



US 20090120273A1

(19) **United States**(12) **Patent Application Publication**  
**Eckdahl et al.**(10) **Pub. No.: US 2009/0120273 A1**(43) **Pub. Date: May 14, 2009**(54) **ARMORED TACTICAL VEHICLE WITH  
MODULAR APPARATUS****Publication Classification**(75) Inventors: **Jeremy K. Eckdahl**, Newberry, FL  
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Gainesville, FL (US)(51) **Int. Cl.****F41H 7/02** (2006.01)**F41H 13/00** (2006.01)(52) **U.S. Cl.** ..... **89/36.08; 89/1.1**

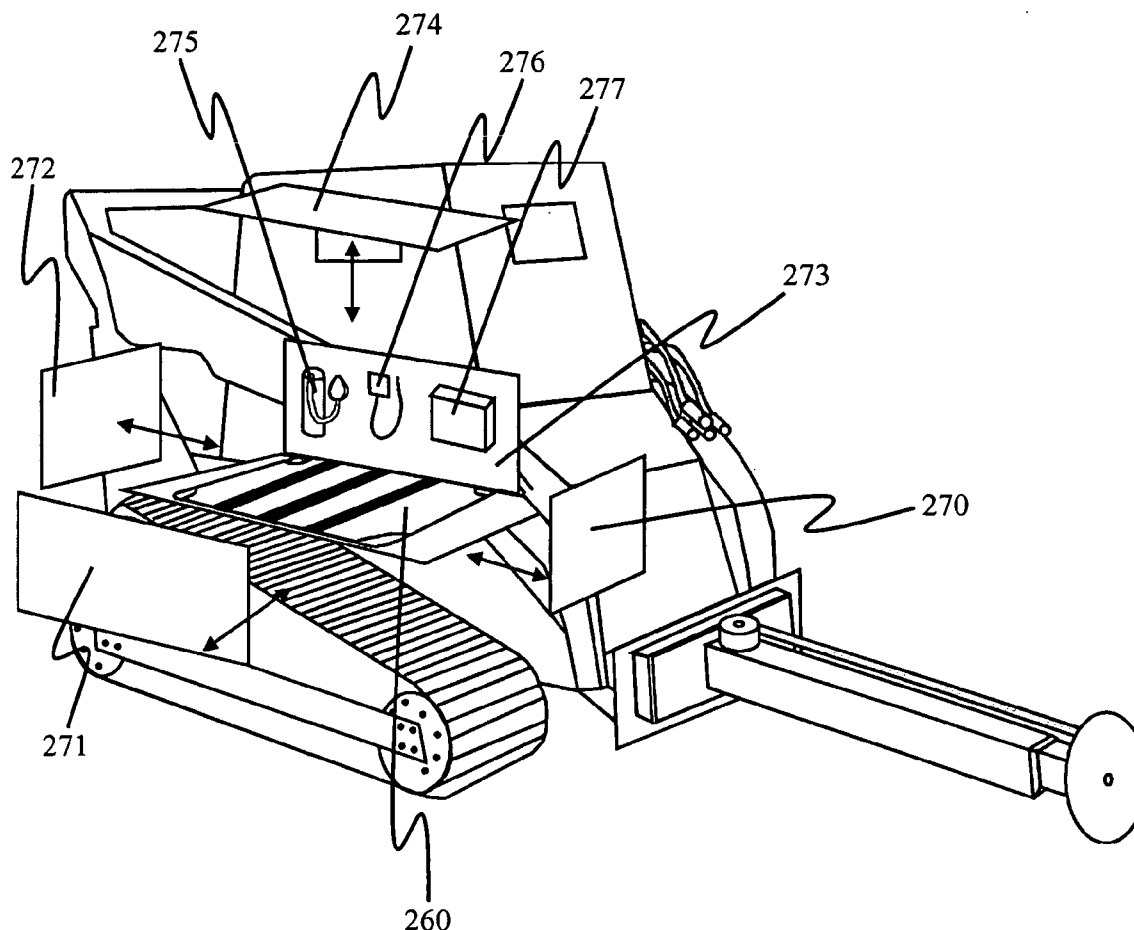
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**ABSTRACT**

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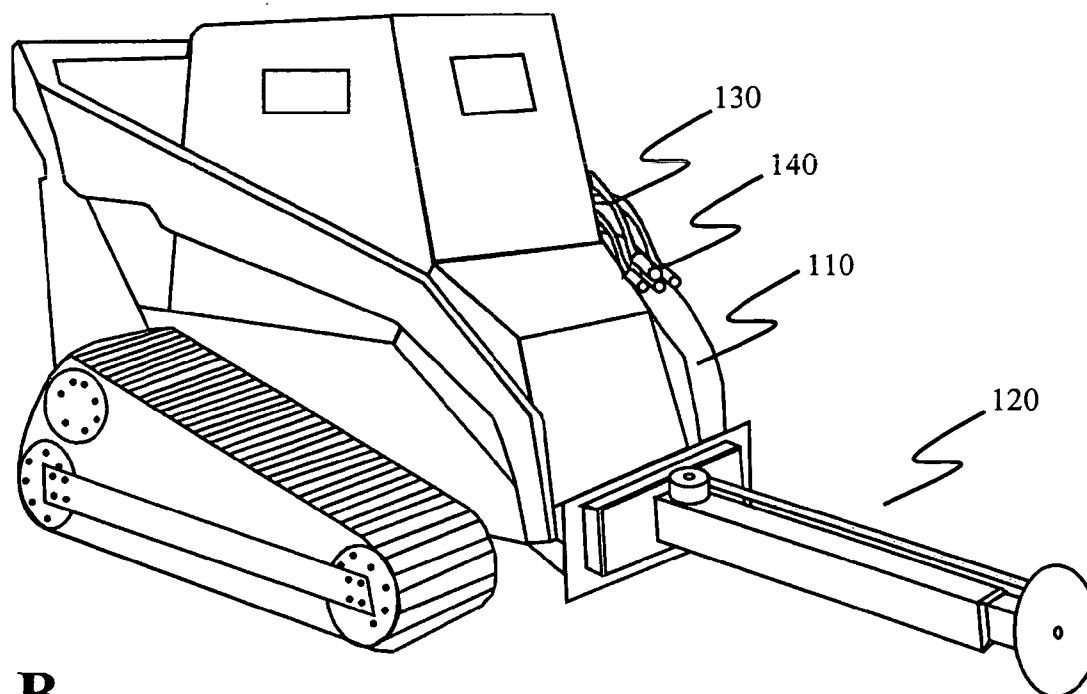
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The invention described herein is a tactical assault and rescue vehicle system, in which the base vehicle is preferably a tracked multi-terrain loader with modular attachments that can be added and removed to the lifting unit of the base vehicle. The modular attachments comprise an assault and rescue platform, a powered extensible ram unit, and a vehicle extraction device. The system also provides a trailer for towing the base vehicle and acting as a mobile tactical operations center.

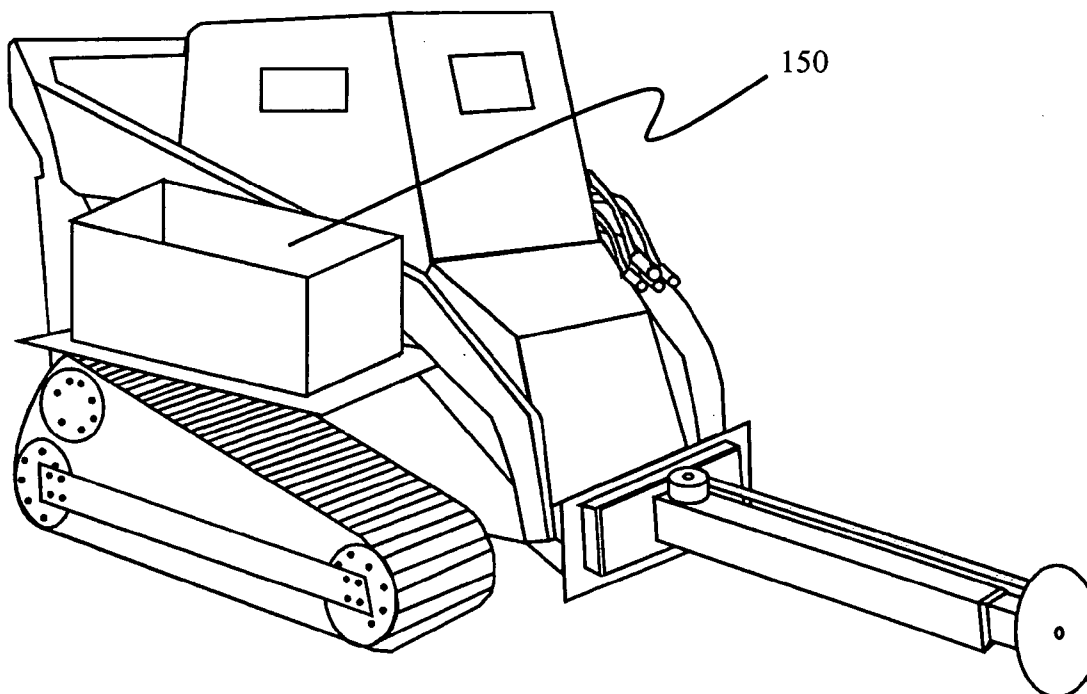


**A**

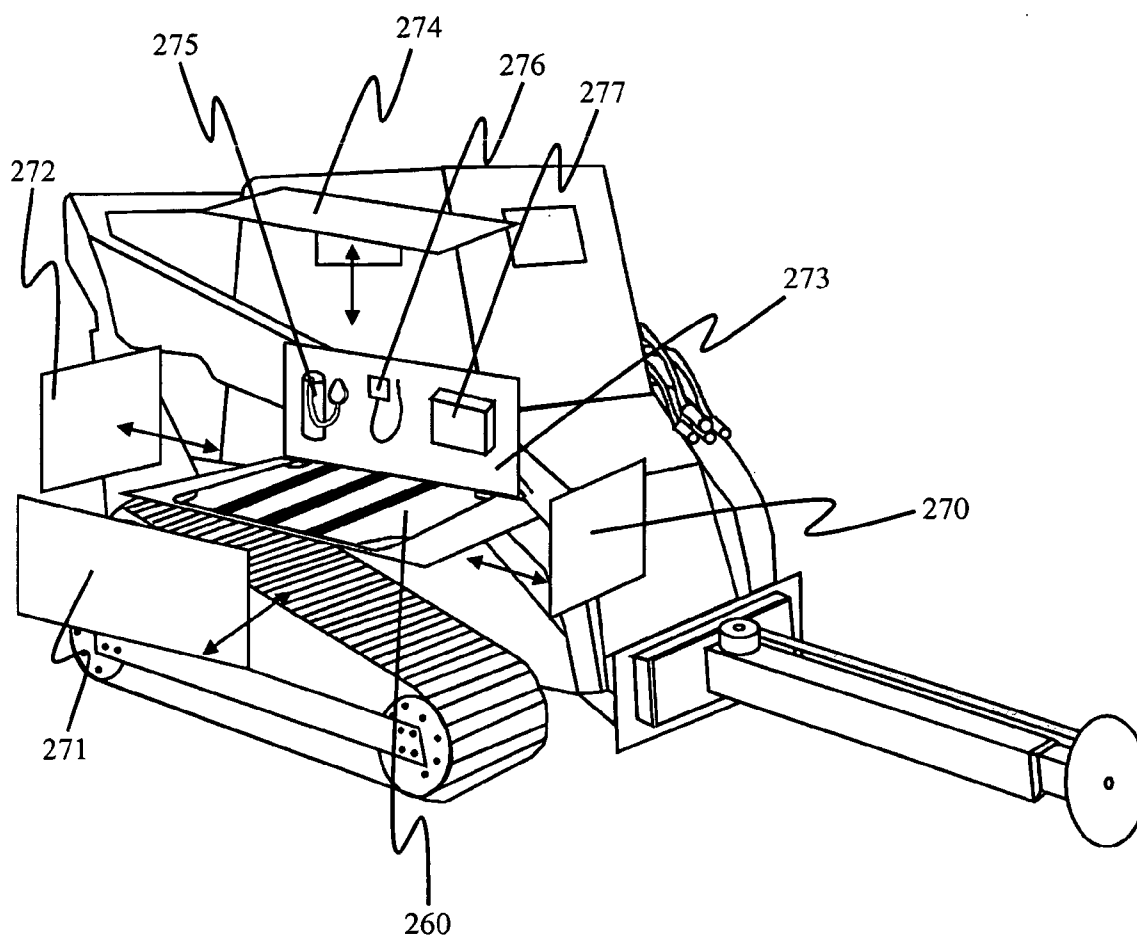
**Fig. 1**



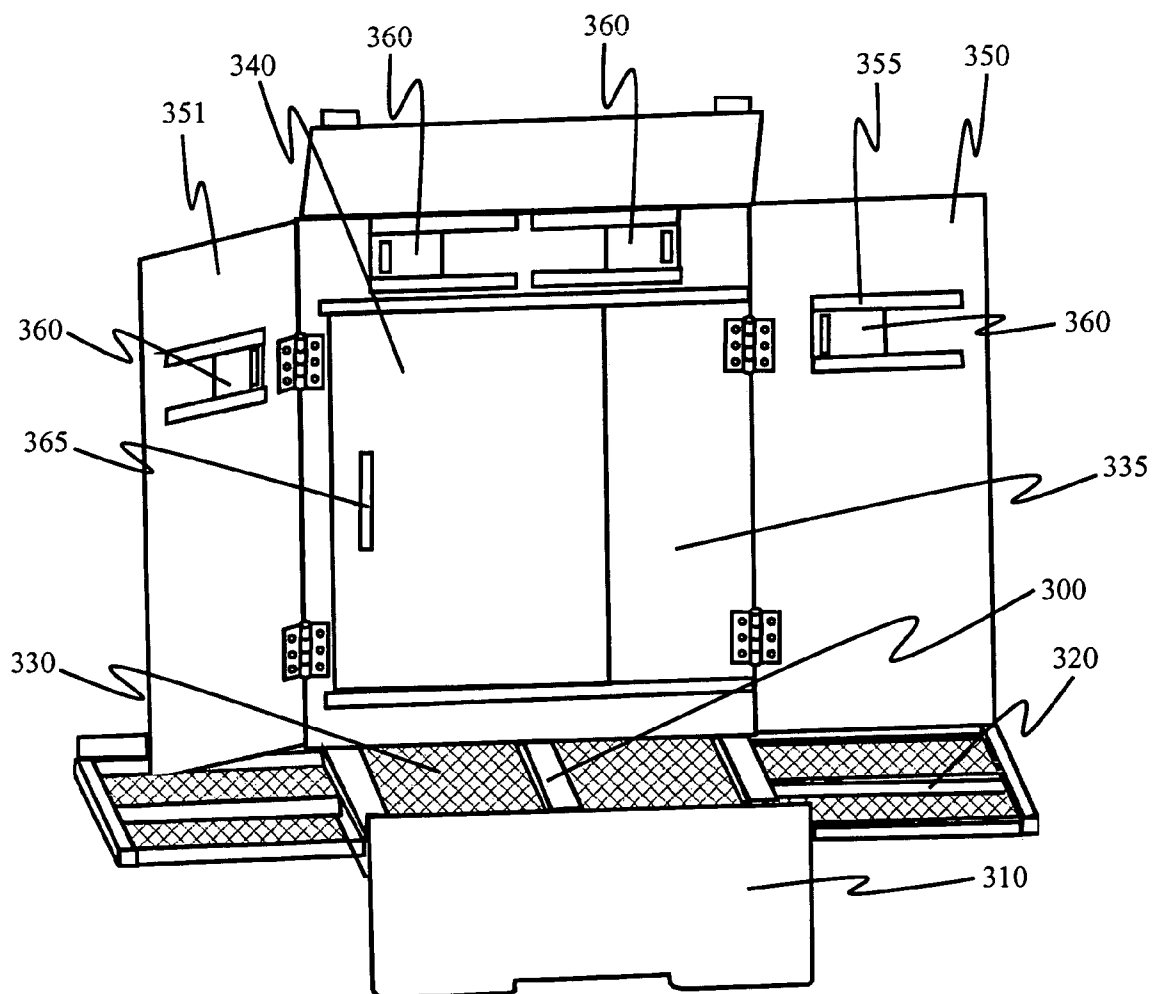
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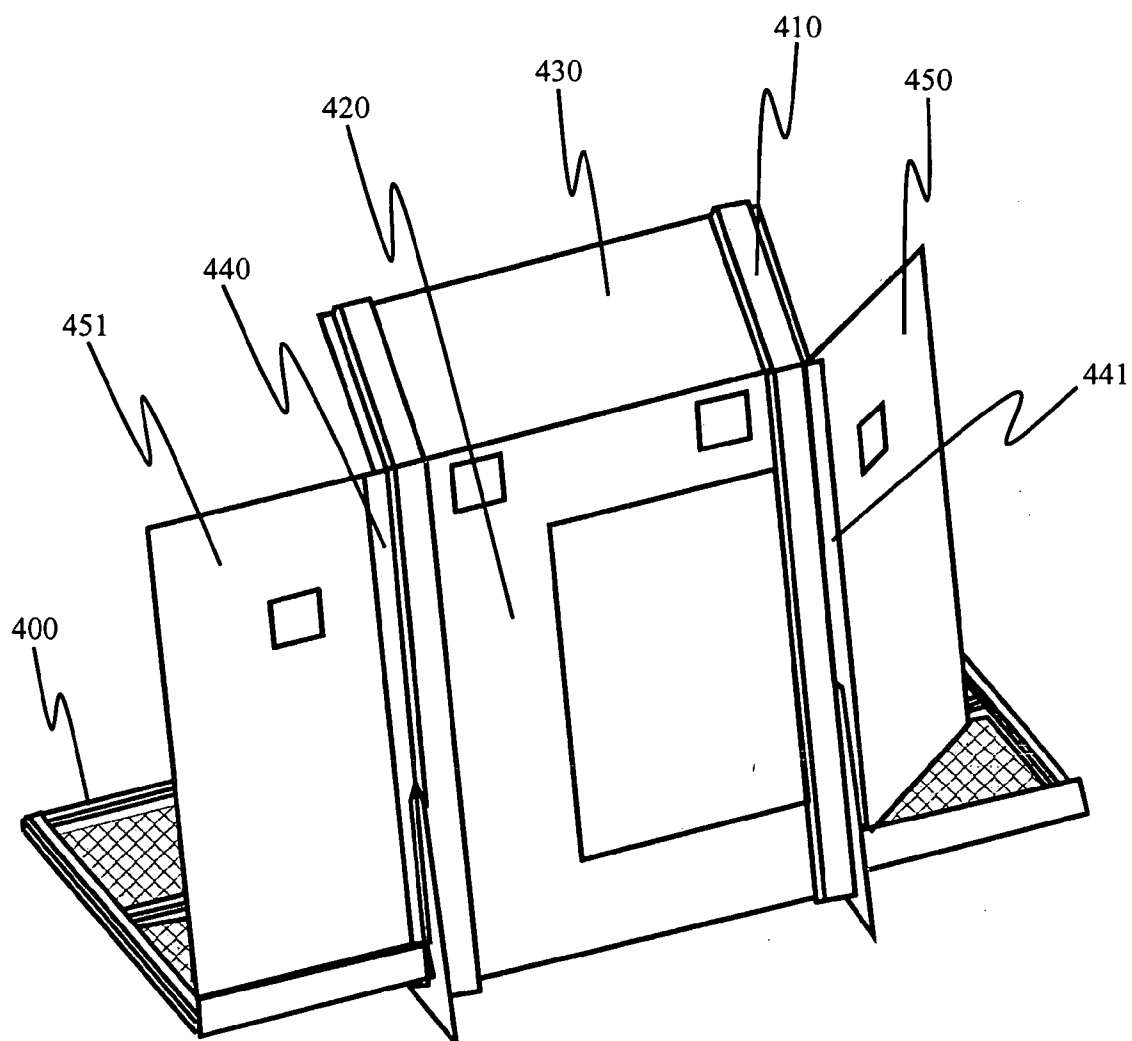
**Fig. 2**



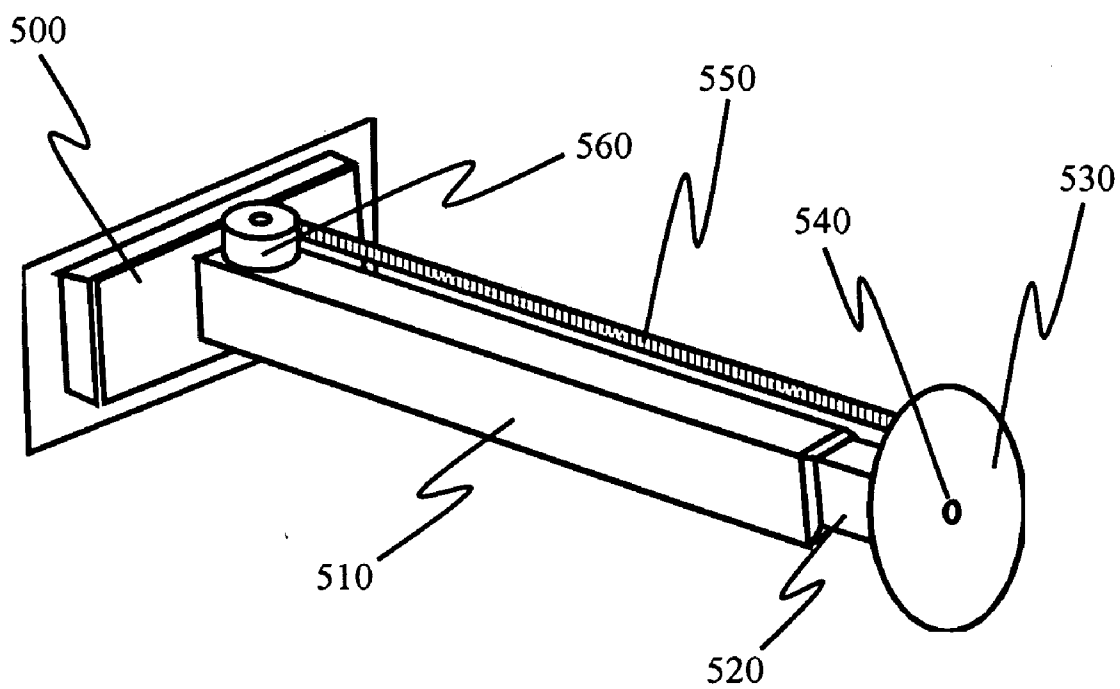
**Fig. 3**



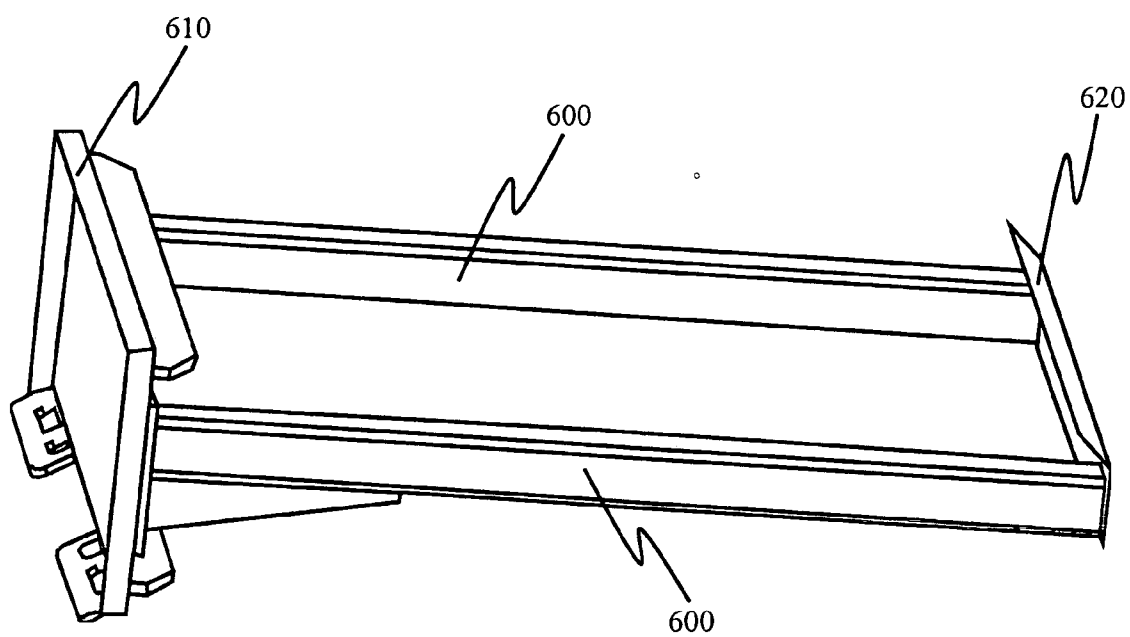
**Fig. 4**



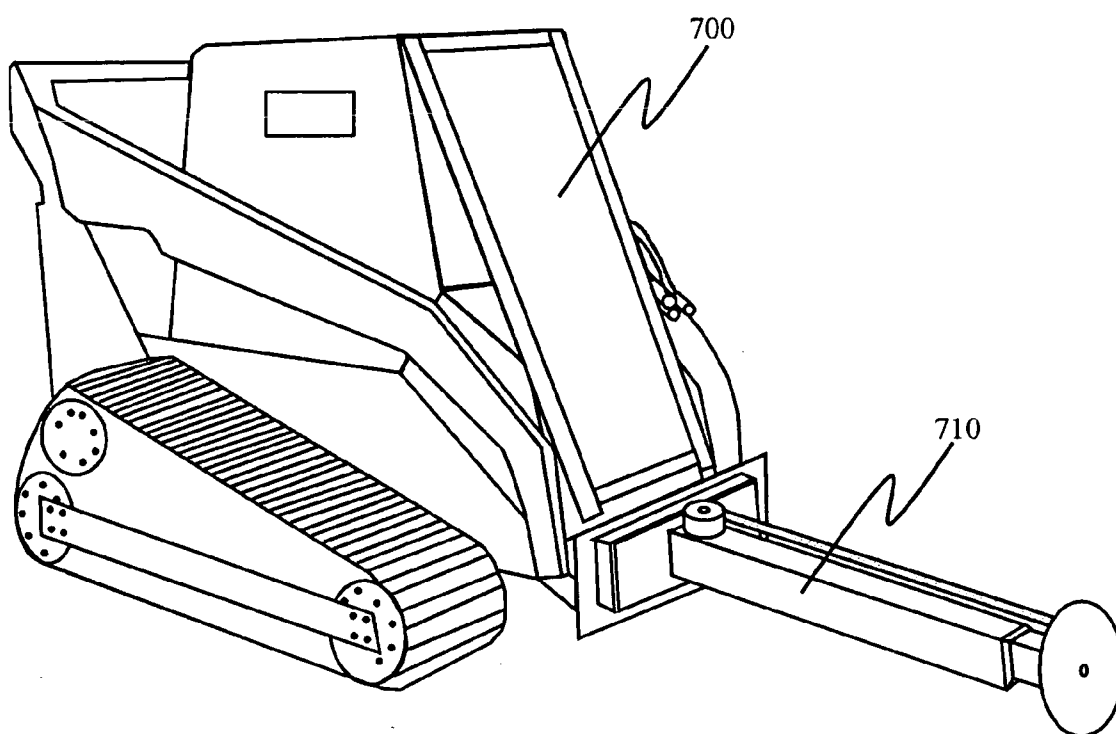
**Fig. 5**



**Fig. 6**

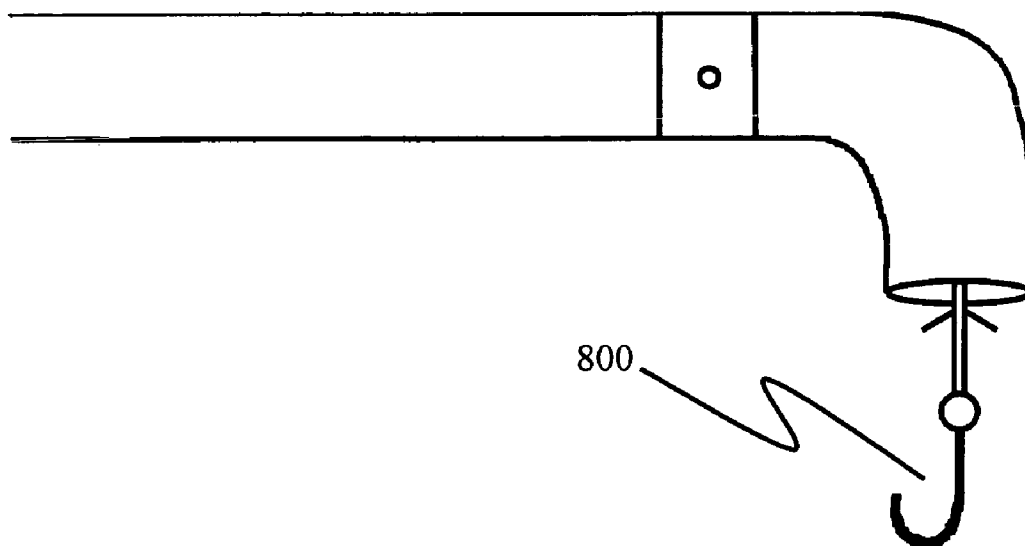


**Fig. 7**

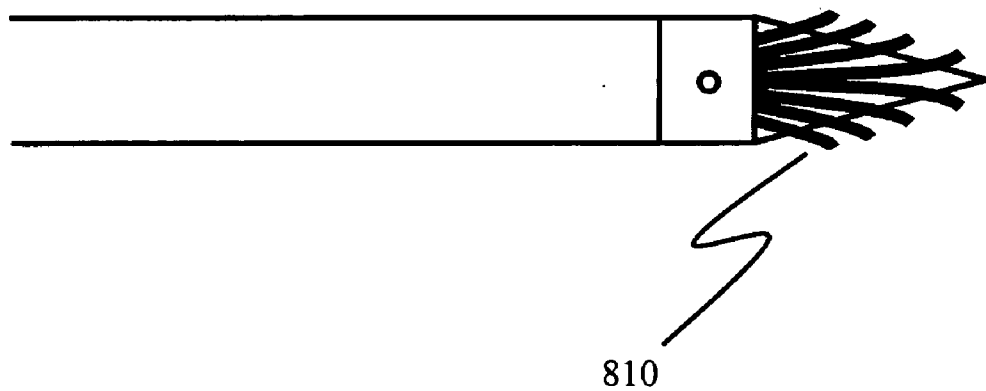


**Fig. 8**

**A**



**B**



**C**



## ARMORED TACTICAL VEHICLE WITH MODULAR APPARATUS

### FIELD OF THE INVENTION

**[0001]** This invention relates generally to a tactical assault vehicle system, and more particularly to an armored tactical assault vehicle system with modular apparatus including a transportation unit, a mobile tactical operations center and tactical holding area, a deployable armored assault platform, and an armored structural breaching ram.

### BACKGROUND OF THE INVENTION

**[0002]** The need for enhanced protection and tactical capabilities in police, fire, military and homeland security operations is widely known and well documented. As Kropf cites in his U.S. Pat. No. 6,711,980, "In recent years, there have been frequent situations in which a school, place of business, home or residence is occupied or taken over by an armed individual or individuals, such as, a deranged student, disgruntled employee or unhappy lover. In many cases there are hostages involved. The police authorities are faced with a difficult problem. In order to obtain access to the premises and arrest the perpetrators, they must risk personal injury or death. Frequently the result is a standoff with the hope that the perpetrators will come to their senses and surrender and that any hostages will not be injured or killed. The desired outcome does not always happen, however, and it is therefore desirable that improved means be provided for aiding the police authorities in overcoming such perpetrators and rescuing any hostages."

**[0003]** There are available in the prior art various devices which might be used in such situations. The U.S. Pat. No. 1,253,964 to Hack discloses a guardhouse that is movable from place to place by the person inside the guardhouse who is protected by the guardhouse. The U.S. Pat. No. 6,711,980 to Kropf discloses an armored booth that is moveable under the power of the occupants and provides protection for the occupants. The U.S. Pat. No. 5,856,629 to Grosch discloses an unmanned armored minesweeping vehicle. The U.S. Pat. No. 5,727,481 to Voorhees et al. discloses a portable armored incinerator for burning explosive materials. The U.S. Pat. No. 4,892,345 to Rachael discloses an armored vehicle with separate compartments for driver, crew and cargo vault. The U.S. Pat. No. 4,853,998 to Bernard et al. discloses an armored bridge deployment vehicle. The U.S. Pat. No. 4,672,435 to Gluck discloses an electronic observation and reconnaissance system for an armored vehicle. The U.S. Pat. No. 4,192,216 to Wait discloses a single person armored vehicle provided with lights, loud-speaker and aerial. The U.S. Pat. No. 6,435,071 to Campbell discloses an armored vehicle configured to retrieve a victim from a minefield under fire. These devices, however, are not completely satisfactory, in that they do not, for example, deal with the problems of transporting the system to the site of a hostage incident over public roadways, placing a tactical team in position to breach a hostile building, performing the breach in a controlled and legal manner, providing protected ingress and egress to the building for the tactical team, and removing the team and hostages following the incident. Further, these devices do not, for example, deal with the problems of transporting the system to the site of a fire or hazardous materials incident over public roadways, clearing unoccupied civilian vehicles from the site rapidly and without damage, establishing a tactical command center at the site,

transporting personnel safely to the source of the fire or other hazard, neutralizing the hazard, and then returning the personnel safely from the site.

### SUMMARY OF THE INVENTION

**[0004]** The present invention has multiple aspects. In one aspect the invention involves a system including a tandem axle trailer pulled by a rugged all-terrain tow vehicle. This trailer is fitted to carry a mobile power source such as a generator, certain elements of a mobile tactical operations center such as a communications board and work table, a base vehicle derived from a commercially available multi-terrain loader platform, and one or more modular attachments to the armored base vehicle such as an armored tactical assault platform, a vehicle extraction device or a breaching ram.

**[0005]** In another aspect the invention involves the base vehicle armored with National Institute of Justice (NIJ) level 3 ballistic protection, and fitted with self contained breathing apparatus, a remote communications subsystem, a public address system, electric power generating equipment, one or more external cameras, one or more external microphone and other external sensors.

**[0006]** In yet another aspect the invention involves a system which allows the base vehicle to be controlled remotely using a global positioning system, so that the vehicle is un-manned.

**[0007]** Other aspects of this invention utilize any platform that combines vehicle mobility with lifting capability and powered by hydraulics or other systems. Potential platforms include, but are not limited to: tracked multi-terrain loaders, wheeled loaders, backhoes, forklifts, and bulldozers. Still another aspect of this invention uses a base vehicle powered by natural gas or batteries for use indoors. Lifting implements associated with the base vehicle also include a lift bucket or fireman's "cherry picker", or a scissors style cargo lift. The lifting unit of the base vehicle is capable of switching between at least two modular attachments without the operator leaving the cab. One of the lifting unit modules is a tactical assault platform for moving personnel, equipment, and munitions into a hazardous area. Another module is an extensible ram unit that contains a variety of functional attachments. Another module is a vehicle extraction device capable of lifting and moving cars or other heavy objects from beneath with minimal damage. The lifting unit can also be fitted with fluid hose attachments for firefighting purposes.

**[0008]** Another aspect of the invention is the ability to be loaded and towed on a trailer by a towing vehicle. The base vehicle is small and light enough to be easily towed.

**[0009]** The invention is useful for multiple applications, including but not limited to tactical operations, reconnaissance, inspection of buildings or containers, search and rescue, bomb squad operations, fire fighting, and hazardous materials response. These vehicular units are able to serve multiple needs for any city, state, regional or federal agency, or any homeland security, defense or military agency, including local, state, and federal law enforcement, national guard units, any branch of the armed forces, or any federal agency in the United States or in another country.

**[0010]** Another aspect of the invention provides a variety of attachments to the base vehicle which are modular to the front, rear, roof and sides of the base unit. One such attachment is a cargo box for holding medical supplies or other equipment. Another attachment is a gurney or backboard for carrying injured patients. The gurney is able to incline, decline and tilt in any one or more directions to control blood

flow to different regions of the body, and has removable and configurable panels that can protect the patient while still allowing access for medical treatment.

**[0011]** Yet another aspect of the invention are attachments which allow a person to give medical assistance while walking alongside the vehicle. Attachments include oxygen tank and mask, intravenous fluid bags, or any apparatus for advanced medical support, such as a defibrillator.

**[0012]** Still another aspect of the invention is an armored assault platform on the lifting unit that is deployable, recoverable and modular. The armored platform is mounted on the lifting unit to deploy above or below grade with protection, allowing access to a second story or roof of a building. The armor of the platform can be a rigid ballistic plating or a flexible ballistic blanket or fabric barrier. The platform has a sliding front exit portal and rotating side panels for protected personnel deployment forward or laterally from the platform, as well as a fixed or adjustable roof, with or without vertical egress. The floor of the platform is either expanded metal mesh or armored construction, with or without vertical egress. The platform also has a loudspeaker and a deployable negotiation phone. In addition the platform has an attachment point for a variable or fixed power fan for repelling fire or smoke. The fan is used to direct tear gas for crowd control, clear smoke from a fire scene, or clear a gaseous chemical hazard. The platform is configured to carry and power standard and specialized tools, including but not restricted to the Hurst Jaws of Life, Halligan bars, cutting torches, and hydraulic, pneumatic or electric jacks and saws. The assault platform is also equipped with a removable and portable munitions carrier for firearms or less-lethal munitions.

**[0013]** The platform is used to deliver a tactical team to a breach point, convey explosives technicians to a bomb site, deliver food or medicine, retrieve hostages in hostage situation, or allow face to face hostage negotiations with ballistic protection. A stokes basket or basic stretcher is mountable on the platform to provide safe transport and medical treatment to an injured person under fire, or in hazardous conditions. Bomb robots or disruptors can be deployed and operated through the portal.

**[0014]** Another aspect of the platform is that it can be configured with light weight armor or shielding to protect personnel and equipment from heat and explosions. "Light weight armor" is defined in this specification as steel-plating that is not necessarily NIJ or UL rated for projectile resistance, but is capable of resisting heat and force from explosions. In this configuration, seats are installed on the platform that double as detachable equipment boxes for fire-fighting, first aid, and safety kits. In all cases, personnel and equipment are fully protected, in full communication and unseen.

**[0015]** A ram unit is another modular aspect of the current invention. The ram unit can be fitted with additional armor or protective equipment, and is interchangeable with various sized rams or other tools. The ram unit may be outfitted with or without a hydraulic cylinder or other driver for ram extension, as well as auxiliary hydraulics or other drivers for actuating accessory tools, which can spin, scissor, or punch in one or more directions. The accessory tools can be changed quickly, and include: a camera, lights or laser pointing devices, microphones or other listening devices, tasers, and smoke-producing devices.

**[0016]** The ram unit contains multiple cameras, allowing the ram to simultaneously breach a wall, and view and record the interior of the structure. The ram makes a controlled

structural breach with minimal damage and minimal exposure. The ram may also be fitted with additional sensors such as air quality, x-ray or radiation detection devices.

**[0017]** An additional aspect of the invention is an armored blast shield that can be added to the front of the vehicle. This unit can be attached with either the assault platform or the modular ram unit in place, and can also attach directly to the ram or assault platform. This blast shield provides additional protection to the vehicle and its operator from weapons fire, radiation, bomb blast, high heat, or shrapnel.

**[0018]** Yet another aspect of the invention provides exterior implements, such as a fire suppression system or fire extinguisher array, a localized coolant system to maintain base unit and operator safety in or near a fire zone, task lights, flood lights, blinding lights, and cameras.

**[0019]** The invention also has a generator aspect which powers the tactical operations center, the trailer and the vehicle. The generator can be fixed to the vehicle directly or can be moveable between the vehicle and the trailer. Any portable generator may be used.

**[0020]** The trailer also carries an x-ray imaging unit or a fire hose and tank/pump mechanism capable of pumping liquids or foam. The hose and pump mechanism could be used for fire or crowd control. The x-ray unit could be used for search or surveillance in customs, shipping or transportation applications. The x-ray unit and the hose and pump mechanism can both be fitted to the ram, the assault platform, the armored base unit, or configured for hand held or independent use.

**[0021]** Another aspect of the trailer is a secure wireless communication link from the vehicle to the tactical operations center or trailer, as well as to the armored assault platform, the ram, or personnel associated with the operation.

**[0022]** Yet another aspect of the invention is a tactical acoustic or public address system with microphones. Such a system could be used to perform an automated knock and announce procedure that is controlled by the vehicle operator, as well as recording the events before, during and after the procedure. The knocking sound could be pre-recorded, or performed by a physical knocking device on the ram attachment. The knock and announce system provides for scripting, pre-recording, playback, and documentation of a knock and announce procedure meeting all statutory and regulatory requirements, without directly exposing the vehicle occupants to danger.

**[0023]** Still another aspect of the invention is a posting or tactical operations board associated with the trailer. The board is a full size chalkboard, grease board, whiteboard, or other large erasable surface that is secured in a sealed storage enclosure on or underneath the trailer and is deployed and mounted to the trailer or to a separate stand or base, for use by the tactical operations commander. Alternatively, the tactical operations board may include pre-printed or blank, single use disposable or peel-away surfaces for writing or posting of information. The tactical operations board is accessed directly by sliding, rotating or dropping out of the sealed storage enclosure and flipping, latching, hooking, sliding or rotating into place, and is deployable to either side of the trailer. Multiple boards can be mounted on the trailer. The tactical operations board is preconfigured with labeled areas for personnel, division/section, special unit, objective, inner perimeter and outer perimeter. The tactical operations board can also be computerized, displaying information and allowing the tactical operations commander to write over the information. A computerized board records and transmits data

directly, with the data connection being integrated, collocated and mounted. Writing implements are stored with the board.

**[0024]** Other aspects of the trailer are attached lighting and cover to protect the tactical operations board and users of the tactical operations center or tactical holding area from rain, snow or wind. The trailer features open sections for quick and easy access to equipment, closed sections for secure and discrete transport and storage of equipment, and configurable sections which may be closed in transport and selectively unlocked, opened or exposed when deployed. In some cases the trailer may be completely enclosed, unmarked, and not identifiable. In some cases the trailer may be open to display the unit and attachments, or the trailer may be painted or posted with information about the machine and the agency which it serves.

**[0025]** Another aspect of the present invention involves one or more counterweights that can be mounted to the base vehicle to account for equipment and loading scenarios as well as variability in the terrain or area of operation.

#### BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

**[0026]** FIG. 1A shows a perspective view of a base vehicle with a modular ram unit.

**[0027]** FIG. 1B shows a perspective view of a base vehicle with a modular ram unit and a storage box attachment.

**[0028]** FIG. 2 shows a perspective view of a base vehicle with a modular ram unit and a stretcher attachment.

**[0029]** FIG. 3 shows a rear view of a modular assault platform.

**[0030]** FIG. 4 shows a front view of a modular assault platform.

**[0031]** FIG. 5 shows a perspective view of a modular ram unit.

**[0032]** FIG. 6 shows a side view of a modular vehicle lifting assembly.

**[0033]** FIG. 7 shows a perspective view of the base vehicle with the detachable blast shield.

**[0034]** FIG. 8A shows a side view of a detachable hook ram head.

**[0035]** FIG. 8B shows a side view of a detachable pulverizer or crusher ram head.

**[0036]** FIG. 8C shows a side view of a detachable wedge ram head.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0037]** The present invention has multiple embodiments. In one embodiment the invention involves a system including trailer, a tow vehicle, a mobile power source, a communications board and work table, an armored base vehicle, and one or more modular attachments to the armored base vehicle such as an armored tactical assault platform, a vehicle extractor or a structural breaching ram.

**[0038]** In a preferred embodiment the invention involves a system including a tandem axle trailer pulled by a rugged all-terrain tow vehicle, both capable of legal travel on public roads without special markings, flags or lead vehicles. The trailer is fitted to carry a mobile power source such as a generator, certain elements of a mobile tactical operations center such as a communications board and work table, a base vehicle derived from a commercially available multi-terrain loader platform, and one or more modular attachments to the

armored base vehicle such as an armored tactical assault platform or an armored breaching ram.

**[0039]** In a more preferred embodiment, the invention provides the base vehicle armored with National Institute of Justice (NIJ) level 3 ballistic protection, and fitted with self contained breathing apparatus, a remote communications subsystem, a public address system, electric power generating equipment, one or more external cameras, one or more external microphones and other external sensors.

**[0040]** Ballistic armor can be rated in two systems, one from the National Institute of Justice (NIJ), and the other from Underwriters Laboratories (UL). NIJ Armor ratings include I, IIA, II, IIIA, III, and IV, with lower numbers denoting armor resistant to lower power projectiles, while UL 752 armor ratings range from 1 to 8, although the UL rating level does not necessarily correlate with projectile force that can be withstood, as is known by those skilled in the art. In a preferred embodiment armor plating used on the base vehicle as well as the assault platform comprises  $\frac{3}{8}$  inch thick Armor Gard, a rigid plating providing NIJ level 3A or "3+" or UL level 4 ballistic protection (Heflin Steel, Esco Engineered Products, Phoenix, Ariz.). Alternative embodiments could use a thicker or thinner rigid plating that provides more or less ballistic protection. In one such embodiment, the base vehicle is fitted with  $\frac{1}{4}$  inch thick plating providing NIJ level 3 protection, alternatively with  $\frac{1}{2}$  inch thick plating providing NIJ level 4 protection, which is sufficient to stop armor piercing bullets. In another embodiment, the assault platform or ram is fitted with  $\frac{1}{4}$  inch thick plating providing NIJ level 3 protection, alternatively with  $\frac{1}{2}$  inch thick plating providing NIJ level 4 protection, which is sufficient to stop armor piercing bullets. The assault platform, ram and base vehicle may each be fitted with the same armor, or each may be fitted with different armor to meet specific tactical requirements. In one embodiment, the ram is fitted with armor lighter than that on the base unit since it does not carry personnel, and the assault platform is fitted with armor heavier than that of the base unit, since it is more likely to receive sustained fire at close range and may be temporarily immobilized when deployed. In another alternative embodiment, the ballistic protection comprises a lightweight material such as the Instant Armor TACIII+ or a flexible material such as the Instant Armor 1st Responder Level IIIA (Instant Armor, Simi Valley, Calif.).

**[0041]** A preferred embodiment of the invention provides bullet resistant glass windows such as those available from Security Impact Glass (Riviera Beach, Fla.) at the front, sides, rear and roof of the vehicle operator cabin. Alternatively one or more of the windows may be fitted with a ballistic armor plate cover in addition to, or instead of the bullet resistant glass.

**[0042]** A preferred embodiment of the invention provides a forward exit door from the operator cabin. The forward exit door allows the operator to quickly enter and leave the cabin. The bullet resistant glass window in the exit door allows the operator to scan the area for hazards prior to opening the exit door and exiting the vehicle. Alternatively, the exit door may be configured in the roof of the operator cabin. Alternatively, the exit door may be configured in one side of the operator cabin. Alternatively, the exit door may be configured in the rear of the operator cabin.

**[0043]** In another embodiment, the invention involves a system which allows the base vehicle to be controlled remotely using a global positioning system, so that the vehicle is un-manned.

[0044] In still another embodiment, the invention has sensors in the rear of the vehicle to detect the presence of personnel or equipment behind the base unit when backing up. Backup sensors are known to those skilled in the art, such as sensors based on sonar technology, video, laser, infrared or visible spectrum light. The sensors are preferably integrated with the operator controls and video system to provide feedback to the operator when a potential runover hazard exists out of the operators direct line of sight.

[0045] Other embodiments of this invention utilize any platform that combines vehicle mobility with lifting capability and powered by hydraulics or other systems. A particularly preferred embodiment, as shown in FIG. 1A, uses a multi-terrain loader such as the 287b multi-terrain loader available from Caterpillar, Inc. (Peoria, Ill.) as a base vehicle platform. The multi-terrain loader has a hydraulic dual-arm lifting unit 110 to which custom modules, such as a breaching ram 120 are attached. Alternative embodiments utilize other tracked or wheeled vehicle platforms that have a lifting system such as: wheeled loaders, tracked loaders, backhoes, forklifts, feller-bunchers, front shovels, harvesters, excavators, skid steer loaders, skidders, telehandlers, tractors, and bulldozers. Another embodiment of this invention uses a base vehicle such as a forklift or pallet jack powered by natural gas or batteries for use indoors, as well known by those skilled in the art. Other embodiments of the base vehicle have varied lifting implements including a lift bucket, a fireman's "cherry picker", or a scissors style cargo lift.

[0046] In a preferred embodiment, the platform is a tracked all-terrain loader. The tracked loader is a particularly advantageous platform due to its ability to move reliably across wet, soft, loose or unstable ground and its broad load distribution, which spreads the vehicle weight over the entire track surface. Another advantage of the tracked loader platform is its inherent ruggedness, and resistance to damage from the terrain or from attacks including bullets, projectiles, small explosives and fire. Alternatively, the platform is a wheeled loader. A wheeled loader is an advantageous platform due to its relatively low cost, simplicity and maneuverability. In a wheeled loader platform, one particularly advantageous embodiment features high strength, bullet proof or flat resistant tires.

[0047] In one embodiment the lifting unit 110 of the base vehicle, illustrated in FIG. 1A is capable of switching between at least three modular attachments without the operator leaving the cab. The invention provides for adaptation of standard lift and attachment interfaces such as the one found, for example, on the Caterpillar 287b multi-terrain loader. One of the lifting unit modules is a tactical assault platform for moving personnel, equipment, and munitions into a hazardous area. Another lifting unit module is an extensible ram unit that contains a variety of functional attachments. A third lifting unit module is a vehicle lifting assembly that can lift and move vehicles. The lifting unit can also be fitted with fluid hose attachments for firefighting purposes. In a preferred embodiment shown in FIG. 1A, a hydraulic power system is attached to the base vehicle, with hoses 130 running from the pumping mechanism and terminating in coupling nozzles 140 on one side of the lifting unit. The hydraulic hoses are used to power an extensible ram or other attachments such as the Hurst Jaws of Life, hydraulic shears, jacks, cutters, lifting units, drills or saws. In a preferred embodiment, the hoses are protected by a flexible Kevlar jacket. The Kevlar jacket provides NIJ level 3 ballistic protection, alternatively level 1 ballistic protection, alternatively level 2 bal-

listic protection, alternatively level 2a ballistic protection, alternatively level 3a ballistic protection, alternatively level 4 ballistic protection. In another embodiment, the hydraulic hoses are protected by rigid ballistic armor plating which provides NIJ level 3 ballistic protection, alternatively level 1 ballistic protection, alternatively level 2 ballistic protection, alternatively level 2a ballistic protection, alternatively level 3a ballistic protection, alternatively level 4 ballistic protection.

[0048] A preferred embodiment of the invention is configured to be loaded and towed on a trailer by a towing vehicle. The base vehicle is small and light enough to be easily towed. In a particularly preferred embodiment, the entire system including base vehicle, all attachments, and trailer is configured for legal passage on public roadways when pulled by a commercially available car or truck without requiring the operator to possess a commercial drivers license. In this embodiment, the gross vehicle weight is preferably equal to or less than about 17,000 pounds, alternatively about 20,000 pounds, alternatively about 15,000 pounds, alternatively about 12,000 pounds and tongue weight of the trailer is equal to or less than about 21,000 pounds, alternatively about 15,000 pounds, alternatively about 12,000 pounds, alternatively less than about 10,000 pounds. Also in this particularly preferred embodiment, the trailer preferably has three axles, alternatively two axles, each carrying a per-axle load preferably equal to or less than about 7,000 pounds, alternatively about 6,000 pounds, alternatively about 5,000 pounds, alternatively about 4,000 pounds, alternatively about 3,000 pounds. To allow for passage under bridges, through tunnels and other openings, the vehicle and trailer are preferably less than about 10 feet tall, alternatively less than about 12 feet tall, alternatively less than about 8 feet tall. To allow for passage over public roadways without special markings or permitting, the vehicle and trailer are preferably less than about 8 feet wide, alternatively less than about 9 feet, alternatively less than about 7 feet, alternatively less than about 6 feet wide.

[0049] In another preferred embodiment, the invention provides a specialized tow vehicle, adapted to transport the operator, additional personnel and their personal equipment. The vehicle has preconfigured storage for personal protective equipment including bullet proof vests, helmets, protective eyewear, personal communications devices, gloves, munitions, and other specialized equipment including kits for first aid, emergency medical supplies, or bomb squad operations. The vehicle is preferably a rugged all terrain vehicle (such as a Hummer H1, available from General Motors Corporation, Detroit, Mich.), alternatively a heavy duty truck, alternatively a light duty truck, alternatively a sport utility vehicle, alternatively a special purpose vehicle such as a dump truck or snow plow, alternatively a van configured with mobile command and communications equipment.

[0050] The invention is useful for multiple applications, including but not limited to: tactical operations, reconnaissance, inspection of buildings or containers, search and rescue, bomb squad operations, fire fighting, and hazardous materials response. These vehicular units are able to serve multiple needs for any city, state, regional or federal agency, or any homeland security, defense or military agency.

[0051] One embodiment of the present invention includes one or more counterweights that can be mounted to the base vehicle to account for equipment and loading scenarios as well as variability in the terrain or area of operation.

[0052] Another embodiment of the invention provides a variety of attachments to the base vehicle which are modular to the front, rear, roof or sides of the base unit. FIG. 1B illustrates a cargo box attachment 150 on one side of the base vehicle for holding medical supplies or other equipment. FIG. 2 is an illustration of the invention with a stretcher attachment 260 for carrying injured patients. The stretcher is head brace and neck brace compatible. In another embodiment, the attachment is a backboard or other means of stabilizing and immobilizing a patient. The stretcher is able to incline, decline and tilt in any one or more directions to control blood flow to different regions of the body, and has removable and configurable panels 270, 271, 272, 273 and 274 that can protect the patient while still allowing access for medical treatment.

[0053] Yet another embodiment of the invention provides attachments which allow a person to give medical assistance while walking alongside the vehicle. Attachments include oxygen tank and mask 275, intravenous fluid bags 276, or any apparatus for advanced medical support, such as a defibrillator 277.

[0054] FIGS. 3 and 4 illustrate still another embodiment of the invention, which is an armored assault platform attached to the base plate of the lifting unit that is deployable, recoverable and modular. The armored platform is mounted to lift or deploy above or below grade with protection, allowing access to a second story or roof of a building. In an alternative embodiment, the lifting arm may be further extensible to allow access to taller structures including third floor windows or the roof of a two story building. In a preferred embodiment, the armor of the platform comprises Armor Gard, a rigid plating providing NIJ level 3 or UL level 4 ballistic plating (Heflin Steel, Esco Engineered Products, Phoenix, Ariz.). In another embodiment, a flexible and configurable barrier such as an Instant Armor 1<sup>st</sup> responder or TacIII+ system (Instant Armor, Inc., Simi Valley, Calif.).

[0055] FIG. 3 illustrates a rear view of a preferred embodiment of the assault platform, in which three lengths of 4 inch by 4 inch square steel tubing 300 are welded to a face plate attachment 310 such as the Model No. UK made by Caterpillar, Inc., (Peoria, Ill.), and gussets are welded underneath the 4 inch by 4 inch square steel tubing for support. A frame of 2 inch by 2 inch square steel tubing is welded to the 4 inch by 4 inch square steel tubing to create a platform framework 320. An expanded metal floor 330 is welded directly to the platform framework 320. The floor of the platform is preferably expanded metal mesh, alternatively armored construction, preferably with a solid floor, alternatively with a vertical egress panel or trap door. The expanded metal mesh floor is advantageous because it provides sure footing and unimpeded motion inside the platform during tactical operations. The armored construction is advantageous because it provides additional ballistic protection. The vertical egress panel or trap door is advantageous because it provides an additional egress point which is well hidden and protected. The platform has a front panel 335 with a sliding front exit cover 340 mounted on cam rollers, and rotating side panels 350 and 351 mounted on hinges for protected personnel deployment forward or laterally from the platform. Alternatively, the side panels may slide instead of rotating. Alternatively, the side panels may feature both a sliding and a rotating motion. Alternatively, the front exit cover may rotate on a vertical or horizontal hinge instead of sliding. Alternatively, the front exit cover may feature both sliding and rotating motion. The

front and side panels are pre-cut with gun portals, with slide brackets 355 which hold armored port covers 360. Armored port covers 360 and sliding front exit cover 340 have handles 365 as well as locking nuts and securement fasteners to hold the armored port covers in place. Alternatively, the port covers may rotate about a vertical or horizontal axis to allow access to the ports. Alternatively, the port covers may be removable and stowable to allow access to the ports. In another embodiment, the assault platform has a fixed or adjustable roof, with or without vertical egress. In still another embodiment, the movable panels are configured with crash door handles.

[0056] FIG. 4 illustrates a front view of the assault platform, with 2 inch by 6 inch rectangular steel tubing welded to front of platform framework 400 to form vertical supports 410 for the front wall 420, made from precut armor plate. Vertical supports 410 are welded back at an angle to provide support for a fixed upper deflector plate 430. In a preferred embodiment, the angle of the deflector is about 45 degrees from vertical towards the vehicle, alternatively about 60 degrees from vertical towards the vehicle, alternatively about 30 degrees from vertical towards the vehicle. A pair of 4 inch metal strips 440 and 441 are attached to the side panels 450 and 451; these metal strips protect the side panel hinges and cover the gap formed when the side panels are moved. In a preferred embodiment the side panels are about 60 inches high and about 24 inches wide, alternatively about 48 inches high, alternatively about 36 inches high, alternatively about 72 inches high, alternatively about 36 inches wide, alternatively about 12 inches wide. The height and width of the side panels is adjusted in each particular embodiment to provide a larger protective area, or to allow access into smaller confined spaces. In a preferred embodiment, the frame, floor, panels, roof, hinges and slides are welded in place by means known in the art. Welding provides a reliable and maintenance free means of permanent attachment. In a preferred embodiment, the dimensions of the floor of the platform are about 90 inches wide and about 45 inches deep, alternatively about 60 inches wide, alternatively about 45 inches wide, alternatively about 30 inches deep, alternatively about 60 inches deep. In one advantageous embodiment, the floor of the platform is sized just wide enough to hold a stretcher across the width of the platform, under ballistic protection. In an alternative advantageous embodiment, the floor of the platform is sized just deep enough to hold the length of a stretcher across the depth of the platform. Platform size is selected in a given embodiment to advantageously maximize protected area, mobility, and ability to fit into restricted spaces. In a preferred embodiment, the dimensions of the front wall of the platform are about 60 inches high and about 48 inches wide, alternatively about 48 inches high, alternatively about 36 inches high, alternatively about 72 inches high, alternatively about 36 inches wide, alternatively about 60 inches wide. The height of the front wall is adjusted in each particular embodiment to provide a larger protective area, or to allow access into smaller confined spaces. In an alternative embodiment, one or more of the frame, floor, panels, roof, hinges or slides are mechanically fastened in place by means known in the art, such as bolts, screws, rivets, lynch-pins, quick release cam-locking fasteners or clamps. These fasteners provide simple and secure attachment, while allowing for changes in configuration over time, or at the tactical deployment site.

[0057] The platform also has a loudspeaker and a deployable negotiation phone in one embodiment. The negotiation

phone may be used to conduct hostage negotiations, or to interact with suspects in any law enforcement activity. The phone is deployable from either the platform, or the ram or the base unit. When deployed from the ram, the phone has the advantage of being remotely placed without exposing the operator to danger. When deployed from the base unit, the phone has the advantage of being highly maneuverable for precise placement without exposing the operator to danger. When deployed from the platform, the phone has the advantage of being safely deployed and used immediately by the tactical negotiator, optionally with direct line of sight and visual contact to the suspect through one or more portals, through the front exit cover or around one of the side panels.

**[0058]** In another embodiment the platform has an attachment point for a variable or fixed power fan for repelling fire or smoke. The fan is used to direct tear gas for crowd control or clear a gaseous chemical hazard. In yet another embodiment, the platform is configured to carry and power both standard and specialized tools, including but not restricted to, the Hurst Jaws of Life (Hale Products, Inc., Shelby, N.C.), Halligan bars, cutting torches, and hydraulic jacks and saws. In one embodiment, the assault platform is also equipped with a removable and portable munitions carrier for firearms or less-lethal munitions.

**[0059]** The platform is used to deliver a tactical team to a breach point, convey explosives technicians to a bomb site, deliver food or medicine, retrieve hostages in hostage situation, or allow face to face hostage negotiations with ballistic protection. A stokes basket or basic stretcher is mountable on the platform to provide safe transport and medical treatment to an injured person under fire, or during transport. Bomb robots or disruptors can be deployed and operated through the portal. Another embodiment of the platform is that it can be configured with light weight armor or shielding to protect personnel and equipment from heat and explosions. In this configuration, seats are installed on the platform that double as detachable equipment boxes for fire-fighting, first aid, EMT, and safety kits. In all cases, personnel and equipment are fully protected, in full communication and unseen.

**[0060]** In another embodiment the invention provides two identical assault platforms. Two identical platforms allow for delivery and deployment of two full tactical teams to the same or different breach points simultaneously. Two identical platforms provides an advantageous configuration in that tactical teams will only have a single configuration to learn and train under, no matter which platform they use in a live engagement.

**[0061]** In yet another embodiment, the invention provides a second platform which is smaller or larger than the primary platform. Preferably, the second platform is smaller, allowing for storage and transport on the same trailer with the other attachments. The smaller platform is particularly advantageous in that it may be deployed into spaces where the primary platform would not fit, e.g., onto a porch or balcony, or into a small space between a door or window and an adjacent wall. Alternatively, the second platform is larger than the first platform to allow for transport and deployment of a larger team with additional equipment which might not fit on the first platform. The second platform has preferably the same armor material, configuration and ballistic protection level as the primary platform, alternatively the second platform has lighter armor and a more open configuration to reduce weight and improve access, alternatively the second platform has heavier armor and a more restrictive armor configuration to

provide increased protection. Alternative embodiments provide three, four, or five platforms of various sizes adapted to be transported and deployed by the same base vehicle. Preferably at least one of these additional platforms is smaller than the primary platform, more preferably sized to deploy two individuals, most preferably sized to deploy a single individual into a confined space.

**[0062]** A modular structural breaching ram unit is provided in a preferred embodiment of the current invention, as illustrated in FIG. 5. The ram can be fitted with additional armor or protective equipment, and is interchangeable with various sized rams or other tools. A face plate attachment **500** such as the Model No. UK made by Caterpillar, Inc., (Peoria, Ill.) is welded to an outer horizontal 6 foot long, 6 inch by 6 inch by 1/4 inch square steel tubing beam **510**. A gusset or support is added, and a hole is cut in the back of the face plate attachment. A hydraulic cylinder with 4 foot travel and capable of exerting 6500 pounds of pressure is slid through the hole into the steel tubing beam and the rear of the cylinder is pinned in place. An inner square steel tube (6 feet 6 inches, 5 inch by 5 inch by 1/4 inch) **520** is inserted into the outer square steel tubing beam **510**, and the front end of the hydraulic cylinder is pinned to the inner steel tube **520**. A 12 inch diameter face plate **530** with a hole in the center is mounted to the inner square steel tube **520** using quick release pins. A camera **540** is mounted behind the face plate **530**. Wiring **550** from the camera is contained within a protective sleeve, and a spring-loaded spool **560** takes up slack wiring and releases extra wiring during ram unit extension and retraction. Both the spool and the metal tube can be protected by armor or some other protective shielding. In one embodiment, the wiring is contained within a metal tube for protection. In another embodiment, the wiring is contained within the extensible tube which makes up the ram unit.

**[0063]** In alternative embodiments, the ram head is about 6 inches in diameter, alternatively about 10 inches, alternatively about 16 inches, alternatively about 20 inches, alternatively about 24 inches in diameter. Larger ram heads provide faster breaching, with a larger penetration. Smaller ram heads provide precise breaching, with controlled access and minimal damage.

**[0064]** FIG. 8A illustrates an alternative embodiment, in which the ram head is interchangeably replaced with a hook **800** or angle bracket. The ram may have a winch or pull-bar powered by the hydraulics or by electric or other means. Alternatively the ram head is interchangeably replaced with a pulverizer or crushing head **810** providing sharp edges, teeth or protrusions which aid in breach or piercing operations, illustrated in FIG. 8B. Alternatively the ram head is interchangeably replaced with a wedge or pointed member **820**, illustrated in FIG. 8C, to focus the ram force and maximize penetration capability in the case of strong or reinforced structures. Alternatively, the ram head is interchangeably replace with a small deployment platform. The small deployment platform is preferably sized to hold one person, alternatively sized to hold two people; preferably armored, alternatively unarmored; preferably with a frame or support rails to help personnel maintain their balance as the ram moves, alternatively without any frame or railings; and preferably configured for both sitting and standing upon, alternatively configured primarily for sitting, with a seat and grab rails, alternatively configured primarily for standing, with a foot platform and non-slip surface.

**[0065]** In certain embodiments, the ram unit is armored with NIJ level 3 ballistic protection and outfitted with a hydraulic cylinder or other driver for ram extension, as well as auxiliary hydraulics for actuating accessory tools, which can spin, scissor, or punch in one or more directions. The accessory tools can be changed quickly, and include: a camera, lights or laser pointing devices, microphones or other listening devices, tasers, and smoke-producing devices such as fixed or deployable tear gas and visual impairment smoke canisters or grenades.

**[0066]** The ram unit contains a camera, allowing the ram to simultaneously breach a wall, and view and record the interior of the structure. In a particularly preferred embodiment three PC180XP Ex-View black and white cameras (Supercircuits, Inc., Liberty Hill, Tex.) are mounted in the ram, facing forward, left and right to provide a full panoramic view to the operator, via displays mounted inside the base unit. In one preferred embodiment the ram unit features a contact sensor and depth gauge to guide the operator in placing and actuating the ram. In a particularly preferred embodiment the contact sensor and depth gauge are combined in a flexible probe which deflects when it contacts the structure to be breached, at about the midpoint of the extension of the ram. Alternatively, the depth gauge may indicate at about the endpoint or the extension of the ram, alternatively at about 20% of the extension, alternatively at about 33% extension, alternatively at about 65% extension, alternatively at about 80% extension. In yet another preferred embodiment, the ram features a pointing device, preferably the pointing device may be a laser, and in an even more preferred embodiment the laser also provides an electronic measurement of extension distance from the ram to the target surface. Alternatively, the extension distance may be obtained from an ultrasound measurement.

**[0067]** In one preferred embodiment the ram unit has about 6,500 pounds of pushing force, alternatively about 4,000 pounds of pushing force, alternatively about 8,000 pounds of pushing force; net travel of about 4 feet, alternatively less than 1 foot net travel, alternatively about 2 feet net travel, alternatively about 6 feet net travel, alternatively about 8 feet of travel; and 10 feet total extension, alternatively more than 15 feet total extension, alternatively about 12 feet total extension, alternatively about 8 feet total extension, alternatively about 6 feet total extension, alternatively about 4 feet total extension, alternatively less than about 2 feet of total extension; with NIJ level 3 ballistic protection, alternatively level 1 ballistic protection, alternatively level 2 ballistic protection, alternatively level 2a ballistic protection, alternatively level 3a ballistic protection, alternatively level 4 ballistic protection.

**[0068]** In one embodiment, an accessory tool that can be attached to the ram unit is a device for measuring air quality and detecting hazardous chemicals or gases in the air. The air measurement device is remote from the vehicle operator, who is protected by the vehicle's shielding and self contained breathing apparatus or air filtration system. The measurement device signals the conditions and possible hazards to the vehicle operator, the assault platform, and the tactical operations center. Other environmental measurement devices attached to the ram unit can detect the presence of radioactivity, chemical, or biological hazards. Each of these sensors has the advantage of detecting potential hazards quickly and efficiently, without exposing the operator directly to the hazards.

**[0069]** Yet another embodiment of the invention features a modular vehicle lifting assembly, illustrated in FIG. 6. In a preferred embodiment of the vehicle lifting assembly sleeves 600 made of square steel tubing are slid over the forks of a pallet fork attachment 610 (Model No. 149-1411 made by Caterpillar, Inc., Peoria, Ill.) and then drilled and pinned or bolted onto the forks. A steel plate 620 about one foot in length is welded onto the sleeves, then heated and bent back towards the lifting unit to form a hook. The bend angle of the steel plate is preferably about 65 degrees, alternatively about 75 degrees, alternatively about 45 degrees. The vehicle lifting assembly can be used to lift a car or truck and move it from its current location rapidly and without damage to the vehicle, other vehicles or surroundings. This can save time and eliminate the need for a tow truck or other resource in a law enforcement or fire fighting operation.

**[0070]** An additional embodiment of the invention features an armored blast shield that can be added to the front of the vehicle base or lift unit as illustrated in FIG. 7. This blast shield 700 can be attached by itself or with either the assault platform or the modular ram 710 in place. The blast shield mounts either directly to the base vehicle frame, to the lifting unit, to the assault platform, or to the end of the ram, or along the length of the ram. This blast shield provides additional protection to the vehicle and its operator from weapons fire, radiation, bomb blast, high heat, or shrapnel. To adequately provide protection the blast shield is preferably about 36 inches wide, alternatively about 48 inches wide, alternatively about 60 inches wide. To adequately provide protection the blast shield is preferably about 48 inches tall, alternatively about 60 inches tall, alternatively about 36 inches tall. In a particularly preferred embodiment, the blast shield is built up from ballistic armor plate framed and reinforced with 2"x4" structural steel tubing welded along its periphery, and extending below the bottom edge to provide mounting points. Alternatively, the blast shield is built up from 2 layers of ballistic material, alternatively from 3 layers of material, alternatively from 4 or more layers of material. The ballistic material is preferably  $\frac{3}{8}$  inch thick MIL 4610 plate, alternatively  $\frac{1}{4}$  inch thick plate, alternatively  $\frac{1}{2}$  inch thick, alternatively 1 inch thick, alternatively 3 inches thick, alternatively 6 inches thick, all of which are commercially available. In another alternative embodiment, the blast shield is constructed from an engineered composite or advance armor material known in the art, such as those in U.S. Pat. Nos. 6,862,996; 6,703,104; 6,112,635 and others. In yet another alternative embodiment, the blast shield includes a view portal covered with a transparent protection such as bulletproof glass which is known in the art, such as that available from USA SECUR GLASS Corporation (Carrollton, Tex.) or other vendors.

**[0071]** Yet another embodiment of the invention provides exterior implements, such as a fire suppression system which dispenses water and/or foam around and on the base vehicle to control fires, a localized coolant system to maintain the base vehicle, operator and passengers at a safe temperature in a fire zone, task/flood/blinding lights, interior cabin operator lights and cameras. Lighting is movable and adjustable, and can be used for illuminating a focused area away from the vehicle, illuminating the immediate vicinity of the vehicle for the operator and team, or for blinding combatants some distance from the vehicle. Lights feature red light for minimal night vision disturbance in the cab or working areas, and bright white lighting for illumination, flood, and blinding lights.

**[0072]** Another embodiment of the invention also comprises a generator which powers the tactical operations center, the trailer and the vehicle. Generators, such as the Honda EB1000 are known in the art, and commercially available. The generator can be fixed to the vehicle directly or can be moved between the vehicle and the trailer. The generator is preferably rated to provide about 8500 W continuous duty power, alternatively about 10.5 kW, alternatively about 6500 W, alternatively about 4500 W, alternatively about 2500 W continuous power.

**[0073]** In another embodiment, the trailer carries an x-ray imaging unit which can be fitted to either the breach ram, the assault platform, or directly to the lifting unit of the base vehicle for inspection of packages, shipping crates, or buildings. In yet another embodiment, a tank and pump mechanism capable of pumping liquids or foam through a fire hose is located on the trailer. The hose and pump mechanism could be used for fire fighting or crowd control. The nozzle of the fire hose is mounted on the base vehicle. In one embodiment, the nozzle of the fire hose is mounted on one or both lifting arms of the base vehicle.

**[0074]** An embodiment of the invention includes a secure wireless communication link from the vehicle to the tactical operations center or trailer, as well as to the armored assault platform, the ram, or personnel associated with the operation.

**[0075]** Yet another embodiment of the invention includes a tactical acoustic or public address system with microphones. Such a system could be used to perform an automated knock-and-announce procedure that is controlled by the vehicle operator, as well as recording the events before, during and after the procedure. The knocking sound could be pre-recorded, or performed by a physical knocking device on the ram attachment. This system provides for scripting, pre-recording, playback, and documentation of a knock-and-announce-procedure meeting all statutory and regulatory requirements, without directly exposing the vehicle occupants to danger.

**[0076]** Still another embodiment of the invention includes a posting or tactical operations board associated with the trailer. The board is a full size chalkboard, grease board, whiteboard, or other large erasable surface that is secured in a sealed storage enclosure on or underneath the trailer and is deployed and mounted to the trailer or to a separate stand or base, for use by the tactical operations commander. In an alternative embodiment, the tactical operations board may include pre-printed or blank, single use disposable or peel-away surfaces for writing or posting of information. The tactical operations board is accessed directly by sliding, rotating or dropping out of the sealed storage enclosure and flipping, latching, hooking, sliding or rotating into place, and is deployable to either side of the trailer. Multiple boards can be mounted on the trailer, or on separate stands. In an alternative embodiment, the board or stand or both are mounted on the base unit for storage and transport, then removed and mounted nearby or remote from the trailer at the tactical operations site. In one embodiment, the tactical operations board is preconfigured with labeled areas for personnel, division/section, special unit, objective, inner perimeter and outer perimeter. The tactical operations board can also be computerized, displaying information and allowing the tactical operations commander to write over the information. A computerized board records and transmits data directly, with the data connection being integrated, collocated and mounted. Writing implements are stored with the board. Yet another embodiment of the inven-

tion provides one or more partitions integral to the trailer which allow for proper placement and segregation of personnel such as unit commanders, communications specialists, and tactical teams at the tactical holding area or tactical operations center. The partitions are preferably a flexible and adjustable barrier with corner posts and anchors. Alternatively, the partitions provide a rigid vertical member with attached horizontal members to restrict movement of personnel at certain points around the trailer.

**[0077]** In additional embodiments, the trailer includes attached lighting and cover to protect the tactical operations board and users of the tactical operations center and tactical holding area from rain, snow or wind. In further embodiments, the trailer is fully or partially enclosed, providing sheltered work space, storage areas, or holding areas when the base vehicle is deployed. In a preferred embodiment, the trailer features lockable externally accessible storage for equipment and munitions.

**[0078]** In a preferred embodiment the trailer, base vehicle, tow vehicle and all attachments are designed and finished to portray a unified theme and to advertise and promote the agency which they serve.

#### EXAMPLES OF USE OF INVENTION

**[0079]** The following examples demonstrate the ability of the present invention to take part in various procedures for tactical assault and fire response.

##### Example 1

##### Response to a Call

**[0080]** Upon receiving an initial call out, the tactical boards a tow vehicle and departs for the incident site with a pre-loaded trailer holding the vehicle unit and accessories. The team drives to the incident site via public roads, then parks, lowers the ramp, and backs the vehicle unit off of the trailer. A tactical holding area (THA) and tactical operations center (TOC) are established by deploying the posting board, lighting, partitions and other attachments on the trailer. The tactical team performs a scene assessment, then selects and configures the necessary accessories for use (e.g. the ram unit, the assault platform or the vehicle lifting assembly).

**[0081]** The armored vehicle is used for reconnaissance of the crisis site, surveying the site with or without the assault platform. A scene assessment is made using the vehicle cameras, windows and sensors. The vehicle then returns to the trailer and accessories for the operation are selected.

##### Example 2

##### Knock and Announce Procedure

**[0082]** In a knock-and-announce procedure, the vehicle approaches the entrance to a building or domicile deployed with the assault platform protecting a tactical team. The presence and authority of law enforcement is announced via an attached public address system. This announcement is audible to the surrounding community so that witnesses may verify the procedure. Cameras and microphones record the announcement, helping to justify the legalities of common knock-and-announce procedures. The tactical team then evaluates the response of the building occupants. If an emergency is detected, the tactical team rapidly exits the assault platform and conducts a mechanical or explosive breach of

the building entrance. If no emergency is detected, the tactical team continues the operation from the platform, with full ballistic protection.

#### Example 3

##### Breaching a Door

**[0083]** In a door breach using the vehicle ram unit, the ram unit is attached to the vehicle and proceeds to a position outside the primary breach point of the structure. A tactical team is already in place with a deployed assault platform as described in Example 2, or is following the vehicle and using it as cover. The vehicle approaches the structure, aligns a sighting aid to the breach point (e.g. a laser pointer or break-away stick) and approaches the door. Vehicle cameras, microphones and sensors are used to record the operation. Upon breach command, the ram cylinder is extended to breach door knob and/or hinges. The camera inside the ram unit is used to view the inside of the structure so that the situation may be evaluated. The ram unit is then raised to open the breach point and the tactical team may enter the structure. Secondary, tertiary, and other breach points may be accessed by repeating this procedure.

#### Example 4

##### Hostage Rescue

**[0084]** In a hostage rescue using the vehicle, the assault platform attached to the vehicle is used to place a tactical assault team at the primary breach point, and the assault platform is deployed. The tactical team then delivers a negotiation phone, establishes communications and opens negotiation. The tactical team may then deliver any negotiated items, such as food or medicine via the front portal of the assault platform. With a positive resolution to negotiations, a second assault platform is mounted to the vehicle, which then proceeds to the hostage recovery point and allows protected hostage retrieval. In the case of negative resolution to negotiations, the vehicle and/or the tactical team can respond directly to the threat. A secondary assault platform can deliver additional tactical teams, while a ram unit may be mounted onto the vehicle for breaching the structure.

#### Example 5

##### Rapid Vehicular Extraction

**[0085]** In a rapid vehicle extraction using the base vehicle of the invention mounted with a ram unit, the lifting arms are lowered and the ram is slid underneath any part of the vehicle to be extracted. The lifting arms are quickly raised, and the target vehicle is then dragged clear of the area by the armored vehicular unit.

#### Example 6

##### Controlled Vehicular Extraction

**[0086]** In a controlled vehicle relocation using the present invention, the vehicle lifting assembly is mounted to the lifting arms. The lifting arms are lowered and the vehicle lifting assembly is slid carefully underneath the vehicle to be moved, seated and adjusted under the vehicle chassis. The lifting arms are then raised slightly to confirm a secure and non-damaging match to the frame or chassis of the target vehicle. After confirming the fit and alignment of the lifting arms and making any adjustments, the arms are raised an amount sufficient

to separate the target vehicle from the ground, securely lifting the vehicle and allowing the armored vehicle to move the lifted vehicle in any direction.

#### Example 7

##### Vehicle Relocation and Door Breach for Fire Fighting Support

**[0087]** In a vehicle relocation and door breach for fire fighting support, the entrance to a burning structure is blocked by at least one vehicle and other debris. The vehicle lifting assembly is mounted to the powered lifting unit of the current invention and the lifting arms are lowered and slid underneath the obstructing vehicle as described in Examples 5 and 6 of the disclosure. The lifting arms are then raised, and the obstructing vehicle is slid or lifted off of the ground and then moved to another location. The base vehicle then moves back to the trailer, disengages the vehicle extraction assembly from the lifting arms, and engages the ram unit onto the lifting arms. Next, the base vehicle returns to the entrance of the burning structure, removing any additional debris blocking the entrance with the ram unit. The entrance to the structure is then breached with the ram unit as described in Example 3 of the disclosure. The video system contained in the ram unit is used to assess the fire risk within the structure. Heat shielding and a local cooling system mounted on the exterior of the base vehicle protects the operator and vehicle from fire and heat damage. The local cooling system sprays water, foam or another fire-suppressing or cooling substance on the outside of the vehicle. A fire suppression system with the nozzle mounted on the lifting arms is used to fight the fire in the burning structure directly, using water or a fire-retarding liquid or foam. In addition, a fan mounted on the base vehicle is used to clear smoke from the vicinity and improve the vision of the fire-fighting team.

**[0088]** While the present invention has been described and illustrated by reference to particular embodiments, it will be appreciated by those of ordinary skill in the art that the invention lends itself to many different variations not illustrated herein. For these reasons, then, reference should be made solely to the appended claims for purposes of determining the true scope of the present invention.

**[0089]** All patents, test procedures, and other documents cited herein, including priority documents, are fully incorporated by reference to the extent such disclosure is not inconsistent with this invention and for all jurisdictions in which such incorporation is permitted.

**[0090]** While the present invention has been described and illustrated by reference to particular embodiments, it will be appreciated by those of ordinary skill in the art that the invention lends itself to many different variations not illustrated herein. For these reasons, then, reference should be made solely to the appended claims for purposes of determining the true scope of the present invention.

**[0091]** Although the appendant claims have single dependencies in accordance with U.S. patent practice, each of the features in any of the appendant claims can be combined with each of the features of other appendant claims or the main claim.

1. An armored tactical assault and rescue vehicle, comprising:

- (a) an armored base vehicle derived from a commercially available multi-terrain loader platform, said multi-terrain loader platform including a powered lifting unit

- formed from a pair of spaced arms spanning between and connected to said arms;
- (b) at least one modular attachment with a detachable coupling selectively attachable to and deployed from said mounting plate; and
- (c) said at least one modular attachment being selected from the group consisting of a tactical assault and rescue platform, a powered extensible breaching ram and a vehicle lifting assembly.
2. (canceled)
3. The armored tactical assault and rescue vehicle of claim 1, wherein said armored tactical assault and rescue platform includes a sliding front exit cover and pivoting side panels.
4. The armored tactical assault and rescue vehicle of claim 1, wherein the armor of said armored tactical assault and rescue platform includes armor which is movable to provide a configurable barrier.
5. The armored tactical assault and rescue vehicle of claim 1, wherein said armored tactical assault and rescue platform includes a rigid plating providing NIJ level 3 or higher protection thereto.
6. The armored tactical assault and rescue vehicle of claim 1, wherein said powered extensible breaching ram includes a camera.
7. The armored tactical assault and rescue vehicle of claim 1, wherein said powered extensible breaching ram includes a contact sensor and depth gauge.
8. A tactical assault and rescue vehicle, comprising:
- (a) a base vehicle derived from a commercially available multi-terrain loader platform, said multi-terrain loader platform including a powered lifting unit formed from a pair of spaced arms with a mounting plate spanning between and connected to said arms;
- (b) a vehicle lifting assembly with a detachable coupling selectively attached to and deployed from said mounting plate;
- (c) a tactical assault and rescue platform with a detachable coupling selectively attachable to and deployed from said mounting plate, said tactical assault and rescue platform including a frame with shielding and floor attached thereto, one or more detachable storage units removably secured to said floor, and at least one seat, whereby personnel and supplies may be transported on said tactical assault and rescue platform; and
- (d) a powered extensible breaching ram with a detachable coupling adapted to selectively attached to and deployed from said mounting plate.

9. (canceled)
10. The tactical assault and rescue vehicle of claim 8, further comprising:
- (e) a local cooling system; and
- (f) a fire suppression system.
11. The tactical assault and rescue vehicle of claim 8, further comprising a fan for repelling fire, smoke or chemical hazards.
12. The tactical assault and rescue vehicle of claim 8, further comprising a stretcher attachment.
13. The tactical assault and rescue vehicle of claim 8 further comprising backup sensors for said vehicle.
14. A tactical assault and rescue vehicle system, comprising:
- (a) a base vehicle derived from a commercially available platform, said platform including a powered lifting unit formed from a pair of spaced arms with a mounting plate spanning between and connected to said arms;
- (b) at least one modular attachment with a detachable coupling adapted to selectively attachable to and deployed from said mounting plate, said modular attachment being selected from the group consisting of a tactical assault and rescue platform, a breaching ram, and a vehicle lifting assembly; and
- (c) a trailer for transporting said base vehicle and said one or more modular attachments over public roadways, said trailer further comprising a mobile tactical operations center.
15. (canceled)
16. The tactical assault and rescue vehicle system of claim 14, further comprising:
- (d) a secure wireless communication link; and
- (e) a tactical acoustic system.
17. The tactical assault and rescue vehicle system of claim 14, further comprising a tactical holding area defined by one or more partitions.
18. The tactical assault and rescue vehicle system of claim 14, further comprising a tactical briefing board movable between a secure storage position and a deployed mounting position on said trailer.
19. The tactical assault and rescue vehicle system of claim 14, further comprising at least two modular attachments with a detachable coupling adapted to selectively attach to and deploy from said mounting plate.
20. The tactical assault and rescue vehicle system of claim 14, with a gross vehicle weight less than 17,000 pounds.

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