



**Homeland
Security**

Science and Technology

Summary

U.S. Department of Homeland Security



The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions.

Located within the Science and Technology (S&T) Directorate of DHS, the SAVER Program conducts objective assessments and validations on commercial equipment and systems, and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL).

The SAVER Program is supported by a network of technical agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?"

For more information on this and other technologies, contact the SAVER Program Support Office.

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Ballistic Shields

(AEL reference number 01LE-01-SHLD)

In order to provide emergency responders with information on currently available ballistic shield technologies, capabilities, and limitations, Science Applications International Corporation (SAIC) conducted a comparative assessment of ballistic shields for law enforcement applications for the System Assessment and Validation for Emergency Responders (SAVER) Program in December 2009. Detailed findings are provided in the Assessment Report on Ballistic Shields, which is available by request at <https://www.rkb.us/saver>.

Background

Ballistic shields are used by law enforcement officers, especially members of tactical entry or special weapons and tactics (SWAT) teams. They are invaluable in situations where officers have little to no cover and provide the additional ballistic protection needed in high-risk circumstances where officers are required to approach potentially armed individuals.

During the assessment, the SAVER Program did not verify manufacturer specifications regarding the level of ballistic protection provided by each shield but rather focused on the operational use of each shield during response operations (e.g., physical coverage, maneuverability, ergonomic grip).

Assessment

Prior to the assessment, a focus group of eight emergency response practitioners with strong law enforcement backgrounds and experience in SWAT, drug enforcement, and other special tactical teams was selected from different jurisdictions. The focus group's primary assignment was to develop ballistic shield evaluation criteria; however, they were also tasked with recommending possible uses and operational outcomes to support the assessment plan development. The group's final task was to recommend specific ballistic shields that they considered potentially beneficial to the response disciplines for evaluation.

Based on the high-risk warrant and hostage rescue scenarios that were discussed, the focus group identified important characteristics of the ballistic shields to be selected for the upcoming assessment. Focus group participants discussed factors affecting the SAVER Program's equipment selection process and helped to streamline the selection process by recommending different ballistic shields for the upcoming assessment.

Based on focus group recommendations, market survey research, and shield availability, the following ballistic shields were assessed:

- PROTECH[®] Tactical Entry One
- First Choice Armor IIIA Entry Shield (20-inch by 34-inch)
- First Choice Armor Multi-Use Shield Technology (M.U.S.T.[™])
- Baker Ballistics TacticalBat[™].

Eight law enforcement personnel served as evaluators for this assessment. All evaluators had at least 7 years of professional law enforcement experience with no less than 4 years of experience in a SWAT, drug enforcement, and/or a warrant apprehension unit where high-risk warrants were routinely conducted.

Evaluators were tasked to conduct two no-knock search and seizure warrants, respond to an active shooter scenario, and evacuate a wounded police officer, all in relation to a plot to detonate a large vehicle bomb (LVB) within the United States. The assessment environment and activities performed were replicable should there be a need to repeat an identical or similar assessment in the future. The activities performed in this assessment were consistent with this scenario and with the operational objectives that might exist if a similar incident were to occur.

Assessment Results

Evaluators rated the ballistic shields based on the evaluation criteria established by the ballistic shields focus group. Each criterion was assigned to one of the five SAVER categories, and then assigned a weight for its level of importance. Once the criteria were weighted, the five SAVER Program categories were assigned a percentage value to represent the level of each category's importance relative to the other categories.

Table 1 displays the composite assessment scores as well as the category scores for each product. Higher scores indicate a higher rating by evaluators. To view how each ballistic shield scored against each of the

SAVER Program Category Definitions

Affordability: This category groups criteria related to life-cycle costs of a piece of equipment or system.

Capability: This category groups criteria related to the power, capacity, or features available for a piece of equipment or system to perform or assist the responder in performing one or more responder-relevant tasks.

Deployability: This category groups criteria related to the movement, installation, or implementation of a piece of equipment or system by responders at the site of its intended use.

Maintainability: This category groups criteria related to the maintenance and restoration of a piece of equipment or system to operational conditions by responders.

Usability: This category groups criteria related to the quality of the responders' experience with the operational employment of a piece of equipment or system. This includes the relative ease of use, efficiency, and overall satisfaction of the responders with the equipment or system.

evaluation criteria assigned to the SAVER Program categories, see Table 2. For product specifications, see Table 3.

The following paragraphs provide a brief summary of evaluator comments and feedback on each ballistic shield used during the assessment. The shields are listed from highest to lowest composite score. The complete assessment report includes a breakdown of evaluator comments by individual criterion.

Table 1. Ballistic Shields Assessment Results¹

Model	Composite Score	Affordability (5% Weighting)	Capability (30% Weighting)	Deployability (20% Weighting)	Maintainability (15% Weighting)	Usability (30% Weighting)
PROTECH® Tactical Entry One	70	52	80	56	65	74
First Choice Armor IIIA Entry Shield	69	31	74	60	58	80
First Choice Armor Multi-Use Shield Technology (M.U.S.T.™)	60	30	67	53	58	65
Baker Ballistics TacticalBat™	59	52	57	60	60	63

Note:

¹ Scores contained in the assessment report may be displayed differently. For the purposes of the SAVER Summary, all SAVER category scores are normalized using a 100-point scale and rounded to the nearest whole number.

PROTECH Tactical Entry One

The Entry One shield received the highest composite score as well as the top scores in the capability and maintainability SAVER categories.

Evaluators agreed that the shield offers good coverage of vital areas. Most evaluators agreed that the shape and curvature of the shield enhance the amount of coverage to vital areas and that the location of the shield's vertical and horizontal grips help maintain essential area coverage during use. Evaluators agreed that the viewport provides a wide field of view and the lens provides a good, clear, undistorted view. They also agreed that the shape of the top of the shield allows a good field of view without compromising coverage and that the bumper padding along the side of the shield provides added comfort when firing a weapon.

Evaluators agreed that the attached light includes an easy-to-use pressure switch, provides a sufficient amount of light for low-light operations, and is bright enough to temporarily blind or distract suspects. Several evaluators noted that the carry strap, horizontal and vertical handles, and forearm rests help provide good maneuverability. The shield also offers a neck strap for additional support.

Some disadvantages of the Entry One shield were noted by evaluators. They stated that the location of the viewport exposes the user's head and that the tapered sides increase exposure of the user's legs. The lack of padding on the handle of the Entry One contributed to user fatigue. Evaluators also stated that

	 Pros	<ul style="list-style-type: none"> • Good coverage of vital areas • Viewport with clear field of view • Neck strap to assist with weight and maneuverability • Easy-to-use pressure switch • Detailed user manual • Bumpers for weapons arm
	 Cons	<ul style="list-style-type: none"> • No gripping pads on handles • Exposure of head due to viewport location • Exposure of legs due to tapered sides • Heavy • Difficult access to battery • Strap unsecured when not being used
PROTECH® Tactical Entry One	Composite Assessment Score: 70	

the Entry One is heavier than the other assessed shields and the support strap does not remain secure when not being worn by the user. In addition, they stated that the battery compartment is difficult to access.

First Choice Armor IIIA Entry Shield

The IIIA Entry Shield received the second highest composite score and the top score in the usability SAVER category.

Evaluators reported that the shield provides good coverage of vital areas. They noted that the viewport provides a clear, undistorted, wide field of view during use and that it is well-located on the shield. Evaluators reported that the shield provides large padded handles with a solid, non-slip grip surface. They noted that the handles provide a good fit for the user's hand and allow for extended use of the shield.

Evaluators noted that the pressure switch for the light is located on top and underneath the grip padding of the horizontal handle, allowing it to be easily manipulated while wearing gloves. They reported that the switch is simple and intuitive to use, and its capability to operate continuously or as a pressure switch was a preferred feature. In addition, evaluators noted that the shield provides users easy access to the battery and simple bulb replacement.

Evaluators identified some disadvantages to the IIIA Entry Shield. Although the shield offers a wide viewport, evaluators stated that it is positioned too low to use when the shield is placed on the ground. They noted that the shield lacks a forearm rest; the lightface

	 Pros	<ul style="list-style-type: none"> • Good coverage of vital areas • Wide field of view • Thick handles; good grip • Neck strap provided • Easy to operate light controls while wearing gloves • Easy to access battery • Easy to replace blubs
	 Cons	<ul style="list-style-type: none"> • Viewport too low to use when shield is placed on ground • Buckle not secure • No forearm rest • Lightface prone to damage • Ballistic panels easily compromised • Battery runtime
First Choice Armor IIIA Entry Shield	Composite Assessment Score: 69	

appears prone to damage; and the ballistic panels can be easily compromised after repeated use. In addition, evaluators experienced problems with the light having enough power to last through the rotations, even when the battery was fully charged.

First Choice Armor M.U.S.T.

The M.U.S.T. shield received the third highest composite score. Evaluators liked the lightweight design and maneuverability of the shield and stated that the cutouts on each side of the shield provided good weapon props. They also stated that the viewport offers a clear line of sight and good peripheral vision further noting that the vertical dimension of the viewport is taller than the other shields, which helps when ascending and descending stairs. Evaluators also noted additional support features such as a forearm strap and a Velcro® lining attachment system on the back of the shield.

Evaluators agreed that the shape, weight, and curvature of the M.U.S.T. shield enable it to be easily maneuvered. They noted that even when going up and down stairs or through narrow spaces, the shield's smooth cased edging did not catch on objects during the assessment tasks. Evaluators stated that the attached light is extremely bright and could easily illuminate small to medium-sized rooms, and it offers an effective strobe function to momentarily disorient suspects. They further noted that the light provides a wide coverage area and a strong central beam for

specific target areas. They also commented that the folding handle and flat light assembly greatly reduce the depth of the shield when stored and also allow easy horizontal or vertical stacking.

Evaluators encountered some disadvantages with the use of the M.U.S.T. shield. They noted that the handle is narrow and hard to switch from one hand to the other. Evaluators explained that the swivel handle was difficult to grip and required the use of the support strap to minimize user fatigue. Half of the evaluators noted that the pivoting handle reduces control of the shield and the forearm strap reduces flexibility. They agreed that the deployment of the shield would be more stable with a fixed handle. Evaluators also noted occasional problems when removing the batteries, and expressed concerns that the molding at the bottom of the shield would not withstand repeated use.

Baker Ballistics TacticalBat

The TacticalBat received the fourth highest composite score. This shield was designed differently and allowed evaluators to note features and capabilities not experienced with the other shields. Evaluators noted that the shield design provides good coverage below the shoulders and comfortable cornering because the shield is able to wrap around the user. They also noted that the handle material allows the user to easily regain a secure grip on the shield when transitioning from one hand to the other.

	 Pros	<ul style="list-style-type: none"> • Large, clear viewport • Lighting options (continuous or strobe) • Blinding light capability • Lightweight • Weapons props provided by side cutouts of shield • Velcro attachment system • Stacking capabilities • Good maneuverability
	 Cons	<ul style="list-style-type: none"> • Narrow handle • Difficult to grip without use of strap • Reduced control of shield due to swivel handle • Occasional problems removing fourth battery • Hard to switch hands • Molding at bottom of shield not durable
First Choice Armor M.U.S.T.™	Composite Assessment Score: 60	

	 Pros	<ul style="list-style-type: none"> • Comfortable cornering; wraparound design • Replaceable panels • Compact storage, folding capabilities • Disposable batteries
	 Cons	<ul style="list-style-type: none"> • Too much play in handle • Limited field of view • Head/neck exposure • Accidental activation of light • Light location too low • Lighting cable not secured against light, snags easily • Not durable around seams • Exposed hinge points
Baker Ballistics TacticalBat™	Composite Assessment Score: 59	

Most of the evaluators noted that the light controls of the TacticalBat are simple to operate with gloves.

They also stated that the panels can be folded so that the shield lays flat for storage and the panels can be replaced if they become unserviceable.

Though positive features were noted with the TacticalBat, evaluators reported several concerns as well. Safety was the primary issue with this shield as evaluators described concerns about increased exposure of the head and neck area, limited field of view, and exposed hinge points. Evaluators noted that the pressure switch for the light can be accidentally activated, and the unsecured lighting cable can easily snag on objects during deployment. In addition, the low location and strength of the light beam prevents the light from being used to temporarily blind or disorient a suspect. Finally, evaluators noted that the shield does not appear durable around the seams and can easily become frayed or damaged after repeated use.

Conclusion

Evaluators were able to successfully complete the assessment tasks with all four of the assessed ballistic shields. They observed advantages and disadvantages of the assessed shields, but noted that their results are unique to the shield models used for this assessment.

Analysis of evaluator comments and scores revealed these common observations concerning the assessed ballistic shields:

- Evaluators placed a high value on ballistic shields that are designed to provide adequate coverage for tactical operations. They noted that ballistic protection is critical in high-risk circumstances where officers with little or no coverage are required to approach potentially armed individuals.
- Evaluators expressed a strong preference for ballistic shields that can be easily maneuvered during response activities. They explained that the size and shape of the shield affect how easily it can be deployed in various environments (e.g., stairwells and hallways), and the handle design affects how easily the shield can be carried for extended periods of time and also switched from one hand to the other.
- Evaluators placed a high value on ballistic shields with viewports that are properly positioned and allow clear vision. They noted

that the viewport increases responder visibility and should be positioned low enough on the shield to prevent exposure to the user's head. Evaluators also stated that the viewport should be wide enough to enhance peripheral vision.

- Evaluators preferred ballistic shields with support straps to aid in deployment. They stated that neck straps offer support while carrying the shields, as well as when transitioning between weapons or reloading ammunition. Evaluators also emphasized that forearm straps are helpful in alleviating user fatigue.
- Evaluators expressed a strong preference for ballistic shields with adequate lighting. They noted a preference for lights with adjustable settings that provide continuous, strobe, and temporary illumination. In addition, evaluators stated that lights with blinding capabilities aid in approaching potentially armed suspects.
- Evaluators preferred ballistic shields that are well made and built with quality materials. They stated the shields may be constructed from a variety of ballistic resistant materials (e.g., metals, ceramics, fabric-reinforced plastics) and it is imperative that the shields are durable enough to withstand repeated use and storage.

All reports in this series, as well as reports on other technologies, are available in the SAVER section of the Responder Knowledge Base (RKB) Web site at <https://www.rkb.us/saver>.

Table 2. Ballistic Shields Criteria Ratings¹

KEY					
Least Favorable: 1  Most Favorable: 5					
    		Entry One	IIIA Entry Shield	M.U.S.T.™	TacticalBat™
Capability					
Physical coverage					
Overall visibility					
Illumination					
Chemical resistance					
Usability					
Maneuverability					
Ergonomic grip					
Easy to switch hands					
User-friendly light controls					
Easy transitioning					
Deployability					
Quick deployment					
Storage requirements					
Maintainability					
Rugged construction					
Battery replacement					
Bulb replacement					
Cleaning requirements					
Strap replacement					
Viewport replacement					
Affordability					
Service life					
Replacement part cost					
Shield replacement					

Note:

¹ Averaged criteria ratings for each product that was assessed are graphically represented by colored and shaded circles. Highest ratings are represented by full green circles.

Table 3. Ballistic Shields Specifications

Ballistic Shield	Product Specifications
<p>PROTECH® Tactical Entry One</p>	<ul style="list-style-type: none"> • Meets NIJ 0108.01 Level IIIA Standard • 24-inch by 36-inch dimensions • 21 pounds • 4-inch by 16-inch polycarbonate viewport • Multi-hit capability • Manufactured with Dyneema® UD-HB25 • 3-point multi-position ambidextrous handle • Optional dual-light kit with pressure switch and NiCad battery
<p>First Choice Armor IIIA Entry Shield (20-inch by 34-inch)</p>	<ul style="list-style-type: none"> • Meets NIJ 0108.01 Level IIIA Standard • Available in Level III or IIIA • 20-inch by 34-inch shield with additional sizes available (24-inch by 36-inch and 24-inch by 48-inch) • 14 pounds • 4-inch by 16-inch ballistic viewport • Multi-hit capability • Arm padding • Retention straps
<p>First Choice Armor M.U.S.T™</p>	<ul style="list-style-type: none"> • Meets NIJ 0108.01 Level IIIA Standard • 24-inch by 36-inch • 14 pounds • Large viewport • Firearm deployment from right or left side • Allows easy long-gun deployment • Allows reduced exposure of head and arms • Forearm strap • Inner Velcro® lining attachment system • Optional light-emitting diode (LED) halogen light
<p>Baker Ballistics TacticalBat™</p>	<ul style="list-style-type: none"> • Meets NIJ 0108.01 Level IIA Standard • 13.2 pounds • 7.7 square feet in size • Multi-hit capability • Allows two hands on weapon • Carrying case for storage • 2-position support strap • Bungee lanyard • Proprietary Baker Ballistics Polyethylene Reinforced Composite (PRC) • Identification banner options • Provides stabilized sniper weapon platform