TALON
Gyro-Stabilized Weapon Platform
White Paper

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Introduction

Paradigm SRP has developed the truly state of the art universal gyro-stabilized marksman platform known as the TALON. It is designed for precision shooting applications from moving and stationary vehicles. Devised primarily for helicopter use, it is equally capable of working from ground vehicles, sea vessels, and in static emplacements. The TALON is the only unit of its kind capable of stabilizing and removing unwanted movement, which allows unprecedented accuracy for military and law enforcement applications.

The Problem

The use of marksmen and snipers is an integral part of today’s military and law enforcement operations. When deployed from a helicopter to provide overwatch and support, the marksman has to deal with not only the range to the target, but the inherent issues of movement and vibration associated with helicopters. This type of precision marksmanship is not fully realized for long ranges, thus requiring the helicopter to operate close in to the target, putting the marksman and the crew at a greater risk.

The reduced accuracy of marksmen with existing techniques also puts the ground personnel that they support and protect in harm’s way. Un-stabilized fire results in a diminished size of the zone that combatants or other threats can be mitigated. This problem is more pronounced when operators move in to secure a location.

Our military and law enforcement personnel will continue to operate at a much greater risk of serious injury or death unless a way to improve marksman accuracy from helicopters and other vehicles is developed.
The History

During the early days of aerial precision marksmanship development, two methods evolved to steady a rifle from inside an aircraft. Originally, gun mounts, similar to what is used for door gunner machine guns, were modified to hold a marksman’s rifle. The other method involved bracing the rifle against a part of the aircraft or by simply lying on the floor.

The technique that finally was developed, and in fact is the most prevalent method today, is the use of straps, ropes, or bungee cords to rest the weapon on. While this is minimally effective, the uncorrected movement and residual vibrations prevent the use of full scope magnification. Yet, this method remains the status quo for aerial marksmanship.
These techniques became solidified as the only doctrines that were capable of delivering any sort of accuracy from various crafts. This was largely due to the fact that technology did not lend itself to being able to stabilize an individual operator’s rifle. It quickly became apparent to Paradigm SRP that these methods could not truly compensate for the crafts movement, or transmitted vibrations to the weapon. These movements and vibrations caused unwanted input to the weapon which decreased long range accuracy, due to the shooter’s inability to remain steadfastly on target. However, helicopter based marksmen are still respected as a very effective option, even though serious limitations in regard to long range accuracy must be taken into consideration.

The aforementioned techniques are now far behind modern stabilization technology. Today, Paradigm SRP has bridged this gap and given the modern marksman the latest technology to increase their mission success rate.
The Solution

The film and television industries pioneered the use of gyro-stabilized camera systems capable of unprecedented levels of stability. One offshoot was the use of FLIR (forward looking infrared) camera systems for military and law enforcement use.

One early attempt at weapon stabilization was the use of mechanical Kenyon style gyros. While the concept was promising, the results were less than satisfactory. The device was unwieldy, and the operators had to battle the gyros just to stay on target, especially when moving.

In 2011, Paradigm SRP began development of the TALON weapon platform by merging the entertainment industries' camera stabilization technology with aerial precision gunnery. The process was not a simple integration, but required extensive engineering to take into consideration weapon recoil, load balancing, and precise movement control. The TALON was envisioned as being a universal mount, capable of accepting the most common precision rifles in use today. It also had to allow the operator to make precise weapon movements in order to keep the scope’s crosshairs on the target. This challenge meant that the TALON’s programming had to be diverse enough to manage all potential combinations.

The TALON was designed to be lightweight enough to allow one operator to transport and install it on an aircraft, boat, or vehicle. Installation is facilitated by the use of quick connectors and cargo tie down straps, allowing the TALON to be rapidly mounted, unmounted, and/or switched between aircraft. This ability is significant, in that the TALON can be considered a part of the TO&E of the operator, and not the air crew or aircraft.
Unlike the early mechanical gyros, the TALON development focused on the use of Micro-Electrical-Mechanical System (MEMS) gyros to send data to a CPU motherboard. The MEMS gyros send up to 1000 units of movement data per second. The CPU receives the movement data and in turn calculates the correctional data to be sent to high speed brushless servo motors. Thus, the TALON allows the weapon to remain on target during movement and vibration.

The power consumption of the gyros and CPU is extremely low. This allows the TALON to connect to virtually any vehicle using a standard Mil-Spec cannon plug connector. An optional battery pack connected to the TALON, allows for complete standalone operation.

The use of servo motors also means that the precise movement of the weapon can be managed by the TALON's controller board, thus eliminating the need for the operator to be behind the weapon in the traditional manner. This allows the TALON to be controlled by a handheld controller board with the operator offset from the unit, or remotely located when concealment or protection is required.

Moving the marksman away from his weapon by the use of the hand controller required a camera system to view not only the scope picture, but also the surrounding target area. The TALON features a two camera system. A color HD camera with a universal scope mount allows for an optimum view the target through the scope. A second HD wide angle color camera is mounted on the TALON for an overall perspective of the target area. Both cameras transmit the imagery to the hand controller, where an HD color monitor displays the video. The TALON also features an additional video output capability which allows external sources, such as a command center monitor or a video recording device.
The last difficulty in relocating the operator away from the weapon was the need to activate the trigger remotely. Paradigm SRP developed the Remote Trigger Actuator (RTA) to allow fire control from the hand controller. The RTA is universal and quickly attaches to any weapon via the trigger guard, and then connects into the TALON’s electrical system. The RTA has the capability to be quickly removed to allow the operator to manually activate the trigger with their finger if necessary.

The RTA allows for a much more precise shot than physically pulling the trigger. The manual depression of the trigger often introduces asymmetric forces on the trigger and the weapon system. Such asymmetric forces are undesirable since they often result in a shifting of the bullet’s point of impact. The RTA eliminates all undesirable outside forces on the trigger during the firing process.

Although the TALON removes undesirable shooter and vehicular inputs, and facilitates acquiring and tracking of a target, the operator must still rely on their training to determine crosshair placement based on the normal environmental and range calculations. The TALON helps to facilitate these calculations by the incorporation of a laser range finder, which displays the target distance on the hand controller screen. The range is displayed as both a line of sight true range, and an adjusted range that is based on the angle of the weapon in relation to the target.

**The Benefits**

The ability to make precision, long range shots from a helicopter, boat, or other vehicle is highly desirable for military and law enforcement applications. The TALON is a force multiplier that allows a weapon system to reach its full theoretical accuracy by removing negative input from the operator and the vehicle. Employing the TALON, the operator is only limited by the capability of their rifle and training.

In today’s over scrutinized environment, collateral damage can be the deciding factor in which missions are viewed as successful or not, especially on the public stage. The TALON’s surgical precision capability is a game-changer that can make the difference between mission success and failure.
To learn more about the Talon and how you can benefit from this technology, please contact Paradigm SRP by phone: 877-677-9899, or by email at TALON@paradigmSRP.com.

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