



*System Assessment and Validation for Emergency Responders*

# Enhanced Law Enforcement Uniforms Market Survey Report

*August 2016*



**Homeland  
Security**

Science and Technology

**U.S. Department of Homeland Security**



System Assessment and Validation for Emergency Responders

*Prepared by the National Urban Security Technology Laboratory*

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## FOREWORD

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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 Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations on commercially available equipment and systems and develops knowledge products that provide relevant equipment information to the emergency responder community. The SAVER Program mission includes:

- Conducting impartial, practitioner-relevant, operationally oriented assessments and validations of emergency response equipment
- Providing information, in the form of knowledge products, that enables decision-makers and responders to better select, procure, use, and maintain emergency response equipment.

SAVER Program knowledge products provide information on equipment that falls under the categories listed in the DHS Authorized Equipment List (AEL), focusing primarily on two main questions for the responder community: “What equipment is available?” and “How does it perform?” These knowledge products are shared nationally with the responder community, providing a life—and cost—saving asset to DHS, as well as to Federal, state, and local responder

The SAVER Program is managed and executed by the National Urban Security Technology Laboratory (NUSTL). NUSTL is responsible for all SAVER activities, including selecting and prioritizing program topics, developing SAVER knowledge products, coordinating with other organizations, and ensuring flexibility and responsiveness to first responder requirements. NUSTL provides expertise and analysis on a wide range of key subject areas, including chemical, biological, radiological, nuclear, and explosive weapons detection; emergency response and recovery; and related equipment, instrumentation, and technologies. In support of this tasking, NUSTL conducted a market survey of commercially available enhanced law enforcement uniforms.

For more information on the SAVER Program or to view additional reports on this and other technologies, visit <https://www.dhs.gov/science-and-technology/saver>.

## **POINTS OF CONTACT**

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**SAVER Program**  
**National Urban Security Technology Laboratory**  
**U.S. Department of Homeland Security**  
**Science and Technology Directorate**  
201 Varick Street  
New York, NY 10014

E-mail: [nustl@hq.dhs.gov](mailto:nustl@hq.dhs.gov)

Website: <https://www.dhs.gov/science-and-technology/saver>

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## 1. INTRODUCTION

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Enhanced uniforms are used by law enforcement officers to increase the level of personal protection from hazards that they may encounter, while maintaining or increasing comfort and durability. To provide law enforcement organizations with information on enhanced uniforms, the System Assessment and Validation for Emergency Responders (SAVER) Program conducted a market survey on commercially available Enhanced Law Enforcement Uniforms.

The information on enhanced uniforms was gathered between December 2015 and January 2016 from vendor websites, industry publications, and a government-issued [Request for Information \(RFI\)](#) posted on the Federal Business Opportunities website (<https://www.fbo.gov>).

For inclusion in this report, enhanced uniforms had to meet the following criteria as recommended by a law enforcement agency:

- Commercially available
- Provide protection from liquids
- Have at least one feature that increases durability, including but not limited to utilization of ripstop fabrics, reinforced stitching, or padded knees.

Due diligence was performed to develop a report that is representative of products in the marketplace.

## 2. ENHANCED UNIFORMS OVERVIEW

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Enhanced uniforms are designed to provide an increased level of protection for law enforcement officers. To work safely, rapidly, and efficiently, law enforcement officers must be confident that their uniform will protect them from hazards that they may encounter, including physical interactions (e.g., falls, tackling), exposure to liquids, and increased heat or sun exposure. Enhanced uniforms have been commercially developed to help combat some of these hazards, and showcase features such as liquid repellent, increased durability, ultraviolet (UV) protection, and moisture wicking.

### 2.1 Current Technologies

#### 2.1.1 Liquid Repellency

Liquid repellency is of high importance to law enforcement officers as it provides an exterior barrier that prevents liquids from seeping through uniforms and protects their skin. Law enforcement officers may come in contact with liquids while spending time outdoors in weather that can be unpredictable, during interactions with the general public, or while responding to emergency situations. An enhanced uniform with built in liquid repellent can provide law enforcement officers with additional protection and increased comfort, by fending off rain, snow, sleet, hail, saliva, blood, etc. Various methods are used to achieve liquid repellence including using repellency technology, e.g., IntelliDry™, which features a push/pull mechanism that repels moisture from the outer layer of the enhanced uniform and wicks moisture from the inner layer, and treating enhanced uniforms with omniphobic liquid repellencies, such as Teflon® which enables liquids to bead up and roll off of the enhanced uniforms.

### **2.1.2 Increased Durability**

Law enforcement officers regularly encounter situations in which their uniforms may be compromised. This includes increased physical activities such as running, climbing fences, performing takedowns, and conducting routine searches. To compensate for these types of activities, uniforms are being developed with enhanced fasteners (e.g., buttons that are resistant to burning and cracking); reinforced or padded knees, seats and/or elbows; and reinforced stitching and ripstop fabrics. Ripstop fabrics are often made of nylon and use a special reinforced weaving technique to increase their resistance to ripping and tearing. During weaving, reinforcement threads are interwoven at regular intervals in a crosshatch pattern in the fabric, creating a three dimensional structure and increasing the strength of the uniform<sup>1</sup>.

### **2.1.3 Ultraviolet Protection**

Many law enforcement officers spend extended periods of time outdoors, resulting in increased sunlight exposure; sunlight includes rays of invisible UV radiation. Overexposure to UV rays can have short term effects, including sunburn, and long-term effects, including skin cancer. To assist in combating sun exposure risks, enhanced uniforms are being developed using textiles that effectively shield skin from UV rays. These products are identified and labeled in accordance with the [American Society for Testing and Materials \(ASTM\) Standard D6603: Standard Specification for Labeling of UV-Protective Textiles](#).

### **2.1.4 Moisture Wicking Fabric**

Moisture wicking fabrics have been introduced into law enforcement and other first responder uniforms to assist officers in maintaining an ideal body temperature and increase comfort levels. These fabrics work by pulling moisture from the body to the exterior of the garment where it can easily evaporate, resulting in dryer garments. Wicking fabrics are typically comprised of synthetic fabrics, including polyester.

## **2.2 Applications**

All law enforcement officers are required to wear a uniform while working in the field for their safety and general visibility so that they are easily identifiable. Performing potentially dangerous and strenuous activities in various environments leave law enforcement officers vulnerable to injuries, illnesses, and discomfort. The enhanced uniforms in this market survey report have features that may mitigate these vulnerabilities, including moisture wicking, UV protection, liquid repellent, and increased durability.

## **3. PRODUCT DATA**

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Uniforms are comprised of three pieces: shirts, pants, and jackets. This market survey report includes 6 shirts, ranging in price from \$52 to \$98; 11 pants, ranging in price from \$49 to \$268; and 6 jackets, ranging in price from \$50 to \$353. These products are listed in Table 3-1, Enhanced Uniform Shirt Product Comparison Matrix; Table 3-2, Enhanced Uniform Pant

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<sup>1</sup> Fairchild's Dictionary of Textiles, 7th edition, pg. 474



Product Comparison Matrix; and Table 3-3, Enhanced Uniform Jacket Product Comparison Matrix. Products are listed in alphabetical order by company.

Product data was obtained directly from the manufacturer or distributor or their websites. The information obtained has not been independently validated by the SAVER program.

Product features in Table 3-1 are defined as follows:

**Company** indicates the manufacturer or distributor of the enhanced uniform piece.

**Product** indicates the product name of the enhanced uniform piece.

**Cost (\$)** indicates the price of the enhanced uniform piece rounded to the nearest U.S. dollar as quoted by the vendor, or posted on their website.

**Fabric** gives information about the type of material that the enhanced uniform piece is constructed with.

**Closures** indicates the method or technology used to close the various aspects of the enhanced uniform piece, e.g., zippers, buttons, Velcro<sup>®</sup>.

**Color Retention** indicates if the enhanced uniform piece has been treated to maintain color over time, multiple uses, and after multiple launderings.

**Liquid/Blood Resistant** indicates if the enhanced uniform piece has an exterior barrier that prevents liquids or blood from penetrating through to the skin.

**Moisture Wicking** indicates if enhanced uniform piece is designed with moisture wicking fabrics that are designed to pull moisture from the body to assist with increasing comfort and regulating body temperature.

**UV Protection** indicates if the enhanced uniform piece is designed with fabric that is capable of shielding the skin from ultraviolet radiation.

**Ripstop** indicates if the enhanced uniform piece is made of a reinforced fabric utilized to resist ripping and tearing.

**Reinforced/Padded Elbows** indicates if there are additional measures taken to prevent wear, rips, or tears to the elbow area of enhanced uniform shirts or jackets, including but not limited to layers of padding and reinforced stitching.

**Reinforced Stitching** indicates if the enhanced uniform piece has been enhanced via multiple stitches in order to strengthen the garment.

**Pockets** lists the number and locations of pockets on each enhanced uniform piece, if applicable.

**Mic Pass Through** indicates if there is an access point on the enhanced uniform shirt or jacket for microphone or radio use.

Table 3-2 has the same product features, except the column titled “Reinforced/Padded Elbows” is replaced by “Reinforced/Padded Knees,” and the column titled “Mic Pass Through” is eliminated since this is not a feature for pants. Additionally, columns titled “Reinforced Seats” and “Double Ply Crotch Lining/Reinforced Crotch” have been included.

**Reinforced/Padded Knees** indicates if there are additional measures taken to prevent wear, rips, or tears in the knee area of enhanced uniform pants, including but not limited to reinforced stitching, added padding, and pockets at the knee for optional knee pad insertion.

**Reinforced Seats** indicates if there are additional measures taken to prevent wear, rips, or tears to the seat area of enhanced uniform pants, including but not limited to reinforced stitching and added padding.

**Double Ply Crotch Lining/Reinforced Crotch** indicates if there are additional measures taken to prevent wear, rips, or tears to the crotch area of enhanced uniform pants, including but not limited to additional layers of lining, reinforced stitching, and gusseting.

Table 3-3 has the same features, as Table 3-1. Additionally, a column titled “Bleach Resistant” has been included.

**Bleach Resistant** indicates if the enhanced uniform piece has been treated to retain uniform color when exposed to bleach.

**Table 3-1. Enhanced Uniform Shirt Product Comparison Matrix**

Company	Product	Cost (\$)	Fabric	Closures	Color Retention	Liquid/Blood Resistant	Moisture Wicking	UV Protection	Ripstop	Reinforced / Padded Elbows	Reinforced Stitching	Pockets	Mic Pass Through
5.11 Tactical	Taclite PDU Class-A Shirt	\$52	Taclite ripstop fabric	Melamine resin buttons that will not melt, burn, or crack	No	Yes - Teflon treatment for stain, soil and moisture resistance	No	No	Yes	No	Yes	Two chest pockets, integrated pen holders in chest pockets	Yes
Elbeco	ADU Ripstop Long Sleeve Shirt	\$62	65% polyester 35% cotton ripstop	False-button front placket with hidden nylon zipper closure	No	Yes	No	No	Yes	N/A	No	Two chest pockets with pen openings	Cross-stitched shoulder straps with button for mic attachment
Elbeco	ADU Ripstop Short Sleeve Shirt	\$65	65% polyester 35% cotton ripstop	False-button front placket with hidden nylon zipper closure	No	Yes	No	No	Yes	N/A	No	Two chest pockets with pen openings	Cross-stitched shoulder straps with button for mic attachment
Elbeco	Response Paragon Plus Shirt	\$52	65% polyester 35% cotton	Melamine resin buttons that will not melt, burn, or crack	Yes	Yes	Yes	No	No	N/A	No	Two pleated pockets with scalloped flaps, hook and loop closure, pen opening in left pocket, pocket flap	No

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Company	Product	Cost (\$)	Fabric	Closures	Color Retention	Liquid/Blood Resistant	Moisture Wicking	UV Protection	Ripstop	Reinforced / Padded Elbows	Reinforced Stitching	Pockets	Mic Pass Through
Flying Cross - Fechheimer	Cross FX Functional Duty Class B Uniform Shirt	\$60	65% polyester 35% cotton mini ripstop	Two functional buttons along with a faux button placket; Velcro® closure pockets; 3/4 zipper closure	No	Yes - liquid repel	No	No	Yes	No	Yes	Two chest pockets; two hidden pockets	Yes
Spiewak	Performance Duty Shirt	\$40	100% polyester	High impact break resistant buttons; hidden tabs to button down collar	No	Yes - permanent water and stain resistance	Yes	Yes UPF 40+	No	No	No	Two chest pockets, hidden pen pocket	Removable microphone sling

\* Information for this product is from the vendor website. N/A: Information not available or applicable.

### 3.1 Enhanced Uniform Shirts

#### 3.1.1 5.11 Tactical, Taclite PDU Class-A Shirt

The Taclite PDU Class-A Shirt, available with long or short sleeves, is constructed of a Tactile<sup>®</sup> ripstop fabric and is enhanced with a Teflon<sup>®</sup> coating to repel liquids. This shirt also features underarm vents for breathability, reinforced stitching, and melamine buttons that will not melt, burn, or crack. This shirt is available in three colors--brown, spruce green and navy blue-- and is outfitted with two chest pockets with integrated pen holders as well as a mic pass through.



**Taclite PDU Class-A Shirt**  
*Courtesy of 5.11 Tactical*

This shirt is available in sizes small – 6XL and retails for \$52.

#### 3.1.2 Elbeco, ADU Ripstop Long Sleeve Shirt

The ADU Ripstop Long Sleeve Shirt is constructed of 65 percent polyester and 35 percent cotton ripstop with built in Nano fluid repellency. This shirt features flex mesh underarm vents for breathability and it has a utility loop on the chest that can be used for a mic or body camera and dual communication wire access openings on both sides of the shirt. The shirt is available in three colors: navy blue, black, and khaki. The shirt has a false-button front placket with a hidden nylon zipper closure and two pleated chest pockets with pen openings.



**ADU Ripstop Long Sleeve Shirt**  
*Courtesy of Elbeco*

This shirt is available in men's sizes sleeve length 33 (neck size 14.5 - 18.5); sleeve length 35 (neck size 15.5 - 20); sleeve length 37 (neck size 16.5 - 22), and women's sizes extra small – 4XL. This shirt retails for \$62.

#### 3.1.3 Elbeco, ADU Ripstop Short Sleeve Shirt

The ADU Ripstop Short Sleeve Shirt is constructed of 65 percent polyester and 35 percent cotton ripstop with built in Nano fluid repellency. This shirt features flex mesh underarm vents for breathability and it has a utility loop on the chest that can be used for a mic or body camera and dual communication wire access openings on both sides of the shirt. The shirt is available in three colors: navy blue, black and khaki. The shirt has a false-button front placket with a hidden nylon zipper closure and two pleated chest pockets with pen openings.



**ADU Ripstop Short Sleeve Shirt**  
*Courtesy of Elbeco*

This shirt is available in men's and women's sizes extra small – 4XL, and retails for \$65.

### 3.1.4 Elbeco, Response Paragon Plus Shirt

The Response Paragon Plus Shirt is constructed of 65 percent polyester and 35 percent cotton and is available with both long sleeves and short sleeves. This shirt is designed to retain color, repel liquid, provide UV protection at 40+, which blocks out approximately 97% of UV radiation, and features moisture wicking. The shirt is available in three colors: navy blue, light blue and white. It is outfitted with high-impact melamine buttons that will not melt, crack, or burn and has two pleated chest pockets with scalloped flaps, hook and loop closures, and a pen opening in the left pocket.



**Response Paragon Plus Shirt**  
*Courtesy of Elbeco*

This shirt is available in men's sizes extra small – 4XL and women's sizes 30 – 50, and retails for \$65.

### 3.1.5 Flying Cross – Fechheimer, Cross FX Functional Duty Class B Uniform Shirt

The Cross FX Functional Duty Class B Uniform Shirt is constructed of 65 percent polyester and 35 percent cotton mini ripstop and is available with long sleeves or short sleeves. The shirt is available in five colors: navy blue, black, olive drab green, silver, and tan. These shirts feature knit mesh stretch panels built into the underarm and through the shoulder blade and a vented back yoke for breathability. Additionally, they can repel liquids, have reinforced stitching and include four pockets, two on the chest and two hidden pockets as well as a mic pass through.



**Cross FX Functional Class B Uniform Shirt**  
*Courtesy of Flying Cross – Fechheimer*

This shirt is available in sizes extra small – 5XL, with sleeve lengths 30 – 39 inches and retails for \$60.

### 3.1.6 Spiewak, Performance Duty Shirt

The Performance Duty Shirt is constructed of 100 percent polyester that is treated to ensure permanent water and stain resistance, and features a silicone grip Shirt Retention System® to assist in maintaining a tucked in shirt. This shirt is available with long sleeves or short sleeves in three colors-- black, dark navy blue, and white--and features high impact, break-resistant buttons with hidden tabs to button down the collar, moisture wicking, and UV protection of 40+. There are two chest pockets with a hidden pen pocket on the left chest pocket as well as a removable microphone sling attached to the shoulder under the epaulet. There is an optional upgrade of center front zipper hidden behind a button façade.



**Performance Duty Shirt**  
*Courtesy of Spiewak*

This shirt is available in men's sizes sleeve length 32/33 (neck size 14.5 - 20); sleeve length 34/35 (neck size 14.5 - 22); sleeve length 36/37 (neck size 15 - 22) and women's sizes 30 – 48 and retails for approximately \$40.

**Table 3-2. Enhanced Uniform Pant Product Comparison Matrix**

Company	Product	Cost (\$)	Fabric	Closures	Color Retention	Liquid/Blood Resistant	Moisture Wicking	Ripstop	Reinforced / Padded Knees	Reinforced Seats	Reinforced Stitching	Double Ply Crotch	Pockets
5.11 Tactical	5.11 Stryke Class-A PDU Pants <sup>2</sup>	\$80	Flex-Tac mechanical stretch fabrics	YKK Zipper with Melamine resin buttons	No	Yes	No	No	No	No	Yes	No	Hidden side seam pockets provide added utility, traditional hip pockets and double welt back pockets
Arrow Safety Device	Tru-Spec Men's 24-7 Series Ascent Pants	\$49	65% polyester 35% cotton micro ripstop	YKK brass zipper with PRYM snap closure	Yes	Yes	No	Yes	Optional knee pads can be inserted	No	Yes	No	Internal knee pockets, reinforced wide front knife/flashlight utility pocket, inset cargo pockets, easy access DropN pocket deep behind cargo pocket
CrewBoss	Tri-Cert Elite Pants	\$268	Nomex IIIA	YKK #5 zipper with button closure	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Oversized, extra deep front slash pockets, internal smart phone pocket, internal divider pocket, pleated cargo pockets with drain holes, two rear pockets
Elbeco	ADU Ripstop Pants	\$65	65% polyester 35% cotton ripstop	Zipper with double hook and eye closure	No	Yes	No	Yes	Yes	Yes	No	Yes	Notch front pockets with zipper security pocket and reinforced front pockets; low profile cargo pockets with back bellows on each leg feature internal compartments
Elbeco	DutyMaxx Cargo Pants (Men)	\$110	80% polyester 20% rayon serge weave	Zipper with double	No	Yes	No	No	No	No	No	Yes	Two dual-compartment cargo pockets: hidden zipper behind, inverted pleat pocket underneath

<sup>2</sup> Class A Pant – This pant has the appearance of a traditional uniform piece.

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Company	Product	Cost (\$)	Fabric	Closures	Color Retention	Liquid/Blood Resistant	Moisture Wicking	Ripstop	Reinforced / Padded Knees	Reinforced Seats	Reinforced Stitching	Double Ply Crotch	Pockets
			(14% fiber stretch)	hook and eye closure									flap using hook and loop closure; two rear welt pockets
Elbeco	DutyMaxx Cargo Pants (Women)	\$110	80% polyester 20% rayon serge weave (14% fiber stretch)	Zipper with double hook and eye closure	No	Yes	No	No	No	No	No	Yes	Two dual-compartment cargo pockets: hidden zipper behind, inverted pleat pocket underneath flap using hook and loop closure; two rear welt pockets
Flying Cross – Fechheimer	Cross Functional Duty Uniform – Class A Pants <sup>3</sup>	\$60	65% polyester 35% cotton micro ripstop	Zipper fly with button closure	No	Yes, liquid repel	No	Yes	No	No	Yes	Yes	Two front pockets, two back pockets, two zip concealed internal cargo pockets on the side of the thigh
Flying Cross – Fechheimer	Cross Functional Duty Uniform – Class B Pants <sup>4</sup>	\$60	65% polyester 35% cotton micro ripstop	Zipper fly with button closure	No	Yes, liquid repel	No	Yes	No	No	Yes	Yes	Two front pockets, two back pockets, two lower utility pockets on rear thigh, two 4-in-1 cargo pockets
Justin FR – Fechheimer	FR Ripstop 9-Pocket Cargo Pant	\$121	100% cotton ripstop	Zipper fly with button closure	No	Yes	No	Yes	No	No	Yes	No	Nine total pockets - two front, two back, two cargo with internal built in pockets
Vertx – Fechheimer	Phantom OPS Airflow Pants	\$100	65% polyester 35% cotton micro ripstop	Zipper with metal	Yes	Yes, repels liquids, absorbs perspiration	Yes	Yes	No	No	Yes	Yes	Two quarter style front pockets with knife notch, one credentials pocket with zipper closure on the left side of the quarter style side

<sup>3</sup> Class A Pant – A pant that blends the authoritative and professional appearance of a traditional uniform with the functional features that are easy to maintain and wear all day long.

<sup>4</sup> Class B Pant – A pant that is designed for field use, including day-to-day comfort and functionality.



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Company	Product	Cost (\$)	Fabric	Closures	Color Retention	Liquid/Blood Resistant	Moisture Wicking	Ripstop	Reinforced / Padded Knees	Reinforced Seats	Reinforced Stitching	Double Ply Crotch	Pockets
			and IntelliDry™	button closure		and releases stains							front pocket, two back pockets with flap closure and concealed wallet trap, two slim line pockets on each hip, two triple belled cargo pockets on the side of each leg
Vertex – Fechheimer	Phantom OPS Pants	\$70	65% polyester 35% cotton micro ripstop	Zipper fly with button closure	Yes	Yes, repels liquids	No	Yes	Yes, double reinforced knees	No	Yes	No	Two front pockets, two concealed zipper pockets behind front pockets, two tool pockets located on the hip, two rear/back pockets with flaps

### 3.2 Enhanced Uniform Pants

#### 3.2.1 5.11 Tactical, Stryke Class-A PDU Pants

The Stryke Class-A PDU pants are constructed of Flex-Tac<sup>®</sup> mechanical stretch fabric with a Teflon<sup>®</sup> coating to repel liquids. The pants feature a YKK zipper with a melamine button closure that will not burn, crack, or melt, and have two hidden side seam pockets as well as two double welt back pockets. The pants have bartacking at all stress points, feature a self-adjusting tunnel waistband and are available in blue and black.

The pants are available in sizes 30 – 60 and retail for \$80.



**Stryke Class-A PDU Pants**

*Courtesy of 5.11 Tactical*

#### 3.2.2 Arrow Safety Device, Tru-Spec Men's 24-7 Series Ascent Pants

The Tru-Spec Men's 24-7 Series Ascent Pants are constructed of 65 percent polyester and 35 percent cotton micro ripstop and treated with Teflon<sup>®</sup> for liquid repellency. These pants are designed to retain color, and feature reinforced stitching as well as a gusseted crotch. There are numerous pockets, including a reinforced 2.5 inch wide front knife/flashlight utility pocket, inset cargo pockets, an easy access DropN pocket behind the cargo pocket as well as internal knee pockets for optional knee pad insertion. The pants are available in four colors--black, coyote, navy and khaki--and feature a YKK zipper with a PRYM snap closure.

The pants are available in sizes 28 – 44 with 30", 32" or 34" inseam and retail for \$80.



**Tru-Spec Men's 24-7 Series Ascent Pants**

*Courtesy of Arrow Safety Device*

#### 3.2.3 CrewBoss, Tri-Cert Elite Pants

The Tri-Cert Elite Pants are constructed of Nomex IIIA, a lightweight, heat-resistant fiber comprised of 93 percent meta-aramid, 5 percent parap-aramid and 2 percent anti-stat, enhanced with durable water repellent (DWR) and moisture wicking. The pants have an elastic back band, bar tacking at 38 points, an exclusive crotch reinforcement panel, and reinforced, articulated knees. There are oversized, extra-deep front slash pockets, an internal smartphone pocket, an internal divider pocket, and two generous rear pockets. The pants feature a zipper with a button closure and are available in three colors: navy blue, midnight blue, and black. These pants meet the National Fire Protection Association (NFPA) 1975 standard, which includes testing for a minimum level of color loss after over 100 launderings. Note that CrewBoss products can be made with DWR fabric but it requires a minimum order of 500 units and will take an estimated 5 week lead time.

The pants are available in even waist sizes 28 – 50, with even inseam sizes 28 – 36 and retail for \$268.



**Tri-Cert Elite Pants**

*Courtesy of CrewBoss*

### 3.2.4 Elbeco, ADU Ripstop Pants

The ADU Ripstop Pants are constructed of 65 percent polyester and 35 percent cotton enhanced with micro ripstop and Nano fluid repellency. The pants have a double-thick seat, a triple-stitched crotch, and double-thick, articulated knees. There are notch front pockets with a zipper security pocket and low profile cargo pockets with internal compartments. The pants feature a zipper with a double hook and eye closure and are available in three colors: midnight navy, black, and khaki.

They are available in men's sizes 28 – 58, women's sizes 2 – 26 and retail for \$65.



**ADU Ripstop Pants**  
*Courtesy of Elbeco*

### 3.2.5 Elbeco, DutyMaxx Cargo Pants (Men)

The Men's DutyMaxx Cargo Pants are constructed of 80 percent polyester and 20 percent rayon serge weave with 14% Fiber Stretch. They feature a triple-stitched crotch, double-ply crotch lining, Nano fluid repellency and a DutyFit waistband to provide extra stretch. The pants have two dual-compartment cargo pockets with a hidden zipper behind inverted pleat pocket and two rear welt pockets as well as a French fly with a double hook and eye waistband closure. The pants are available in two colors; navy and black.

The pants are available in sizes 28 – 54 and retail for \$110.



**DutyMaxx Cargo  
Pants (Men)**  
*Courtesy of Elbeco*

### 3.2.6 Elbeco, DutyMaxx Cargo Pants (Women)

The Women's DutyMaxx Cargo Pants are constructed of 80 percent polyester and 20 percent rayon serge weave with 14% Fiber Stretch. They feature a triple-stitched crotch, double-ply crotch lining, Nano fluid repellency, and a women's fit waistband with side elastic. The pants have two dual-compartment cargo pockets with a hidden zipper behind an inverted pleat pocket and two rear welt pockets as well as a French fly with a double hook and eye waistband closure. The pants are available in two colors: navy and black.

The pants are available in sizes 2 – 26 and retail for \$110.



**DutyMaxx Cargo  
Pants (Women)**  
*Courtesy of Elbeco*

### 3.2.7 Flying Cross-Fechheimer, Cross Functional Duty Uniform – Class A Pants

The Cross Functional Duty Uniform – Class A Pants are constructed of 65 percent polyester and 35 percent cotton mini ripstop with a zipper fly and button closure. The pants feature liquid repellency, reinforced stitching, a gusseted crotch, and a Freedom Flex waistband which offers 2” of additional stretch per side. There are six pockets including two front pockets with knife notch, two back besom pockets, and two side zip concealed internal cargo pockets. The pants are available in two colors: navy blue and black.

The pants are available in sizes 28 – 54 and retail for \$60.



**Cross Functional  
Duty Uniform –  
Class A Pants**

### 3.2.8 Flying Cross-Fechheimer, Cross Functional Duty Uniform – Class B Pants

The Cross Functional Duty Uniform – Class B Pants are constructed of 65 percent polyester and 35 percent cotton mini ripstop with a zipper fly and button closure. The pants feature liquid repellency, reinforced stitching, a gusseted crotch, and a Freedom Flex waistband which offers 2” of additional stretch per side. There are ten pockets including two front pockets with knife notch, two back besom pockets, two lower utility pockets and two, 4-in-1 cargo pockets. The pants are available in two colors: navy blue and black.

The pants are available in sizes 28 – 54 and retail for \$70



**Cross Functional  
Duty Uniform – Class  
B Pants**  
*Courtesy of Flying Cross-  
Fechheimer*

### 3.2.9 Justin FR-Fechheimer, FR Ripstop 9-Pocket Cargo Pant

The FR Ripstop 9-Pocket Cargo Pants are constructed of 100 percent cotton ripstop with a zipper fly and button closure. The pants feature liquid repellency, a contoured waistband and 1/8” reinforced stitching. The pants are available in navy blue and have nine pockets including two front notch pockets with leather trim, a vertical zip-inset pocket on the right side, two back pockets with built in wallet trap, and two 2-in-1 low-profile cargo pockets (with built-in inset utility pockets).

The pants are available in sizes 28 – 50 with lengths ranging from 30 – 36 (note that lengths may vary by waist size) and retail for \$121.



**FR Ripstop 9-Pocket  
Cargo Pant**  
*Courtesy of Justin FR-  
Fechheimer*

### 3.2.10 Vertx-Fechheimer, Phantom OPS Airflow Pants

The Phantom OPS Airflow pants are constructed of 65 percent polyester and 35 percent cotton enhanced with mini ripstop, IntelliDry™, reinforced stitching and articulated, double reinforced knees. These pants include Active Airflow System™ technology, specifically mesh inserts along the inseams and interior of the cargo pockets, which enables constant movement of fresh air across the skin for cooling purposes. These pants are designed to retain color and repel liquids. The pants have a zipper fly with a button closure and include 12 pockets, two front hand pockets, two hidden zipper pockets behind hand pockets, two tool pockets on the hips, two rear/back pockets with flap closure, two thigh cargo pockets and two internal pockets built into the thigh cargo pockets. There are four color options available: desert tan, navy, smoke grey and olive drab green.

The pants are available in waist sizes 28 – 44 with corresponding lengths of 30 – 34 (note that lengths may vary by waist size) and retail for \$100.



**Phantom OPS Airflow  
Pants**

*Courtesy of Vertx-Fechheimer*

### 3.2.11 Vertx-Fechheimer, Phantom OPS Pants

The Phantom OPS pants are constructed of 65 percent polyester and 35 percent cotton enhanced with mini ripstop, IntelliDry™, reinforced stitching and articulated, double reinforced knees. These pants are designed to retain color and repel liquids. The pants have a zipper fly with a button closure and include eight pockets, two front hand pockets, two hidden zipper pockets behind hand pockets, two tool pockets on the hips, and two rear/back pockets. There are six color options available: black, khaki, desert tan, olive drab green, navy and smoke grey.

The pants are available in waist sizes 28 – 44 with corresponding lengths of 30 – 36 (note that lengths may vary by waist size) and retail for \$70.



**Phantom OPS Pants**

*Courtesy of Vertx-Fechheimer*

**Table 3-3. Enhanced Uniform Jacket Product Comparison Matrix**

Company	Product	Cost (\$)	Fabric	Closures	Color Retention	Liquid / Blood Resistant	Bleach Resistant	Moisture Wicking	UV Protection	Ripstop	Reinforced / Padded Elbows	Reinforced Stitching	Pockets	Mic Pass Through
Arrow Safety Device	TruSpec H2O Proof Element Jacket	\$132 - \$152	Waterproof, windproof nylon	Velcro® cuff, front zippers	Yes	Yes (water resistant, blood borne pathogen tested)	Yes	Yes	No	No	No	Yes	Two deep front pockets, two upper chest pockets, side hand pockets, lower back pocket	No
Boathouse Row Sports Ltd.	Gore-Tex Solid Jacket	\$144	Two layers of laminated fabric, Face is 100% polyester, membrane is 100% Gore-Tex	Velcro® elastic cuff closures, front zipper	Yes	Yes (water proof)	Yes	Yes	Yes	Yes	N/A	Yes	Two side welt pockets, one internal zippered pocket	Yes
Flying Cross - Fechheimer	Layertech 73160A Series High-Vis Reversible Jacket	\$195	Polyester outer shell	Collar snap, cuff snap, Velcro® closure cuff, full zip closure, side vent zip closure, interior zip tracking to accept layers liner	Yes	Yes - liquid repel	No	No	No	No	No	Yes	Two front hand pockets with snap closures, two hidden side hand pockets behind the front hand pockets	No
Flying Cross - Fechheimer	Layertech 79900 GTXA All Season Jacket	\$353	3-ply Taslonized Nylon with Gore-Tex membrane	Six snap storm clusur eplacket	Yes	Yes - liquid repel	No	Yes	No	No	No	Yes	Two upper chest pockets, two lower hand pockets with top entry, two lower hand pockets with side entry	No

Company	Product	Cost (\$)	Fabric	Closures	Color Retention	Liquid / Blood Resistant	Bleach Resistant	Moisture Wicking	UV Protection	Ripstop	Reinforced / Padded Elbows	Reinforced Stitching	Pockets	Mic Pass Through
Flying Cross – Fetchheimer	Layertech 32700A Series Thinsulate Liner	\$50	Polyester with PTFE laminate	Full zip closure	Yes	Yes – liquid repel	No	No	No	No	No	Yes	N/A	No
Vertex – Fetchheimer	Integrity Waterproof Shell Jacket	\$220	100% 50-Denier polyester	Full zip closure, side vent zip closure, Velcro® closure cuffs, weapon access / side vent snaps, hood attachment snaps	Yes	Yes – liquid and blood resistant	No	Yes – 37.5 moisture evaporative technology	No	No	No	Yes	Two hand pockets, one forearm pocket, two chest pockets	No

### 3.3 Enhanced Uniform Jackets

#### 3.3.1 Arrow Safety Device, TruSpec H2O Proof Element Jacket

The TruSpec H2O Proof Element jacket is constructed of two layers of nylon fabric which makes it waterproof and windproof. To achieve waterproof protection, this jacket is outfitted with Bemis seam tape, a thermoplastic film. This jacket is designed to retain color, resist bleach, and features reinforced stitching and moisture wicking. This jacket is also blood-borne pathogen resistant and has been tested under the American Society for Testing and Materials (ASTM) Standard F1670, *Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Synthetic Blood*, which determined that the jacket meets or exceeds the standard's requirement. Additionally, the jacket has seven pockets – two front pockets in the inner liner, two upper chest pockets, two side hand pockets, and a lower back pocket in the outer layer of the jacket. There are three color options available: black outer jacket with black inner liner, charcoal outer jacket with black inner liner, and coyote outer jacket with coyote inner liner. This jacket is manufactured in accordance with the International Organization for Standards (ISO)/International Electrotechnical Commission (IEC) 17025:2005 – General requirements for the competence of testing and calibration laboratories.



**TruSpec H2O Proof Element Jacket**

*Photo Courtesy of Arrow Safety Device*

The jacket is available in sizes extra small – 5XL and retails from \$132 – \$152.

#### 3.3.2 Boathouse Row Sports Ltd., Gore-Tex® Solid Jacket

The Gore-Tex® Solid Jacket is waterproof and constructed of 100 percent Gore-Tex® (70 percent polyether sulfone; 30 percent polytetrafluoroethylene) enhanced with ripstop and reinforced stitching. This jacket is designed to retain color, resist bleach, and provide UV protection. There are two side pockets, one internal zippered pocket and mic-pass-through access. There are 16 color options available: black, white, grey, brown, forest green, kelly green, vegas, athletic gold, orange, red, maroon, cardinal, purple, victory, royal, and navy blue. This jacket has undergone user acceptance tests and conforms with the NFPA 1992 Standard: Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies as well as the ASTM D6603: Standard Specification for Labeling of UV-Protective Textiles.



**Gore-Tex® Solid Jacket**

*Photo Courtesy of Boathouse Row Sports, Ltd.*

The jacket is available in sizes extra small – 5XL and retails for \$144.



### 3.3.3 Flying Cross-Fechheimer, Layertech 73160A High-Vis Reversible Jacket

The Layertech 73160A High-Vis Reversible Jacket has a polyester outer shell and is windproof, waterproof, and fully reversible, with one side being a highly visible yellow with two rows of 2” wide 3M™ Scotchlite reflective material around the body and sleeves and the other side is available in black or navy. This jacket is designed to retain color and features reinforced stitching. The jacket includes four pockets, two front hand pockets with snap closures and two hidden side hand pockets built behind the front hand pockets.

Additionally, there is a full zip closure and an interior zip tracking to accept liners. This jacket has undergone acceptance testing performed by users and is in compliance with the American National Standards Institute (ANSI)/International Safety Equipment Association (ISEA) 107:2015: American National Standard for High-Visibility Safety Apparel and Accessories, and identified as Class 2 Certified.



**Layertech 73160A High-Vis Reversible Jacket** Photo Courtesy of Flying Cross-Fechheimer

The jacket is available in sizes extra small – 5XL and retails for \$195.

### 3.3.4 Flying Cross-Fechheimer, Layertech 79900 GTXA All Season Jacket

The Layertech 79900 GTXA All Season Jacket is constructed of a 3-ply Taslonized Nylon with a Gore-Tex® membrane. This item is designed to retain color, and features liquid repellence, moisture wicking, and reinforced stitching. The jacket has a full length, waterproof, two-way zipper with a six snap closure placket. There are six pockets on the jacket, two upper chest pockets with snap closures, two front utility pockets with Velcro® closures and top entry, and two lower hand pockets with zipper closures and side entry. The cuffs are elasticized and have an adjustable tab with snap closures. There are four color options available: black, navy blue, brown, and forest green.



**Layertech 79900 GTXA All Season Jacket** Photo Courtesy of Flying Cross-Fechheimer

The jacket is available in sizes extra small – 5XL and retails for \$352.50.

### 3.3.5 Flying Cross-Fechheimer, Layertech 32700A Series Thinsulate™ Liner

The Layertech 32700A Series Thinsulate™ Liner is constructed of polyester with a polytetrafluoroethylene (PTFE) laminate to repel liquids. There is a zip-in/zip-out liner that was designed to maintain warmth while minimizing bulk. The black liner is designed to retain color, and features reinforced stitching and a full-length front zipper. Note that this liner does not have any pockets. This jacket has undergone acceptance testing performed by users.



**Layertech 32700A Series Thinsulate™ Liner** Photo Courtesy of Flying Cross-Fechheimer

The liner is available in sizes extra small – 5XL and retails for \$49.99.

### 3.3.6 Vertx-Fechheimer, Integrity Waterproof Shell Jacket

The Integrity Waterproof Shell jacket is waterproof, windproof, and constructed of 100% 50-Denier polyester. This jacket is available in black and is designed to retain colors, to resist liquids and blood, and features 37.5™ moisture evaporative technology and reinforced stitching.

Additionally, there is a full zip closure, zippered side vents, side snaps for weapon access/side vents and hood attachment snaps. This jacket features two hand pockets, one forearm pocket and two chest pockets, all of which feature zipper closures. This jacket has undergone third party 37.5 Moisture Evaporative Technology™ testing.



**Integrity Waterproof Shell Jacket**  
*Photo Courtesy of Vertx-Fechheimer*

The jacket is available in sizes extra small – 3XL and retails for \$220.

#### 4. VENDOR CONTACT INFORMATION

Additional information on the products included in this market survey report can be obtained from the following vendors.

**Table 4-1. Vendor Contact Information**

Company	Address/Phone Number	E-Mail/Website
5.11 Tactical	4300 Spyres Way Modesto, CA 95356 (866) 451-1726	<a href="http://www.511tactical.com">www.511tactical.com</a>
Arrow Safety Device	123 Dixon Street Selbyville, DE 19975 (302) 856-2516	<a href="mailto:rcannon@arrowsouthpenn.com">rcannon@arrowsouthpenn.com</a> <a href="http://www.arrowsafetydevice.com">www.arrowsafetydevice.com</a>
Boathouse Row Sports, Ltd.	425 E. Hunting Park Avenue Philadelphia, PA 19124 (215) 425-4300 x141	<a href="mailto:johna@boathouse.com">johna@boathouse.com</a> <a href="http://www.boathouse.com">www.boathouse.com</a>
CrewBoss	830 Wilson Street P.O. Box 2729 Eugene, OR 97402-2713 (514) 344-7267	<a href="mailto:vdmello@westernshelter.com">vdmello@westernshelter.com</a> <a href="http://www.crewboxxppe.com">www.crewboxxppe.com</a>
Elbeco	P.O. Box 13099 Reading, PA 19612 (800) 468-4654	<a href="http://www.elbeco.com">www.elbeco.com</a>
Fechheimer	4545 Malsbary Road Cincinnati, OH 45242 (513) 792-1658	<a href="mailto:amilligan@fechheimer.com">amilligan@fechheimer.com</a> <a href="http://www.fechheimer.com">www.fechheimer.com</a>
Spiewak	(800) 223-6850	<a href="http://www.spiewak.com">www.spiewak.com</a>

## 5. SUMMARY

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Enhanced uniforms allow law enforcement officers to perform their duties with an increased level of protection and comfort. This market survey report includes six enhanced shirts, eleven enhanced pants, and six enhanced jackets. The price range for enhanced shirts is from \$52 – \$98, enhanced pants range from \$49 – \$268, and enhanced jackets range from \$50 – \$353.

The uniform pieces identified in this market survey report are available in a variety of colors, fabrics, and styles with enhanced features to increase protection and comfort. All products in this market survey report are designed to repel liquids. This feature is highly sought as it prevents liquids from seeping through to the skin of law enforcement officer, limiting their exposure to potentially hazardous materials. Below is a categorical summary of each piece of the enhanced uniform.

All enhanced shirts are available with both long and short sleeves and include at least one feature that increases the durability of the product, such as reinforced stitching or UV protection, as well as at least one feature that enhances comfort, such as moisture wicking or mesh underarm vents for breathability. None of the shirts are capable of resisting bleach.

All enhanced pants include at least one feature that increases the durability of the product, such as ripstop fabrics or reinforced/padded knees. Several of the pants also have features that enhance comfort including self-adjusting waistbands or gusseted crotches. None of the pants are capable of resisting bleach.

All enhanced jackets are designed to retain color and include at least one feature that increases the durability of the product, such as bleach resistance or UV protection. Additionally, two of the jackets are enhanced to resist blood. Note that one jacket does not have pockets.

Law enforcement agencies that consider purchasing enhanced uniforms should carefully research the overall capabilities and limitations of each enhanced uniform piece in relation to their agency's operational needs.