

## **TITLE**

Advanced 360-Degree Surface Projectile Launch Helmet System

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## **FIELD OF THE INVENTION**

The subject matter herein relates to the helmets, particularly relates to the ballistic helmets, which are capable of launching projectiles, including bullets, pellets, tasers, lasers, etc., from the helmets without endangering the user of the helmet.

## **BACKGROUND OF THE INVENTION**

A person's head is the most vulnerable part of his or her body, so the head should be protected during outdoor sports, games and activities. Tactical helmets are among the oldest forms of personal protective equipment and are also known to have been worn by many combatants. The best tactical helmets provide head protection without compromising comfort.

A ballistic helmet is a type of tactical helmet that provides protection against small arms fire, flying debris, concussive events and more. Ballistic helmets are typically worn by those with a realistic expectation of encountering live fire. Their materials and construction became more advanced as weapons became more and more powerful. Initially constructed from leather and brass, and then bronze and iron during the Bronze and Iron Ages, they soon came to be made entirely from forged steel in many societies after about 950 AD. At that time, they were purely military equipment, protecting the head from cutting blows with swords, flying arrows, and low-velocity musketry. Iron helmets were deployed into

the cavalry of the Mali Empire to protect the cavalymen and their mount. Such helmets offered protection for the head from shrapnel and fragments.

Today's militaries often use high quality helmets made of ballistic materials  
5 such as Kevlar and Twaron, which offer improved protection. Some helmets also have good non-ballistic protective qualities, against threats such as concussive shock waves from explosions. By the late 20th century, starting in the 1970s and 1980s, new materials such as Kevlar and Twaron began replacing steel as the primary material for combat helmets, in an  
10 effort to improve weight, ballistics protection, and protection against head injuries caused by blasts. This practice still continues into the 21st century, with further advancement and refinements in the fibers used, design and shape of the helmet, and increased modularity. Early helmet systems of this new design are the American PASGT, the Spanish MARTE, the Italian  
15 SEPT-2 PLUS, and British Mk6.

Military Kevlar helmets with modern designs from Hard Head Veterans can provide military personnel with the head protection they need while also offering comfort and convenience. From low-cut ballistic helmets to  
20 various helmet accessories, several safety gear options are provided for those helmets used in the military and beyond.

Military combat helmets come in numerous types, generations, and features. Such as older PASGT helmets to next generation ATE (above the  
25 ear) type tactical helmets. Military helmets have come a long way since the invention of the M1917, first used in World War I. This helmet was made from a manganese-steel alloy shell that provide minimal protection. With each new helmet design, warfighters have benefited from improvements in form and function. In 1936, the M1917A1, or "Kelly," helmet came out

and then in 1941, the M1 helmet emerged onto the scene. In the 1970s, the well-known Personnel Armor System Ground Troops (PASGT) helmet was introduced, made from the newly developed material Kevlar. This style of helmet, also sometimes called a "K-Pot," remained standard issue for  
5 decades and is still in use today. In the early 2000s, the military upgraded once again with the Modular Integrated Communications Helmet (MICH) and the Advanced Combat Helmet (ACH).

These helmets continue to evolve to meet the demands of modern soldiers.  
10 Some of the newest styles are known as Enhanced Combat Helmets (ECH). New military helmets from Hard Head Veterans feature contemporary designs and quality materials to keep military personnel safe.

These ballistic helmets do more than just stay out of the way of a headset,  
15 they actually make it easy to integrate the headset via rail mounting system. One can also mount other accessories such as lights or cameras for tactical operations.

These ballistic helmets are till date manufactured only for the purpose of  
20 protecting the wearer from the wide spectrum of ballistic threats, very high velocity fragments, secondary fragmentation, blunt trauma and accidents. However, till date no ballistic helmet has been manufactured that could also be used as a weapon during combat. Therefore, a ballistic helmet, which could also be used as a weapon during battles/combat, will change the  
25 outcome of the battles. Many attempts have been made to develop such technology; however, no person has ever been able to achieve the same.

### **AIMS AND OBJECTIVES**

The primary objective of the present invention is to develop a smart ballistic helmet, equipped with advanced projectile launch system, which  
5 allows the wearer to propel or launch the projectiles with high velocity from the helmet all around him so that the threat from the enemy soldiers surrounding him can be mitigated without any impact to the wearer.

### **SUMMARY OF THE INVENTION**

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The invention relates to development of an advanced 360-degree projectile launch helmet system, which can launch projectiles (which may be selected from bullets, pellets, tasers, lasers, mini drones, etc.) from within the helmet without any collateral damage either to helmet or to the person wearing the  
15 same. This advanced system cross counters any recoil that is generated because of the launch of the projectiles. This advanced projectile launch system consists of a ballistic helmet, which is extended at the lower shell to include a band in an ergonomic shape (circular, etc.).

20 The magazines containing the projectiles are placed inside the loading chambers, which are provided within the band of the smart ballistic helmet, in such a manner that the bores, from where the projectiles are launched, are provided at  $0^{\circ}$ ,  $45^{\circ}$ ,  $90^{\circ}$ ,  $135^{\circ}$ ,  $180^{\circ}$ ,  $225^{\circ}$ ,  $270^{\circ}$  and  $315^{\circ}$ . The presence of bores at these angles of the band within the smart ballistic helmet makes  
25 sure that there is a counter bore for each bore in opposite directions. This advanced projectile launch system helps in cancelling out the recoil pressure within the shell body of the helmet without any impact to the wearer of the helmet, which gets generated from the launch of the projectiles.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1: Right perspective view of the Advanced 360-Degree Surface Projectile Launch Helmet System.

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Figure 2: Left perspective view of the Advanced 360-Degree Surface Projectile Launch Helmet System.

Figure 3: Back view of the Advanced 360-Degree Surface Projectile Launch Helmet System.

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Figure 4: Top view of the Advanced 360-Degree Surface Projectile Launch Helmet System.

Figure 5: Front view of the Advanced 360-Degree Surface Projectile Launch Helmet System.

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Figure 6: Bottom view of the Advanced 360-Degree Surface Projectile Launch Helmet System.

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### **DETAILED DESCRIPTION OF THE INVENTION**

The present invention relates to the development of a smart ballistic helmet, which is equipped with advanced projectile launch system, that allows the wearer to propel or launch the projectiles with high velocity from inside the helmet without any collateral damage.

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Over the period of time, efforts were made to develop a ballistic helmet which could act as a firearm; however, it was difficult to overcome the

problems associated with the same. One such example of the ballistic helmet that was developed to be use as a firearm is the helmet wherein the pistol was mounted upon the head gear or helmet of the wearer, however, the same had many drawbacks and therefore, has not been used  
5 commercially till date. The drawbacks included the increase in weight of the ballistic helmet; a very significant and disorienting unidirectional recoil from the mounted gun, and; change in the shape of the shell because of the gun mounted on it.

10 Pertinently, the curvature of the shell is found to have a significant effect upon the helmet's ballistic limit like that of a laminated composite shell, the mounted gun or anything above the shell reduces its strength and compromise the safety of the user. Further, when an object exerts force on a second object, the second object exerts an equal force on the first object, but  
15 in the opposite direction, hence, whenever a projectile is launched, there is a recoil in the opposite direction. Similarly, when a gun mounted on the ballistic helmet, launches any projectile forward, there will be a recoil in the opposite direction, which not only reduces the strength of the ballistic helmet, it further produces a collateral damage to the wearer as he will most  
20 probably be thrown backwards or probably lose consciousness or injure himself gravely.

After considering all the drawbacks which earlier inventions had, a smart ballistic helmet, having an advanced 360-degree projectile launch helmet  
25 system has been developed to cross counter any recoils from within the helmet shell, which can launch projectiles (which may be selected from bullets, pellets, tasers, lasers, etc.) from within the helmet without any collateral damage either to helmet or to the person wearing the same. This advanced projectile launch helmet system consists of a ballistic helmet,

which is extended at the lower shell [Figure 1 (2)] to include a band in a circular shape [ Figure 1 (4)].

- The magazines [Figure 1 (3)] containing the projectiles [Figure 1 (11)] are placed inside the loading chambers [Figure 1 (12)], which are provided within the band of the smart ballistic helmet, in such a manner that the bores [Figure 1 (5)], from where the projectiles are launched, are provided at  $0^{\circ}$ ,  $45^{\circ}$ ,  $90^{\circ}$ ,  $135^{\circ}$ ,  $180^{\circ}$ ,  $225^{\circ}$ ,  $270^{\circ}$  and  $315^{\circ}$ . The presence of bores at these angles of the band within the smart ballistic helmet makes sure that there is a counter bore exerting equal and opposite force for each bore in opposite directions. This advanced projectile launch helmet system helps in cancelling out the recoil pressure, which gets generated from the launch of the projectiles. In this system, the recoil pressure produced from the simultaneous launch of all projectiles from all bores with zero time differential or from the launch of one projectile from one bore will be cancelled out from the recoil pressure generated from the launch of projectile from the counter bore(s) in opposite direction(s) and absorbed by the helmet shell with zero net recoil.
- The process of cancelling or annulling of the recoil pressures generated after the launch of projectiles from the bore and counter bore is achieved by the help of the harness system [Figure 6 (1)] connected with the ballistic helmets. The minimal recoil pressure generated on the ballistic helmets, after the cancelling of recoil pressures because of the launch of the projectiles from bores and counter bores at exactly the same time with exactly the same momentum, gets transferred to the harness system, which further absorbs the said minimal surface stress and recoil pressures. Hence, neither the strength of the ballistic helmet is compromised nor the wearer of the smart ballistic helmet gets effected by any recoil pressures generated

due to the launch of multiple projectiles aimed at neutralizing enemy threat in the wearer's vicinity.

This advanced projectile launch helmet system in the smart ballistic helmet gets activated by the help of a single button push [Figure 1 (8)], situated below the peak of the helmet, which results in the launch of the projectiles from all the bores simultaneously. The projectiles get reloaded from the magazines placed in the loading chamber, provided at the band of the smart ballistic helmet. This single button push act as a trigger for the launch of the projectiles from the bores, which the fighters can use in any combat, especially when they are surrounded by the enemies and there is minimal possibility of escape. This single button push ignites the projectile, and this ignition can be based on electrically operated system or system based on electromagnetic discharges or electrothermal or spring or mechanical.

When the button is pushed, the battery, situated within the band, sends out electrical current to the projectiles' primer (gun powder or plasma), which generates the spark to the gun powder or plasma and results into the detonation of the primer. This detonation of the primer further results in the successful and simultaneous launch of all the projectiles loaded in the bores. Thereafter, another projectile gets reloaded into the bores with the help of spring [Figure 1 (10)] inside the magazine which keeps pushing the projectiles towards the bores automatically as soon as a projectile is fired. The user of the smart ballistic helmet can, thereafter, again use the single button push or an audio command or a code word to launch the projectiles from the bores. The user can use the advanced projectile launch helmet system, until the magazines run out of the projectiles. The magazines do not affect the integrity of the shell of the smart ballistic helmet and thereby, maintaining the helmet's ballistics' limit to its highest strength.

In another embodiment, the ignition can be based on the electromagnetic system, wherein the electric current generated by the battery or capacitor is switched from a fast discharge storage device (usually a capacitor) into a coil of wire wrapped inside the bore to produce the strong magnetic or  
5 electromagnetic field required for the rapid acceleration of the metallic projectile. The projectile is situated at one end of the coil and is pulled to its center by magnetic induction. When the current is switched off (by pushing the button), the projectile travels forward down the bore, exits the smart ballistic helmet and moves towards the intended target. The force applied to  
10 the armature is proportional to the change in inductance of the coil with respect to the change in position of the armature and the current flowing through the coil. This system also uses the reloading of the projectiles from the magazine to help the wearer to launch projectiles multiple times.

15 In another embodiment, the ignition can be based on the mechanical system, wherein the single button is pushed, at which point the already pulled back firing pin gets released and hits the cartridge or the primer, which results into the detonation of the primer, which further results in the successful launch of any projectile.

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In another embodiment, the advanced projectile launch helmet system can further be connected with the voice activation and recognition system alongside a single or dual camera [Figure 1 (14)]. With the support of the voice activation and recognition system, the projectiles can be launched  
25 with a single voice command either locally or remotely through a central command center monitoring the wearers situation through the helmet cameras and assisting the wearer through voice inputs. In other words, it helps the user to operate the advanced projectile launch helmet system hands free. This system can be custom tailored to each operator utilizing the

system. For instance, the main processor, connected with the projectiles, can be taught to recognize a particular's person voice and particular words or numbers. Similarly, the projectiles from the wearers helmet can be triggered remotely through an app, dashboard or command control unit.

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The advanced projectile launch helmet system is also provided with ruggedized cameras [Figure 1 (6)], which are installed at the lower band [Figure 1 (7)] of the smart ballistic helmet, in such a way that all these cameras are able to cover 360-Degree area surrounding the wearer of the smart ballistic helmet. These cameras, which are used to detect any object or threat surrounding the wearer, can be selected from a long-range visible day/light camera or a small range visible day/light camera or any other camera (infrared, night vision, thermal, etc.) depending on the requirement of the user. These cameras may also be equipped with thermal imaging sensors, which are able to detect even a small change in temperature within the vicinity of the wearer and target the projectiles accordingly.

In another embodiment, the ruggedized cameras can be installed along with the LiDAR (Laser imaging, Detection and Ranging) system, which can be used to determine the distance between the wearer and the moving object or a surface. It can also target a wide range of materials, including non-metallic objects, rocks, rain, chemical compounds, aerosols, clouds and even single molecule. LiDAR further identifies the spatial structure of the obstacle, which helps in distinguishing objects based on size, which helps in creating a 3D map of the area surrounding the user thereby aiding in better targeting.

These cameras, connected with the LiDAR system, are further linked with the haptic alert system [Figure 1(13)], which produces an alert to the wearer

in a form of vibration, when there is any movement noticed in the area surrounding the wearer. The smart ballistic helmet wearer will be alerted by the haptic alert system, which gives the wearer time to observe and check the vicinity before any enemy attacks. This allows the wearer to take action  
5 and if the situation comes, the wearer can even push the button to launch the projectiles.

Additionally, Aim Assist Heads-up Display [Figure 1 (9)] may also be attached below the peak of the helmet, which gives the visual display as  
10 captured by the 360-degree cameras illustrated above. This helps the user to regularly keep a all-around watch at the surrounding area. Instead of an Aim Assist Heads-up Display, the cameras can further be linked to the goggles to show 2d or 3d display or a dashboard to relay real time 360-degree feeds.

15 In another embodiment, the smart ballistic helmets are equipped with radio beacon, which can work at a specific radio frequency to prevent any collateral damage which can be caused by the launch of the projectiles. This radio beacon halts the functioning of advanced projectile launch helmet  
20 system, in case there are smart ballistic helmets of the same team present within a particular perimeter, which can be pre-programmed within the smart ballistic helmets helping the helmets automatedly identify friends and foes and calibrate their functioning accordingly.

25 This invention increases the efficiency of the fighter wearing the smart ballistic helmet, which enables the fighter to not only protect his head with the helmet, but simultaneously launch projectiles in the form of bullets, tasers etc., without causing any collateral damage.

## CLAIMS

I/We Claim:

- 5        1. An advanced 360-degree surface projectile launch helmet system,  
         comprising of:
- a) an advanced projectile launch helmet system installed within the  
         ballistic helmet and extended at the lower shell [Figure 1 (2)] of  
10        the ballistic helmet;
- b) magazines [Figure 1 (3)] containing the projectiles [Figure 1  
         (11)] are placed inside the loading chambers [Figure 1 (12)],  
         which are provided within the band [Figure 1 (4)] of the lower  
15        shell of the smart ballistic helmet, in such a manner that the bores  
         [Figure 1 (5)], from where the projectiles are launched, are  
         provided at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°;
- wherein, the presence of bores at these angles of the band within  
20        the smart ballistic helmet is configurable and makes sure that  
         there is a counter bore for each bore at opposite direction, that  
         helps in cancelling out the recoil pressure, which gets generated  
         from the launch of the projectiles;
- 25        c) cancelling or annulling of the recoil pressures generated after the  
         launch of projectiles from the bore and counter bore is achieved  
         by the help of the shell of the helmet and the harness system  
         [Figure 6 (1)] connected with the ballistic helmets;

- 5 d) advanced projectile launch helmet system in the smart ballistic helmet gets activated by the help of a single button push [Figure 1 (8)], situated below the peak of the helmet, which act as a trigger for ignition and results in the launch of the projectiles from all the bores simultaneously;
- 10 e) at the push of the button, the battery, situated within the band, sends out electrical current to the projectiles' primer (gun powder or plasma), which generates the spark to the gun powder or plasma and results into the detonation of the primer;
- 15 f) the projectiles get reloaded from the magazines placed in the loading chamber, provided at the band of the smart ballistic helmet;
- 20 g) the detonation of the primer further results in the successful and simultaneous launch of all the projectiles loaded in the bores;
- h) another projectile gets reloaded into the bores with the help of spring [Figure 1 (10)] or electromagnet or magnet inside the magazine which keeps pushing the projectiles towards the bores and the same can be launched with a single push button;
- 25 2. An advanced 360-degree surface projectile launch helmet system as claimed in Claim 1, wherein the projectile can be selected from bullets, pellets, tasers, lasers, etc.;

3. An advanced 360-degree surface projectile launch helmet system as claimed in Claim 1, wherein the ignition can be based on the electromagnetic system;

5 wherein, the electric current generated by the battery or the electric current is switched from a fast discharge storage device (usually a capacitor) into a coil of wire wrapped inside the bore to produce the strong magnetic field required for the rapid acceleration of the metallic projectile;

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wherein, the projectile is situated at one end of the coil and is pulled to its center by magnetic induction. When the current is switched off (by pushing the button), the projectile travels forward down the bore, exits the smart ballistic helmet and moves towards the intended target. The force applied to the armature is proportional to the change in inductance of the coil with respect to the change in position of the armature and the current flowing through the coil.

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- 20 4. An advanced 360-degree surface projectile launch helmet system as claimed in Claim 1, wherein the ignition can be based on the mechanical system, wherein the single button is pushed, at which point the already pulled back firing pin gets released and hits the cartridge or the primer, which results into the detonation of the primer, which further results in the successful launch of any projectile.

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5. An advanced 360-degree surface projectile launch helmet system as claimed in Claim 1, wherein the advanced projectile launch helmet system can further be connected with the voice activation and

recognition system [Figure 1 (14)]. With the support of the voice activation and recognition system, the projectiles can be launched with a single voice command or remotely via an app, dashboard or central command center;

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wherein, the voice activation and recognition system can be custom tailored to each operator utilizing the system with launch codes, abort codes and delayed launch codes.

- 10      6. An advanced 360-degree surface projectile launch helmet system as claimed in Claim 1, wherein the advanced projectile launch helmet system is also provided with ruggedized cameras [Figure 1 (6)], which are installed at the lower band [Figure 1 (7)] of the smart ballistic helmet, in such a way that all these cameras are able to  
15      cover 3600 area surrounding the wearer of the smart ballistic helmet and stream them real time to a remote location;

wherein, the cameras, can be selected from a long-range visible day/light camera or a small range visible day/light camera or any  
20      other camera depending on the requirement of the user including thermal, infrared, UV or night vision;

wherein, the cameras may also be equipped with thermal imaging sensors, which are able to detect even a small change in temperature  
25      within the vicinity of the wearer and target the projectiles accordingly.

7. An advanced 360-degree surface projectile launch helmet system as claimed in Claim 1, wherein the ruggedized cameras can be installed

along with the LiDAR (Laser imaging, Detection and Ranging) system, which can be used to determine the distance between the wearer and the moving object or a surface or 3D mapping the surface.

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8. An advanced 360-degree surface projectile launch helmet system as claimed in Claim 1, wherein the cameras, connected with the LiDAR system, are further linked with the haptic alert system [Figure 1(13)], which produces an alert to the wearer in a form of vibration, when  
10 there is any movement noticed in the area surrounding the wearer.

9. An advanced 360-degree surface projectile launch helmet system as claimed in Claim 1, wherein the Aim Assist Heads-up Display [Figure 1 (9)] is also attached below the peak of the helmet, which  
15 gives the visual display to regularly keep a watch at the surrounding area.

10. An advanced 360-degree surface projectile launch helmet system as claimed in Claim 1, wherein the system is equipped with radio  
20 beacon, which can work at a specific radio frequency to prevent any collateral damage which can be caused by the launch of the projectiles towards a friendly wearer.

wherein, radio beacon halts the functioning of advanced projectile  
25 launch helmet system, in case there are smart ballistic helmets present within a particular perimeter, which can be pre-programmed within the smart ballistic helmets thereby automating friend or foe recognition.