm rotator **160**, which in turn rotates the arm **120**. Various other motors (not illustrated) may also be used to control any of the arm extender **170**, the gun rotator **180**, and the gun pivoter **190**.

[0031] The arm **120** may also expand and contract, thereby moving all of the components disposed at (i.e., above) the second end of the arm **120** (i.e., the cradle **130**, the target **140**, and the gun **150**) up and down (i.e., with respect to a vertical direction). More specifically, the arm extender **170** may function as a fulcrum or joint to cause the arm to optionally extend and/or contract, based on a user's control.

[0032] The gun rotator **180** may rotate the gun **150** independently from the arm **120**. As such, the gun rotator **180** may rotate the gun **150** left or right, **360**-degrees.

[0033] The gun pivoter **190** may pivot the gun **150** up and down on a vertical axis.

[0034] As such, the combination of the arm rotator **160**, the arm extender **170**, the gun rotator **180**, and the gun pivoter **190**, may all be utilized to point a barrel of the gun **150** in any desired direction.

[0035] The cradle **130** may house various components therein, including, but not limited to, a computer system **131**, a camera **132**, simulation ammunition **133**, a microphone **134**, and a speaker **135**.

[0036] The computer system **131** may include various components separately, or alternatively, disposed on a printed circuit board (PCB), and may be used to control all of the components within the turret system **100**.

[0037] The computer system **131** may communicate with other external devices using wire or wireless technologies such as WIFI, WIFI DIRECT, BLUETOOTH, Near Filed Technology, RFID, the Internet, or any other type of wireless communication system or network known to one of ordinary skill in the art.

[0038] The computer system **131** may include electrical components such as a storage unit, a processor, a controller, a transceiver, and a receiver, but is not limited thereto. Furthermore, the computer system **131** may include a sensor as an integrated component of the computer system **131**, or alternatively, may be provided separately from the computer system **131** and connected via a wire or wirelessly, thereto.

[0039] The computer system **131** may be connected wired or wirelessly to the other electrical components within the turret system, including, but not limited to, the speakers, the motors, an electrical outlet, a battery, a touch screen display unit, and USB ports.

[0040] The storage unit may include a memory storage device, such as a hard drive, a flash drive, a RAM, a ROM, or the cloud, but is not limited thereto. The storage unit may store information received from the external devices, or alternatively, information input directly into the computer system **131**.

[0041] The processor may include logic that allows the other components within the cradle **130** to communicate with each other.

[0042] The controller may receive signals interpreted from the processor, and may control other components within the computer system **131**. For example, the controller may control a volume of the speaker **135**.

[0043] The transceiver may send information to external devices regarding a state and/or condition of the turret system **100**.

[0044] The receiver may receive, from external devices, information and/or signals regarding programming and/or moving the turret system **100**.

[0045] The camera **132** may be any type of camera that captures and records still or moving objects.

[0046] Therefore, when a moving object is captured by the camera **132**, the storage unit of the computer system **131** may store a media file including the captured image (i.e., .avi file, .mpeg file, .mp4 file, etc.). The image may also be transmitted to an external device via the transceiver of the computer system **131**.

[0047] A mobile application may be provided on an external mobile device or another external system, to allow for communication between the external mobile device (or the another external system) and the computer system **131**. More specifically, the external mobile device (or the another external system) may communicate with the computer system **131** via WIFI, BLUETOOTH, Near Filed Technology,

RFID, the Internet, or any other type of wireless communication known to one of ordinary skill in the art, in order to control functions of the turret system **100**. Also, the mobile device may be "paired" with the turret system **100**, using BLUETOOTH technology, for example.

[0048] The microphone **134** may allow users to talk to the turret system **100**, such that a user, who is using an external device at a location different from a location of the turret system **100** that is connected to and in communication with the turret system **100**, may hear the sounds emitted by the users.

[0049] The speaker **135** may allow the user, who is using the external device at the location different from the location of the turret system **100** that is connected to and in communication with the turret system **100**, to communicate with and speak to the users.

[0050] The arm rotator **160**, the arm extender **170**, the gun rotator **180**, and the gun pivoter **190** may all be controlled by the computer system **131**. More specifically, the receiver of the computer system **131** may receive instructions from an external device to move the gun **150** in any desired direction.

[0051] The target **140** may be disposed on the cradle **130**, and may have any desired shape including, but not limited to, a human torso, a bullseye target, and an animal. Alternatively, the target **140** may be provided in plurality, and/or may be placed in various locations away from the cradle **130**, such that the target **140** is in wireless communication with the computer system **131**.

[0052] The target **140** may include a sensor **141** to sense whether the target **140** has been fired upon and/or hit by an ammunition round.

[0053] The sensor **141** may be at least one of a pressure sensor, a force sensor, a vibration sensor, a density sensor, a level sensor, a proximity sensor, a tilt sensor, a presence sensor, a position sensor, an angle sensor, a displacement sensor, a distance sensor, a speed sensor, an acceleration sensor, an optical sensor, a light sensor, an imaging sensor, an electric current sensor, an electric potential sensor, a magnetic sensor, an acoustic sensor, a sound sensor, and a proximity sensor, but is not limited thereto.

[0054] When the target **140** is hit by an ammunition round, the sensor **141** may sense the hit, and may send a signal to the computer system **131**, which may record the hit and store the recording in the storage unit of the computer system **131**. Also, an external device may be notified of the hit via the transceiver of the computer system **131**.

[0055] The gun **150** may be connected to the cradle **133**, and may be fired via the computer system **130**, such that the gun **150** may shoot (i.e., expel) the simulation ammunition **133** stored in the cradle **130** from the barrel of the gun **150**. Although the simulation ammunition **133** is intended to be non-lethal ammunition, it may alternatively include real live lethal bullets, based on a user's preference.

[0056] FIG. **2** illustrates a combat scenario **1000** including the turret system **100**, according to an exemplary embodiment of the present general inventive concept.

[0057] FIG. **3** illustrates a turret system control station **400**, according to an exemplary embodiment of the present general inventive concept.

[0058] Referring to FIGS. **2** and **3**, the combat scenario **1000** may include an infinite amount of possibilities.

[0059] For example, the turret system **100** may be set up in a room in a location such as building (such as an industrial building, or any other type of environment) and may be controlled by another person utilizing the turret system control station **400** that is connected wirelessly in communication with the turret system **100**. A team of soldiers **300** may be tasked to clear the building of all hostile targets. As the soldiers **300** are making their way through the building and clearing each room, they may come to a doorway **200** of the room that has a the turret system **100** (i.e., to simulate a criminal) in it. As the soldiers **300** make entry into the room through the door **200**, the camera **132** may capture the images of the soldiers **300**, such that the user may view soldiers **300** on a display screen **411** of a computing device **410**. The person who is controlling the turret system **100** via the turret system control station **400** will have to acquire a target (e.g., one of the team of soldiers **300**), and use an input unit **412** (a keyboard, touch screen, mouse, etc.) and/or a joystick **420** to remotely fire a the simulation ammunition **133** at the soldiers **300** from the gun **150**. The gun **150** may fire the simulation ammunition **133** at **3-5** round bursts, simulating a common rate of fire from enemies, before the team soldiers shoot the attached target **140**, disengaging the turret system **100**. In other words, the team of soldiers **300** must enter the room through the door **200**, locate/view the attached target **140**, and fire well placed rounds (i.e., live ammo or simulation ammunition rounds), hitting the sensor **141** of the target **140**, simulating a kill shot, which will thereby disengage the turret system **100**.

[0060] By having a real person controlling the turret system **100**, it gives the soldiers **300** a more realistic threat creating chaos with simulation ammunition **133** rounds flying towards their direction and the realistic sounds of live rounds being fired. This will raise the soldiers' **300** awareness, raise their adrenaline and they will react in a more realistic manner than entering a room with paper targets or role players shooting blanks. Overall this will create a better bond within each team knowing how each person will react to certain situations and will better prepare them to react more efficiently in live events.

[0061] Alternatively, the turret system **100** may be used in ambush situations as well.

[0062] For example, an ambush scenario may be set up for vehicles. The turret systems **100** can be set off to either the left or right side of a convoy or both if you have multiple turret systems **100**. Each turret system **100** could have a separate operator. While a military convoy is driving on their route, the operator can pop-up multiple targets and engage the convoy with the turret system **100**. The convoy would have to make the decision to dismount and eliminate the threat (i.e., pop-up targets), or push through the ambush leaving the medium machine guns that are mounted on each vehicle to provide suppression fire, firing at the pop-up targets. There may be various numbers of targets on pop-up stands. The operator of the turret system **100** will have the ability to remotely activate the targets. Once the target is shot, it will go down simulating it has been shot and killed. Once in the down position it may be on a predetermined time delay (e.g., five seconds) before the target pops back up to be shot again.

[0063] As another example, another type of ambush could be a foot patrol through an urban environment. While conducting a foot patrol through a heavily populated urban area, police must be on their toes and ready for anything to happen. The turret systems **100** may be set up in well-hidden locations around a town. This will cause the trainees to practice their search and assessment of an area. Ultimately

the trainees are not supposed to find the turrets so the operator can engage the patrol. In these ambush scenarios, they are going to be set up so that patrols can be engaged. Ambushes are a situation that needs to be trained on because of how spontaneous and deadly they can become. Practice does help but the human emotion cannot be taken out of the equation. Some people do in fact freeze in these situations and that could mean lives may very well be lost due to said person's hesitation. By throwing troops into the most realistic situation without the lethality, the troops may be trained to effectively react to their surroundings.

[0064] Although a few embodiments of the present general inventive concept have been shown and described, it will be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the general inventive concept, the scope of which is defined in the appended claims and their equivalents.

1. A turret system in communication with a turret system control station, the turret system comprising:

a base;

an arm connected to the base at a first end;

a cradle connected to the arm at a second end;

a gun connected to the cradle to shoot simulation ammunition stored in the cradle; and

a computer system to communicate with and receive instructions from the turret system control station, from which a user may remotely control the turret system.

2. The turret system of claim **1**, further comprising:

an arm rotator disposed on the base to rotate the arm with respect to a horizontal axis;

an arm extender to move the cradle and the gun up and down with respect to a vertical axis;

a gun rotator to rotate the gun independently from the arm; and

a gun pivoter to pivot the gun up and down with respect to the vertical axis.

3. The turret system of claim **2**, wherein the computer system controls the shooting of the gun, the rotation of the arm rotator, the movement of the arm extender, the rotation of the gun rotator, and the pivoting of the gun pivoter.

4. The turret system of claim **3**, wherein the computer system performs the controlling based on instructions received from the turret system control station.

5. The turret system of claim **1**, further comprising:

a camera to capture images, wherein that the computer system transmits the captured images to the turret system control station such that the captured images a viewable on a display unit of the turret system control station.

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