

## PROACTIVE SOLUTIONS

Darien, GA 31305

### REPORT FOR GOSHEN INC. RE: HEXSITE SYSTEM

Date: April 22, 2002

Author: John G. Jacobs, System Evaluator

Test Item(s): Goshen Enterprises, Inc., HexSite rear, HemisHex front sight

Evaluation Equipment: Glock 22 Pistol equipped with HexSite System

Test Period: January 2001 – November 2001

#### Evaluator Credentials:

1.5 years - Police Patrolman, South Burlington VT

7 years - Chief of Police, Richmond VT

21 years - U.S. Border Patrol

2 years - Private Consultant/Instructor Anti-Terrorism Training Program

1984-1992 - O.I.C., U.S. Border Patrol Academy Firearms Training Unit, Glynco, GA

1996-1999 – Assistant Chief, National Firearms Unit, Altoona, PA

1999-current – Consultant/Instructor, International Anti-Terrorism Training Programs

#### Relevant Duties:

From the period of 1984-1999, I was a primary officer in charge of U.S.B.P. Firearms training programs, firearms procurement, and ammunition procurement. I wrote specifications, conducted tests and evaluations, and submitted documents for the procurement of rifles,

shotguns, sub-machine guns, and handguns for use by the INS/USBP. This agency consists of over 20,000 armed officers with a variety of special needs. It is the largest Federal Law Enforcement Agency and the third largest Law Enforcement Agency in the United States. In my last three years of Service I was dedicated full-time to writing specifications and conducting research and evaluation for ammunition/firearms procurement for the INS/USBP. Most of this work was conducted under laboratory conditions using sophisticated high-speed photography, SAAMI certified pressure/accuracy equipment, and an Agency-specific ballistic gelatin test protocol I developed to meet the needs of the Agency.

#### Firearms Ratings:

Top Gun Award, U.S. Border Patrol Academy, Class 119

Governor's 20 Ratings: Georgia, Arizona

N.R.A. Police Pistol Combat – High Master

I.D.P.A. – Expert

American Pistol Institute 1983 – Expert, 1911 Pistol (Jeff Cooper, Instructor)

Chapman Academy – Expert, Sig 226 pistol\Remington 870 shotgun,

Ray Chapman, Instructor

N.R.A. Distinguished Badge

Police Marksman Association Distinguished Badge

Member, Federal Law Enforcement Training Center Pistol Team

Member, U.S. Border Patrol Academy Pistol Team

Alternate Member, U.S. Border Patrol National Pistol Team (Unable to participate full-time due to assigned duties)

#### Other Discipline Participation:

IPSC, N.R.A. High-Power and small-bore silhouette, Single Action Shooting Society.

Training:

U.S. Army Marksmanship Unit Long-Range Rifle School, Fort Benning, GA

U.S. Marine Corp Scout/Sniper Instructor's School, Advanced rifle/handgun Training

Course, Quantico, VA

H&K MP-5 Advanced Training/Armorer's School, Chantilly, VA

American Pistol Institute – Basic Semi-auto Pistol School, Pauldin, AZ

M.I.S.S. Institute: Advanced pistol/rifle/sub-gun school, Memphis, TN

Chapman Academy: Advanced Handgun/Shotgun, Hall, MO.

U.S. Border Patrol Firearms Instructors School (Master)

Federal Law Enforcement Training Center Firearms Instructor's School (Expert)

Combat Sight Systems – Background Experience and Philosophy

Preface: Any evaluation of combat equipment is prejudiced to some degree by the past experiences of the evaluator. The following information is provided to inform you of the evaluator's biases regarding sight systems prior to the evaluation of the HexSite System.

Visual Aspects of Combat Shooting Sight Usage

The concept of Visual Acuity as it relates to combat sights is the first issue of consideration. It is my belief that the use of any mechanical sighting device on a firearm is reduced to the combination of three physical principles. These principles are derived from the fact that the human eye responds to light in three distinct ways. These three responses are triggered by 1. Light absorption, 2. Light reflection, and

3. the level of contrast between light absorbing and light reflecting materials.

The use of light-enhancing or light-emanating materials will be touched on, but I feel that sights of these types do not in general meet the demand for flexibility of use in a law enforcement environment.

There are additional considerations based on the natural abilities and limitations of the human eyes that are critical to the use of sights. The first is that the human eyes, being bi-focal, demand visual symmetry. This, however, only applies when two or more light reflecting objects are in the line-of-sight of the eyes. For example, a circular object free-floating in an open space will always appeal to the eye's sense of symmetry, regardless of where it is within an area of undefined boundaries. Good examples of this visually acceptable asymmetrical juxtaposition are the stars in the sky at night or, say, flowers blooming in a garden. The same circular object, when placed within a well-defined boundary, either symmetrical or asymmetrical, will not meet the eye's demand for symmetry. Example of this would be the same flowers taken from the garden and placed in a flower vase with all the flowers on one side of the vase, or the classic "crooked picture" hung on a wall. This is a concept that is most important regarding our visual ability to create sight alignment and sight picture with minimum reliance on conscious effort.

The second consideration is based on our Visual Focus. Visual focus is the greatest limitation of the eyes in the context of combat engagement. We all accept that the eye cannot maintain clear focus on more than one object within multiple planes. This is why sights that create a "Single Plane" illusion are considered ideal. All modern telescopic and electronic dot-type sights achieve this goal beautifully and it is no surprise that they are used exclusively in those competitive sports that allow their use. It is also noteworthy that they have found their way into use by both elite military and law enforcement units.

The third consideration is an effect based on the combination of all the above considerations. This is a concept I term "Skills Sublimation". The concept of skills sublimation is based on the reality that there is no time for conscious thought while one is engaged in physical response to an immediate threat. Therefore, all connections between mental process and physical action must occur with a minimum of conscious effort on the part of the shooter. The more one's duty equipment responds to this requirement, the more effective the shooter/equipment interface becomes.

The fourth consideration is one I describe as “robustness”. I borrowed this term from the ammunition industry. It is a term they use to describe the effectiveness of a projectile design under a variety of different but realistic conditions. For a sight system to be robust, it must perform reliably under all conditions that can realistically occur in a combat engagement. While companies such as Trijicon have met the requirement for robustness in some of their combat long-arm optical sights, no one has yet produced an electronic/tritium-based handgun sight that meets minimal requirements for robustness. I will go one step further and suggest that the current vogue for placing tritium inserts on the front and rear sights of the combat handgun is a dubious practice at best in terms of robust application.

The Ideal L.E./Defensive sight system

Based on these concepts of visual advantages and limitations,, the “perfect” sight system would meet all of the following challenges:

**Visual Acuity:** The sights create a perfectly balanced contrast between light-gathering and light-reflecting materials.

**Visual Symmetry:** The rear sight, front sight, and target achieve symmetry without conscious effort. The clarity of this symmetry is so striking that it becomes the “triggering” mechanism for firing the shot.

**Visual Focus:** Sight alignment and sight picture appear on a single plane or as close to this ideal as possible.

**Skills Sublimation:** The overall effect of combining items one thru three results in the shooter’s ability to gain proper sight alignment and sight picture with a minimum of conscious thought applied to the process.

**Robustness:** The concepts of visual acuity, visual symmetry, and visual focus combine to create effective skill sublimation under all realistic environmental conditions.

Evaluator's Current Sighting Preferences: (Prior to HexSite™ System evaluation)

Aiming Preference: I use a "flash-sight picture" as the ideal compromise between the deliberate use of sights and rapid, controlled delivery of accurate shots to the target. Emphasis in this technique still advocates focus on the front sight rather than on the target. I believe that front-sight focus provides critical advantages to the shooter. The use of sights on a firearm allows the shooter to do all of the following, none of which are available to the shooter who employs "point-aiming" techniques.

- \* It combines the intuitive ability to point with an empirical assurance that the "point" is correct,
- \* Sight usage allows the shooter to evaluate the effective use of the firearm without reliance on the reaction of the target to determine the effectiveness of shot delivery.
- \* Sight usage consistently outperforms point-aiming techniques in Performance-\* on-Demand (POD) skills testing.
- \* Weapon control is maintained throughout the entire shot sequence. Recoil recovery and follow-up shots are much quicker and more accurate when a shooter uses proper sight-aiming techniques as opposed to point-aiming techniques.

Combat sight usage techniques are demonstrably improved through use of widened rear sight notches that create very broad light-bars to appear on each side of the front post. Rear sight alignment becomes dependent on the eye's natural demand for symmetry rather than on conscious effort to keep the front and rear sights in alignment. The target remains blurred, which reduces the detrimental illusionary effects caused by target movement or changes in target shape, size, or availability.

Evaluator's Current Sight Preferences: (prior to HexSite™ System evaluation)

Precision Sights: 6" sight radius +/- .5 inches using .125 black undercut high front post. Rear sight, .130-.135 rear sight with deep notch. Both sights and top of barrel carbide blackened.

L.E. Police Service Combat Sights: Plain, High Front Post with 5-degree forward slant. Sight serrated at 22 lines/inch to reduce glare, .125-inch width combines with deep rear notch sight opened to .135-.140 inches

L.E. Night Sight Preference: None or Front Dot only with minimal illumination.

Competitive IDPA Match sights: 4" – 5" Sight Radius. Light green optical-fiber front dot 1/8-1/4 inches in diameter. Plain rear notch of .135-.140 inches with deep notch, rearward serrated slant to reduce glare.

## Evaluation of HEXSITE SYSTEM

Methodology: The sights will be installed on a pistol that has been used both as a duty sidearm and a competitive sidearm by the evaluator. The evaluator will perform a series of tests to determine the product's ability to perform in the four areas of consideration. Those areas are:

Visual acuity

Visual Symmetry

Visual Focus

Robustness

The sights will additionally be subjected to "Performance on Demand" testing through participation in formal combat-style competitive matches and scored qualification courses of fire. The evaluator considers "Performance on Demand" to be the only reliable gauge of effectiveness for equipment that is designed for deadly force confrontations.

Technical Description: None (Evaluation for use by sight system designer/manufacturer)

#### Product Description:

Rear sight: The rear sight is a fully-enclosed hexagon of excellent design that eliminates glare/reflection of light through the aperture. The sight is designed to gather light solely through the front opening of the aperture. The designer claims that the sight is also designed to provide leverage for one-handed operation of the slide. This is accomplished by placing the top surface of the rear sight against almost any resistant surface while pushing the gun forward to operate the slide.

Front sight: The front sight appears to be a conventional post. This post has a groove cut through the top of the sight blade. The designer describes this groove as a "HemisHex" design. The groove is almost microscopic and is hexagonal in design. The purpose of this groove is to create a focused point of light on the direct top-center of the sight when it is viewed through the rear sight. According to the designer, this reduces or eliminates sighting errors caused by glares on other portions of the front sight. The designer claims that the "HemisHex" groove should be the brightest point on the front sight, regardless of glare conditions.

Product Installation: The sights were installed at Goshen Enterprises, Inc., on a

Glock 22 chambered in .40 Smith and Wesson.

Firearm: The Glock 22 used by the evaluator is a standard Glock firearm with the exception of the following modifications.

Stainless steel guide rod and Wolff recoil spring installed. The recoil spring is a 22-pound spring mated to the slide velocity produced by the Remington 155 grain .40 S&W JHP ammunition used in this test.

3.5 lb trigger sear installed

Hogue rubber grip sleeve installed

Goshen Enterprises, Inc. HexSite System installed

Proper Use of Sight System

I spent approximately one hour with Mr. Tim Sheehan, owner of Goshen Enterprises and designer of the HexSite System. Mr. Sheehan explained that the rear sight was designed to create greater visual symmetry than conventional notches or circular aperture sights. He stated that the front sight was designed to reduce obstruction between the shooter's eye and the target.

Mr. Sheehan further explained that the sight was properly used when the shooter looked through the rear sight, past the front sight, and focused on the target. As a confirmed front-sight focus shooter, I found it difficult to work with this concept. He stated that if I could allow myself to "let go" of the front sight, that it would still be properly aligned as a result of the eye's demand for symmetry even though it was not the main point of focus. He further advised that it would probably take several hundred rounds of ammunition for me to break away from the front sight focus technique.

He also demonstrated to me how the rear sight was utilized as a cocking lever for the slide. I practiced this technique and found it easily learned and extremely practical. It is a definite plus to the product design.

#### Product Use

500 rounds familiarization

500 rounds general proficiency evaluation

200 rounds Performance on Demand testing under the following circumstances:

IDPA Match, Brunswick GA (System used by 2 evaluators)

Glock regional Match, Jacksonville FL (System used by 2 evaluators)

Course development qualification program, Baton Rouge LA (1 evaluator)

100 rounds low light proficiency evaluation

## Evaluation Results

### Visual Acuity

The HexSite system maintained high visual acuity under all conditions. The value of contrast between front and rear sight remained constant regardless of light source and light value. I rate this sight as the best mechanical sight system I have tested in the area of visual acuity.

### Visual Symmetry

The use of a hexagonal design creates a profound increase in visual symmetry when this system is compared with both circular aperture and post and notch mechanical sight systems. This was particularly noticeable when targets were exposed on the side of a vertical plane such as a wall barrier. The hexagon planes create a reassuring parallel effect in the sight picture regardless of the target size and position that does not occur with other mechanical sight systems.

### Visual Focus/Sublimation of Skill

This was perhaps the most startling aspect of the sight system. As a confirmed "front-sight-focus" shooter, the HexSite system was difficult to adopt. I found it very difficult to train myself to look through the rear sight and focus on the target rather than focusing on the front sight. I eventually broke through this prejudice during the performance on demand test I fired on a course of fire I was helping to develop for an anti-terrorism program in Baton Rouge LA. We were using NRA B-27 targets that are black in color with poorly defined scoring rings. Due to the time constraints on this course of fire, there was no time to consciously align the front sight on the target using front sight focus as the triggering mechanism. I fired all shots, 50 total, at a distance of 3 yards to 15 yards and do not recall seeing my front sight during any phase of this course of fire. Much to my surprise, all 50 shots were within the "10 ring" of the target. I repeated the course of fire with conventional sights on a Glock 17 but was significantly slower gaining sight alignment/sight picture. All other attempts on the course of fire resulted in a loss of 10 or more points directly attributable to the difference in the sights being used.

Most importantly to me personally, was how my Perception of the relationship between rear sight, front sight, and target were modified by the use of the HexSite system. I experienced a dramatic shift in the

value that I placed on how much each individual object in the relationship of focus between the front sight, rear sight, and target received. This change in point-of-focus value and overall sight picture perception has carried over to my use of the conventional post and notch systems I currently use.

The gains delivered in POD tests are spectacular. I shoot in the Expert division of IDPA in the Standard Service Revolver class. My overall average ranking in a group of approximately 40 shooters averaged between 10<sup>th</sup> to 16<sup>th</sup> place overall. This placement includes all semi-automatic pistol shooters who, due to the speed of their reloads and in many cases, the absence of a need to reload, gives them great advantage over a revolver shooter in these matches. I usually ranked 3<sup>rd</sup> – 4<sup>th</sup> overall in the revolver class.

After re-training with the HexSite system, I have consistently placed within the top six to 10 places overall. I have placed second overall in two of these matches and placed in 3<sup>rd</sup> – 5<sup>th</sup> several times. I am consistently 1<sup>st</sup> in the revolver division and have out-performed the current Georgia State IDPA revolver champion and several highly proficient revolver shooters from the Federal Law Enforcement Training Center in the 5 matches I have shot since working with the HexSite system. If the HexSites were allowed in the IDPA competition, I would immediately replace my current post and notch sights with the HexSites. The point is, the HexSites not only worked well on their own merit, but also actually improved my ability to properly use conventional sights. This has been a major breakthrough in my ability to shoot quickly and accurately under highly competitive circumstances.

### Robustness

This was an area of major concern. I rate the HexSite system as excellent in terms of overall robustness. They were particularly effective in transitioning from daylight to lowlight conditions. I used the sights in natural nighttime lighting conditions, with flashlight illumination, and in reduced light (streetlight) conditions. I was able to use the system effectively even when the light was so low that all that was visible to me was the aperture of the rear sight and the target. How the front sight "aligns itself" without being clearly visible is a mystery to me. The results, however, speak for themselves. I found that these sights were highly effective in any light source that would enable a shooter to identify between a friend or foe target and in which the rear sight aperture was still visible.

I also found them significantly more robust than conventional sights, including fiber optic systems, when the sights were subjected to strong front-lighting, back-lighting, or side-lighting. This is clearly due to both the heavily-shaded rear aperture and the decreased value placed on front sight focus by this system. In side-by-side testing using a precision revolver with un-blackened post and notch sights, the point of impact and clarity of sight picture remained constant with the HexSite system. The conventional system displayed distinct distortion of the front sight resulting in point-of-impact shifts of as much as 1.5 inches at 25 yards. The overall accuracy potential using conventional sights also fluctuated due to harsh lighting conditions. The HexSites were easier to use under these circumstances and demanded less conscious effort for shot delivery. The HexSite demonstrated no significant fluctuation in accuracy due to light conditions.

My perception of the difference between sight systems is that the HemisHex front sight theory actually works under field conditions. Although one does not "see" the HemisHex in any normal sense of the term, its presence is the only significant difference between the front sight on the HexSite system and the post in a conventional system. Both are exposed to the same imbalance in light intensity under the above-noted conditions yet, the HemisHex groove must continue to be the defining factor in front sight alignment. This is the only explanation I can give for why the HexSite system does not demonstrate point-of-impact shifts under such conditions while conventional sights demonstrate high point-of-impact shifts. I made a conscious effort to see if I could visually identify this higher light value on the HemisHex portion of the sight between shooting sessions. I found that it was somewhat visible if I really concentrated on the front sight in moderate light values. I could not identify it at all in strong light values. I am still fascinated by the fact that it seems to perform a function even when it is not visually apparent.

#### Transitional Training Recommendations:

My own experience suggests the use of dark-tone targets that reduce the definition between the front and rear sights on both your sight system and conventional sight systems. This will reduce the shooter's reliance on front sight focus and may ease the transition from front sight focus to the target focus required by the HexSite system. Secondly, I recommend the use of multiple steel reactive targets painted in dark tones, and fired upon under increasing time constraints

as a method for transitional training to this sight system. I found that dark blue and dark red were good colors for this transitional training (Black should not be used as it eliminates the contrast needed for efficient use of any sight system). I then painted dark yellow centers on them. As shooter proficiency increased, I transitioned to high contrast yellows and whites for the targets, still maintaining the dark yellow center point on them. My center point was painted to cover approximately 20% of the available target area.

The instructor can modify the size of the center point based on shooter reaction to it. If the shooter "stops" the shot sequence in an attempt to hit the center point, the diameter of the center point should be increased. If shooters tend to miss the target completely, the center point should be decreased. Once shooters are hitting their targets consistently and rhythmically, the center points can be reduced either by lessening the contrast with the target color or eliminating the center point completely. The targets can be repainted with conventional high-tone monochromatic colors once the shooters have gained confidence in their ability to use the sight system.

Note that the center point on a reactive target does not equate to an actual "aiming point". These center points merely provide the shooter, who is under time constraints, with an assisted focus on the center of the target. I find this creates a significant increase in the number of hits on the target and provides additional positive feedback for the shooter even when the hits are peripheral. This gave them greater confidence and encouragement to continue the transition from front sight focus to target focus.

I also observed that the shooters reverted to jerking the trigger during initial use of the HexSite system. I am sure this is related to the ease with which they gain a significantly better sight picture than they have previously experienced. As their miss rate goes up, they begin to lose confidence in the system. This also occurs when training shooters to increase speed of shot delivery when using conventional sights.

I found that if I brought their focus back to the issue of trigger control, they were able to identify the causes of their misses as trigger related and not sight related. This got them back on course and reduced or eliminated the tendency to jerk the trigger.

SUMMATION

The HexSite system is an excellent advancement in the design of combat sights. My evaluation of this system suggests a high potential for application in combat situations for military, law enforcement, and private individuals. It provides a high level for robustness in field applications and is less affected by adverse light conditions than any other sight system currently on the market. It excels in low light conditions and provides a greater potential for speed and accuracy under adverse lighting conditions than either conventional sights or sights equipped with tritium inserts. The HexSite system is designed to withstand daily use in harsh environments and the system meets or exceeds all claims regarding effectiveness when used in the manner recommended by the manufacturer.

End of Report

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John G. Jacobs, Evaluator,

Proactive Solutions Inc.