

SIGNAL DAMPENING AND BLAST MITIGATION DEVICE**CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] This application claims priority to U.S. Non-Provisional Patent Application Serial No. 18/818,769, filed on August 29, 2024, and U.S. Provisional Patent Application Serial No. 63/579,418, filed on August 29, 2023, which are hereby incorporated by reference in their entireties into this application.

BACKGROUND**Field**

[0002] Embodiments generally relate to a counter weaponized drone device and method. Specifically, embodiments provide a signal dampening and blast mitigation device method for protecting human life and critical infrastructure. More specifically, various embodiments of the device and method can be used to counter the effects of a downed weaponized device by mitigating blast fragmentation and blocking signal transmission.

Description of the Related Art

[0003] Current counter weaponized drone/UAS (C-UAS) technologies are oriented towards electronic location, identification, blocking, and disablement causing the drone to crash land.

[0004] Weaponized drones for use by drug cartels, terrorists, and militaries have surged significantly in the past few years. They range from State sponsored/manufactured weapons systems to small Commercial Off-The-Shelf (COTS) drones with improvised explosive payloads. Current estimates are that Ukraine is losing more than 10,000 drones per month with more than half being weaponized (LeMonde, 2023).

[0005] The focus of C-UAS technologies has been electronic warfare blocking, disrupting, and spoofing. Once a drone reaches the surface (*i.e.*, ground, building, ship), it becomes a

Public Security and Explosive Ordnance Disposal (EOD) problem and is largely treated as an Improvised Explosive Device (IED) response.

[0006] Water has long been used as blast protection to mitigate IEDs. Conventional blast protection designs are placed around typical ground ordnance or IEDs to neutralize blast fragmentation generated by the IED when it is detonated. Current C-UAS technologies do not have signal blocking capabilities, and therefore are limited in their mitigating capabilities. They also are not designed for rapid deployment to minimize the time spent inside the range of blast and fragmentation hazards.

[0007] Conventional signal jamming material is used extensively for blocking and includes pop-up buildings and bags. These materials do not have blast and fragmentation protective capabilities, and therefore are not a comprehensive C-UAS solution.

[0008] What is needed is a first responder device and associated mitigating method offering a simple process to disrupt the send/receive signal of the downed weaponized drone, while also providing a structure to offer explosive blast and fragmentation protection.

SUMMARY

[0009] Embodiments provide a signal dampening and blast mitigation device which protects human life & critical infrastructure from downed weaponized devices carrying explosive payloads or intelligence, surveillance, and reconnaissance (ISR) sensors. Designed for rapid deployment by first responders, the signal dampening and blast mitigation device uses electromagnetic radiation (EMR) shielding, a remotely fillable liquid bladder, and a Cordura outer shell to mitigate explosive blast and fragmentation hazards. This method provides time to evacuate personnel in the blast and fragmentation area as well as protection to critical infrastructure. The signal dampening and blast mitigation device includes features for significantly reducing hazards up to 10 pounds Net Explosive Weight (NEW).

[0010] The signal dampening and blast mitigation device, according to various embodiments, improves upon conventional counter weaponized drone technologies by providing multiple capabilities to respond to a downed drone or IED, including layering of signal jamming material, providing an enhanced water system, and an additional layer of fragmentation slowing material plus rapid deployment capabilities.

[0011] The signal dampening and blast mitigation device is intended for airfield, hotel, warehouses, public venue and critical infrastructure protection.

[0012] According to an embodiment, there is provided a signal dampening and blast mitigation device for mitigating a downed, weaponized drone or an IED, the device including: a hose assembly and a neutralizing body. According to an embodiment, the hose assembly is configured to connect to a water source and a first distal end of the neutralizing body, the neutralizing body includes a water bladder, and the hose assembly is configured to fill the water bladder in the neutralizing body. According to an embodiment, upon deployment, the signal dampening and blast mitigation device is configured to be placed over the downed weaponized drone or the IED, such that the filled water bladder and the neutralizing body are further configured to mitigate explosive blast and fragmentation and to block signal transmission from or received by the downed weaponized drone or the IED.

[0013] According to an embodiment, the hose assembly includes a connector, an on/off valve, a flow meter, a check valve, a relief valve, a quick release connector, and a hose.

[0014] According to an embodiment, the check valve is a one-way valve configured to protect the flow meter from back pressure when the water bladder is being filled.

[0015] According to an embodiment, the quick release connector is configured to be connected to the hose and the hose is connected to a first distal end of the water bladder in the neutralizing body, and wherein the quick release connector is configured to disengage a

connection between the hose and the hose assembly, so that the water bladder in the neutralizing body can be drained.

[0016] According to an embodiment, the hose has a length of 100 feet, so that the signal dampening and blast mitigation device can be deployed at least at a standard minimum safety distance for an explosive charge of 5 pounds Net Explosive Weight for the operator while filling the water bladder in the neutralizing body.

[0017] According to an embodiment, the signal dampening and blast mitigation device is configured to mitigate the explosive blast and fragmentation from the downed weaponized drone or the IED under 10 pounds Net Explosive Weight.

[0018] According to an embodiment, the neutralizing body includes an outer shell, an electromagnetic radiation shielding layer, and a fragmentation layer.

[0019] According to an embodiment, the outer shell is configured to encase the water bladder.

[0020] According to an embodiment, the outer shell includes an access door configured to insert the water bladder into the outer shell, the access door arranged at a second distal end of the neutralizing body opposite to the first distal end, and where the outer shell further includes a Velcro loop and a Velcro hoop to secure the access door in a closed position when the water bladder is filled and to prevent entry of any debris from a detonated downed weaponized drone or IED.

[0021] According to an embodiment, the outer shell, the electromagnetic radiation shielding layer, and the fragmentation layer are double folded and stitched together.

[0022] According to an embodiment, the electromagnetic radiation shielding layer includes two faraday electromagnetic radiation shielding layers, the electromagnetic radiation shielding

layer being configured to block electronic signals transmitted from or received by the downed weaponized drone or IED.

[0023] According to an embodiment, the fragmentation layer is comprised of a heavy duty nylon webbing, the fragmentation layer configured to reduce the travel of the thrown fragmentation from the downed weaponized drone or IED.

[0024] According to an embodiment, the water bladder is constructed of thermoplastic polyurethane having a thickness of 1 millimeter, and wherein the water bladder is configured to expand to an operational volume of 2,300 liters/607 gallons when filled with water.

[0025] According to an embodiment, the neutralizing body further includes a plurality of securing loops, and wherein each corner of the neutralizing body comprises one or more securing loop, each securing loop being configured to secure the neutralizing body to the ground over the downed weaponized drone or IED.

[0026] According to another embodiment, there is provided a method for mitigating blast and fragmentation damage of a downed weaponized drone or an IED, using a signal dampening and blast mitigation device, as described in detail below. According to an embodiment, the method includes: placing the signal dampening and blast mitigation device over a downed weaponized drone or IED, such that the neutralizing body covers the downed weaponized drone or IED, and extending the hose assembly of the signal dampening and blast mitigation device a distance of 100 feet towards a water source for filling the water bladder in the neutralizing body. The method further includes connecting the hose assembly to the water source, and filling the water bladder using the water source, the step of filling the water bladder comprising opening an on/off valve of the hose assembly and monitoring a flow meter of the hose assembly to ensure that the water bladder is filled to a capacity of 2,100 liters and the hose is filled to a capacity of 200 liters, totaling 2,300 liters. The method further includes closing the on/off valve when the water bladder is filled to the capacity and depressurizing a hose of

the hose assembly and removing the neutralizing body from the water source, such that the filled water bladder and the neutralizing body mitigate the explosive blast and fragmentation and block signal transmission from or received by the downed weaponized drone or the IED.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] So that the manner in which the recited features, aspects, and advantages of the disclosure, as well as others that will become apparent, are attained and can be understood in detail, a more particular description of certain embodiments briefly summarized above can be had by reference to the embodiments that are illustrated in the drawing that forms a part of this specification. It is to be noted, however, that the appended drawing illustrates only an exemplary embodiment and is, therefore, not to be considered limiting of the disclosure's scope, for the disclosure can admit to other equally effective embodiments. Like numbers refer to like elements throughout, and the prime notation, if used, indicates similar elements in alternative embodiments or positions.

[0028] FIG. 1 is a perspective view of a signal and dampening blast mitigation device according to an embodiment.

[0029] FIG. 2 is a perspective view of a hose assembly of the signal dampening and blast mitigation device, as shown in FIG. 1, according to an embodiment.

[0030] FIG. 3 is a flow chart of a method of operation of the signal dampening and blast mitigation device, as shown in FIGS. 1 and 2, for mitigating the hazards of a downed weaponized device according to an embodiment.

DETAILED DESCRIPTION

[0031] While the scope of the apparatus and the method will be described with several embodiments, it is understood that one of ordinary skill in the relevant art will appreciate that

many examples, variations and alterations to the apparatus and method described here are within the scope and spirit of the embodiments.

[0032] Accordingly, the embodiments described are set forth without any loss of generality, and without imposing limitations, on the embodiments. Those of skill in the art understand that the scope includes all possible combinations and uses of particular features described in the specification.

[0033] The signal dampening and blast mitigation device, according to various embodiments, provides non-obvious advantages over conventional ordnance mitigation devices. Conventional devices typically use electronic circuitry to disrupt the operational signal (*e.g.*, initiation/detonation) of downed weaponized drones or IEDs. The signal dampening and blast mitigation device, according to various embodiments, when properly placed over the downed weaponized drones or IED, disrupts the ability of the signal to initiate the firing train by acting as an electronic barrier. Once the bladder of the mitigating body is filled with water, the weight of the water in the bladder seals multiple faraday layers of the mitigating body over the downed weaponized drones or IED, thereby slowing the trajectory of material fragmentation and pushing downward any blast fragmentation from a detonated downed weaponized drone or IED. Water is an environmentally sound method for tamping as it is non-toxic and readily available. Accordingly, the signal dampening and blast mitigation device, according to various embodiments, offers public security representatives time to evacuate personnel and call emergency services.

[0034] The signal dampening and blast mitigation device is a comprehensive emergency response tool used to prevent RF signaling both to and from a downed weaponized drone (*i.e.*, loitering drone) or an IED and to protect the surrounding area from blast fragmentation of the detonated device. According to various embodiments, the signal dampening and blast mitigation device offers three capabilities in a single tool: (1) prevention of the weaponized

device from sending or receiving signals, (2) capability to flood the weaponized device and cause the electrical systems of the device to fail, and (3) protection from blast and fragmentation in the event of the detonation of the weaponized device.

[0035] FIG. 1 is a perspective view of a signal dampening and blast mitigation device according to an embodiment. FIG. 2 is a perspective view of a hose assembly of the signal dampening and blast mitigation device, as shown in FIG. 1, according to an embodiment. As shown in FIG. 1, the device 10 includes two primary components: (1) the hose assembly 100, as further shown in FIG. 2, and (2) the neutralizing body 200.

[0036] According to an embodiment, the hose assembly 100, as shown in FIGS. 1 and 2, includes the following components, positioned in series (as attached from a water source to a connection to the neutralizing body 200): (a) a universal connector 110, (b) an on/off valve 120, (c) a flow meter 130, (d) a check valve 140, (e) a relief valve 150, (f) a quick release connector 160 and a fill/drain hose 170.

[0037] According to an embodiment, the universal connector 110 of the hose assembly 100 is a Camlock connector varying in size based upon customer needs. In a preferred embodiment, the quick release connector 110 has a size of 1.5 inches, more preferably 2 inches, and more preferably 2.5 inches. The sizing variability of the universal connector 110 allows the neutralizing body 200 to be connected to a standard firefighting hose or a fire main (noting that the size of the fire main varies regionally). The sizing variability of the universal connector 110 also facilitates an easily removed connection that allows for the water bladder 240 of the signal dampening and blast mitigation device 10 to be conveniently emptied.

[0038] According to an embodiment, the on/off valve 120 of the hose assembly 100 is a gate valve that allows both water inflow, outflow, as well as variable adjustment. In operation, the on/off valve 120 is opened to allow the water supply to be turned on, thereby filling the water bladder 240. Upon filling the water bladder 240 to the appropriate level (as denoted by

the flow meter/totalizer), the on/off valve 120 can then be closed to shut off the supply of water to the water bladder 240. The on/off valve 120 has three iteration possibilities: 1.5 inches, 2.0 inches, and 2.5 inches, based upon the desired size of the connection to the water source.

[0039] According to an embodiment, the flow meter 130 of the hose assembly 100 allows the operator to monitor the volume of water entering the water bladder 240. The water bladder 240 has a demonstrated volume capacity of 2,300 liters/607 gallons. When the water volume reaches 2,300, as displayed by the flow meter 130, the operator turns off the on/off valve 120 and secures the water source. According to an embodiment, the flow meter 130 is powered by two double A batteries requiring bi-annual battery changing. In some embodiments, the flow meter 130 is a totalizer.

[0040] According to an embodiment, the check valve 140 of the hose assembly 100 is a one-way valve (towards the water bladder 240) that protects the flow meter from back pressure when filling the water bladder 240. According to an embodiment, the relief valve 150 of the hose assembly 100 is an over pressure valve (200 psi) that protects against pressure surges when filling the water bladder 240.

[0041] According to an embodiment, the quick release connector 160 of the hose assembly 100 is a Camlock connector varying in size based upon customer needs. In a preferred embodiment, the quick release connector 160 has a size of 1.5 inches, more preferably 2 inches, and more preferably 2.5 inches. The sizing variability of the quick release connector 160 allows the neutralizing body 200 to be connected to a standard firefighting hose or a fire main (noting that the size of the fire main varies regionally). The sizing variability of the quick release connector 160 also facilitates an easily removed connection that allows for the water bladder 240 of the signal dampening and blast mitigation device 10 to be conveniently emptied. The quick release connector 160 allows the hose assembly 100 to be quickly disengaged from the

neutralizing body 200 to thereby allow the operator to quickly drain the water bladder 240 after use.

[0042] According to an embodiment, the fill/drain hose 170 of the hose assembly 100 is 100 feet or 33 meters long, such that the signal dampening and blast mitigation device can be deployed and used at a safe standoff while filling the water bladder 240. The signal dampening and blast mitigation device 10 is ideally suited to mitigate explosive devices under 5 pounds Net Explosive Weight (NEW), and reasonably suited to mitigate explosive devices under 10 pounds NEW. The length of the fill/drain hose 170 of 100 feet or 33 meters is chosen because it exceeds the standard minimum safety distances for an explosive charge of 5 pounds NEW. In an embodiment, the fill/drain hose may be 4 inches in diameter and may be made of TPU and is heat sealed for structural integrity.

[0043] As further shown in FIG. 1, the neutralizing body 200 includes: (a) an outer shell 210, (b) an EMR shielding layer 220, (c) a fragmentation layer 230, (d) a water bladder 240, (e) an EMR shielding layer Velcro loop 250, (f) an EMR shielding layer Velcro hoop 260, and (g) a plurality of securing loops 270. The outer shell 210, the EMR shielding layer 220, and the fragmentation layer 230 are sewn together to form a liner or blanket surrounding the water bladder 240. The EMR shield layer Velcro loop 250 and the EMR shielding layer Velcro hoop 260 are configured to seal the liner or blanket securing the water bladder 240 within the liner or blanket.

[0044] According to an embodiment, the outer shell 210 is comprised of a planar top surface 210a, a planar bottom surface 210b, and 4 planar side surfaces, 210c, 210d, 210e, 210f. In an embodiment, one of the 4 planar side surfaces 210f is comprised of two panels 210g, 210h, forming an access door to install the water bladder 240 and to prevent entry of any debris from a detonated downed, weaponized drone or IED, one panel 210g to which the EMR shielding layer Velcro loop 250 is affixed and the other panel 210h to which the EMR shielding layer

Velcro hoop 260 is affixed. As shown in FIG. 1, side surface 210e of the outer shell 210 is configured to receive and connect to the hose assembly 100, and the side surface 210f is arranged on an opposing side of the outer shell 210 from the connection to the hose assembly 100.

[0045] The outer shell 210 is composed of Cordura fabric, more particularly, Cordura 1000 fabric, although other materials have been contemplated according to various embodiments, materials that can withstand tears, scuffs, and abrasions with the same capabilities as Cordura 1000, such as canvas or Kevlar-reinforced nylon.

[0046] According to an embodiment, each planar surface of the outer shell 210 is double folded and stitched to a respective EMR shielding layer 220 and respective fragmentation layer 230 with high strength thread. In some embodiments, each planar surface of the outer shell 210, EMR shielding layer 220, and the fragmentation layer 230 are double stitched together with high strength thread to form a single surface sheet, such that the top surface sheet, the bottom surface sheet, and the 4 side surface sheets can be stitched together to form a pouch for containing the water bladder 240 therein. The top and bottom surface sheets of the outer shell 210, EMR shielding layer 220, and the fragmentation layer 230 measure (L) 2.7 meters/8.86 feet by (W) 2.7 meters/8.86 feet, thereby having dimensions of a size to contain the water bladder 240 when it is filled to capacity. The choice of thread will have no blast mitigation effect and serves only to secure the layers to one another. It should be noted that other dimensional sizes of the outer shell 210, the EMR shielding layer 220, and the fragmentation layer 230 are contemplated to adjust for larger downed, weaponized drones and IEDs. The outer shell 210 made of Cordura serves as an additional fragmentation slowing mechanism as well as friction protection to the EMR shielding layer 220. The fragmentation layer 230 touches the water bladder 240.

[0047] According to an embodiment, the EMR shielding layer 220 includes one faraday EMR shielding layer, more preferably two faraday EMR shielding layers. The two faraday EMR shielding layers may be constructed of woven copper and aluminum that are configured to disrupt and/or block electronic signals transmitted from and/or received by the downed, weaponized drone or IED. One of ordinary skill in the art would have understood that other electronic signal blocking materials may be used to construct the faraday EMR shielding layers 220 according to various embodiments.

[0048] According to an embodiment, the fragmentation layer 230 is made from heavy duty nylon webbing that serves two functions: (1) protecting the EMR shielding layer 220 and (2) slowing the expulsion of fragmentation in the event of an explosion. The combination of water contained in the water bladder 240 to serve as a tamping method combined with the nylon webbing of the fragmentation layer 230 to ensnare thrown fragmentation reduces potential travel of hazardous fragmentation over long distances away from the down, weaponized drone or the IED. The fragmentation layer 230 is double stitched to an outside surface of the EMR shielding layer 220. One of ordinary skill in the art would have understood that other materials may be used, which would serve the prescribed functions, to construct the fragmentation layer 230 according to various embodiments.

[0049] According to an embodiment, the water bladder 240 is constructed of thermoplastic polyurethane (TPU) having a thickness of 1 millimeter. The water bladder 240 measures (L) 2.5 meters/8.2 feet by (W) 2.5 meters/8.2 feet by (H) 30 centimeters/12 inches. TPU allows for significant expansion when filled where the ideal operational volume is 2,300 liters/607 gallons. One of ordinary skill in the art would have understood that other materials may be used, which would serve to accommodate the significant expansion of the water bladder 240, to construct the water bladder 240 according to various embodiments. It should be noted that

other dimensional sizes of the water bladder 240 are contemplated to adjust for larger downed, weaponized drones and IEDs.

[0050] According to an embodiment, the EMR shield layer Velcro loop 250 and the EMR shielding layer Velcro hoop 260 are configured as a double flap, in which one fold provide an initial closure and then a second fold seals the water bladder 240 within the the outer shell 210.

[0051] According to an embodiment, the plurality of securing loops 270 include one or more securing loops 270 secured to each corner of the neutralizing body 200. More particularly, the neutralizing body 200 includes a pair of securing loops 270 at each corner, one being secured to a top surface corner of the neutralizing body 200 and the other secured to a bottom surface corner of the neutralizing body 200. According to an embodiment, the plurality of securing loops 270 are non-magnetic and are configured to allow the signal dampening and blast mitigation device when the water bladder 240 is filled to capacity to be moved by the operator when pulling the signal dampening and blast mitigation device using one or more of the plurality of securing loops 270, or to secure the neutralizing body 200 to the ground over the downed weaponized drone or IED in high winds or other heavy weather.

[0052] According to an embodiment, the signal dampening and blast mitigation device includes a separate portable bag for carrying the device to a site of the downed weaponized device or IED. The signal dampening and blast mitigation device may also include an operation and maintenance manual as well as recommended training with the Emergency Response Procedure (ERP).

[0053] The device, according to various embodiments, is designed to be used by first responders (*e.g.*, military, police, firefighters, bomb disposal technicians), when arriving at the scene of a downed weaponized drone or IED, removing the signal dampening and blast mitigation device from a vehicle and walking to the ordnance, removing the signal dampening

and blast mitigation device from a carrying bag, and placing the signal dampening and blast mitigation device directly over the top of the ordnance. The first responder then unfolds the device, and dependent upon weather conditions may also stake the device down or tie it down using the tie downs on the outer edges of the signal dampening and blast mitigation device. At this juncture, the ordnance is likely RF signal safe and cannot transmit or receive signals. The first responder can also decide whether he/she will flood the device by filling the water bladder to capacity, as discussed above (*i.e.*, opening a relief valve), or not flooding the device (*i.e.*, maintain the relief valve in a closed position). Flooding of ordnance has successfully been used for 80 years but is dependent upon conditions of the ordnance and local environmental conditions (*i.e.*, water would cause other problems).

[0054] Next, the first responder connects the signal dampening and blast mitigation device, using a hose assembly, at a safe distance (K50), to a water source (*e.g.*, hydrant, fire truck, or other available sources). Once the water bladder of a neutralizing body is filled (*i.e.*, dependent upon the size of signal dampening and blast mitigation device, multiple sizes available), the downed weaponized device has a moderate blast and fragmentation veil of protection as well as signal protection.

[0055] FIG. 3 is a flow chart of a method of operation of the signal dampening and blast mitigation device, as shown in FIGS. 1 and 2, for neutralizing a downed weaponized device according to an embodiment.

[0056] As shown in FIG. 3, the method provides for the deployment of a signal dampening and blast mitigation device at a site of a downed weaponized drone or IED, the signal dampening and blast mitigation device, as shown in FIGS. 1 and 2, including two primary components: (1) a hose assembly, as further shown in FIG. 2, and (2) a neutralizing body, as described in detail above. The method includes placing the neutralizing body of the signal

dampening and blast mitigation device over the downed weaponized drone or IED, such that the neutralizing body completely covers the drone or IED (step 310). The method further includes extending the hose assembly of the signal dampening and blast mitigation device a distance of 100 feet towards a water source for filling a water bladder of the signal dampening and blast mitigation device (step 320), and then connecting the hose assembly to the water source (step 330). The method further includes filling the water bladder using the water source (step 340). The water bladder is filled by opening an on/off valve of the hose assembly (step 350). The operator of the signal dampening and blast mitigation device monitors a flow meter of the hose assembly to ensure that the water bladder is filled to a capacity of 2,100 liters and the hose is filled to a capacity of 200 liters, totaling 2,300 liters (step 360). The on/off valve is turned to an off position, the hose is depressurized and removed from the water source (step 370). With the water bladder filled to capacity, the neutralizing body disrupts the ability of a remote signal to initiate the firing train of the downed weaponized drone or IED by acting as an electronic barrier, while the weight of the water in the bladder seals a faraday liner of the neutralizing body over the downed weaponized drones or IED, thereby slowing the trajectory of and pushing downward any blast fragmentation from a detonated downed weaponized drone or IED.

[0057] Upon neutralization of the downed weaponized drone or IED, a quick release connector of the hose assembly is disconnected from the water bladder of the neutralizing body, thereby causing the water in the water bladder to drain out (step 390). A plurality of securing loops are arranged at each corner of the signal dampening and blast mitigation device, further enabling the operator to raise the neutralizing body to assist in the drainage of the water from the water bladder.

[0058] Embodiments address the absence of an existing protocol for mitigating a signal or blast of a downed weaponized drone or IED. The signal dampening and blast mitigation device,

according to various embodiments, provides a solution for saving lives and protecting critical infrastructure while the downed weaponized drone or IED is being neutralized.

[0059] The signal dampening and blast mitigation device offers a rapidly deployable, agile, and scalable response to a wide range of downed weaponized devices and IEDs. As swarming becomes an increasingly relevant threat, it is critical that some drones be recovered to exploit the drone to determine counter swarm leverage points. The signal dampening and blast mitigation device is simple to deploy, mobile, and cost effective against both small and large attacks. Signal dampening and blast mitigation devices that are not destroyed in the response process can be re-used.

[0060] Extensive laboratory testing has been performed on modeling blast and fragmentation capabilities. Explosive devices vary tremendously based upon the types of explosive fillers (*e.g.*, TNT) as well as the type of fragmentation (*e.g.*, shape charge, ball bearings). In addition to water used for blast fragmentation protection, embodiments of the signal dampening and blast mitigation device include a water-filled bladder that helps mitigate the speed of travel of blast fragmentation, as well as one additional layer of fibrous Cordura-type material to slow fragmentation dispersion. The explosive calculations are based upon standard RE factors (RE 1=1 pound TNT). The blanket size can be adjusted to mitigate different size categories of weaponized drones, ranging from small category 1 drones to large category 3 drones.

[0061] Various embodiments contemplate frequency ranges that will jam the types of signals transmitted from and received by the downed weaponized devices.

[0062] Signal blocking benefits of this design are maximized by layering. Each layer increases the protective capability of the signal dampening and blast mitigation device because signals cannot be transmitted from or received at the downed weaponized device. When filled with water, for example, an additional blocking factor of water is applied. Functionally, no

signals have penetrated four layers of signal jamming material with water, therefore preventing the downed weaponized device from relaying its location, and in particular sending signals indicating its static movement to a home station, so that remote destruction can be avoided (sometimes, drones can be remotely detonated if they are showing they have been downed). Additionally, this configuration blocks the device operator from sending signals to the downed weaponized device, preventing detonation of the device and mitigating the blast and fragmentation for material exploitation.

[0063] While preferred embodiments have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments described herein may be employed in practicing the invention. It is intended that any claims presented define the scope of the various embodiments and that methods and structures within the scope of these claims and their equivalents be covered thereby.

[0064] Embodiments described herein, therefore, are well adapted to carry out the objects and attain the ends and advantages mentioned, as well as others inherent therein. While a presently preferred embodiment has been given for purposes of disclosure, numerous changes exist in the details of procedures for accomplishing the desired results. These and other similar modifications will readily suggest themselves to those skilled in the art and are intended to be encompassed within the spirit of the various embodiments disclosed herein and the scope of the appended claims.

[0065] Although the various embodiments have been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereupon without departing from the principle and scope of the various embodiments. Accordingly, the scope of

the various embodiments should be determined by the following claims and their appropriate legal equivalents.

[0066] The singular forms “a,” “an,” and “the” include plural referents, unless the context clearly dictates otherwise.

[0067] Optional or optionally means that the subsequently described event or circumstances can or may not occur. The description includes instances where the event or circumstance occurs and instances where it does not occur.

[0068] Ranges can be expressed herein as from about one particular value and/or to about another particular value. When such a range is expressed, it is to be understood that another embodiment is from the one particular value and/or to the other particular value, along with all combinations within said range.

[0069] As used herein and in the appended claims, the words “comprise,” “has,” and “include” and all grammatical variations thereof are each intended to have an open, non-limiting meaning that does not exclude additional elements or steps.

[0070] As used herein, terms such as “first” and “second” are arbitrarily assigned and are merely intended to differentiate between two or more components of an apparatus. It is to be understood that the words “first” and “second” serve no other purpose and are not part of the name or description of the component, nor do they necessarily define a relative location or position of the component. Furthermore, it is to be understood that the mere use of the term “first” and “second” does not require that there be any “third” component, although that possibility is contemplated under the scope of the various embodiments.

[0071] While the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to

embrace all such alternatives, modifications, and variations as fall within the spirit and broad scope of the appended claims. The embodiments can suitably comprise, consist, or consist essentially of the elements disclosed and can be practiced in the absence of an element not disclosed.

CLAIMS

We Claim:

1. A signal dampening and blast mitigation device for risk reduction of a downed weaponized drone or an IED, the device comprising:

a hose assembly and a neutralizing body,

wherein the hose assembly is configured to connect to a water source and a first distal end of the neutralizing body,

wherein the neutralizing body comprises a water bladder,

wherein the hose assembly is configured to fill the water bladder in the neutralizing body, and

wherein, upon deployment, the signal dampening and blast mitigation device is configured to be placed over the downed weaponized drone or the IED, such that the filled water bladder and the neutralizing body are further configured to mitigate explosive blast and fragmentation and to block signal transmission from or received by the downed weaponized drone or the IED.

2. The signal dampening and blast mitigation device according to claim 1, wherein the hose assembly comprises a connector, an on/off valve, a flow meter, a check valve, a relief valve, a quick release connector, and a hose.

3. The signal dampening and blast mitigation device according to claim 2, wherein the check valve is a one-way valve configured to protect the flow meter from back pressure when the water bladder is being filled.

4. The signal dampening and blast mitigation device according to claim 2, wherein the quick release connector is configured to be connected to the hose and the hose is connected to a first distal end of the water bladder in the neutralizing body, and wherein the quick release

connector is configured to disengage a connection between the hose and the hose assembly, so that the water bladder in the neutralizing body can be drained.

5. The signal dampening and blast mitigation device according to claim 2, wherein the hose has a length of 100 feet, so that the signal dampening and blast mitigation device can be deployed at least at a standard minimum safety distance for an explosive charge of 5 pounds Net Explosive Weight for the operator while filling the water bladder in the neutralizing body.

6. The signal dampening and blast mitigation device according to any of claims 1-5, wherein the signal dampening and blast mitigation device is configured to mitigate the explosive blast and fragmentation from the downed weaponized drone or the IED under 10 pounds Net Explosive Weight.

7. The signal dampening and blast mitigation device according to any of claims 1-6, wherein the neutralizing body comprises an outer shell, an electromagnetic radiation shielding layer, and a fragmentation layer.

8. The signal dampening and blast mitigation device according to claim 7, wherein the outer shell is configured to encase the water bladder.

9. The signal dampening and blast mitigation device according to claim 8, wherein the outer shell comprises an access door configured to insert the water bladder into the outer shell, the access door arranged at a second distal end of the neutralizing body opposite to the first distal end, and wherein the outer shell further comprises a Velcro loop and a Velcro hoop to secure the access door in a closed position when the water bladder is filled and to prevent entry of any debris from a detonated downed weaponized drone or IED.

10. The signal dampening and blast mitigation device according to claim 7, wherein the outer shell, the electromagnetic radiation shielding layer, and the fragmentation layer are double folded and stitched together.

11. The signal dampening and blast mitigation device according to claim 7, wherein the electromagnetic radiation shielding layer comprises two faraday electromagnetic radiation shielding layers, the electromagnetic radiation shielding layer being configured to block electronic signals transmitted from or received by the downed weaponized drone or IED.

12. The signal dampening and blast mitigation device according to claim 7, wherein the fragmentation layer is comprised of a heavy duty nylon webbing, the fragmentation layer configured to reduce the travel of the thrown fragmentation from the downed weaponized drone or IED.

13. The signal dampening and blast mitigation device according to any of claims 1-12, wherein the water bladder is constructed of thermoplastic polyurethane having a thickness of 1 millimeter, and wherein the water bladder is configured to expand to an operational volume of 2,300 liters/607 gallons when filled with water.

14. The signal dampening and blast mitigation device according to claim 7, wherein the neutralizing body further comprises a plurality of securing loops, and wherein each corner of the neutralizing body comprises one or more securing loop, each securing loop being configured to secure the neutralizing body to the ground over the downed weaponized drone or IED.

15. A method for mitigating hazards of a downed weaponized drone or an IED, using a signal dampening and blast mitigation device comprising:

a hose assembly and a neutralizing body,

wherein the hose assembly is configured to connect to a water source and a first distal end of the neutralizing body,

wherein the neutralizing body comprises a water bladder,

wherein the hose assembly is configured to fill the water bladder in the neutralizing body, and

wherein, upon deployment, the signal dampening and blast mitigation device is configured to be placed over the downed weaponized drone or the IED, such that the filled water bladder and the neutralizing body are further configured to mitigate explosive blast and fragmentation and to block signal transmission from or received by the downed weaponized drone or the IED,

the method comprising the steps of:

placing the signal dampening and blast mitigation device over a downed weaponized drone or IED, such that the neutralizing body covers the downed weaponized drone or IED,

extending the hose assembly of the signal dampening and blast mitigation device a distance of 100 feet towards a water source for filling the water bladder in the neutralizing body,

connecting the hose assembly to the water source,

filling the water bladder using the water source, the step of filling the water bladder comprising opening an on/off valve of the hose assembly and monitoring a flow meter of the hose assembly to ensure that the water bladder is filled to a capacity of 2,100 liters and the hose is filled to a capacity of 200 liters, totaling 2,300 liters,

closing the on/off valve when the water bladder is filled to the capacity, and

depressurizing a hose of the hose assembly and removing the neutralizing body from the water source, such that the filled water bladder and the neutralizing body mitigate the explosive blast and fragmentation and block signal transmission from or received by the downed weaponized drone or the IED.