



# Guide for the Selection of Explosives Detection and Blast Mitigation Equipment for Emergency First Responders

Preparedness Directorate Office of Grants and Training

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Security





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# **Guide for the Selection of Explosives Detection and Blast Mitigation Equipment for Emergency First Responders**

## **Guide 105–07**

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We also sincerely thank all vendors who provided us with information about their products.

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## **FOREWORD:**

The U.S. Department of Homeland Security, Office of the Secretary, Preparedness Directorate Office of Grants and Training (G&T) Systems Support Division (SSD) develops and implements preparedness and prevention programs to enhance the capability of Federal, State, and local governments, and the private sector to prevent, deter and respond to terrorist incidents involving chemical, biological, radiological, nuclear, and explosive (CBRNE) devices. The Preparedness Directorate Office of G&T administers comprehensive programs of direct and grant support for training, exercises, equipment acquisition, technology transfer, and technical assistance to enhance the nation's preparedness for CBRNE acts of terrorism. The Preparedness Directorate Office of G&T SSD works closely with other Office of Domestic Preparedness (ODP) divisions and Homeland Security professionals gaining an intimate understanding of the emergency responder technology needs and shortfalls. In addition, SSD conducts commercial technology assessments and demonstrations, and transfers equipment directly to the emergency responders. As part of the Congressional FY-03 funding, SSD was tasked with developing CBRNE technology guides and standards for the emergency responder community. This is one of several guides that will aid emergency responders in the selection of CBRNE technology.

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## COMMONLY USED SYMBOLS AND ABBREVIATIONS

A	ampere	hf	high frequency	oz	ounce
ac	alternating current	Hz	hertz	o.d.	outside diameter
AM	amplitude modulation	i.d.	inside diameter	Ω	ohm
cd	candela	in	inch	p.	page
cm	centimeter	IR	infrared	Pa	pascal
CP	chemically pure	J	joule	pe	probable error
c/s	cycle per second	L	lambert	pp.	pages
d	day	L	liter	ppb	parts per billion
dB	decibel	lb	pound	ppm	parts per million
dc	direct current	lbf	pound-force	qt	quart
°C	degree Celsius	lbf·in	pound-force inch	rad	radian
°F	degree Fahrenheit	lm	lumen	rf	radio frequency
dia	diameter	ln	logarithm (base e)	rh	relative humidity
emf	electromotive force	log	logarithm (base 10)	s	second
eq	equation	M	molar	SD	standard deviation
F	farad	m	meter	sec.	Section
fc	footcandle	μ	micron	SWR	standing wave ratio
fig.	Figure	min	minute	uhf	ultrahigh frequency
FM	frequency modulation	mm	millimeter	UV	ultraviolet
ft	foot	mph	miles per hour	V	volt
ft/s	foot per second	m/s	meter per second	vhf	very high frequency
g	acceleration	mo	month	W	watt
gal	gallon	N	newton	λ	wavelength
g	gram	N·m	newton meter	wk	week
gr	grain	nm	nanometer	wt	weight
H	henry	No.	number	yr	year
h	hour				

area=unit<sup>2</sup> (e.g., ft<sup>2</sup>, in<sup>2</sup>, etc.); volume=unit<sup>3</sup> (e.g., ft<sup>3</sup>, m<sup>3</sup>, etc.)

### PREFIXES (See ASTM E380)

d	deci (10 <sup>-1</sup> )	da	deka (10)
c	centi (10 <sup>-2</sup> )	h	hecto (10 <sup>2</sup> )
m	milli (10 <sup>-3</sup> )	k	kilo (10 <sup>3</sup> )
μ	micro (10 <sup>-6</sup> )	M	mega (10 <sup>6</sup> )
n	nano (10 <sup>-9</sup> )	G	giga (10 <sup>9</sup> )
p	pico (10 <sup>-12</sup> )	T	tera (10 <sup>12</sup> )

Temperature: T<sub>°C</sub> = (T<sub>°F</sub> - 32) × 5/9

### COMMON CONVERSIONS

0.30480 m = 1 ft	4.448222 N = 1 lbf
2.54 cm = 1 in	1.355818 J = 1 ft·lbf
0.4535924 kg = 1 lb	0.1129848 N m = 1 lbf·in
0.06479891 g = 1 gr	14.59390 N/m = 1 lbf/ft
0.9463529 L = 1 qt	6894.757 Pa = 1 lbf/in <sup>2</sup>
3600000 J = 1 kW·hr	1.609344 km/h = 1 mph
psi = mm of Hg x (1.9339 x 10 <sup>-2</sup> )	
mm of Hg = psi x 51.71	

Temperature: T<sub>°F</sub> = (T<sub>°C</sub> × 9/5) + 32

### ACRONYMS SPECIFIC TO THIS DOCUMENT

ANFO	ammonium nitrate and fuel oil	LOD	Limit (Level) of Detection
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives	LSSI	Life Safety Systems, Inc.
BRM	blast resistant materials	MIPT	Memorial Institute for the Prevention of Terrorism
C <sub>6</sub> H <sub>N<sub>3</sub>O<sub>8</sub>Pb</sub>	lead 2,4,6-trinitroresorcinate	NFPA	National Fire Protection Agency
CBIAC	Chemical and Biological Information Analysis Center	MSRP	Manufacturer Suggested Retail Price
CBRN	Chemical, Biological, Radiological, and Nuclear	NG	nitroglycerin
CBRNE	Chemical, Biological, Radiological, and Nuclear, and Explosive	NIJ	National Institute of Justice
COTS	Commercial-off-the-shelf	NIOSH	National Institute for Occupational Safety and Health

### ACRONYMS SPECIFIC TO THIS DOCUMENT

DDNP	diazodinitrophenol (dinol)	NIR	near infrared
DHS	Department of Homeland Security	NRC	Nuclear Regulatory Commission
DNT	2,4 dinitrotoluene	NIST	National Institute of Standards and Technology
DoD	Department of Defense	NO	nitric oxide
DTIC	Department of Defense Technical Information Center	NO <sub>2</sub>	nitrite
ECBC	Edgewood Chemical Biological Center	O <sub>3</sub>	ozone
EDE	explosives detection equipment	ODP	Office of Domestic Preparedness
EGDN	ethylene glycol dinitrate	OLES	Office of Law Enforcement Standards
FedBizOpps	Federal Business Opportunities	PETN	pentaerythritol tetranitrate
FTIR	Fourier transform infrared	Pb(N <sub>3</sub> ) <sub>2</sub>	lead azide
G&T	Grants and Training	PMC	polymer matrix composite
GC	gas chromatograph	PMT	photomultiplier tube
GC/ECD	gas chromatography/electron capture detector	RDX	cyclotrimethylenetrinitramine (cyclonite)
GC/IMS	gas chromatography/ion mobility Spectrometry	RDX	Research Department composition X
GC/MS	gas chromatography/mass spectroscopy	RKB	Responder Knowledge Base
GC/SAW	gas chromatography/surface acoustic wave	S	sulfur
HAZMAT	hazardous materials	SAVER	System Assessment and Validation for Emergency Responders
Hg(ONC) <sub>2</sub>	mercury fulminate	SAW	surface acoustic wave
HMTD	hexamethylene triperoxide diamine	SF	selection factor
HMX	high melting point	SSD	Systems Support Division
HMX	homocyclonite (octogen)	TATP	triacetone triperoxide
IAB	InterAgency Board	TNB	trinitrobenzene
IDLH	Immediately Dangerous to Life and Health	TNT	trinitrotoluene
IED	improvised explosive device	TSWG	Technical Support Working Group
IMS	Ion Mobility Spectroscopy	U.S.C.	United States Code
KNO <sub>3</sub>	potassium nitrate		

## ABOUT THIS GUIDE

The Preparedness Directorate's Office of Grants and Training (G&T) Systems Support Division (SSD) of the U.S. Department of Homeland Security (DHS) is the focal point for providing support to State and local law enforcement agencies in the development of counterterrorism technology and standards, including technology needs for chemical, biological, radiological, nuclear, and explosives (CBRNE) defense. In recognizing the needs of State and local emergency first responders, the Office of Law Enforcement Standards (OLES) at the National Institute of Standards and Technology (NIST), supported by the U.S. Department of Homeland Security (DHS), the Technical Support Working Group (TSWG), the U.S. Army Edgewood Chemical and Biological Center (ECBC), the National Fire Protection Association (NFPA), the National Institute of Occupational Safety and Health (NIOSH), and the InterAgency Board (IAB) for Equipment Standardization and Interoperability, has developed CBRNE defense equipment guides. The guides focus on CBRNE equipment in areas of detection, personal protection, decontamination, and communication. This document focuses specifically on explosives detection and blast mitigation and was developed to assist the emergency first responder community in the evaluation and purchase of explosives detection and blast mitigation equipment.

The long-range plans include the following goals: (1) subject existing explosives detection and blast mitigation equipment to laboratory testing and evaluation against a specified protocol, and (2) conduct research leading to the development of multiple series of documents, including national standards, user guides, and technical reports. It is anticipated that the testing, evaluation, and research processes will take several years to complete; therefore, DHS will continue to maintain this guide for the emergency first responder community in order to facilitate their evaluation and purchase of explosives detection and blast mitigation equipment.

In conjunction with this program, additional published guides and other documents, including chemical, radiological/nuclear materials, and biological detection equipment, personal protective equipment, and communications equipment used in conjunction with protective clothing and respiratory equipment, will be periodically updated.

The information contained in this guide has been obtained through literature searches and market surveys. The vendors were contacted multiple times during the preparation of this guide to ensure data accuracy. In addition, the information is supplemented with test data obtained from other sources [e.g., Department of Defense (DoD)] if available. It should also be noted that the purpose of this guide is not to provide recommendations but rather to serve as a means to provide information to the reader to compare and contrast commercially available explosives detection and blast mitigation equipment.

Technical comments, suggestions, and product updates are encouraged from interested parties. They may be addressed to the Office of Law Enforcement Standards, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8102, Gaithersburg, MD 20899-8102. It is anticipated that this guide will be updated periodically.

Questions relating to the specific devices included in this document should be addressed directly to the proponent agencies or the equipment manufacturers. Contact information for each equipment item included in this guide can be found in the equipment data sheets.



# **GUIDE FOR THE SELECTION OF EXPLOSIVES DETECTION AND BLAST MITIGATION EQUIPMENT FOR EMERGENCY FIRST RESPONDERS**

This guide includes information intended to be useful to the emergency first responder community in the selection of explosives detection and blast mitigation equipment for CBRNE incidents. It includes an updated market survey of explosives detection and blast mitigation equipment known to the authors as of December 2006. Brief technical discussions are presented that consider the principles of operation of the various technologies. Readers desiring additional technical information can obtain it from the extensive list of references that is included in appendix A and the equipment data sheets provided in the appendices.

## **1. INTRODUCTION**

The primary purpose of the *Guide for the Selection of Explosives Detection and Blast Mitigation Equipment for Emergency First Responders* is to provide responder groups with information to aid them in the selection and purchase of explosives detection and blast mitigation equipment. The guide is intended to be more practical than technical and provides information on a variety of factors that should be considered when purchasing and using these types of equipment, including sensitivity, response time, and weight to name a few.

The remainder of this guide is divided into several sections. Section 1 is the introduction. Section 2 provides an introduction to explosives materials. It discusses explosives terminology, characteristics and categories of explosives materials, and presents some common chemical explosives. Section 3 discusses the purchase and use of explosives detection and blast mitigation equipment, specifically the threat assessment, the use plan, the equipment performance, and precautions when using the equipment. Section 4 presents an overview of the explosives detection and blast mitigation technologies. For each technology, a short description is provided along with photographs of specific equipment that falls within the technology discussed. Section 5 is the final section in the guide and discusses the market survey that was conducted to identify the commercially available explosives detection and blast mitigation equipment. It also discusses various characteristics and performance parameters used to evaluate the chemical explosives detection and blast mitigation equipment in this guide. These characteristics and performance parameters are referred to as selection factors. The selection factors were compiled by a panel of experienced scientists and engineers with multiple years of experience in explosives detection and blast mitigation and analysis, domestic preparedness, and identification of emergency first responder needs. The factors have also been shared with the emergency responder community in order to obtain their thoughts and comments. Section 5 also presents several tables that allow the reader to compare and contrast the different explosives detection and blast mitigation equipment items utilizing the selection factors.

Several appendices are included within this guide. Appendix A lists the documents that were referenced in this guide. Appendix B provides the trace and bulk explosives detection data field definitions; appendix C provides the trace and bulk explosives detection data sheets. Appendix D provides the visual inspection equipment data field definitions; appendix E provides the visual inspection equipment data sheets. Appendix F provides the blast mitigation

equipment data field definitions; appendix G provides the blast mitigation equipment data sheets; and appendix H is the 2006 list of explosive materials covered under section 841(c) of Title 18, United States Code (U.S.C.).



## **2. INTRODUCTION TO EXPLOSIVE MATERIALS**

The purpose of this section is to provide an introduction to explosive materials. Section 2.1 discusses the nature of explosive materials; sec. 2.2 discusses the characteristics of explosive materials; and sec. 2.3 provides the classification of explosive materials. Appendix H contains the Bureau of Alcohol, Tobacco, and Firearms (ATF)<sup>3</sup> 2006 published list of explosive materials.

### **2.1 Nature of Explosives**

Explosives are substances that undergo rapid burning (deflagration) or detonation (instantaneous explosion) resulting in the formation of large volumes of gases, liberation of heat and light, and sudden pressure effect (shock and blast waves).

#### **2.1.1 Uses of Explosives**

Explosives are used both commercially and for military applications. Commercial uses of explosives include blasting (construction and road building), demolition, fireworks, and metal forming, to name a few. Military uses of explosives may include propellants (rockets and missiles), bursting charges (projectiles and bombs), and military demolition and construction.

#### **2.1.2 Categories of Explosives**

Generally, there are three categories of explosives, i.e., chemical, mechanical, and nuclear explosives. Chemical explosives, the most commonly used explosives, are compounds or mixtures of compounds that react to produce large volumes of rapidly expanding gases as well as energy, heat, light, and shock waves that exert sudden pressures on the surroundings. Mechanical explosives are those substances that tend to undergo a physical change such as overloading a container with compressed air or steam. Nuclear explosives, the most powerful explosives, produce sustained nuclear reactions while releasing a tremendous amount of heat and energy.

### **2.2 Characteristics of Chemical Explosives**

The characteristics of chemical explosives influence the type of explosives that are used for a specific application. Such characteristics include, but are not limited to: sensitivity, stability, rate of detonation, and brisance.

- Sensitivity refers to the ease at which an explosive is ignited or detonated; it reveals the amount and intensity of shock, friction, and heat that is required to initiate detonation.
- Stability indicates the ability of an explosive to be stored without deterioration. Deteriorating explosives may be more sensitive and more dangerous to handle. For example, dynamite stored for a long time will allow nitroglycerin (NG) to seep out and will become very unstable.

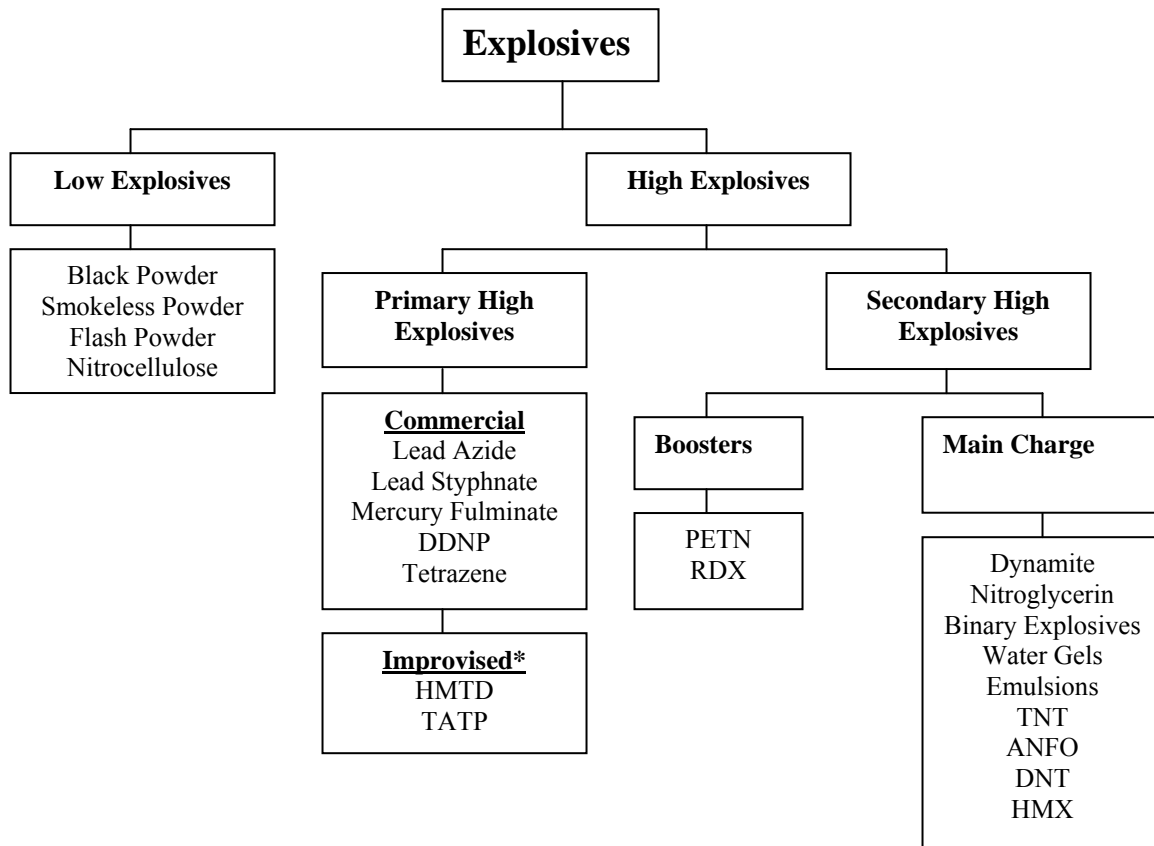
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<sup>3</sup> See section 841(d) of title 18, United States Code and 27 CFR 55.23 for the 2006 list of explosive materials.

- Detonation rate refers to the speed at which a detonation wave travels through an explosive and determines whether an explosive will exert a heaving effect or a shattering effect.
- Brisance describes the shattering effect and is much greater when the rate of detonation is high. Brisance is important in determining the effectiveness of an explosive in fragmenting the likes of shells, bomb casings, and grenades.

## 2.3 Classification of Chemical Explosives

Chemical explosives are classified as either high or low explosives according to their rates of decomposition. Figure 2–1 is a classification chart of explosives with representative examples.



*Figure 2–1. Classification of explosives*

\*It is important to note that there are other improvised explosives, i.e., mixtures of flammable liquid/solid/and peroxides (oxidizers); however, these improvised explosives are not included in the graphic because of the unpredictability of their performance.

### 2.3.1 Explosives Train

An explosive train is a series of explosive materials arranged according to decreasing sensitivity and increasing explosive potency. An explosive train is relatively safer to use since the small amount of sensitive material may be carefully packaged for controlled initiation and the large quantity of potent explosive will not accidentally detonate. In the simplest form, this would

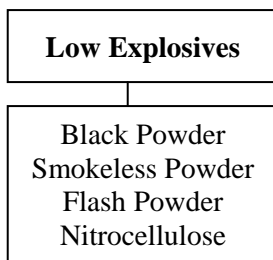
require one primary and one secondary explosive. In practical applications, there are often up to four elements: the primer, the detonator, a booster and the working charge. In its simplest form, an explosive train can also involve low explosives such as black powder with a simple fuse detonator, as in the construction of pipe bombs. Figure 2–2 shows an explosive train.



**Figure 2–2. Explosive train**

### 2.3.2 Low Explosives

Low explosives are compounds or mixtures that experience deflagration. Deflagration is a process by which explosive material decomposes and releases energy through rapid reaction. These types of explosives have propagation speeds less than 1000 m/s (3280 ft/s). Most low explosives are mechanical mixtures or a mechanical blending of the individual ingredients that comprise the low explosives. They are used primarily as propellants because they tend to exert a rapid pushing effect rather than a shattering effect as do high explosives. Low explosives are frequently used as fillers for homemade bombs, such as pipe bombs, where the heated gas causes the failure of the container. Commonly used low explosives are black powder, smokeless powder, and flash powder. Nitrocellulose is a major constituent of smokeless gunpowder. Flash powder is a mixture of materials and in this respect is similar to black powder, but it is regulated as a high explosive by the ATF (see section 2.3.3). Figure 2–3 presents the low explosives with representative examples.



**Figure 2–3. Low explosives**

The following section describes several low explosives along with a brief description and picture of each.

#### 2.3.2.1 Black Powder

Black powder is one of the most difficult low explosives to handle because of its sensitivity to heat, friction, and spark. It is readily acquired in the community and has become a favorite

homemade explosive in the U.S. Black powder consists of the granular ingredients sulfur (S), charcoal (provides carbon to the reaction), and saltpeter [potassium nitrate ( $KNO_3$ ), which provides oxygen to the reaction]. Figure 2–4 is an example of black powder.



**Figure 2–4. Black powder**

### 2.3.2.2 Smokeless Powder

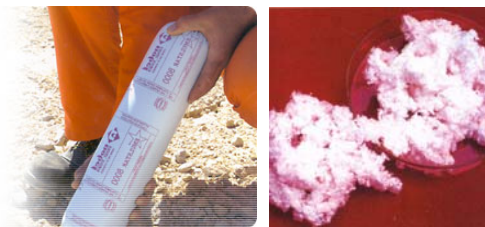
Smokeless powder is an extremely flammable low explosive that burns rapidly and vigorously. When ignited, it produces large volumes of gas and releases energy, which is derived from nitrocellulose and NG. Smokeless powder is similar to black powder but differs in form and color. Smokeless powder is the world-standard propelling powder for small arms, cannons, and in a different form, some military warheads. It is frequently used in the production of pipe bombs. Figure 2–5 is an example of smokeless powder.



**Figure 2–5. Smokeless powder**

### 2.3.2.3 Nitrocellulose

Nitrocellulose, or guncotton, is a highly flammable low explosive that produces a flash of orange flame. It is made by treating ordinary cotton with concentrated nitric and sulfuric acids. Nitrocellulose is a major constituent of smokeless gunpowder. Figure 2–6 shows both the packaged and the raw form of nitrocellulose.



**Figure 2–6. Nitrocellulose**

### 2.3.2.4 Flash Powder

Flash powder is a mixture of oxidizer and metallic fuel that reacts extremely quickly and, if confined, will produce a loud explosion. It is widely used in fireworks and theatrical

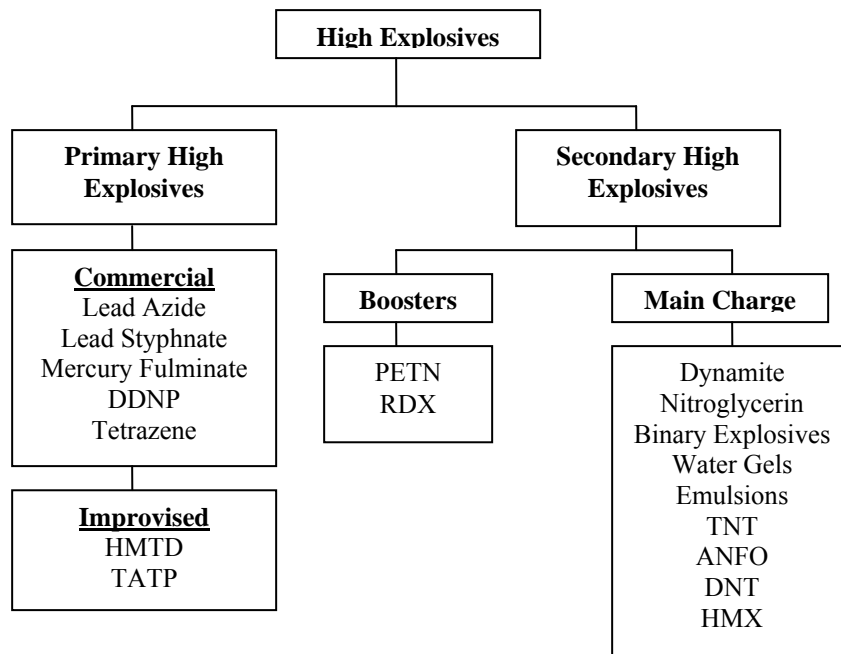
pyrotechnics. Potassium perchlorate and aluminum powder compose the most common variety of flash powder, which sometimes includes sulfur in the mixture to increase the sensitivity. Chemically, it is highly unstable and is a heat, static, friction, and impact sensitive explosive. Flash powders are regulated as a high explosive by the ATF. Figure 2–7 is an example of flash powder.



**Figure 2–7. Flash powder**

### 2.3.3 High Explosives

High explosives are compounds or mixtures that undergo instantaneous detonation to produce a blasting effect. Detonation is the explosion effect that is caused by the transmission of high-speed shockwaves when the explosive compound or mixture decomposes and liberates energy. These types of explosives have detonation speeds greater than 1000 m/s (3280 ft/s). High explosives are normally employed in both commercial applications (e.g., demolition and mining) and military applications (e.g., propellants and bursting charges in warheads). High explosives are further subdivided into primary explosives and secondary explosives based upon their susceptibility to initiation. The primary high explosives can be further divided into commercial explosives and improvised explosives, which include mixtures of flammable liquid/solid/and peroxides (oxidizers), but are so variable that they are not discussed in section 2.3.3. Figure 2–8 is a classification tree of the high explosives with representative examples.



**Figure 2–8. High explosives**

### 2.3.3.1 Primary High Explosives

Primary explosives are among the most powerful and most sensitive of all chemical explosives. This combination of power and sensitivity makes this type of explosives hazardous and difficult to handle. These types of explosives, because of their sensitivity, are easily detonated by applying heat, spark, shock, or any combination of these conditions. Examples of primary high explosives are lead azide, lead styphnate, mercury fulminate, diazodinitrophenol (DDNP), tetrazene, and hexamethylene triperoxide (HMTD) and triacetone triperoxide (TATP), both of which have no commercial uses. HMTD and TATP are included with improvised explosives in section 2.3.4.

#### 2.3.3.1.1 Lead Azide ( $\text{Pb}(\text{N}_3)_2$ )

Lead azide ( $\text{Pb}(\text{N}_3)_2$ ) is a highly sensitive and toxic explosive material that is usually handled and stored under water in rubber containers. It is a white to buff powder or colorless crystalline compound. Lead azide will explode after a fall of around 150 mm (5.9 in) or in the presence of a static discharge of 7 mJ. Figure 2–9 shows a precision detonator utilizing lead azide or lead styphnate.



**Figure 2–9. Lead azide**

#### 2.3.3.1.2 Lead Styphnate

Lead styphnate (lead 2,4,6-trinitroresorcinate,  $\text{C}_6\text{H}_3\text{N}_3\text{O}_8\text{Pb}$ ) is a toxic explosive used as a component in primer and detonator mixtures for less sensitive explosives, such as NG. Lead styphnate is a poor initiator but is easily ignited by fire or by a static charge. Its structure is reddish brown crystals. Figure 2–10 shows crystals of lead styphnate.



**Figure 2–10. Lead styphnate**

#### 2.3.3.1.3 Mercury Fulminate

Mercury fulminate ( $\text{Hg}(\text{ONC})_2$ ) is highly sensitive to friction and shock and is mainly used in older blasting caps. Mercury fulminate, as a primary explosive, has been replaced by other primary explosives that are less toxic and more stable. Figure 2–11 is an example of purified mercury fulminate salt.



**Figure 2–11. Mercury fulminate salt**

#### 2.3.3.1.4 Diazodinitrophenol (DDNP)

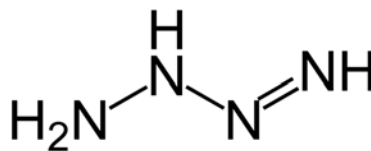
DDNP is a yellowish brown powder that is used as an initiating high explosive in propellant primer devices. The sensitivity of DDNP to friction is about the same as lead azide but less than mercury fulminate. DDNP is used with other materials to form priming mixtures where a high sensitivity to flame or heat is desired. Figure 2–12 is an example of DDNP.



**Figure 2–12. Diazodinitrophenol (DDNP)**

#### 2.3.3.1.5 Tetrazene

Tetrazene [1(5-tetrazolyl)-4-guanyl tetrazene hydrate] is a colorless to yellowish solid that is used for sensitizing priming compositions. It is slightly more impact-sensitive than mercury fulminate. In contact with fire it readily explodes, producing large amounts of black smoke. However, its sensitivity can be destroyed by compressing it, and it decomposes in boiling water. It is made by reacting sodium nitrite with an aminoguanidine salt dissolved in acetic acid. Figure 2–13 is shows the chemical formula of tetrazene.



**Figure 2–13. Tetrazene**

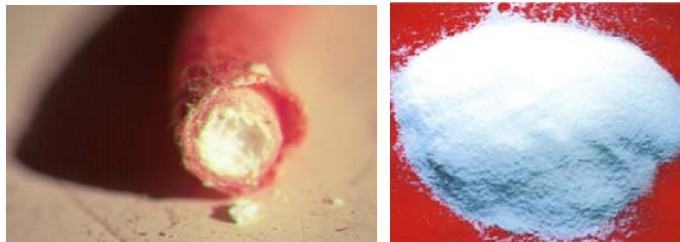
### 2.3.3.2 Secondary High Explosives

Secondary high explosives are relatively insensitive to heat, flame, and shock and usually require a primary explosive to initiate detonation. Secondary high explosives include boosters and main charges.

#### 2.3.3.2.1 Boosters

Boosters include pentaerythritol tetranitrate (PETN) and cyclotrimethylenetrinitramine (RDX).

PETN is one of the strongest known high explosives, i.e., more sensitive to shock and friction than trinitrotoluene (TNT). It is primarily used in booster and bursting charges of small caliber ammunition and in detonators of some land mines and shells. PETN does not occur naturally, and the production and use of this kind of compound can lead to contamination of the environment. PETN is white in color. Figure 2–14 is an example of PETN.



**Figure 2–14. Pentaerythrite tetranitrate (PETN)**

Cyclotrimethylenetrinitramine, also known as RDX, cyclonite, hexogen, and T4 is second in strength to NG among common explosive substances and is used in mixtures with other explosives. It has a high degree of stability and brisance and is considered the most powerful of the military explosives. As a military explosive, it is used as a base charge in detonators or mixed with other explosives such as TNT to produce a bursting charge for various munitions. In addition to military applications, RDX also has commercial applications. Typically, RDX is dyed pink. Figure 2–15 shows the pink RDX.



**Figure 2–15. Cyclotrimethylenetrinitramine (RDX)**

#### 2.3.3.2.2 Main Charges

Main charges include dynamite (based on EGDN and NG), binary explosives, water gels, emulsions, TNT, and ANFO.

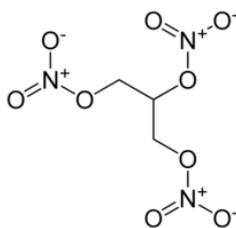


Ethylene glycol dinitrate (EGDN) is an explosive ingredient in dynamite. EGDN is a colorless to yellow, oily, odorless liquid that is included in dynamite to lower the freezing point. It is more volatile than NG and has a higher vapor concentration over dynamite. Figure 2–16 shows sticks of dynamite (EGDN).



**Figure 2–16. Dynamite (EGDN)**

NG is the most powerful high explosive in common use and a key explosive ingredient used to produce dynamite, gunpowder, and rocket propellant. It is very unstable and extremely sensitive to shock and to rapid heating, which makes this material highly dangerous to handle and transport. Figure 2–17 shows the chemical structure of nitroglycerin (NG).



**Figure 2–17. Nitroglycerin (NG)**

Binary explosive systems use two chemical components, a solid and a liquid, that are mixed prior to use. Before mixing, the components are nonexplosive, but once mixed, they become a 1.1.D\* explosive with high shock energy. They are classified as a Class 3 flammable liquid when transported. Figure 2–18 shows plastic bottles containing unidentified binary explosives.



**Figure 2–18. Binary explosives**

Water gels or slurries are aqueous solutions of oxidizers and/or fuels. There are three types of slurries based on the method of sensitization: metallized slurries, emulsions or occluded gas slurries; and slurries based on other explosives, such as TNT, ethylene glycol di- and mononitrates, RDX, high melting point explosive (HMX), PETN, etc. Slurries are safe and versatile. They will not explode unless sensitized. The consistency of slurries varies from pourable to hard solid. Figure 2–19 is a water gel in a glass bubble sensitizer.



**Figure 2–19. Water gels**

Emulsion explosives are mixtures of two liquids (oil-based and water-based) that do not normally mix with one another. An emulsifying agent stabilizes the emulsion from separating. The major component by weight is mixed into the minor component, resulting in a finely dispersed, homogenous mixture, which makes the emulsion-type explosives water resistant. Figure 2–20 shows tubes of emulsion explosives.



**Figure 2–20. Packaged emulsions**

TNT is one of the most commonly used high explosives in military weapons and in civilian mining and excavation activities. The yellow-colored solid is frequently used as a main charge in artillery projectiles, mortar rounds, and aerial bombs. TNT is classified as a secondary high explosive because it is less susceptible to ignition and requires a primary explosive to ignite it. It has fairly high explosive power, good chemical and thermal stability, and is compatible with other explosives. TNT is considered the standard measure of strength of explosives. Figure 2–21 shows the yellow TNT solids.



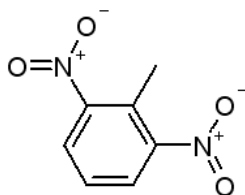
**Figure 2–21. Trinitrotoluene (TNT)**

Ammonium nitrate and fuel oil (ANFO), a common high explosive component of many explosives, is a mixture of ammonium nitrate (found in fertilizer) and diesel fuel oil. Explosives that contain ammonium nitrate include explosives, military and commercial (mining). ANFO is commonly used by terrorists around the world because the components are readily available and unregulated. Other explosive fuels are often added to mixtures like ANFO in order to make a more powerful explosion. Figure 2–22 shows a bag of ammonium nitrate.



**Figure 2–22. Ammonium nitrate and fuel oil (ANFO)**

Dinitrotoluene (DNT) is a dinitro-aromatic mixed isomer used in the production of flexible polyurethane foam intermediates. Physically, it is a solid at ambient temperatures. DNT is a high explosive in the same class as TNT. Figure 2–23 shows the chemical structure of DNT.



**Figure 2–23. Dinitrotoluene (DNT)**

HMX is the highest energy-solid explosive produced in the U.S. HMX explodes violently at high temperatures. Because of its low volatility, it is solely used for military purposes to implode nuclear devices, as a component of rocket propellant, or as a high explosive bursting charge. Figure 2–24 shows the pellets of HMX.



**Figure 2–24. High melting point explosive (HMX)**

### 2.3.4 Improvised Explosives

Improvised explosives are chemical explosives that first responders could encounter. Many books and websites describe how to make explosives, and first responders must be aware that they may come across homemade explosives labs that contain extremely sensitive chemicals. The ATF<sup>4</sup> added nitrate explosive materials, azide explosives, HMTD, TATP, and picrate explosive to its list of regulated explosive materials in 2002 (see appendix H for a complete listing of the 2006 ATF explosive materials). Nitrate explosive materials encompass all forms of sodium, potassium, barium, calcium, and strontium nitrates. Other improvised explosives include mixtures of flammable liquids, solids and/or peroxides (oxidizers).

<sup>4</sup> The Bureau of Alcohol, Tobacco, and Firearms name was officially changed to the Bureau of Alcohol, Tobacco, Firearms and Explosives in 2006. Its official abbreviation is “ATF,” although it is frequently referred to as “BATF” or “BATFE.”

Both TATP and HMTD are extremely sensitive high explosives that can be set off by heat, shock, and friction. Common operations, such as unscrewing the lid of a container of the explosive, could cause them to explode since they can be used as sensitizers and the main charge. Both explosives have been used by terrorists with increasing frequency throughout the world. They are increasingly being made by experimenters in the United States. Since they are improvised materials, they are not labeled and may look like simple white powders. The first responder can recognize that improvised explosives may be present primarily by recognizing the presence of precursor materials. TATP and HMTD are discussed in the following sections.

#### **2.3.4.1 Hexamethylene Triperoxide Diamine (HMTD)**

HMTD was initially used as a primary explosive but was soon superseded by more stable compounds such as tetryl. It has become a popular homemade explosive because it is relatively inexpensive and easy to synthesize and can be produced from common ingredients. HMTD precursors include hydrogen peroxide, citric acid (sour salt), and hexamine (camp stove fuel tablets).

Although no longer used in any official application, HMTD remains a popular homemade explosive and has been used recently by suicide bombers and may have been used in the 2007 London bombings. It is sensitive to shock, friction, and heat and degrades in a matter of weeks, so its commercial value is limited. Figure 2–25 shows the ingredients for making HMTD (left) a solution of HMTD (right) prior to being desiccated into a white mass of crystals.



*Figure 2–25. Hexamethylene triperoxide diamine (HMTD)*

#### **2.3.4.2 Triacetone Triperoxide (TATP)**

TATP, a white crystalline solid material, is one of the most sensitive explosives known, being extremely sensitive to impact, temperature change, and friction. TATP can be detonated simply using friction or impact. If the material is made and then stored, the crystals are stored underwater in a vessel without a screw cap. If the crystals sublime, a highly toxic gas is produced.

As a terrorist high explosive, TATP has recently appeared in the Middle East. TATP can easily be prepared in a basement using commercially available chemicals. Its precursors include acetone (pure or in products like nail polish remover); acids (typically sulfuric, but hydrochloric

(muriatic) or nitric possible), and hydrogen peroxide solution (especially high concentration). Figure 2–26 shows crude TATP and dry TATP<sup>5</sup> and the ingredients for making TATP.



***Figure 2–26. TATP (crude and dry) and preparation ingredients***

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<sup>5</sup> Courtesy of FBI Laboratory Explosives Unit.



### **3. PURCHASE AND USE OF EXPLOSIVES DETECTION AND BLAST MITIGATION EQUIPMENT BY FIRST RESPONDERS**

Explosives detection and blast mitigation equipment may play a useful role in dealing with explosive-related threats as they relate to personnel and package screening and for the implementation of protective measures. This section will discuss the purchase of both types of equipment and the potential use of this equipment by the first responder.

#### **3.1 Purchasing Considerations**

Before allocating money for purchasing explosive detection and mitigation systems, departments should have an idea of the type of equipment they will need. The department should do a threat assessment, and based on the threat assessment, establish a response plan. Equipment should then be selected based on the threat assessment and the planned use.

##### **3.1.1 Threat Assessment**

A central issue in purchasing explosive equipment is determining the character of the threat your department must deal with. In particular, it is necessary to:

- Identify facilities that are terrorist targets.
- Identify events that are terrorist targets.
- Establish goals for the equipment performance.

##### **3.1.2 Establishing a Use Plan**

Equipment must be incorporated into response plans with a clearly defined role. The operations planning must describe:

- Where, when, and how the equipment will be used.
- What the equipment will be used on, such as vehicles, buildings, packages, or luggage.
- The primary operator of the equipment.
- Protocols for notifying the local bomb squad that assistance is required.
- Plans for joint training between investigators and the local bomb squad.

##### **3.1.3 Equipment Performance**

Based on the threat assessment and planned use, equipment must be selected that will meet these goals and fall within operational constraints. It is necessary to:

- Establish measurement of mitigation performance.
- Define operating conditions (cold, wind, rain, etc.).
- Determine allowable maintenance costs (e.g., calibration, repairs, training, etc.).
- Determine allowable operating costs (e.g., consumable chemicals, wireless connections).

When these questions have been answered and one or more candidate pieces of equipment identified, the manufacturer should be asked to supply data to support that their equipment can meet the requirements. If possible, the manufacturer should demonstrate the equipment under field conditions or provide a loaner for testing. A response plan to an explosive threat may include both explosive detection and blast mitigation equipment.

### **3.1.4 Precautions**

The purpose of detection equipment is to locate possible explosives or improvised explosive devices (IEDs); it should not be used to clear a suspect item. A positive alert should be resolved with the assistance of a certified bomb technician. The following safety principles for clearing suspect items are part of the *National Guidelines for Bomb Technicians*:

“It is recognized that explosives detection systems (i.e., x-ray, computerized tomography, mass spectrometry, etc.), explosive vapor and/or trace detection, or other chemical or mechanical explosives detectors are commonly used by security and law enforcement personnel who are not bomb technicians. These methods of explosives detection may be useful for the routine screening of large numbers of people, their personal belongings and/or luggage for security within the mass transportation sector (i.e., airports, commuter rail, etc.), protective details, high-profile businesses, government buildings, sporting and concert venues or special events. However, due to the possibility of a false negative response, such methods of explosive detection should NEVER be used to assess, examine or clear items identified as a suspected explosive item or as a possible improvised explosive device, unless under the direction of an accredited bomb squad.”

According to the National Guidelines, explosive detection equipment does have a place within certain parameters (threats, sweeps) but should never be used to clear a suspected IED.

## **3.2 Blast/Fragmentation Mitigation Equipment**

Blast/fragmentation mitigation equipment can be used by the first responder to provide some protection from a potential explosion. Blast mitigation equipment is divided into the following two systems:

- Portable barricades, barriers and containers that can be moved into place when the threat of an IED is suspected.
- Preplanned and prepositioned building/personnel protection systems, including blast resistant trash receptacles.

Portable mitigation systems allow the first responder to have some protection for themselves and others when dealing with a suspicious item. In many settings, such as airports, courthouses, and public buildings with x-ray screening areas, an item may appear suspicious or unusual when x-rayed. Once this item has been examined in the x-ray machine, the first responder should alert the bomb squad. Some protocols may provide for the suspicious item to be placed in a mitigation system that would allow the first responder the opportunity to sequester the item while awaiting a bomb squad’s assistance. Figure 3–1 shows a portable mitigation system, the Life



Safety Systems, Inc. (LSSI) Blast Containment System. Figure 3–2 is a preplanned, or pre-positioned protection system, the NABCO Containment Vessel.



*Figure 3–1. Blast Containment System, LSSI*      *Figure 3–2. Containment Vessel, NABCO*

If a suspicious item has been located and has not been moved or touched, the use of a mitigation system by a first responder is not recommended. In addition, bomb squads recommend that suspicious items not be covered or placed in enclosed areas because these procedures may increase the hazard to the public as well as the bomb squad. Instead, an immediate evacuation is currently the standard response. However, the use of explosive mitigation systems is sometimes necessary under special circumstances where rapid evacuation is not possible. These systems should be implemented under protocols that have been reviewed by the bomb squad.



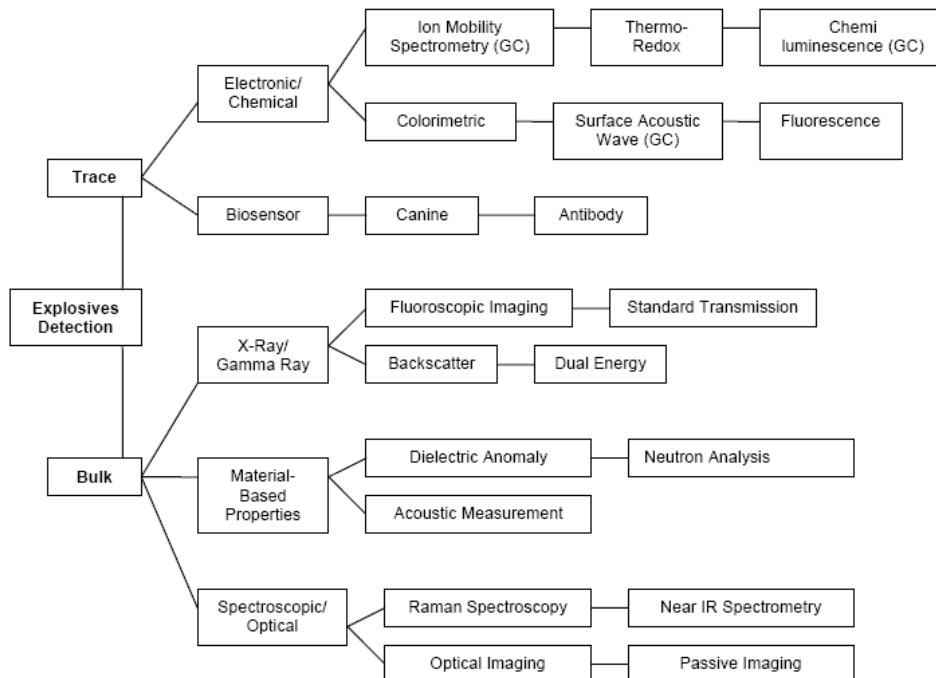
## 4. OVERVIEW OF EXPLOSIVES DETECTION AND BLAST MITIGATION TECHNOLOGIES

The applicability of explosives detection and blast mitigation equipment depends on the user's objective and the equipment capabilities. This section presents an overview of explosives detection and blast mitigation technologies.

### 4.1 Explosives Detection Technologies

Explosives detection technologies include trace detection and bulk detection. Trace detection involves the chemical detection of explosives by collecting and analyzing tiny amounts of explosive vapor or particles (a microscopic amount of explosives). Generally, trace detectors provide more specific identification, require being close to the source to get a sample, may be subject to false alarms from background materials, and can be defeated by packaging.

Bulk explosives detection involves the detection of a macroscopic mass of explosives material (a visible amount of explosives), usually based on imaging or on material properties of the explosive. Often when a bulk detector is employed, some initial analysis of the object may be done from visual inspection. Generally, bulk detectors do not require sampling, are not sensitive to background materials, can penetrate some packaging materials, and provide less specific identification. Figure 4-1 shows a technology tree representation of the detection equipment covered by this guide.



**Figure 4-1. Technology tree for explosives detection\***

\*GC in parenthesis indicates that gas chromatography may be combined with this technology to improve sensitivity.

### 4.1.1 Trace Detection

Trace detection determines the presence of an explosive by the chemical identification of microscopic residues of the explosives, either as microscopic particles or as vapor (gas-phase molecules). Trace detection is grouped into two technologies, electronic/chemical and biosensor technologies. These two technologies are further grouped into the following eight techniques:

- Electronic/Chemical.
  - Ion Mobility Spectrometry (IMS).
  - Thermal Redox.
  - Chemiluminescence.
  - Colorimetric.
  - Surface Acoustic Wave (SAW).
  - Fluorescence.
- Biosensor.
  - Canine.
  - Antibody.

#### 4.1.1.1 Electronic/Chemical Technologies

Electronic/chemical technologies identify explosive materials based on the molecular or chemical properties of the material. Table 4–1 summarizes the advantages and disadvantages of the six trace electronic/chemical technologies used to identify the presence of explosives.

*Table 4–1. Advantages and disadvantages of electronic/chemical techniques*

Detector Technique	Advantages	Disadvantages
Ion mobility spectrometry	<ul style="list-style-type: none"> <li>• Widely used technique.</li> <li>• Moderate price.</li> </ul>	<ul style="list-style-type: none"> <li>• May contain radioactive source.</li> <li>• Moderate selectivity</li> </ul>
Thermal redox	<ul style="list-style-type: none"> <li>• No radioactive source.</li> <li>• Moderate price.</li> </ul>	<ul style="list-style-type: none"> <li>• Detects NO<sub>2</sub> groups only.</li> <li>• Cannot distinguish NO<sub>2</sub> interferants from explosives materials.</li> </ul>
Chemiluminescence	<ul style="list-style-type: none"> <li>• No radioactive source.</li> <li>• Moderate price.</li> </ul>	<ul style="list-style-type: none"> <li>• Inability to detect explosives that are not nitro-based.</li> </ul>
Colorimetric	<ul style="list-style-type: none"> <li>• Low cost.</li> <li>• Easy to use.</li> </ul>	<ul style="list-style-type: none"> <li>• Reliance on operator’s interpretation of color.</li> <li>• Inability to detect vapors.</li> <li>• Sample concentration dependent.</li> </ul>
Surface acoustic wave	<ul style="list-style-type: none"> <li>• No radioactive source.</li> <li>• Detects wide range of chemicals.</li> <li>• Moderate price.</li> </ul>	<ul style="list-style-type: none"> <li>• Less specific; presence of other chemicals makes detection of explosives unreliable.</li> </ul>
Fluorescence	<ul style="list-style-type: none"> <li>• Sensitive.</li> <li>• Rapid.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential false positives (selectivity).</li> </ul>

##### 4.1.1.1.1 Ion Mobility Spectrometry

IMS is a widely used trace detection technique for explosives and other contraband materials. It is typically implemented as a stand-alone detector that samples the environment by using an air pump. Contaminants in the sampled air are ionized, usually by a radioactive source that emits

low-energy electrons. The ions are accelerated by an electric field and then traverse an atmospheric pressure drift region toward an ion detector. The time it takes the ionized contaminant to traverse the distance is proportional to the contaminant mass-to-charge ratio and the ion shape and is used as a means of identification. Analysis times can range from several seconds to a few minutes. If explosives are present, the negative ions typically associated with the explosives are recognized. IMS requires a vapor or gas sample for analysis; therefore, liquid and particulate samples must first be volatilized. Figure 4–2 shows a handheld portable IMS detector, the SABRE 4000, manufactured by Smiths Detection.

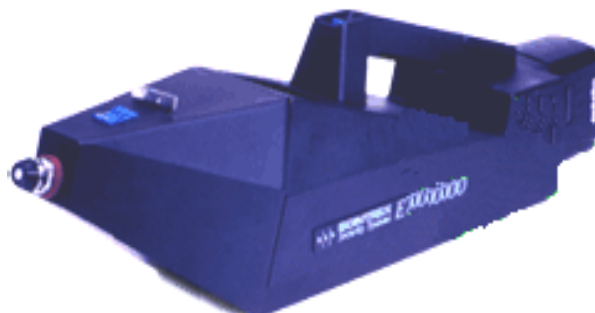


*Figure 4–2. SABRE 4000, Smiths Detection*

Several features make IMS attractive for trace detection of explosives. IMS systems are moderately priced and, while maintenance costs vary from system to system, most are at a moderate level. Many IMS systems are small and can be transported or stored in the trunk of a police cruiser. IMS instruments are fairly simple to use and can be operated with minimum training. They have response times of a few seconds, the ability to detect many key explosives, and have good sensitivities. Most IMS instruments have audio and visual alarms to warn the operator if an explosive has been detected, and alarms to also identify the type of explosives.

#### 4.1.1.1.2 Thermo-redox

The thermo-redox technique is based on the thermal decomposition of explosive molecules and the subsequent reduction of nitrite ( $\text{NO}_2$ ) groups. Air containing the explosive sample is drawn into a system inlet at a rate of approximately 1.5 L/min. The air is then passed through a concentrator tube that selectively adsorbs explosive vapor using a coating on the tube's coils. The sample is next pyrolyzed to liberate  $\text{NO}_2$  molecules, which are detected using proprietary technology. Since only the presence of  $\text{NO}_2$  groups is detected, this technique cannot distinguish between different explosives and potential interferents that contain  $\text{NO}_2$  groups. Also, the technique cannot detect explosives that do not contain  $\text{NO}_2$  groups. In other words, the system identifies the presence of an “explosive-like” material but cannot identify a specific explosive. Thermo-redox can analyze both vapor and particle samples. Unlike IMS, thermo-redox contains no radioactive source. Figure 4–3 shows the EVD-3000 Handheld Explosives Detector, from Scintrex Trace Corp., which is based upon the thermo-redox technique.

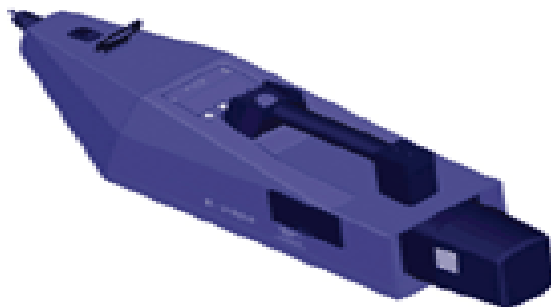


**Figure 4–3. EVD-3000 Handheld Explosives Detector, Scintrex Trace Corp.**

#### 4.1.1.1.3 Chemiluminescence

Detectors based on chemiluminescence identify explosives by detecting infrared light that is emitted by the decay of the excited electronic state of  $\text{NO}_2$  molecules. Most explosive compounds contain either  $\text{NO}_2$  or nitrate ( $\text{NO}_3$ ) groups, and the compounds commonly used as taggants in plastic explosives also contain  $\text{NO}_2$  groups. In a chemiluminescence system, explosive molecules are first pyrolyzed to produce nitric oxide ( $\text{NO}$ ). The  $\text{NO}$  molecules are then mixed with ozone ( $\text{O}_3$ ) in an evacuation reaction chamber maintained at a constant pressure. The reaction of the  $\text{NO}$  molecules and  $\text{O}_3$  produces  $\text{NO}_2$  light. A photomultiplier tube (PMT) situated behind a red light filter is used to detect the red photons of a characteristic frequency that are emitted when the  $\text{NO}_2$  molecules decay to form unexcited  $\text{NO}_2$ . The signal output of the PMT is directly proportional to the amount of  $\text{NO}_2$  present in the reaction chamber, and this signal is used to detect the presence of explosives.

Used alone, chemiluminescence is not capable of identifying the specific explosive molecule that is present, only that a molecule had been present that decomposed to yield  $\text{NO}$ . Because there are potential interferences found in fertilizer and perfumes that decompose to yield  $\text{NO}$ , chemiluminescence detectors are often fitted with a front-end gas chromatograph (GC). Chemiluminescence is typically higher in cost than other explosives detectors but has excellent sensitivity and selectivity when coupled with high-speed GC. Additionally, chemiluminescence can detect a wide range of explosives, including EGDN, NG, ANFO, TNT, RDX, and PETN. Figure 4–4 shows the E-3500 Portable Advanced Explosives Detector, from Scintrex Trace Corp., which is a handheld portable device that uses chemiluminescence.



**Figure 4–4. E-3500 Portable Advanced Explosives Detector, Scintrex Trace Corp.**

#### 4.1.1.1.4 Colorimetric

Colorimetric detection kits typically have sprays or surface swipes that react to different explosives by changing color. Different sprays are used sequentially for rapidly identifying different explosives. Nitrate esters, such as NG and nitrocellulose, under certain conditions will undergo alkali hydrolysis producing  $\text{NO}_2$ . Nitro aromatics, such as TNT and trinitrobenzene (TNB), and picric acid and its derivatives, form highly colored compounds when reacted with alkali. However, there is no way to distinguish between innocent fertilizers and nitrate-based explosives with colorimetric kits. When an explosive is detected, it is not always possible to identify the specific type.

The Expray™ Field Test Kit, by the Mistral Group, (fig. 4–5) is a field test kit designed to detect and identify trace levels of explosives and explosive residues. The Expray has been used extensively in forensic investigations since 1991, but it has certain limitations. Since there is no way to distinguish between fertilizers and nitrate-based explosives, care must be taken when interpreting the results. Also, any fertilizer containing nitrates will react to Expray. Sampling is entirely by surface swiping; there is no method for obtaining a vapor sample. In addition, only specific colors give a positive result; other discoloration is possible but should be judged negative. If  $\text{NO}_2$  containing compounds (such as sodium nitrite) are tested, a color reaction will be obtained even after applying the detection kit, i.e., a false positive. No other false positives have been determined, but one should note that only the colors listed should be observed.



**Figure 4–5. Expray™ Field Test Kit, Mistral Group**

#### 4.1.1.1.5 Surface Acoustic Wave

SAW-based detector systems consist of multiple piezoelectric crystals coated with a polymeric film designed to absorb molecules from the air. The piezoelectric crystals vibrate in response to an electronic excitation signal; the frequency of the vibration is determined both by the characteristics of the crystal and the polymeric film coating. When the polymeric film absorbs vapors, its mechanical properties change, which is detected as a vibration frequency shift. SAW detectors typically use two to six piezoelectric crystals, each coated with a different polymeric film, and each polymeric film preferentially absorbs a particular class of volatile compound. For example, one polymeric film will be designed to preferentially absorb water, while other polymer films are designed to preferentially absorb different types of volatile compounds. The adsorption process changes the mass of the polymeric coatings resulting in the shift of the resonant frequency of the piezoelectric crystal. By monitoring the vibration frequency of the

different piezoelectric crystals, a response pattern of the system for a particular vapor is generated, and this response pattern is stored in a microprocessor. When the system is operating, it constantly compares each new response pattern to the stored response pattern for the target vapor, and when the response pattern for the target vapor matches the stored pattern, the system alarm is activated. The selectivity and sensitivity of these detectors depends on the ability of the film to absorb only the suspect vapors from the sample air. Many SAW devices concentrate the vapors before detection. These pre-concentrators reduce environmental interferences and increase the detection sensitivity. Figure 4–6 shows the zNose Model 4200, from Electronic Sensor Technology, which is a hand-held portable SAW detector.



**Figure 4–6. zNose Model 4200, Electronic Sensor Technology**

#### 4.1.1.1.6 Fluorescence

Fluorescence techniques use the phenomenon that molecules, when illuminated by one wavelength of light, will re-emit light at a different wavelength, usually at a longer wavelength. This permits sensitive detection of the fluorescent molecule since a strong excitation signal may be used while looking for a weaker signal at a different wavelength. This technique may be used as a vapor detector if the fluorescent behavior changes in the presence of a particular chemical vapor. The Fido XT Portable Explosives Detector, from ICx Nomadics (fig. 4–7) has incorporated fluorescence for trace detection of explosives. This instrument has a proprietary polymer that has its fluorescence quenched (reduced in intensity) in the presence of explosive vapors. The particular polymer formulation has an amplifying effect in that a single explosive vapor molecule quenches many linked fluorescent molecules, resulting in an amplification of sensitivity.



**Figure 4–7. Fido XT Portable Explosives Detector, ICx Nomadics**



#### 4.1.1.2 Biosensor

Biosensor technologies are subdivided into canine detection and antibody-based detection kits. Table 4–2 summarizes the advantages and disadvantages of the two trace biosensor technologies used to identify the presence of explosives.

*Table 4–2. Advantages and disadvantages of biosensor techniques*

Detector Technology	Advantages	Disadvantages
Canine	Very sensitive. Highly mobile.	<ul style="list-style-type: none"><li>• Not specific.</li><li>• Requires rest periods.</li></ul>
Antibody	Sensitive. Specific.	<ul style="list-style-type: none"><li>• Requires minutes per test.</li><li>• May require a separate antibody for every explosive material.</li></ul>

##### 4.1.1.2.1 Canine Detection

Canine detection is a popular technique widely used by law enforcement agencies to search for contraband and concealed explosives. Because canines have excellent smell-detection capabilities and can perceive very small quantities of odorants, they have been used successfully for sniffing out drugs, agricultural products, fugitives, cadavers, hidden explosives, and landmines. A good search dog can recognize at least 14 different types of odors. Dogs are trained to identify specific explosive ingredients rather than specific products; for example, a dog is trained to detect NG instead of dynamite, so the exact formulation of the explosives is not important (see fig. 4–8). There are no explosive compounds that dogs cannot be trained to sniff out, but dogs used in the U.S. military are typically trained to detect nine different explosives.



*Figure 4–8. Firearms and explosives detector dog at work*

Compared to technology-based “sniffer” systems, dogs have the advantages of superior mobility with the ability to rapidly follow a scent directly to its source. These advantages make canines an excellent choice for explosives detection applications that involve a significant search component. Disadvantages of canines compared to trace technologies include limited duty cycle (i.e., a dog works about 1 h before requiring a break), the need for regular retraining, and the inability to communicate to the handler the type of explosives that is detected. It costs about \$20K to purchase, train, and certify a new canine.

#### 4.1.1.2.2 Antibody-Based Detection Kits

Antibody-based detection kits use highly specific proteins, or antigens, made by animals in response to foreign substances. These test kits are most commonly used to identify diseases but can also be developed to identify some chemicals. An antibody developed for a specific chemical couples to the chemical with a “lock and key” structure making it a highly specific test. However, antibody-based tests may be confounded by contaminants, i.e., acids and/or bases. Biosensor Applications, AB has developed an antibody-based explosives detection instrument, the Biosens (fig. 4–9) that uses cartridges containing specific antibodies, which are then read by the instruments.



*Figure 4–9. Biosens, Biosensors Applications, AB*

#### 4.1.2 Bulk Detection

Bulk detection involves the use of a radiation source to examine questionable material and detect the response from all materials present. They measure the characteristics of the materials in question in an attempt to detect the possible presence of explosives. Bulk detection is grouped into three major technologies: x-ray or gamma ray, material-based properties, and spectroscopic/optical. These three technologies are further grouped into the following 11 techniques:

- X-ray or gamma ray techniques:
  - Standard (Transmission).
  - Fluoroscope.
  - Dual Energy.
  - Backscatter.
- Material-based properties techniques:
  - Dielectric anomaly.
  - Acoustic.
  - Neutron Activation.
- Spectroscopic/Optical:
  - Raman Spectrometry.
  - Near Infrared (NIR) Spectrometry.
  - Optical Imaging.
  - Passive Imaging.

### 4.1.2.1 X-Ray/Gamma-Ray

X-ray/gamma-ray based technologies do not detect explosives; they detect materials that have explosives-like characteristics, or structures (e.g., wires) that may indicate a bomb. These techniques involve irradiation of a target item with x-rays, followed by detection of an image created by x-rays that are either transmitted or backscattered by the item. The capabilities of x-ray systems range from those that produce a black and white picture to those that measure the effective atomic number of the screened items. Table 4–3 summarizes the advantages and disadvantages of each x-ray detection technique.

**Table 4–3. Advantages and disadvantages of x-ray/gamma-ray detection techniques**

Detector Technology	Advantages	Disadvantages
Fluoroscopic imaging	<ul style="list-style-type: none"> <li>• Field portable.</li> <li>• Single-man portable.</li> <li>• Real-time device.</li> <li>• Low energy x-ray.</li> </ul>	<ul style="list-style-type: none"> <li>• X-ray radiation source.*</li> <li>• Small viewing area.</li> <li>• Limited penetration ability.</li> <li>• May have digital image storage/processing/transmission.</li> </ul>
Standard transmission	<ul style="list-style-type: none"> <li>• Low energy x-ray.</li> </ul>	<ul style="list-style-type: none"> <li>• X-ray radiation source.*</li> <li>• Small viewing area.</li> <li>• Limited penetration ability.</li> <li>• Requires film consumable.</li> </ul>
Backscatter detection/imaging	<ul style="list-style-type: none"> <li>• Dual imaging capability.</li> <li>• Moderate cost.</li> </ul>	<ul style="list-style-type: none"> <li>• X-ray radiation source.*</li> <li>• Very dense materials can hide other objects.</li> <li>• Cannot discriminate between various materials.</li> </ul>
Dual energy	<ul style="list-style-type: none"> <li>• Material discrimination based upon density.</li> <li>• Low cost.</li> </ul>	<ul style="list-style-type: none"> <li>• X-ray radiation source.*</li> <li>• Difficult to separate overlapping objects from one another in image.</li> </ul>

\*The x-ray radiation source may pose a potential health hazard to the operator.

#### 4.1.2.1.1 Fluoroscopic Imaging

Fluoroscopic imaging is a transmission x-ray system, where the transmitted x-rays form an image of the investigated object on a fluorescent screen. Fluoroscopic imaging is the simplest type of x-ray system, exposing the entire object with a cone of x-ray energy, often for extended periods. The simple black and white images from fluoroscopic imaging allow the operator to see wires, batteries, detonators, and other bomb components but not to identify actual explosive material. Dangerous items such as plastic weapons and explosives, which are usually transparent to x-rays, can be missed. The fluorescent screen can be viewed in real time using a 45° mirror (to avoid standing in direct line with the x-rays), or can be used in conjunction with a video camera and a video image storage panel. Use of the camera and image storage panel minimizes the x-ray dose to the object being viewed by allowing the image to be captured during a brief exposure. Figure 4–10 shows the foX Trekker PC Based X-ray System, from Vidisco Ltd., that utilizes fluoroscopic imaging.



*Figure 4-10. foX Trekker PC Based X-ray System, Vidisco Ltd.*

#### 4.1.2.1.2 Standard Transmission

Standard transmission x-ray imaging systems typically use a beam of x-rays to penetrate an object, and the transmitted x-rays are recorded by film, usually a Polaroid film back that develops in the field. Standard transmission x-ray imaging systems produce black and white transmission images similar to the fluoroscopic systems and provide a permanent record on film. They are subject to the same detection limitations as fluoroscopic images (i.e., they cannot identify the actual explosive material but do allow the operator to see wires, batteries, detonators, and other bomb components). Figure 4-11 shows the Golden Engineering, XR-200 portable x-ray source. This source may be used with any film pack to provide a field x-ray of a package.



*Figure 4-11. XR-200 Portable X-ray, Golden Engineering*

Since fluoroscopic and transmission x-ray systems cannot identify explosives, backscatter or dual energy techniques may be needed to identify the contraband. Because of the limitations of standard transmission techniques, backscatter or dual energy techniques are employed to provide an operator with the ability to identify explosives.

#### 4.1.2.1.3 Backscatter

Backscatter x-ray/gamma-ray imaging not only discriminates between different materials but can reveal organic materials, including explosives and narcotics, by producing an image from scattered x-rays from the screened object. The backscatter system produces two images, backscatter and transmission, both of which are displayed. Explosive-like materials are barely

visible in the transmitted image but are bright in the backscatter image. The backscatter image is usually most effective for the detection of explosives, narcotics, and plastic weapons, while the transmission image is most useful for viewing metals. However, backscatter systems cannot discriminate between different materials (e.g., between the C-4 military plastic explosives and ordinary everyday plastics). Although backscatter x-ray systems are usually too large to be carried by a single individual, backscatter techniques can be used in smaller, nonimaging configurations to look specifically for nitrogen and oxygen compound materials characteristic of explosives. Figure 4–12 depicts one such device, the Buster K910B, from SAS R&D Services, that uses the backscatter technique.



*Figure 4–12. Buster K910, SAS R&D Services*

In order to specifically differentiate explosive-like materials from ordinary materials, other technologies are employed, such as dual energy x-ray.

#### 4.1.2.1.4 Dual-Energy

Dual-energy x-ray systems utilize: 1) a single broad-energy x-ray beam and a dual detector arrangement or 2) a combination of low-energy x-rays and high-energy x-rays to image materials. This technique is based on the fact that high atomic mass materials, such as common metals, have different x-ray absorption characteristics than low atomic mass materials, such as explosives. The use of two different energies enables the high and low atomic mass materials to be distinguished. X-ray data is obtained at both x-ray energies, and the two separate images are computer-processed to compare low-energy to high-energy x-ray absorption. The displayed results characterize and identify the various materials by their shape. The system also uses color to separate items in the image into organic and metallic material. The resulting image is displayed on a monitor for visual identification. An example of a dual-energy x-ray system is the foX-Rayzor, from Vidisco Ltd. (fig. 4–13).



**Figure 4–13. foX-Rayzor, Vidisco Ltd.**

#### 4.1.2.2 Material Property-Based Technologies

Material property-based technologies measure material properties, such as dielectric constant and loss or acoustic velocity and attenuation. They use active energy transmission to penetrate packaging and containers and use nonionizing radiation for safety. Measurements can be made quickly. Two disadvantages of material property-based technologies are that they are nonimaging, and that they are nonspecific in identifying explosives. Table 4–4 provides a summary of the advantages and disadvantages of each material property-based detection techniques.

**Table 4–4. Advantages and disadvantages of material property-based techniques**

<b>Detector Technology</b>	<b>Advantages</b>	<b>Disadvantages</b>
Dielectric anomaly	<ul style="list-style-type: none"> <li>• No ionizing radiation.</li> <li>• Searches for items hidden in bulk cargo.</li> <li>• Can search people.</li> </ul>	<ul style="list-style-type: none"> <li>• Susceptible to shielding.</li> <li>• Nonspecific.</li> <li>• Requires calibration before use.</li> <li>• Relatively high false alarm rate.</li> </ul>
Acoustic measurements	<ul style="list-style-type: none"> <li>• Non-intrusive measurement of liquids in containers.</li> <li>• Rapid.</li> <li>• Detects hidden items.</li> </ul>	<ul style="list-style-type: none"> <li>• Nonspecific.</li> <li>• Does not measure solids.</li> </ul>
Fast Neutron Activation	<ul style="list-style-type: none"> <li>• Excellent penetration.</li> <li>• Identifies atomic composition.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires neutron source.</li> <li>• Relatively slow.</li> <li>• Identifies atoms, not molecules.</li> </ul>

##### 4.1.2.2.1 Dielectric Anomaly

A dielectric anomaly detector transmits a beam of radio frequency or microwave energy into a search volume and measures the reflected energy. The amount of reflected energy depends on discontinuities in the dielectric constant along the beam path. The instrument is calibrated on a region known to contain no explosive materials and then used to measure other volumes to look for hidden materials. Figure 4–14 is the M600 Anomaly Detector, from EMIT Technologies.



*Figure 4–14. M600 Anomaly Detector, EMIT Technologies*

#### 4.1.2.2.2 Acoustic Measurement

Acoustic measurement transmits a beam of acoustic energy (generally ultrasonic, above 20 kHz) into a search volume of liquid and measures the reflected sound energy. The amount of reflected energy depends on discontinuities in the density along the beam path. A reflection from the far side of the container can frequently be detected, showing that the entire container has been measured. The system can measure both acoustic velocity and attenuation, which can be compared with the expected value for the container contents. Figure 4–15 shows the PASS System for liquid container detection, from ASC, Inc.<sup>6</sup>



*Figure 4–15. PASS System, ASC, Inc.*

#### 4.1.2.2.3 Neutron Analyses

Material composition can be determined by exposing an unknown sample to neutrons and measuring the resulting  $\gamma$ -ray emission. Two types of neutron irradiation are used. Fast neutrons can be produced either from a radioactive source (most commonly  $^{252}\text{Cf}$ ) or from an accelerator, which can be compact and portable. Fast neutrons induce the emissions of a characteristic  $\gamma$ -ray. A detector with high energy resolution is used to measure the emitted  $\gamma$ -rays and identify specific atomic compositions. For explosives detection, the relative concentration of nitrogen, oxygen,

<sup>6</sup> American security [www.americansecurity.net](http://www.americansecurity.net)

and carbon atoms can be used to identify the compound. Fast neutron analysis has the advantage that it can detect oxygen concentration and can penetrate thick shielding.

The neutrons from the source can also be slowed down before entering the unknown sample, in which case they are called thermal neutrons. Thermal neutrons are captured by the target nuclei to form new isotopes that are radioactive. These new isotopes emit characteristic  $\gamma$ -rays that are measured by the same type of high resolution detector to identify the target material. Thermal neutrons have less ability to penetrate thick shielding and cannot identify oxygen nuclei.

All of the neutron analysis methods can detect fissionable nuclear materials since the neutrons will induce a small amount of fission, and the fission products are radioactive. The SIEGMATM 3M3, manufactured by HiEnergy Technologies, Inc., is a system that uses neutron analysis for explosives identification (see fig. 4-16),



*Figure 4-16. SIEGMATM 3M3, HiEnergy Technologies, Inc.*

#### 4.1.2.3 Spectroscopic/Optical Technologies

Spectroscopic and optical technologies identify chemicals based on characteristic absorption of particular wavelengths of light. The absorption wavelengths can provide highly specific identification of pure chemicals, especially in the infrared (IR) portion of the spectrum. Optical techniques require a clear optical path to the material but will work through the walls of transparent containers. Optical imaging does not analyze the material but relies on finding materials hidden in suspicious places, such as packages attached to the under side of vehicles. Table 4-5 provides a summary of the advantages and disadvantages of each spectroscopic and imaging detection techniques.

*Table 4-5. Advantages and disadvantages of spectroscopic/optical techniques*

Detector Technology	Advantages	Disadvantages
Raman spectroscopy	<ul style="list-style-type: none"> <li>• Good identification capability.</li> <li>• Wide variety of materials can be analyzed.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires sample access.</li> <li>• May be confused by mixtures.</li> </ul>
Near infrared spectroscopy	<ul style="list-style-type: none"> <li>• Proven industrial technology.</li> <li>• Rapid measurement.</li> </ul>	<ul style="list-style-type: none"> <li>• Less specific.</li> <li>• Requires calibration for mixtures.</li> </ul>
Optical imaging	<ul style="list-style-type: none"> <li>• Low cost.</li> <li>• Rapid.</li> </ul>	<ul style="list-style-type: none"> <li>• Relies on operator interpretation of data.</li> </ul>
Passive imaging	<ul style="list-style-type: none"> <li>• Noncontact.</li> <li>• Good spatial resolution.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited to personnel screening.</li> <li>• Does not detect material composition (just shape).</li> </ul>



#### 4.1.2.3.1 Raman Spectroscopy

Raman spectroscopy uses an intense light beam to illuminate a small portion of a sample material. The color (wavelength) of a small fraction of the reflected light is shifted, corresponding to molecular vibrations in the material. The scattered light is collected and the wavelength shifts are analyzed to identify the unknown material. Field portable Raman instruments are relatively new and use diode lasers to produce the intense initial beams and special filter technology to allow separating the shifted and nonshifted light signals. Many of the systems use flexible fiber optics to conduct the light to and from the sample allowing for more flexible sample inspection. The same instrument may be used to analyze explosives and other materials such as narcotics because Raman instruments can support many different spectral libraries. Figure 4–17 shows the StreetLab Portable Raman System, from General Electric.



*Figure 4–17. StreetLab Portable Raman System, General Electric*

#### 4.1.2.3.2 Near Infrared Spectroscopy

NIR spectroscopy uses the reflection of a broad spectrum of light at wavelengths longer than visible light. It does not rely on the small Raman shift effect but looks for reflection variations in the light beam itself. This technique is also sensitive to the molecular vibration spectrum but has lower spectral resolution than the vibration spectrum. NIR is widely used as an industrial inspection technique because it can make rapid measurements in less than 1 s. Figure 4–18 shows the LabSpec<sup>®</sup>, from Analytical Spectral Devices, Inc., which is available in a fully portable battery powered version.



*Figure 4–18. LabSpec<sup>®</sup> 2500 NIR Spectrometer, Analytical Spectral Devices, Inc.*

#### 4.1.2.3.3 Optical Imaging

Optical imaging (image reflection and visualization) techniques are used for bulk explosives detection. They are primarily used in systems to inspect undersides of cars and trucks, under machinery, or in maintenance facilities to detect explosives, bombs, smuggling. Figure 4–19 and figure 4–20 show the SAM Security Assessment Mirror, from Lumenyte International Corp., and the “VMS” Vehicle Inspector, from TigerVision, respectively. Both detectors utilize optical imaging technology.



**Figure 4–19. SAM Security Assessment Mirror, Lumenyte International Corp.**



**Figure 4–20. “VMS” Vehicle Inspector, TigerVision**

Light pipe systems are available that permit inspecting the inside of a container or tank. Most of the equipment items that utilize this technology are single-man portable, easy to use, require minimal maintenance, and are relatively low cost depending upon the sophistication of the system. Figure 4-21 shows the IW-2000 PypeLyte™ Inspection Light, from Lumenyte, a 2 m to 3 m flexible fiber optic wand designed to inspect confined and hard to reach areas. It comes equipped with a camera and mounts onto a flashlight (not included).



**Figure 4–21. IW-2000 PypeLyte™ Inspection Light, Lumenyte**

One of the major disadvantages of this technology is that it can only identify the presence of bulk material (e.g., bomb) that contains the explosive material and not the actual explosive material that is present.

#### 4.1.2.3.4 Passive Imaging

Passive imaging uses energy emitted by an object itself to observe and analyze the object. In the most usual case, the energy is an object's normal heat energy. The advantage to this technique is that no radiation source is required; the limit is that only objects with an internal heat source can be observed. Heat energy is emitted over a broad range of wavelengths longer than visible light. In general, longer wavelengths have better penetration through an object but lose the ability to see small objects.

An example of this technology is the Sago Systems aPat Handheld Passive Millimeter-Wave Imager. Millimeter waves (longer wavelength than infrared) are emitted by warm objects and can penetrate through layers of clothing. The aPat uses this fact to look for items concealed on an individual under the outer clothing layers. It reveals many types of concealed objects including solids, liquids and metals so it could detect concealed weapons or clothing. The spatial resolution is approximately 1.27 cm (½ in), and it images a 20 cm (8 in) wide swath as it is moved. The low spatial resolution does not reveal anatomical detail and may be used for routine screening of individuals.



*Figure 4–22. aPat Handheld Passive Millimeter-Wave Imager, Sago Systems*

## 4.2 Blast Mitigation Technologies

Blast mitigation techniques are used to protect personnel and structures from the effects of an explosion that produce penetrating fragments. Protection is achieved by combining excessive amounts of material and/or material combinations to construct sophisticated systems that are engineered to mitigate projectiles and explosives. These materials are classified as blast resistant materials (BRMs) and include materials such as concrete, metals, and polymer matrix composites (PMCs). Concrete is the most widely used BRM, due mostly to its availability and its relatively inexpensive cost. Metals are used as BRM because of their inherent strength, toughness, and energy absorption capability. PMCs are widely used for personnel protection to deflect small arm projectiles and as backplates (usually with ceramics) to protect against larger projectiles and blast fragments. The two most common PMCs are Kevlar and Spectra. Kevlar is a man-made fiber that was first introduced by DuPont, and Spectra is a polyethylene fiber developed by Allied Signal. Both of these materials have exceptional impact resistance and small caliber ballistic resistance capabilities.

Blast mitigation systems are classified as either flexible or rigid. A flexible containment system is usually comprised of bendable composite BRMs and can be filled with a fluid to provide resistance to blast overpressure and to neutralize outward blast effects. An example of a flexible blast mitigation item is a bomb suppression blanket. A blanket is particularly useful for covering suspected IEDs contained in small packages (up to briefcase size) as well as for covering pipe bombs. The Bomb Suppression Blanket, from XTEK, Ltd., is shown in figure 4–23.



*Figure 4–23. Bomb Suppression Blanket, XTEK, Ltd.*

A rigid containment structure is made from nonbendable BRMs and can be ventilated or completely sealed. A ventilated containment structure allows trapped gases inside the unit to escape to the atmosphere in the event of an explosion. A sealed containment structure ensures that the explosive material is completely contained, preventing contact with anything from the outside environment. Figure 4–24 is an example of a rigid containment system, the Portable Blast Container M3, from Security Pro USA.



*Figure 4–24. Portable Blast Container M3, Security Pro USA*

Trash receptacles may be targets for bomb concealment, especially in high traffic areas that otherwise have few hiding places. Examples could be near public building entrances, in parks, or in transportation areas such as subways. Blast mitigating trash receptacles are available for installation in these areas. The receptacles do not fully contain the blast but direct it upward to mitigate the blast effects. Figure 4-25 shows the BlastGard MBR 300 mitigated trash receptacle.



BlastGard® MBR 300

*Figure 4-25. BlastGard MBR 300, BlastGard International, Inc.*



## 5. MARKET SURVEY AND EQUIPMENT EVALUATION

An extensive market survey was conducted to identify commercially available explosives detection equipment (EDE). The market survey consisted of a solicitation of manufacturers, the review of previously conducted market surveys, literature searches, and consultation with subject matter experts (SMEs). Section 5.1 provides a summary of the assessment of previous market surveys, identification of new and updated equipment, and a summary of information obtained through interfacing with the vendors. In order to provide detailed information on each EDE, data fields, to correspond to the vendor questionnaire, were identified. These data fields were developed by SMEs and approved for distribution by the government. Appendix B provides definitions for the trace and bulk explosives detection equipment data fields; appendix D provides definitions for visual inspection equipment, and appendix E provides definitions for blast mitigation equipment. Section 5.2 provides an overview of the equipment evaluation and selection factors. Section 5.3 discusses the market survey and evaluation results for trace and bulk explosives detectors. Section 5.4 discusses the market survey and evaluation results for the visual detectors. Section 5.5 discusses the market survey and evaluation results for the blast mitigation equipment.

### 5.1 Market Surveys

This section provides a synopsis of the assessment of previous market surveys, identification of new and updated equipment, and a summary of information obtained through interfacing with the vendors.

#### 5.1.1 Past Market Surveys

Three previously conducted market assessments of commercial-off-the-shelf (COTS) explosives detection technologies and equipment were reviewed during the development of this guide. These market assessments are as follows:

- *Guide for the Selection of Commercial Explosives Detection Systems for Law Enforcement Applications* (NIJ Guide 100–99).
- *Explosives Detection Equipment (EDE) Market Survey Report*, January 2006.
- *Survey of Commercially Available Explosives Detection Technologies and Equipment 2004* (NIJ).

The *Guide for the Selection of Commercial Explosives Detection Systems for Law Enforcement Applications* was published in September 1999 and provides first responders with information that should support them in the selection and utilization of explosives detection equipment.

The *Explosives Detection Equipment (EDE) Market Survey Report*, published in January 2006, enables responders to make informed decisions regarding the acquisition and utilization of EDE. It was prepared for the System Assessment and Validation for Emergency Responders (SAVER)

Program, which is focused on evaluating processes and procedures for components as well as establishing system-level interoperability.<sup>7</sup>

The *Survey of Commercially Available Explosives Detection Technologies and Equipment 2004* provides an overview of currently available explosives detection methods and technologies and is intended to inform law enforcement agencies about relevant aspects of explosives detection for making procurement decisions. A complete list of these surveys is provided in appendix A.

### **5.1.2 Identification of Explosives Detection Equipment**

A variety of techniques were utilized to identify commercially available EDEs. These techniques included the distribution of Federal Business Opportunities (FedBizOpps) and NBC Industry Group Announcements, literature searches, database searches, Internet searches, and technical contacts.

### **5.1.3 Vendor Contact**

Vendors were contacted by the Responder Knowledge Base (RKB) in August 2006. The vendors were provided the government-approved online questionnaire. Following completion of the questionnaire by the vendors, RKB forwarded the vendor information to Battelle for analysis.

The detailed description of each piece of equipment, as provided by the manufacturer, is included in appendix D (trace and bulk explosives detectors), appendix F (detectors for visual inspection), and appendix H (blast mitigation equipment) and should be reviewed before making a final acquisition decision. All of the information is also available on line at the RKB website, <http://www.rkb.mipt.org>. This site has features that permit side-by-side comparisons of equipment, which may aid in the selection.

## **5.2 Equipment Evaluation and Selection Factors**

The equipment items in the guide have been evaluated based on data provided by the vendors in response to the online questionnaire.

Twenty-five selection factors are recommended for consideration by the emergency first responder community when considering purchasing explosives detection and blast mitigation equipment. These factors were compiled by a panel of experienced scientists and engineers with multiple years of experience in explosives detection and analysis, domestic preparedness, and identification of emergency first responder needs. This information is shared with the emergency first responder community in order to obtain their thoughts and comments. The selection factors were developed so that the equipment could be compared and contrasted in order to assist with the selection and purchase of the most appropriate product. ***It is important to note that the evaluation conducted using the selection factors was based upon vendor-supplied data, and no independent evaluation of equipment performance was conducted in the development of this guide.*** The remainder of this section defines each of the selection factors. Details on the manner

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<sup>7</sup> <http://saver.tamu.edu>



in which the selection factor was used to assess the EDE are included within the selection factor definition.

Due to distinct design and performance differences between the four types of explosives detection equipment identified in this guide, i.e., trace detection, bulk detection, visual inspection, and blast mitigation, it was important that the selection factors were appropriate for each category. Seven of the selection factors are common to all four types of EDE. Seventeen selection factors are common to both trace explosives detectors and bulk explosives detectors; therefore, trace/bulk explosives detectors are evaluated in the same section. Table 5–1 displays the recommended selection factors and shows which ones apply for each type of equipment.

**Table 5–1. Selection factors for explosives detection and blast mitigation equipment**

Selection Factor	Equipment Type		
	Trace/Bulk Detection	Visual Inspection	Blast Mitigation
Unit Cost	√	√	√
Weight (Portability)	√	√	√
Explosives Detected	√*		
Sensitivity	√		
Selectivity/Resistance to Interferants	√		
Start-up Time	√		
Response Time	√		
Alarm Capability	√		
Recording Capability	√	√	
Penetrability	√**		
Mirror Type		√	
Field of View		√	
Illumination Capability		√	
Explosives Amount Contained/Mitigated			√
Ballistic Performance			√
Battery Needs	√	√	
Operating Environment	√	√	√
Durability		√	√
Maintenance Required	√	√	√
Shelf Life	√	√	√
Operator Skills and Training	√	√	√
Length of Time Fielded	√	√	√
Set-up Time		√	√
Service Support	√		
Consumables	√		

\* Trace only

\*\*Bulk only

### 5.2.1 Equipment Evaluation

The market survey conducted for explosive detectors identified 46 vendors of 127 different explosives detectors suitable for first responder use. Detailed data for the 127 explosives detectors are provided in appendix C of this guide. The remainder of this section documents the results of evaluating each explosives detector with the appropriate selection factors for the detector category, i.e., trace, bulk, visual, or blast mitigation.

In order to display the evaluation results in a meaningful format, the explosives detectors were further grouped according to the technology with which the detector identified the explosive. An overview of detector technologies is discussed in section 4.0.

## 5.2.2 Evaluation Results

The evaluation results for the explosive detectors are presented in tabular format for the 128 explosives detectors deemed suitable for first responder use. Thirty-two of these items are for trace explosives detection, 27 are for bulk explosives detection, 30 are for visual detection, and 39 are for blast mitigation. The evaluation results for each detector category are discussed in the remainder of this section.

## 5.3 Trace/Bulk Detection Equipment

Trace detection equipment is intended to detect vapors from explosives, aerosols of explosive particles, or surface traces such as a fingerprint residue. Bulk detection relies on detecting the size and shape of an unknown object and using this information to determine if it is a bomb. Some bulk detectors give information about the general composition (e.g., density, conductivity) but do not generally identify specific compounds. The advantage of bulk detectors is that many can detect explosive materials concealed within packages or shipping containers.

### 5.3.1 Market Survey

An extensive market survey was conducted to identify commercially available trace and bulk explosives detectors. The market survey resulted in the identification of 32 trace detectors and 27 bulk explosives detectors. The trace and bulk detection equipment data sheets, along with an index identifying each of the items, are included in appendix C. Table 5–2 details the number of trace explosives detectors identified for each of 16 vendors that were included in the market survey.

*Table 5–2. Trace explosive detector vendors*

<b>Vendor</b>	<b>Electronic/Chemical</b>	<b>Biosensor</b>	<b>Total</b>
Biosensor		1	1
ChemSee Incorporated	3		3
ChemSpectra, Inc.	1		1
DetectaChem, LLC	1		1
ElectroMax International, Inc.	1		1
Field Forensics, Inc.	1		1
GE Homeland Protection	3		3
Hitachi	1		1
ICx-Nomadics	1		1
Ketech Defence	2		2
Law Enforcement Associates	1		1
Mistral Security, Inc	3		3
Scintrex Trace Corp.	3		3
Sibel, Ltd.	2		2
Smiths Detection	5		5
Thermo Electron Corporation	2		2
<b>Total</b>	<b>30</b>	<b>1</b>	<b>31</b>

Table 5–3 details the number of bulk explosives detectors identified for each of the 18 vendors that were included in the market survey.

**Table 5–3. Bulk explosive detector vendors**

<b>Vendor</b>	<b>X-ray/Gamma ray</b>	<b>Material-Based Properties</b>	<b>Spectroscopic</b>	<b>Total</b>
American Science and Engineering, Inc.	2			2
Analytical Spectral Devices, Inc.			2	2
Campbell Security Equipment Company	1			1
EMIT Technologies, LLC		1		1
Envision Product Design, LLC	1			1
GE Homeland Protection			1	1
Golden Engineering, Inc.	3			3
HiEnergy Technologies	2			2
Hitachi	1			1
ICM	1			1
Law Enforcement Associates		1		1
Logos Imaging LLC	1			1
Rapiscan Systems	3			3
Sago Systems, Inc.			2	2
SAIC	1			1
Scanna	3			3
Vidisco	1			1
<b>Total</b>	<b>20</b>	<b>2</b>	<b>5</b>	<b>27</b>

### 5.3.2 Trace/Bulk Explosives Detectors Selection Factors

Eighteen selection factors are recommended for consideration by the emergency first responder community when selecting and purchasing trace and/or explosives detection equipment. Seventeen of the 18 selection factors are used for both trace and bulk explosives, while penetrability is used only for bulk explosives detectors. The light blue column in table 5–1 shows the selection factors for trace/bulk explosives detection equipment. These factors were developed to allow for a quick comparison of commercially available trace/bulk explosives detectors.

#### 5.3.2.1 Unit Cost (MSRP)

The unit cost (market price) details the cost associated with functioning explosives detection equipment, to include any required support equipment and consumables. The price indicated is the Manufacturer Suggested Retail Price (MSRP) associated with the explosives detection equipment at the time this guide was published. This price is not a special government price. Individual vendors should be consulted to determine if special government price rates are available.

### 5.3.2.2 Weight

The weight is the total weight of a complete unit, including power supply if required. Weight is the best indicator of how portable the equipment is and how suitable for deployment by a first responder.

### 5.3.2.3 Explosives Detected

This factor describes the ability of the equipment to detect explosives.

Explosives	
●	Nitrates, chlorates, bromates, and peroxides
◐	Nitrates
◑	Chlorate or bromate or peroxide
⊗	Not specified

### 5.3.2.4 Sensitivity (Trace and Bulk)

This factor indicates the lowest quantity of explosives that can be detected by the instrument. It is also referred to as the detection limit or level of detection (LOD).

Sensitivity (Trace)		
	Solid	Vapor
●	< 1 ng (nanogram)	< 1 $\mu\text{g}/\text{m}^3$ [parts per billion (ppb)]
◐	1 ng to 100 ng	1 $\mu\text{g}/\text{m}^3$ to 10 $\mu\text{g}/\text{m}^3$
◑	0.1 $\mu\text{g}$ (micrograms) to 10 $\mu\text{g}$	10 $\mu\text{g}/\text{m}^3$ to 100 $\mu\text{g}/\text{m}^3$
◒	10 $\mu\text{g}$ to 1 $\mu\text{g}$	0.1 $\text{mg}/\text{m}^3$ to 10 $\text{mg}/\text{m}^3$ [parts per million (ppm)]
○	> 1 $\mu\text{g}$	> 10 $\text{mg}/\text{m}^3$
⊗	Not Specified	Not specified

Sensitivity (Bulk)		
	Bulk dimension	Bulk Weight
●	< 0.1 in (inch) dimension	< 0.001 oz
◐	0.1 in to 1 in dimension	0.001 oz to 1 oz
◑	> 1 in to 3 in dimension	> 1 oz to 25 oz
◒	> 3 in dimension	> 25 oz
⊗	Not Specified	Not specified

### 5.3.2.5 Selectivity (Resistance to Interferents)

This factor describes the ability of a trace detection device to resist the effects of interferents, which are compounds that cause the detector to either false alarm or fail to alarm.

<b>Selectivity (Resistance to Interferents)</b>	
●	Identifies many individual explosive compounds, few interferents
◐	Detects nitrates but does not classify compounds, some interferents
◑	Many nonexplosive compounds detected
⊗	Not specified

### 5.3.2.6 Start-Up Time

This factor indicates the time required for setting up and/or initiating sampling with an instrument.

<b>Start-Up Time</b>	
●	≤ 30 second (s)
◐	> 31 s to 60 s
◑	> 61 s to 5 minute (min)
◒	> 6 min to 30 min
○	> 31 min
⊗	Not specified

### 5.3.2.7 Response Time

This factor indicates the time it takes for the detection equipment to collect sample, determine if an explosive is present, and provide feedback.

<b>Response Time</b>	
●	≤ 5 s
◐	> 6 s to 10 s
◑	11 s to 30 s
◒	31 s to 60 s
○	61 s (> 1 min)
⊗	Not specified

### 5.3.2.8 Alarm Capability

This factor indicates if an instrument has an audible, visible, or other type of alarm.

<b>Alarm Capability</b>	
●	Audible and visible or alternate alarm
◐	Audible alarm
◑	Visible alarm
◒	Alternate alarm type
○	No alarm capability
⊗	Not specified

### 5.3.2.9 Recording Capability

This factor refers to the ability of the equipment to record data for later review. Film-based x-ray equipment has the negative for a data record; electronic equipment should provide internal nonvolatile storage.

<b>Recording Capability</b>	
●	> 1000 measurements or 4 h operation
◐	> 100 measurements or 0.5 h operation
◑	> 10 measurements or 5 min operation
○	None
⊗	Not specified

### 5.4.2.10 Penetrability (Bulk)

This factor describes the ability of a bulk detector to sense materials within a container or package.

<b>Penetrability (Bulk)</b>	
●	> 1 in steel
◐	0.25 in to 1 in steel
◑	0.1 in to 0.26 in steel
◒	Penetrates nonelectrically conductive materials
○	Penetrates transparent materials
⊗	Not specified

### 5.3.2.11 Battery Needs

This factor describes the power needed to operate the detector. If battery power is used, it includes the battery type and whether the battery is capable of powering the detector throughout an incident.

<b>Battery Needs</b>	
●	Operates on rechargeable battery pack for 4 hours (h)
◐	Operates on standard, inexpensive, and readily available batteries for 4 h continuous use
◑	Operates on rechargeable battery pack for 1 h
◒	Operates on standard, inexpensive, and readily available batteries for 1 h continuous use
○	Operates on special order and expensive batteries or volts (V) alternating current (ac)
⊗	Not specified

### 5.3.2.12 Operational Environment

This factor describes the type of environment required by the equipment to operate optimally. For example, some equipment is designed to operate in the field under common outdoor weather conditions and climates (i.e., extreme temperatures, humidity, rain, snow, fog, etc.). However, other equipment may require more climate-controlled conditions such as a laboratory environment.

<b>Operational Environment</b>	
●	Operates in all expected environments and extreme environments
◐	Operates in most environments
○	Operates in climate-controlled environments
⊗	Not specified

### 5.3.2.13 Maintenance Required

This factor refers to the frequency of maintenance that is required to keep the equipment at its peak operational readiness.

<b>Maintenance Required</b>	
●	Maintenance not required
◐	Field repairs if needed, to include type or level of maintenance
◑	Periodic preventative maintenance
◒	Periodic factory maintenance required
⊗	Not specified

### 5.3.2.14 Shelf Life

This factor refers to the length of time that the equipment can be stored without being serviced or replaced prior to being used.

Shelf Life	
●	> 5 yr
◐	≥ 1 yr
◑	≥ 6 mo
◒	≥ 1 mo
○	< 1 mo
⊗	Not specified

### 5.3.2.15 Operator Skills and Training

This factor describes the operator skill level and training for the operation of the equipment. Training refers to the amount of time to instruct the operator to become proficient in the operation of the instrument.

Operator Skills and Training		
	Skills	Training
●	Awareness	< 1 h on-site
◐		1 h to 4 h on-site
◑	Technician	> 4 h on-site
◒		Off-site training
⊗	Not Specified	Not specified

### 5.3.2.16 Length of Time Fielded

This factor describes the length of time that the equipment has been in the field. It indicates the state of the maturity of the product.

Length of Time Fielded	
●	≥ 5 yr
◐	4 yr to 5 yr
◑	2 yr to 3 yr
◒	1 yr
○	< 1 yr
⊗	Not specified



### 5.3.2.17 Service Support

Service support reflects how the manufacturer supports the product in the field. The most important feature of service support is rapid support since the equipment may not have a fielded backup. This factor is clearly more important for more complex equipment, and some simple tests or equipment may have limited support without seriously impacting the value of the product.

Service Support	
●	Loaner equipment, rapid repair, phone support, field technicians
◐	Rapid repair, phone support, field technicians
◑	Phone support
◒	Factory service
○	None
⊗	Not specified

### 5.3.2.18 Consumables

Consumables describes materials that must be supplied to maintain operation. Some tests are themselves inherently consumable, and some tests require routine parts replacement, i.e., filters,. This factor is directed toward materials that are required to use with an instrument-based test.

Consumables	
●	None
◐	As scheduled
◑	Every test
⊗	Not specified

### 5.3.3 Evaluation of Trace Explosives Detectors

The evaluation results for the trace explosives detectors are presented in tabular format for the 32 trace explosives detectors identified during the development of this guide. Table 5–4 shows the results of the trace explosives detectors. They are organized according to the technology tree presented in figure 4–1. Within technology groupings, equipment is listed alphabetically by manufacturer. NA designates that the selection factor is not applicable for the detector.

**Table 5-4. Evaluation of trace explosive detectors**

ID Number	Brand and Model	MSRP	Weight, lb (kg)	Capabilities and Features													
				Explosives Detected	Sensitivity	Selectivity	Start-up Time	Response Time	Alarm Capability	Recording Capability	Battery Needs	Operational Environment	Maintenance Required	Shelf Life	Operator Skills and Training	Length of Time Fielded	Service Support
<b>ELECTRONIC/CHEMICAL DETECTORS</b>																	
1	<b>ChemSee Incorporated</b> Gel-Ox (GO-06)		0.06 (2 oz)	●	●	●	●	●	●	●	NA	NA	●	●	●	●	●
2	<b>ChemSee Incorporated</b> On-The-Spot (DET-006)		0.11 (4 oz)	●	●	●	●	●	●	●	NA	NA	●	●	●	●	●
3	<b>ChemSee Incorporated</b> Verifier Tabs (VF-04)		0.09 (0.3 oz)	●	●	●	●	●	●	●	NA	NA	●	●	●	●	●
4	<b>ChemSpectra</b> EX-DETECT (XD-2)	\$4.5K	0.7 (1.54)	●	●	●	●	●	●	●	NA	●	●	●	●	●	●
5	<b>DetectaChem</b> Seeker Handheld Explosives & Narcotics Detector (CDU220)	<\$10K	0.45 (1)	●	⊗	●	●	●	⊗	●	●	●	●	⊗	●	○	●
6	<b>DetectaChem</b> Seeker Handheld Explosives & Narcotics Detector (SK1000)			⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
7	<b>ElectroMax International</b> Explosive Detector (GVD-4)	\$11K	0.82 (1.8)	●	●	⊗	●	⊗	●	⊗	●	●	⊗	●	●	⊗	⊗
8	<b>Field Forensics</b> E.L.I.T.E Explosives Detection (Model EL100)	\$13	0.23 (0.5)	●	●	●	●	●	●	●	NA	●	●	●	●	●	●
9	<b>GE Homeland Protection</b> Itemiser Explosives Trace Detector (P0007018)	\$45.2 K	12 (26.5)	⊗	●	⊗	●	●	⊗	●	●	●	●	●	●	⊗	●
10	<b>GE Homeland Protection</b> VaporTracer Explosives Trace Detector (P0007019)	\$24.5 K	4.37 (9.63)	⊗	●	⊗	●	●	⊗	●	●	●	●	●	●	⊗	●
11	<b>GE Homeland Protection</b> EntryScan Explosives & Narcotics Trace Detector (P0007026-001)	\$143K	745 (340)	⊗	⊗	⊗	●	●	●	●	○	●	●	●	●	●	●
12	<b>Hitachi</b> Explosives Trace Detection System (DS-120E)			⊗	⊗	⊗	○	●	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
13	<b>Icx-Nomadics</b> Portable Explosive Detector (Fido XT)	\$20.8 K	1.4 (3)	●	●	⊗	●	●	●	●	●	●	●	●	●	●	●
14	<b>Ketech Defence</b> KD40	\$140	0.11 (0.25)	●	⊗	●	●	●	●	●	NA	NA	●	●	●	●	●
15	<b>Ketech Defence</b> KD60	\$140	0.11 (0.25)	●	⊗	●	●	●	●	●	NA	NA	●	●	●	●	●
16	<b>Law Enforcement Associates</b> Explosive Detection Kit (EDK 123)	\$100	0.45 (1)	●	⊗	⊗	●	●	●	●	NA	NA	●	●	●	●	⊗

ID Number	Brand and Model	MSRP	Weight, lb (kg)	Capabilities and Features															
				Explosives Detected	Sensitivity	Selectivity	Start-up Time	Response Time	Alarm Capability	Recording Capability	Battery Needs	Operational Environment	Maintenance Required	Shelf Life	Operator Skills and Training	Length of Time Fielded	Service Support	Consumables	
17	<b>Mistral Security</b> Expray: Explosive Detection & Identification (MSI 1553)	\$260	0.9 (2)	●	●	⊗	●	●	○	NA	NA	●	●	●	●	●	●		
18	<b>Mistral Security</b> Expray Plus: Explosive Detection & Identification (MSI 1555)	\$440	0.9 (2)	●	●	⊗	●	●	○	NA	NA	●	●	●	●	●	●		
19	<b>Mistral Security</b> DropEx Plus: Explosive Detection & Identification (MSI 1585)	\$209	0.7 (1.5)	●	●	⊗	●	●	○	NA	NA	●	●	⊗	●	●	●		
20	<b>Scintrex Trace</b> Handheld Explosive Trace Detectors (EVD-2500)	\$13.5 K	3 (6.6)	●	●	⊗	●	●	●	●	●	●	●	○	⊗	●	●		
21	<b>Scintrex Trace</b> Handheld Explosive Trace Detectors (EVD-3000)	\$19.5 K	3 (6.6)	●	●	●	●	●	○	⊗	●	●	●	○	⊗	●	●		
22	<b>Scintrex Trace</b> Portable Advanced Explosives Detector (E 3500)	\$21.5 K	3 (6.6)	●	●	●	●	○	●	●	●	●	●	○	●	●	●		
23	<b>Sibel</b> Trace Explosive Detector (MO-2D)	\$22K	5.5 (12)	●	●	⊗	○	●	●	●	NA	●	●	⊗	⊗	○	●		
24	<b>Sibel</b> Hand Held Explosive Detector (MO-2M)	\$25K	1.35 (3)	●	●	⊗	●	●	●	●	●	●	●	●	⊗	⊗	●		
25	<b>Smiths Detection</b> Sentinel II	\$125K	805 (1775)	●	●	⊗	⊗	●	○	⊗	NA	●	●	⊗	●	●	⊗		
26	<b>Smiths Detection</b> Ionscan (400B)	\$37K	22 (47)	●	●	⊗	○	●	○	⊗	NA	●	●	⊗	●	●	⊗		
27	<b>Smiths Detection</b> Ionscan Document Scanner Trace Detection System	\$43K	24 (53)	●	●	⊗	○	●	●	⊗	NA	●	●	⊗	●	●	⊗		
28	<b>Smiths Detection</b> Sabre 2000		5.8 (2.6)	●	⊗	⊗	●	○	⊗	⊗	●	⊗	⊗	⊗	●	●	⊗		
29	<b>Smiths Detection</b> Sabre 4000	\$25K	3.2 (7)	●	●	⊗	○	○	●	⊗	●	●	●	⊗	●	●	⊗		
30	<b>Thermo</b> Explosive Trace Detection System (EGIS Defender)		27 (60)	●	●	●	○	○	●	●	NA	●	●	●	●	⊗	●		
31	<b>Thermo</b> Explosive Detection System (EGIS Series)			●	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗		
<b>BIOSENSORS</b>																			
32	<b>Biosensor</b> Biosens	\$56K	17 (37.5)	●	⊗	●	○	○	●	○	NA	●	●	○	○	●	●		

Thirty-two explosives detectors used to identify trace materials were evaluated. Thirty-one of the 32 trace explosives detectors use electronic chemical sensors to detect explosives, and one trace explosives detector uses biosensors to detect explosives.

### 5.3.4 Evaluation of Bulk Explosives Detectors

The evaluation results for the bulk explosives detectors are presented in tabular format for the 30 bulk explosives detectors identified during the development of this guide. Table 5–5 shows the results of the bulk explosives detector evaluation. The evaluation table is organized according to the technology tree presented in figure 4–1. Within technology groupings, equipment is listed alphabetically by manufacturer.

**Table 5–5. Evaluation of bulk explosive detectors**

ID Number	Brand and Model	MSRP	Weight, lb (kg)	Capabilities and Features														
				Sensitivity	Selectivity	Start-up Time	Response Time	Alarm Capability	Recording Capability	Penetrability	Battery Needs	Operational Environment	Maintenance Required	Shelf Life	Training	Length of Time Fielded	Service Support	Consumables
<b>X-RAY/GAMMA RAY</b>																		
33	<b>American Science and Engineering</b> Gemini (6040)		1750 (795)	●	●	⊗	⊗	⊗	●	●	○	●	●	●	●	⊗	●	●
34	<b>American Science and Engineering</b> SmartCheck Personnel Screening System		1500 (680)	●	⊗	⊗	⊗	⊗	●	●	○	●	●	●	●	⊗	●	●
35	<b>Campbell Security</b> Contraband Detector Buster (K910B)	< \$10K	1.1 (2.5)	⊗	⊗	⊗	●	⊗	NA	●	●	NA	●	●	⊗	●	⊗	NA
36	<b>Envision Product Design</b> OpenVision LT (OV III LT)	\$69.9K	27 (12)	●	⊗	●	●	NA	●	●	●	●	●	●	●	●	●	●
37	<b>Golden Engineering</b> X-ray Unit (XRS-3)	\$5.6K	12 (5.4)	NA	NA	●	NA	NA	NA	●	●	●	●	●	●	●	○	●
38	<b>Golden Engineering</b> X-ray Source (XR-150)	\$4.5K	4.3 (2)	NA	NA	⊗	NA	NA	NA	●	●	●	●	●	●	●	○	●
39	<b>Golden Engineering</b> X-ray Unit (XR-200)	\$4.3K	12 (5.4)	NA	NA	●	NA	NA	NA	●	●	●	●	●	●	⊗	○	●
40	<b>HiEnergy Technologies</b> Portable Explosives Detector/identifier (SIEGMA TM 3M3)	\$325K		○	○	○	○	○	●	●	●	●	⊗	●	○	○	●	●
41	<b>HiEnergy Technologies</b> Robot-Borne Detector/Identifier (STARRAY TM)	\$450K	358 (790)	○	●	○	○	○	NA	⊗	●	●	⊗	NA	○	○	●	NA
42	<b>Hitachi</b> DS-400L			⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
43	<b>ICM</b> Flatscan 27	\$55K	31.5 (14.3)	●	⊗	●	●	NA	●	●	●	⊗	⊗	⊗	○	⊗	●	●
44	<b>Logos Imaging</b> Logos Digital Imaging System		35 (16)	●	○	⊗	○	NA	⊗	●	○	⊗	⊗	⊗	⊗	⊗	⊗	⊗
45	<b>Rapiscan Systems</b> RAP 515		1650 (750)	●	○	⊗	⊗	⊗	⊗	●	⊗	⊗	⊗	⊗	○	⊗	⊗	⊗
46	<b>Rapiscan Systems</b> RAP 519		690 (315)	●	○	⊗	⊗	⊗	⊗	●	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗

ID Number	Brand and Model	MSRP	Weight, lb (kg)	Capabilities and Features														
				Sensitivity	Selectivity	Start-up Time	Response Time	Alarm Capability	Recording Capability	Penetrability	Battery Needs	Operational Environment	Maintenance Required	Shelf Life	Training	Length of Time Fielded	Service Support	Consumables
47	<b>Rapiscan</b> SECURE 1000		1097 (500)	●	◐	◑	◑	NA	⊗	●	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
48	<b>SAIC</b> Portable Digital X-ray Inspection System (RTR-4N)	\$23.6K	26 (12)	●	⊗	◑	●	NA	●	●	●	◑	◑	⊗	◑	●	⊗	●
49	<b>Scanna</b> Compact Flat Panel Portable X-ray System (Scanwedge 2520)			⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
50	<b>Scanna</b> Flat Panel Portable X-ray System (Scanwedge 3325)			⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
51	<b>Scanna</b> Scantrak Portable X-ray System (STRK01)			⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
52	<b>Vidisco</b> foX Trekker Back Pack Digital X-ray System (FXR2-T-10)	\$25.5K	37.3 (17)	●	⊗	◑	●	NA	●	●	●	●	●	⊗	◑	●	◑	●
<b>MATERIAL-BASED PROPERTIES</b>																		
53	<b>EMIT Technologies</b> Anomaly Detector (M600)	\$25K		⊗	⊗	⊗	●	⊗	⊗	◑	●	⊗	◑	⊗	◑	⊗	⊗	●
54	<b>Law Enforcement Associates</b> Letterbomb Visualizer Spray (LBV1000)	\$39.95	0.5 (0.2)	◑	◑	●	◑	NA	NA	◑	NA	◑	●	◑	●	◑	◑	◑
<b>SPECTROSCOPIC/IMAGING</b>																		
55	<b>Analytical Spectral Devices</b> LabSpec 2500 NIR Spectrometer	\$34K to \$42K	18 (8)	◑	◑	◑	●	◑	●	○	●	●	◑	●	◑	◑	◑	●
56	<b>Analytical Spectral Devices</b> LabSpec 5000 NIR Spectrometer	\$37K to \$45K	19 (8.5)	◑	◑	◑	●	◑	●	○	●	●	◑	●	◑	◑	◑	●
57	<b>GE Homeland Protection</b> StreetLab Portable Substance Identification System (P0007021)	\$24.5K	7 (3.18)	●	⊗	◑	◑	◑	●	○	◑	●	◑	◑	◑	◑	◑	◑
58	<b>Sago Systems</b> Handheld Passive Millimeter-Wave Imager (aPat)	\$10K	5 (2.3)	◑	◑	◑	●	○	◑	◑	●	●	●	●	●	⊗	●	●
59	<b>Sago Systems</b> Stand-off Passive Millimeter-Wave imager (ST-150)	\$50K	65 (30)	◑	◑	◑	●	○	●	◑	○	●	●	●	◑	⊗	⊗	●

Twenty-seven bulk explosives detectors were evaluated. Twenty of the 27 bulk explosives detectors use x-ray/gamma rays to detect explosives, two use material-based properties to detect explosives, and five use spectroscopic/imaging for detecting bulk explosives.

## 5.4 Visual Detection Equipment

Visual detection equipment relies on detecting the size and shape of an unknown object and using this information to determine if it is a bomb. These systems are designed to allow observation of a normally concealed area (e.g., under a vehicle or inside a fuel tank) but rely on the operator's judgment to identify suspicious items.

### 5.4.1 Market Survey

An extensive market survey was conducted to identify commercially available visual detection equipment. The market survey resulted in the identification of 30 visual detectors. The visual detection equipment data sheets, along with an index identifying each of the items, are included in appendix C. Table 5–6 details the number of visual detection items identified for each of the eight vendors that were included in the market survey.

*Table 5–6. Visual bomb detector vendors*

<b>Vendor</b>	<b>Mirror</b>	<b>Camera System</b>	<b>Light/ Light Pipe</b>	<b>Total</b>
Allen-Vanguard Corporation	5	1	—	<b>6</b>
Campbell Security Equipment Company	—	—	2	<b>2</b>
Lumenyte International Corporation	5	—	6	<b>11</b>
PowerLinx, Inc.	—	1	—	<b>1</b>
SAS R&D Services, Inc.	3	—	1	<b>4</b>
Stratech, Inc.	—	1	—	<b>1</b>
Ullman Devices Corp.	4	—	—	<b>4</b>
Vehicle Inspection Technologies	—	1	—	<b>1</b>
<b>Total</b>	<b>17</b>	<b>4</b>	<b>9</b>	<b>30</b>

### 5.4.2 Visual Detection Equipment Selection Factors

Fourteen selection factors are recommended for consideration by the emergency first responder community when selecting and purchasing visual detection equipment. The orange column in table 5–1 shows the selection factors for visual detection equipment. These factors were developed to allow for a quick comparison of commercially available trace explosives detectors.

#### 5.4.2.1 Unit Cost (MSRP)

The unit cost (market price) details the cost associated with functioning visual inspection equipment, to include any required support equipment. The price indicated is the MSRP price associated with the visual inspection equipment at the time this guide was published. This price is not a special government price. Individual vendors should be consulted to determine if special government price rates are available.

### 5.4.2.2 Weight

The weight is the total weight of a complete unit, including power supply if required. Weight is the best indicator of how portable the equipment is and how suitable for deployment by a first responder.

### 5.4.2.3 Recording Capability

This factor refers to the ability of the equipment to record data for later review. Film-based x-ray equipment has the negative for a data record; electronic equipment should provide internal non-volatile storage.

<b>Recording Capability</b>	
●	> 1000 measurements or 4 h operation
◐	> 100 measurements or 0.5 h operation
◑	> 10 measurements or 5 min operation
○	None
⊗	Not specified

### 5.4.2.4 Mirror Physical Characteristics

There are physical characteristics of mirrors that will influence their use. These are categorized as mirror type, mirror shape, and mirror material.

- Mirror type—Mirrors may be either convex or flat. Convex mirrors provide a wider field of view but make objects look smaller and may distort shapes of objects. Flat mirrors provide an undistorted, full-sized view of an object at the expense of a smaller field of view.
- Mirror shape—Mirrors come in a variety of shapes including round, square, rectangular, and trapezoidal. Depending on the application, mirror shape may prove important to the search process.
- Mirror material—Plastic mirrors may be offered to provide lighter weight but may have a higher risk of being scratched or broken.

### 5.4.2.5 Field of View

This factor describes the search coverage area of a visual inspection device.

<b>Field of View</b>	
●	> 30°
◐	15° to 30°
◑	5° to 15°
◒	< 5°
⊗	Not specified

### 5.4.2.6 Illumination Capability

This describes whether the observation system has a self-contained light source or requires an external light source.

<b>Illumination Capability</b>	
●	Self-contained light source
◐	Requires external light source
⊗	Not specified

### 5.4.2.7 Battery Needs

This factor describes the power needed to operate the detector. If battery power is used, it includes the battery type and whether the battery is capable of powering the detector throughout an incident.

<b>Battery Needs</b>	
●	Operates on rechargeable battery pack for 4 h
◐	Operates on standard, inexpensive, readily available batteries for 4 h continuous use
◑	Operates on rechargeable battery pack for 1 h
◒	Operates on standard, inexpensive, readily available batteries for 1 h continuous use
○	Operates on special order and expensive batteries or V ac
⊗	Not specified

### 5.4.2.8 Operational Environment

This factor describes the type of environment required by the equipment to operate optimally. For example, some equipment is designed to operate in the field under common outdoor weather conditions and climates (i.e., extreme temperatures, humidity, rain, snow, fog, etc.). However, other equipment may require more climate-controlled conditions such as a laboratory environment.

<b>Operational Environment</b>	
●	Operates in all expected environments and extreme environments
◐	Operates in most environments
○	Operates in specialized environments
⊗	Not specified



### 5.4.2.9 Durability

This factor describes the ruggedness of the equipment, i.e., how well can the equipment withstand rough handling and still operate.

<b>Durability</b>	
●	Able to operate with rough handling
◐	Able to operate after being moved but not after rough handling
○	Must remain stationary after installation
⊗	Not specified

### 5.4.2.10 Maintenance Required

This factor refers to the frequency of maintenance that is required to keep the equipment at its peak operational readiness.

<b>Maintenance Required</b>	
●	Maintenance not required
◐	Field repairs if needed, to include type or level of maintenance
◑	Periodic preventative maintenance
◒	Periodic factory maintenance required
⊗	Not specified

### 5.4.2.11 Shelf Life

This factor refers to the length of time that the equipment can be stored without being serviced or replaced prior to being used.

<b>Shelf Life</b>	
●	> 5 yr
◐	≥ 1 mo
◑	≥ 6 mo
◒	1 mo
○	< 1 mo
⊗	Not specified

### 5.4.2.12 Operator Skills and Training

This factor describes the operator skill level and training for the operation of the equipment. Training refers to the amount of time to instruct the operator to become proficient in the operation of the instrument.

Operator Skills and Training		
	Skills	Training
●	Awareness	< 1 hour on-site
◐		1 h to 4 h on-site
◑	Technician	> 4 h on-site
○		Off-site training
⊗	Not Specified	Not specified

### 5.4.2.13 Length of Time Fielded

This factor describes the length of time that the equipment has been in the field. It indicates the state of the maturity of the product.

Length of Time Fielded	
●	≥ 5 yr
◐	4 yr to 5 yr
◑	2 yr to 3 yr
◒	1 yr
○	< 1 yr
⊗	Not specified

### 5.4.2.14 Set-up Time

This factor describes the length of time that the equipment requires for assembly before start-up.

Set-up Time	
●	< 30 s
◐	31 s to ≤ 60 s
◑	61 s (1 min) to ≤ 5 min
◒	6 min to ≤ 30 min
○	31 min
⊗	Not specified

## 5.4.3 Evaluation of Visual Detection Equipment

The evaluation results for the visual detection equipment are presented in tabular format for the 30 visual detectors identified during the development of this guide. Table 5–7 shows the results of the visual detection equipment evaluation. The evaluation table is organized according to the technology tree presented in figure 4–1. Within technology groupings, equipment is listed alphabetically by manufacturer.

**Table 5–7. Evaluation of visual detection equipment**

ID Number	Brand and Model	MSRP	Weight, kg (lb)	Capabilities and Features											
				Recording Capability	Mirror Physical Characteristics	Field of View	Illumination Capability	Battery Needs	Operational Environment	Durability	Maintenance Required	Shelf Life	Operator Skills and Training	Length of Time Fielded	Set-up Time
<b>MIRRORS</b>															
1	<b>Allen-Vanguard</b> Pocket Search Mirrors CMT & TACM2		0.3 (0.6)	NA	CX	⊗	●	☉	⊗	●	⊗	⊗	⊗	⊗	
2	<b>Allen-Vanguard</b> Under Vehicle Search Mirror VM-X1		2.4 (5.3)	NA	CX, S	⊗	●	●	⊗	●	⊗	⊗	⊗	⊗	
3	<b>Allen-Vanguard</b> Panther Search Mirrors SM2 & SM3		1.4 (3)	NA	CX, R	⊗	●	●	⊗	●	⊗	⊗	⊗	⊗	
4	<b>Allen-Vanguard</b> Telescopic Mirror Kit TSK1/00			NA	⊗	⊗	●	☉	⊗	⊗	⊗	⊗	⊗	⊗	
5	<b>Allen-Vanguard</b> Under Vehicle Search Mirror VMBD/2			NA	CX, RC, P	⊗	●	☉	⊗	●	⊗	⊗	⊗	⊗	
6	<b>Lumenyte</b> ExPack Expeditionary Pack Inspection Toolkit EP-1000	\$2.5K	18 (40)	NA	FL,T	⊗	⊗	☉	⊗	●	⊗	⊗	●	☉	
7	<b>Lumenyte</b> SLAM Security Lighted Assessment Mirror with Surefire Flashlight SLAM-1000	\$575	2.2 (4.8)	NA	FL,T	⊗	●	☉	⊗	●	☉	⊗	●	☉	
8	<b>Lumenyte</b> SLAM-V Security Lighted Assessment Mirror with Vortex Flashlight SLAM-V-1000	\$380	2 (4.3)	NA	FL,T	⊗	●	☉	⊗	●	☉	⊗	●	☉	
9	<b>Lumenyte</b> TSM Telescoping Search Mirror TSM-1000	\$165	0.9 (2)	NA	FL,T	⊗	⊗	⊗	⊗	●	☉	⊗	●	☉	
10	<b>Lumenyte</b> SAM Security Assessment Mirror SAM-1000	\$299	1.63 (3.6)	NA	FL,T	⊗	⊗	⊗	⊗	●	☉	⊗	●	☉	
11	<b>SAS R&amp;D Services</b> Search and Inspection Mirrors	< \$100	2.5 (5.5)	NA	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	
12	<b>SAS R&amp;D Services</b> Undervehicle Inspection Mirror Hannibal Series	< \$500	5.4 (12)	NA	P	⊗	●	☉	●	●	●	●	●	●	
13	<b>SAS R&amp;D Services</b> Undervehicle Search Mirror Centurion	< \$500	2.5 (5.5)	NA	⊗	⊗	●	☉	●	●	●	●	●	●	
14	<b>Ullman Devices</b> High Tech Telescoping Inspection Mirror	\$9.79 to \$11.32		NA	⊗	●	⊗	NA	⊗	⊗	⊗	⊗	⊗	⊗	
15	<b>Ullman Devices</b> Inspection Mirror S-2 Series	\$9.20 to \$12.32		NA	⊗	⊗	⊗	NA	⊗	⊗	⊗	⊗	⊗	⊗	
16	<b>Ullman Devices</b> Inspection Mirror K-2 Series	\$7.03 to \$15.85		NA	⊗	⊗	⊗	NA	⊗	⊗	⊗	⊗	⊗	⊗	
17	<b>Ullman Devices</b> Inspection Mirror C-2 Series	\$7.02 to \$14.24		NA	⊗	⊗	⊗	NA	⊗	⊗	⊗	⊗	⊗	⊗	

ID Number	Brand and Model	MSRP	Weight, kg (lb)	Capabilities and Features											
				Recording Capability	Mirror Physical Characteristics	Field of View	Illumination Capability	Battery Needs	Operational Environment	Durability	Maintenance Required	Shelf Life	Operator Skills and Training	Length of Time Fielded	Set-up Time
<b>CAMERA/VIDEO SYSTEMS</b>															
18	<b>Allen-Vanguard</b> Eagle Video Search Kit SM1			⊗	NA	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
19	<b>PowerLinx</b> Camera System for Undercarriage Vehicle Inspection VIC-103	\$2K	5.44 (12)	⊗	NA	●	●	●	○	●	◐	⊗	●	●	●
20	<b>Stratech</b> ivacs			⊗	NA	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
21	<b>Vehicle Inspection</b> Und-Aware AG-500 Series		225 (496)	⊗	NA	●	●	NA	●	●	●	●	●	●	○
<b>FIBER OPTICS, LIGHT PIPES, LIGHTS</b>															
22	<b>Campbell Security</b> Kit for Contraband Detection CT 30	< \$20K	22 (49)	NA	NA	NA	NA	◐	●	●	●	◐	●	◐	●
23	<b>Campbell Security</b> Fiberscopes Search and Surveillance FO Series	\$8K to \$20K	11 (24)	NA	NA	NA	●	●	●	●	◐	●	◐	⊗	●
24	<b>Lumenyte</b> Solid State Security Illumination Mat System SS-SIMS-1000	\$1.75K	36 (80)	NA	NA	●	●	○	●	●	⊗	●	●	○	○
25	<b>Lumenyte</b> Security Illuminated Mat System SIMS-1000	\$6K		NA	NA	●	●	⊗	⊗	●	⊗	●	●	◐	◐
26	<b>Lumenyte</b> PypeLyte Inspection Wand with Vortex Flashlight IWV-2000-C		0.3 (0.7)	NA	NA	●	●	◐	⊗	●	●	⊗	●	◐	◐
27	<b>Lumenyte</b> PypeLyte Inspection Wand IW with Surefire Flashlight IW-1000-C	\$350	0.5 (1)	NA	NA	●	●	◐	⊗	●	●	⊗	●	◐	◐
28	<b>Lumenyte</b> PypeLyte Inspection Light with Surefire Flashlight IW-2000-C	\$750	0.8 (1.7)	NA	NA	●	●	◐	⊗	●	●	⊗	●	◐	◐
29	<b>Lumenyte</b> PypeLyte Inspection Light with Vortex Flashlight IWV-1000-C	\$150	0.3 (0.7)	NA	NA	●	●	◐	⊗	●	●	⊗	●	◐	◐
30	<b>SAS R&amp;D Services</b> Readyscope Economical Fiberscopes RS Series		0.5 (1)	NA	NA	⊗	●	◐	●	●	◐	●	●	⊗	●

\* CX = convex, FL = flat, R = round, S = square, RC = rectangular, T = trapezoidal, P = plastic

Thirty visual detectors for identifying explosives were identified. Seventeen use mirrors to visually inspect for explosives; four use cameras or video systems to detect explosives; and nine use fiber optics, light pipes, or lights to detect explosives.

## 5.5 Blast Mitigation Equipment

Blast mitigation equipment is composed of materials and structures with a combination of strength, toughness and high temperature resistance. This equipment can limit the effects of blast wave, temperature, and high speed fragments to lessen the destructive effects of an explosive.

### 5.5.1 Market Survey

An extensive market survey was conducted to identify commercially available blast mitigation equipment. The market survey resulted in the identification of 39 blast mitigation items. The blast mitigation equipment data sheets, along with an index identifying each of the items, are included in appendix C. Table 5–8 details the number of blast mitigation items identified for each of the 11 vendors that were included in the market survey.

*Table 5–8. Blast mitigation equipment vendors*

<b>Vendor</b>	<b>Blast Containment Equipment</b>	<b>Total</b>
Allen-Vanguard Corporation	20	20
American Innovations, Inc.	2	2
BlastGard International, Inc.	3	3
Burner Fire Control/Raytheon	2	2
CHANG Industry, Inc.	1	1
Foster-Miller, Inc. LAST Armor Division	1	1
Geocell Systems, Inc.	1	1
Ideal Products, Inc.	5	5
Mistral Security, Inc.	2	2
NABCO, Inc.	1	1
Security Intelligence Technologies	1	1
<b>Total</b>	<b>39</b>	<b>39</b>

### 5.5.2 Blast Mitigation Selection Factors

Eleven selection factors are recommended for consideration by the emergency first responder community when selecting and purchasing blast mitigation equipment. The yellow column in table 5–1 shows the selection factors for blast mitigation equipment. These factors were developed to allow for a quick comparison of commercially available blast mitigation equipment.

#### 5.5.2.1 Unit Cost (MSRP)

The unit cost (market price) details the cost associated with functioning visual inspection equipment, to include any required support equipment. The price indicated is the MSRP associated with the blast mitigation equipment at the time this guide was published. This price is not a special government price. Individual vendors should be consulted to determine if special government price rates are available.

### 5.5.2.2 Weight

The weight is the total weight of a complete unit, including power supply if required. Weight is the best indicator of how portable the equipment is and how suitable for deployment by a first responder.

### 5.5.2.3 Explosives Contained/Mitigated

This factor refers to the amount of explosives that are contained and/or mitigated by the equipment.

<b>Explosives Contained/Mitigated (Blast Mitigation)</b>	
●	≥ 3 lb
◐	1.1 lb to 2 lb
◑	≥ 0.5 lb to 1 lb
◒	< 0.5 lb
⊗	Not specified

### 5.5.2.4 Ballistic Performance

This factor indicates the ballistic performance of the equipment in terms of the NIJ classification levels and is applicable for blast mitigation equipment only.

- NIJ Class III-A reference velocity is 427 m/s (1400 ft/s) for both 9 mm and 44 mag.
- NIJ Class II reference velocity is 367 m/s (1205 ft/s) for 9 mm or 427 m/s (1400 ft/s) for 357 magnum.
- NIJ Class II-A reference velocity is 332 m/s (1090 ft/s) for 9 mm or 312 m/s (1025 ft/s) for 40 S&W.
- NIJ Class I reference.

<b>Ballistic Performance (Blast Mitigation)</b>	
●	Greater than NIJ Class III-A
◐	NIJ Class II or higher
◑	NIJ Class II-A or higher
◒	NIJ Class I or higher
○	Less than NIJ Class I
⊗	Not specified

### 5.5.2.5 Operational Environment

This factor describes the type of environment required by the equipment to operate optimally. For example, some equipment is designed to operate in the field under common outdoor weather conditions and climates (i.e., extreme temperatures, humidity, rain, snow, fog, etc.). However, other equipment may require more climate-controlled conditions such as a laboratory environment.

<b>Operational Environment</b>	
●	Operates in all expected environments and extreme environments
◐	Operates in most environments
○	Operates in specialized environments
⊗	Not specified

### 5.5.2.6 Durability

This factor describes the ruggedness of the equipment, i.e., how well can the equipment withstand rough handling and still operate.

<b>Durability</b>	
●	Able to operate with rough handling
◐	Able to operate after being moved but not after rough handling
○	Must remain stationary after installation
⊗	Not specified

### 5.5.2.7 Maintenance Required

This factor refers to the frequency of maintenance that is required to keep the equipment at its peak operational readiness.

<b>Maintenance Required</b>	
●	Maintenance not required
◐	Field repairs if needed, to include type or level of maintenance
◑	Periodic preventative maintenance
◒	Periodic factory maintenance required
⊗	Not specified

### 5.5.2.8 Shelf Life

This factor refers to the length of time that the equipment can be stored without being serviced or replaced prior to being used.

Shelf Life	
●	> 5 yr
◐	≥ 1 mo
◑	≥ 6 mo
◒	≥ 1 mo
○	< 1 mo
⊗	Not specified

### 5.5.2.9 Operator Skills and Training

This factor describes the operator skill level and training for the operation of the equipment. Training refers to the amount of time to instruct the operator to become proficient in the operation of the instrument.

Operator Skills and Training		
	Skills	Training
●	Awareness	< 1 h on-site
◐		1 h to 4 h on-site
◑	Technician	> 4 h on-site
◒		Off-site training
⊗	Not Specified	Not specified

### 5.5.2.10 Length of Time Fielded

This factor describes the length of time that the equipment has been in the field. It indicates the state of the maturity of the product.

Length of Time Fielded	
●	≥ 5 yr
◐	4 yr to 5 yr
◑	2 yr to 3 yr
◒	1 yr
○	< 1 yr
⊗	Not specified



### 5.5.2.11 Set-up Time

This factor describes the length of time that the equipment requires for assembly before start-up.

Set-up Time	
●	< 30 s
●	31 s to ≤ 60 s
◐	61 s (1 min) to ≤ 5 min
◑	6 min to ≤ 30 min
○	31 min
⊗	Not specified

### 5.5.3 Evaluation of Blast Mitigation Equipment

The evaluation results for the visual detection equipment are presented in tabular format for the 39 blast mitigation equipment identified during the development of this guide. Table 5–9 shows the results of the blast mitigation equipment evaluation. The evaluation table is organized according to the technology tree presented in figure 4–1. Within technology groupings, equipment is listed alphabetically by manufacturer.

**Table 5–9. Evaluation of blast mitigation equipment**

ID Number	Brand and Model	MSRP	Weight, lb (kg)	Capabilities and Features								
				Explosives Contained/Mitigated	Ballistic Performance	Operational Environment	Durability	Maintenance Required	Shelf Life	Operator Skills and Training	Length of Time Fielded	Set-Up Time
<b>BLAST CONTAINMENT EQUIPMENT</b>												
1	<b>Allen-Vanguard</b> Non-Magnetic Tools (NMT-200, NMT-300)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
2	<b>Allen-Vanguard</b> Non-Magnetic Tools Comprehensive (NMT-EOD)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
3	<b>Allen-Vanguard</b> Special Operations Tool Kit (SO TK1/00)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
4	<b>Allen-Vanguard</b> EOD Operators Tool Kit (SKT-EOD)		6.5 (14.3)	⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
5	<b>Allen-Vanguard</b> HAL® BombTec™ Kit (HAL BT1/00)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
6	<b>Allen-Vanguard</b> HAL® Heavy Duty Kit MK3 (3/00)			⊗	⊗	●	●	⊗	⊗	◐	⊗	⊗

ID Number	Brand and Model	MSRP	Weight, lb (kg)	Capabilities and Features								
				Explosives Contained/Mitigated	Ballistic Performance	Operational Environment	Durability	Maintenance Required	Shelf Life	Operator Skills and Training	Length of Time Fielded	Set-Up Time
7	<b>Allen-Vanguard</b> HAL® Special Operations Hook & Line Kit (SO1/00 &SO2/00)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
8	<b>Allen-Vanguard</b> HAL® Building Accessory Kit (BAK1/00)			NA	NA	●	●	●	NA	◐	⊗	⊗
9	<b>Allen-Vanguard</b> HAL® Key Equipment Schedule Pack (KESP1/00)			⊗	⊗	●	●	⊗	⊗	◐	⊗	⊗
10	<b>Allen-Vanguard</b> HAL® Vehicle Access Kit (VAK1/00)			⊗	⊗	●	●	⊗	⊗	◐	⊗	⊗
11	<b>Allen-Vanguard</b> HAL® Lightweight IEDD Tripod (TRI2/00)		13.6 (30)	⊗	⊗	●	●	⊗	⊗	◐	⊗	⊗
12	<b>Allen-Vanguard</b> HAL® Heavy Duty Tripod (TRI1/00)		22 (50)	⊗	⊗	●	●	⊗	⊗	◐	⊗	⊗
13	<b>Allen-Vanguard</b> Bomb Blast Suppression Blankets		5.1 to 10.8 (11.2 to 23.8)	⊗	◐	●	●	⊗	⊗	⊗	⊗	⊗
14	<b>Allen-Vanguard</b> Suspect Package Container (SPC-1000)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
15	<b>Allen-Vanguard</b> Ballistic Containment Blanket (TD-BG-025)		9.1 (20)	⊗	●	●	●	●	●	◐	●	⊗
16	<b>Allen-Vanguard</b> Air Foam Dolly System (TD-DS-025-M1)			◐	⊗	●	●	⊗	⊗	⊗	⊗	◐
17	<b>Allen-Vanguard</b> Advanced Enclosure [AE] (TD-AE-00-00-000)]		23.6 (52)	◐	⊗	●	●	⊗	⊗	⊗	⊗	⊗
18	<b>Allen-Vanguard</b> Universal Containment System (TD-DS-025-M1)		227 (500)	◐	●	●	●	●	●	◐	●	◐
19	<b>Allen-Vanguard</b> Dual Initiator (DX10)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
20	<b>Allen-Vanguard</b> Remote RF Initiator Firing System (RFI-RFA KIT)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
21	<b>American Innovations</b> Bomb Containment Vessels, Detonation Chambers			⊗	NA	●	●	●	●	◐	⊗	⊗
22	<b>American Innovations</b> Blast Mitigation Trash Bins			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗
23	<b>BlastGard</b> BlastWrap		2.4 kg/m <sup>2</sup> (0.5 lb/ft <sup>2</sup> )	⊗	NA	●	●	●	●	●	⊗	●
24	<b>BlastGard</b> Mitigated Trash Receptacle (Model 81, 91, and 101)		526 to 871 (1160 to 1920)	●	●	●	●	◐	●	●	⊗	◐
25	<b>BlastGard</b> Blast Mitigated Unit Load Device (BMULD)		77 (170)	◐	○	●	●	●	●	●	⊗	●

ID Number	Brand and Model	MSRP	Weight, lb (kg)	Capabilities and Features									
				Explosives Contained/Mitigated	Ballistic Performance	Operational Environment	Durability	Maintenance Required	Shelf Life	Operator Skills and Training	Length of Time Fielded	Set-Up Time	
26	<b>Burner Fire Control</b> Global Defender Blast Mitigation Trailer System (GD-130/60-TC)	\$75K to \$99.5K	1588 (3500)	●	⊗	●	●	●	●	●	◐	⊗	●
27	<b>Burner Fire Control</b> Global Defender Portable Blast Mitigation System (GD-60-C)	\$40K	113 (250)	◐	⊗	●	●	●	●	●	◐	⊗	●
28	<b>CHANG</b> Octatron Explosive Release Pole System (OERPS)	\$500 to \$1K		⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗	⊗
29	<b>Foster-Miller</b> Frag Bag Bomb Box (30233ASSY80975010)	\$750	11.4 (25)	◐	⊗	◐	●	●	●	●	●	●	●
30	<b>Geocell Systems</b> Rapid Deployment Fortification Wall (RDFW MK 4)	\$13.3K	8.6 (19)	●	⊗	●	●	⊗	⊗	⊗	◐	⊗	
31	<b>Ideal Products</b> PAN disrupter (12 gauge)		4 (9)	NA	NA	NA	●	◐	●	◐	●	●	●
32	<b>Ideal Products</b> 12 Gauge Titanium Disrupter (T-3)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗	⊗
33	<b>Ideal Products</b> EOD.357 Gauge Magnum Micro Disrupter (K7000)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗	⊗
34	<b>Ideal Products</b> 0.357 Magnum Microdisrupter	\$1.43K		⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗	⊗
35	<b>Ideal Products</b> 410 Disrupter			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗	⊗
36	<b>Mistral</b> BlastSafe—Golans: Fully Confined Containment Systems for Explosives (MSI Golan)			⊗	⊗	●	●	⊗	⊗	⊗	●	⊗	⊗
37	<b>Mistral</b> Blast Containment Receptacles (MSI BCR)			●	⊗	●	●	⊗	●	●	●	⊗	⊗
38	<b>NABCO</b> Total Containment Vessel			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗	⊗
39	<b>Security Intelligence</b> IED Jammer to Counter RCIED Weapons (VIP300X)			⊗	⊗	●	●	⊗	⊗	⊗	⊗	⊗	⊗

Thirty-nine equipment items used for containment or blast mitigation were identified and evaluated.



## **APPENDIX A—REFERENCES**



## APPENDIX A—REFERENCES

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**APPENDIX B—TRACE AND BULK EXPLOSIVES DETECTION  
EQUIPMENT DATA FIELDS**



## **APPENDIX B—TRACE AND BULK EXPLOSIVES DETECTION EQUIPMENT DATA FIELDS**

Forty-five data fields were used to provide information relating to trace and bulk explosives detection equipment. The 45 data fields are comprised of data fields from the market survey vendor questionnaire requesting specifics about their products. Because of the database limitations, several data fields on the vendor questionnaire were combined, but all the vendor-supplied information was entered into the database. All data fields were developed using input from the emergency responder community.

The data fields are organized into five categories:

- General (12 data fields).
- Operational (9 data fields).
- Physical (5 data fields).
- Logistical (10 data fields).
- Special Requirements (9 data fields).

### **1.0 General**

#### **1.1 Title**

The Title is the full commercial name of the equipment plus appropriate acronyms and pseudonyms (military/commercial versions of identical equipment).

#### **1.2 Information Provided By**

Information Provided By identifies the person or organization that submitted the product. This may be a distributor or the product manufacturer. The address, telephone, email, and website information is also provided.

#### **1.3 Manufacturer**

The Manufacturer is the company that developed the equipment. This data field includes the manufacturer's name, address, telephone and fax numbers, point of contact, and e-mail addresses.

#### **1.4 Detector Technology**

Detector Technology identifies the broad technology area employed by the detector. Specific examples include ion mobility spectrometry or chemiluminescence.

#### **1.5 Model Number**

The Model Number is the unique number identifying a specific line of equipment.

## **1.6 Part Number**

The Part Number is the manufacturer's part number for ordering, if applicable.

## **1.7 Summary and Description**

The Summary and Description are provided by the manufacturer to describe the features and uses of the product.

## **1.8 Keywords**

Keywords are descriptive of the product capabilities and applications and are used to support product searches within the data base.

## **1.9 Availability Date**

Availability Date refers to how readily available a piece of equipment is (e.g., how long it takes to receive equipment upon ordering).

## **1.10 Manufacturer Suggested Retail Price (MSRP)**

MSRP is the cost of the piece of equipment for immediate use upon receipt. The cost includes the set-up cost and initial consumables. Many items have discounts available and the manufacturer should be consulted.

## **1.11 Length of Time Fielded**

Length of Time Fielded permits an evaluation of the maturity of a product.

## **1.12 Current User/Period of Use**

Current User/Period of Use identifies organizations (i.e., military use, commercial applications, civil-service instrument, etc.) that are currently using the piece of equipment. This information may include the average number of units each client has in operation and the average number of years these units have been in use.

## **2.0 Operational**

### **2.1 Explosives Detected**

Explosives Detected describes which materials are detected. Depending on the technology employed, the equipment may also identify specific explosives.

## **2.2 Limits of Detection**

Limits of Detection describes the smallest concentration or quantity of explosives that can be reliably detected.

## **2.3 Sample Collection/Analysis**

Sample Collection/Analysis allows the manufacturer to describe any required sampling procedure or sample preparation that is required.

## **2.4 Interferents**

Interferents are chemicals or materials that may be detected as false positives. A detector may have its utility restricted especially in environments that contain these materials.

## **2.5 Start-up Time**

Start-up Time is the time taken from power-on to full functional capability, if applicable.

## **2.6 Response Time**

Response Time is the time it takes for an instrument to take a sample, analyze the sample, determine if an agent is present, and provide results.

## **2.7 Alarm Capability**

Alarm Capability describes whether an instrument can be set to produce an audible, visual, or vibrational alarm when a detection threshold is crossed.

## **2.8 False Positive Rate**

False Positive Rate is the rate of positive detections per time interval when no explosive material is present.

## **2.9 Radioactivity**

Radioactivity describes whether the equipment contains radioactive material.

## **3.0 Physical**

### **3.1 Size**

Size indicates the external dimensions of the equipment, including height, width, and depth.

### **3.2 Weight (including batteries)**

Weight (including batteries) provides the total weight of the equipment in operational status.

### **3.3 Power Requirements**

Power Requirements indicates the type of power required to operate the equipment and any ancillary components. This field may apply to some equipment that is portable but must be stationary to operate.

### **3.4 Battery Type**

Battery Type describes whether the batteries are consumable or rechargeable and whether they are commonly available.

### **3.5 Battery Lifetime**

Battery Lifetime indicates the length of time the instrument can operate with full functionality before replacing or recharging the batteries.

## **4.0 Logistical**

### **4.1 Transportability**

Transportability is the ability of the equipment to be readily packed, shipped, or transported under typical and atypical conditions. The equipment dimensions and weight are two important factors to consider, because they determine if a single person can transport the equipment or if the equipment requires vehicular transport.

### **4.2 Ease of Use**

Ease of Use provides information on whether the equipment can be accurately used by an operator under challenging circumstances, such as wearing personal protective equipment (PPE). This data field also provides the number of steps and level of accuracy needed to obtain a result.

### **4.3 Operating Environment**

Operating Environment identifies the conditions under which a piece of equipment may be used and still be accurate. For example, some equipment is designed to operate in the field under extreme outdoor weather conditions and climates, while other equipment requires climate-controlled environments.

### **4.4 Consumables Required**

Consumables Required lists the consumables needed to perform one assay, if applicable.

#### **4.5 Calibration Requirements**

Calibrations Requirements are adjustments necessary to bring operating characteristics into substantial agreement with recognized standards. This field describes how often equipment requires calibration, the complexity of calibration, and whether it can be calibrated in the field. This field should also include if calibration is manual or automatic.

#### **4.6 Maintenance**

Maintenance indicates how often equipment requires maintenance, the complexity of maintenance, and whether it can be maintained in the field.

#### **4.7 Service Options**

Service Options describes how the equipment is supported in the field. This includes availability of loaner equipment and whether field support and/or factory support is available.

#### **4.8 Shelf Life**

Shelf Life is the length of time the equipment may be stored and be ready for immediate use, if applicable.

#### **4.9 Support Equipment and Accessories**

Support Equipment and Accessories includes additional equipment needed for operation or other equipment that may increase functionality.

#### **4.10 Operational and Maintenance (O&M) Costs**

O&M Costs include the annual cost to keep the equipment in a state of full readiness, including maintenance, calibration, and consumables, if applicable.

### **5.0 Special Requirements**

#### **5.1 Operator Skills and Training**

Operator Skills and Training refers to the level of skill required (i.e., awareness or technician level) and the specific training required to operate the equipment and interpret data for a final analysis.

#### **5.2 Training Available**

Training Available may range from reading a manual or viewing a video to participating in formal courses offered through the manufacturer or an outside training contractor.

### **5.3 Manuals Available**

Manuals Available indicate which manuals are supplied as standard equipment or if they need to be ordered separately. Manuals may include user manuals, repair manual with illustrated components and parts, or training documentation.

### **5.4 Data Storage**

Data Storage indicates if the data obtained in the field can be stored in the system to be printed out at a later time or if a connected computer is required to save the data.

### **5.5 Communications Interface Capability**

Communications Interface Capability refers to the ability of the equipment to interface with a communications system. This section also includes any optional interface components that are available as an upgrade to the specific equipment (including command control communication, computers, intelligence standardization, interoperability, or commonality).

### **5.6 Tamper Resistance**

Tamper Resistance includes all mechanisms that are standard and optional with the equipment to prevent potential vandalism or mechanism alteration. Examples of tamper resistance include password protection, encryption, or lock-out.

### **5.7 Warranty**

Warranty information describes the specific terms and conditions as set by the manufacturer, including any restrictions by the manufacturer.

### **5.8 Independent Testing Information Available**

Independent Testing Information Available describes any testing that has been done by a third party to confirm the equipment performance.

### **5.9 Applicable Regulations**

Applicable Regulations includes any government and/or safety regulations that may apply to the possession, use, or storage of a piece of equipment (e.g., some detectors may require the use of a radioactive source material, which requires licensure by the Nuclear Regulatory Commission).



**APPENDIX C—TRACE AND BULK EXPLOSIVES DETECTOR INDEX  
AND DATA SHEETS**



**APPENDIX C—TRACE AND BULK EXPLOSIVES DETECTOR INDEX AND DATA SHEETS**

<b>ID#</b>	<b>Detector Name</b>	<b>Model</b>	<b>Manufacturer</b>	<b>Page C-#</b>
<b>TRACE</b>				
1	Gel-Ox	GO-06	ChemSee, Inc.	C-1
2	On-The-Spot	DET-006	ChemSee, Inc.	C-3
3	Verifier	VF-04	ChemSee, Inc.	C-5
4	EX-DETECT	XD-2	ChemSpectra, Inc.	C-7
5	Seeker Handheld Explosives & Narcotics Detector	CDU220	DetectaChem, LLC.	C-9
6	Seeker Detector	SK1000	DetectaChem, LLC.	C-11
7	Explosive Detector	GVD-4	ElectroMax International, Inc.	C-13
8	E.L.I.T.E. Explosives Detection	Model EL100	Field Forensics, Inc.	C-15
9	Itemiser Explosives Trace Detector	P0007018	GE Homeland Protection	C-17
10	VaporTracer Explosives Trace Detector	P0007019	GE Homeland Protection	C-19
11	EntryScan Explosives & Narcotics Trace Detector	P0007026-001	GE Homeland Protection	C-21
12	Explosives Trace Detection System	DS-120E	Hitachi, Ltd.	C-23
13	Portable Explosive Detector	Fido XT	ICx-Nomadics	C-25
14	Detector Kit	KD40	Ketech Defence	C-27
15	Detector Kit	KD60	Ketech Defence	C-29
16	Explosive Detection Kit	EDK123	Law Enforcement Associates	C-31
17	Expray: Explosive Detection & Identification	MSI 1553	Mistral Security, Inc.	C-33
18	Expray Plus: Explosive Detection & Identification	MSI 1555	Mistral Security, Inc.	C-35
19	DropEx Plus: Explosive Detection & Identification	MSI 1585	Mistral Security, Inc.	C-37
20	Handheld Explosive Trace Detectors	EVD-2500	Scintrex Trace Corp.	C-39
21	Handheld Explosive Trace Detectors	EVD-3000	Scintrex Trace Corp.	C-41
22	Portable Advanced Explosives Detector	E 3500	Scintrex Trace Corp.	C-43
23	Trace Explosive Detector for ID and Travel Documents	MO-2D	Sibel Ltd.	C-45
24	Hand Held Explosive Detector	MO-2M	Sibel Ltd.	C-47
25	Sentinel II	Not specified	Smiths Detection, Inc.	C-49

<b>ID#</b>	<b>Detector Name</b>	<b>Model</b>	<b>Manufacturer</b>	<b>Page C-#</b>
26	Ionscan Desktop Explosives/Narcotics Detector	Ionscan 400B	Smiths Detection, Inc.	C-51
27	Ionscan Document Scanner Trace Detection System	Ionscan	Smiths Detection, Inc.	C-53
28	Sabre 2000 Explosives Detector	2000	Smiths Detection, Inc.	C-55
29	Sabre 4000 Explosives Detector	4000 (single), 4000M (dual), 4000E (tri) modes	Smiths Detection, Inc.	C-57
30	Explosive Trace Detection System	EGIS Defender	Thermo Electron Corporation	C-59
31	Explosive Detection System	EGIS Series	Thermo Electron Corporation	C-61
32	Biosens	Not specified	Biosensor	C-63
<b>BULK</b>				
33	Gemini	6040	American Science and Engineering, Inc.	C-65
34	Personnel Screening System	SmartCheck	American Science and Engineering, Inc.	C-67
35	Buster Contraband Detector	K910B	Campbell Security Equipment Company (CSECO)	C-69
36	OpenVision™ LT	OV III LT	Envision Product Design LLC.	C-71
37	X-ray unit	XRS-3	Golden Engineering, Inc.	C-73
38	X-Ray Source	XR-150	Golden Engineering, Inc.	C-75
39	X-ray Unit	XR-200	Golden Engineering, Inc.	C-77
40	Portable Explosives Detector/Identifier	SIEGMA™ 3M3	HiEnergy Technologies	C-79
41	Robot-Borne Detector/Identifier	STARRAY™	HiEnergy Technologies	C-81
42	Compact X-ray Inspection System	DS-400L	Hitachi, Ltd. RKB Provided	C-83
43	Flatscan 27	Not specified	ICM	C-85
44	Logos Digital Imaging System	Not specified	Logos Imaging LLC.	C-87
45	Rapiscan 515	RAP 515	Rapiscan Systems	C-89
46	Rapiscan	RAP 519	Rapiscan Systems	C-91
47	Rapiscan Secure 1000®	Secure 1000	Rapiscan Systems	C-93
48	Portable Digital X-Ray Inspection System	RTR-4N™	SAIC	C-95
49	Compact Flat Panel Portable X-ray System	Scanwedge 2520	Scanna MSC, Inc.	C-97

<b>ID#</b>	<b>Detector Name</b>	<b>Model</b>	<b>Manufacturer</b>	<b>Page C-#</b>
50	Flat Panel Portable X-ray System	Scanwedge 3325	Scanna MSC, Inc.	C-99
51	Portable X-ray System	Scantrak	Scanna MSC, Inc.	C-101
52	foX Trekker Back Pack Digital X-ray System	FXR2-T-10	Vidisco, Delta-Xray, Inc.	C-103
53	Anomaly Detector	M600	EMIT Technologies, LLC.	C-105
54	Letterbomb Visualizer Spray	LBV1000	Law Enforcement Associates	C-107
55	LabSpec® 2500 NIR Spectrometer	2500 NIR	Analytical Spectral Devices, Inc.	C-109
56	LabSpec® 5000 NIR Spectrometer	5000 NIR	Analytical Spectral Devices, Inc.	C-111
57	StreetLab Portable, Substance Identification System	P0007021	GE Homeland Protection	C-113
58	Handheld Passive Millimeter-Wave Imager	aPat	Sago Systems, Inc.	C-115
59	Stand-off Passive Millimeter-Wave Imager	ST-150	Sago Systems, Inc.	C-117



## GENERAL

**Gel-Ox**  
**Model:** GO-06

ChemSee, Inc.  
 840 Main Campus Drive  
 Suite #3590  
 Raleigh, North Carolina 27606  
 919-831-2247 (Tel)  
 ajattar@appealingproducts.com  
**Information Source:** <http://www.chemsee.com>

**Unit Cost:** \$5—2 pack  
 \$10—4 pack  
 \$20—10 pack

Examples of Performance of  
 Gel-Ox™



Before  
 Test



Color Formation  
 With Hydrogen  
 Peroxide

**Type:** Trace

**Availability:** immediately

**Technology:** Colorimetric

**Description:** Gel-Ox tabs detect oxidizers such as hydrogen peroxide in very viscous liquids. The detectors display a black color if such materials are present. The Gel-Ox tabs have been tested with numerous common materials to insure zero false positives. The Gel-Ox tabs are small, lightweight, and therefore easily portable. The use of Gel-Ox tabs is also easily trained, and very simple.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Peroxides, strong oxidizers, and hydrogen peroxide

**LOD:** > 0.25 % peroxide

**Penetrability:** Not applicable

**Sample Collection:** Eye dropper and spoon

**Interferents:** None

**Start-up Time:** < 5 min

**Response Time:** 3 s to 5 s

**Alarm Capability:** Not specified

**Detector Efficiency:** Not specified

**False Positives:** 0 %

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** Paper strip, > 2.54 cm x 2.54 cm (1 in x 1 in)

**Weight:** > 57 g (2 oz)/10 pack

**Power Requirements:** None

**Battery Type:** Not applicable

**Battery Life:** Not applicable

## LOGISTICAL PARAMETERS

**Portability:** Vapor sealed bags, > 2 oz/10-pack

**Ease of Use:** Simple, little training required, no special skills required

**Environmental Considerations:** Standard room conditions

**Consumables Required:** Yes

**Calibration Required:** None

**Maintenance Requirements:** None

**Service Options:** None

**Shelf Life:** > 2 yr

**O&M Costs:** Not applicable

### SPECIAL REQUIREMENTS

**Operator Skills:** Not applicable

**Training Required:** None

**Manuals Available:** Instructions included

**Data Storage:** Not applicable

**Communication Interface:** Not applicable

**Tamper Resistance:** Sealed package

**Warranty:** None

**Independent Testing:** None

**Applicable Regulations:** None



## GENERAL

*On-The-Spot*  
**Model:** DET-006

ChemSee, Inc.  
840 Main Campus Drive  
Suite #3590  
Raleigh, North Carolina 27606  
919-831-2247 (Tel)  
ajattar@appealingproducts.com  
**Information Source:** <http://www.chemsee.com>  
**Unit Cost:** \$80  
\$350—5  
\$650—10



**Type:** Trace

**Availability:** Immediately

**Technology:** Colorimetric

**Description:** On-the-Spot tabs detect the presence of nitrates, such as chemicals present in gunshot residue. The detectors display a red color in the presence of such nitrates. Testing has been done with many other common chemicals to insure no false positives. They are small, easily portable, and provide quick results. Their uncomplicated design allows for easy training and simple use.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Nitrates and gunshot residue

**LOD:** > 0.1 % nitrate

10 gm to 9 gm (< 1 oz to < 1 oz) of Nox

**Penetrability:** Not applicable

**Sample Collection:** Touch to suspect surface, then to second side of detector

**Interferents:** None

**Start-up Time:** < 5 min upon creation

**Response Time:** < 30 s (2 s to 60 s) upon indicator contact

**Alarm Capability:** Not applicable

**Detector Efficiency:** Not specified

**False Positives:** 0 %

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** Paper, < 2.54 cm x 5.08 cm (1 in x 2 in)

**Weight:** < 113 g (4 oz)/10 pack

**Power Requirements:** None

**Battery Type:** Not applicable

**Battery Life:** Not applicable

## LOGISTICAL PARAMETERS

**Portability:** Sealed in packs of 10, < 4 oz/pack

**Ease of Use:** Simple, little training required

**Environmental Considerations:** Standard room conditions

**Consumables Required:** Yes

**Calibration Required:** None

**Maintenance Requirements:** None

**Service Options:** None  
**Shelf Life:** > 1 yr  
**O&M Costs:** Not applicable

### SPECIAL REQUIREMENTS

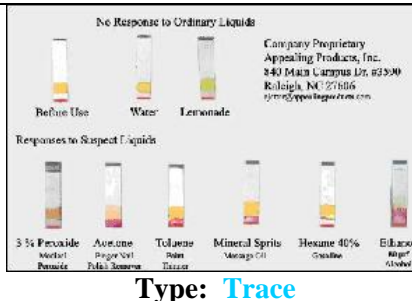
**Operator Skills:** No special skills required  
**Training Required:** None  
**Manuals Available:** Instructions included  
**Data Storage:** Not applicable  
**Communication Interface:** Not applicable  
**Tamper Resistance:** Sealed package  
**Warranty:** None  
**Independent Testing:** None  
**Applicable Regulations:** None

## GENERAL

Verifier  
Model: VF-04

ChemSee, Inc.  
840 Main Campus Drive  
Suite #3590  
Raleigh, North Carolina 27606  
919-831-2247 (Tel)  
ajattar@appealingproducts.com  
**Information Source:** <http://www.chemsee.com>

**Unit Cost:** \$10—2 pack  
\$40—10 pack  
\$70—20 pack



**Type: Trace**

**Availability:** Immediately

**Technology:** Colorimetric

**Description:** The Verifier Tabs are small tabs which detect liquid flammable materials, liquids, which can be used to make explosives and oxidizers such as hydrogen peroxide. The detectors display red color if the material is flammable/explosive and a black color if it contains hydrogen peroxide. The Verifier was used with numerous flammable materials and oxidants including common household materials. The Verifier Tabs are effective, small and lightweight, low-cost, and give results instantly with zero false positives. The use of the Verifier Tabs is simple even for the average layman.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Acetone, peroxides, hydrocarbons, nitromethane, toluene, mineral spirits, and ethanol

**LOD:** > 0.25 % peroxide and > 3.0 % acetone

**Penetrability:** Not applicable

**Sample Collection:** Eye dropper from test liquid

**Interferents:** None

**Start-up Time:** < 5 min

**Response Time:** Instantly upon indicator contact

**Alarm Capability:** Not applicable

**Detector Efficiency:** Not specified

**False Positives:** 0 %

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** Paper strip > 1.27 cm x 5.08 cm (0.5 in x 2 in)

**Weight:** > 8.5 g (0.3 oz)/10 pack

**Power Requirements:** None

**Battery Type:** Not applicable

**Battery Life:** Not applicable

## LOGISTICAL PARAMETERS

**Portability:** Vacuum-sealed bags of various amounts, < 1 kg (0.3 oz) for 10

**Ease of Use:** Simple, < 1 min training, no prior skills required

**Environmental Considerations:** Standard room conditions

**Consumables Required:** Yes

**Calibration Required:** None

**Maintenance Requirements:** Not applicable

**Service Options:** None

**Shelf Life:** > 2 yr

**O&M Costs:** Quote by quote basis

### SPECIAL REQUIREMENTS

**Operator Skills:** Not applicable

**Training Required:** Requires little personnel training

**Manuals Available:** Instructions included

**Data Storage:** Not applicable

**Communication Interface:** Not applicable

**Tamper Resistance:** Sealed transport bag

**Warranty:** None

**Independent Testing:** None

**Applicable Regulations:** None

## GENERAL

EX-DETECT**Model:** XD-2

ChemSpectra, Inc.  
2599 Still Meadow Lane  
Lancaster, California 93536  
661-860-9015 (Tel)  
chemspectra@comcast.net

**Information Source:** <http://www.chemspectra.com>

**Unit Cost:** \$4.5K, quantity discount available



**Type:** Trace

**Availability:** Available

**Technology:** Colorimetric

**Description:** The innovative technology embodied in the EX-DETECT™, Model XD-2 uses a patent pending combination of benign solutions applied to a sample swipe material that is then subjected to a rapid, controlled heating profile. The system operator dispenses a few drops of solution onto the swipe followed by an automated heating cycle. The results displayed on the swipe are instantaneous for aromatic explosives and 30 s for all other explosives, detecting over 40 explosives at sensitivities better than IMS in real-world (humid and polluted) environments. Any color change to the white swipe, indicates the presence of explosives or energetic materials. Therefore, memorization of colors is unnecessary. One TSL caveat, the color “yellow” is an extremely rare test result with XD-2 and is not an explosive. XD-2 simplifies operations, improves screening capabilities, and reduces testing time while maintaining the benefits of trace detection. XD-2 has no calibration, no warm-up, has no bake-out time after a positive hit, blanks stay blank, is easy to use with minimal training, is truly handheld 0.6 kg (1.5 lb), rugged [1.8 m (6 ft) drop test, 6.1 m (20 ft) in case], cost-effective, not hindered by interferences or air quality, uses benign chemicals, all weather use, has a self-contained power source with two other power source adapters included, and is reliable.

**Length of Time Fielded:** 3 yr

**Current Users:** 3 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** Over 40 different compounds. Performs GSR test as well for police (do not have to take suspects to a lab)

**LOD:** 900 pg to 25 ng, depending on the sample, i.e., soil vs. clean

**Penetrability:** Not applicable

**Sample Collection:** Swipe

**Interferents:** Some chemicals give yellow color but yellow is not an explosive

**Start-up Time:** Instantaneous

**Response Time:** Instantaneous to 30 s depending on the explosive

**Alarm Capability:** Visual

**Detector Efficiency:** Not specified

**False Positives:** No false positives

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** 4.2 m x 2.2 m x 1.8 m (165 in x 86 in x 70 in) l,b,h

**Weight:** 0.7 kg (1.54 lb)

**Power Requirements:** : AA batteries; 220 ; dc converter. Automobile cigarette lighter power adapter.

**Battery Type:** 8 AA

**Battery Life:** 250 samples runs without ac or cigarette lighter power usage

## LOGISTICAL PARAMETERS

**Portability:** Handheld, rugged, drop tested

**Ease of Use:** 3 min to 5 min self-instruction

**Environmental Considerations:** All weather, rain, cold, and elevation

**Consumables Required:** Swipes, swabs and 8 AA batteries if no ac is used

**Calibration Required:** none

**Maintenance Requirements:** Occasional wipe down if used in outdoor environments

**Service Options:** If unit fails (none have) 24 h turn-around, FedEx unit to user once old unit is received

**Shelf Life:** Indefinite for XD-2 and swipes, dropper bottles 6 mo; 1 yr if refrigerated

**O&M Costs:** None except battery replacement when necessary

## SPECIAL REQUIREMENTS

**Operator Skills:** No special skill set required, self taught within 5 min

**Training Required:** [www.spectrex.com](http://www.spectrex.com) for video of operation or read provided instruction card

**Manuals Available:** Instruction card

**Data Storage:** None, swipes can be stored in evidence bag

**Communication Interface:** None

**Tamper Resistance:** Lock available for case

**Warranty:** 1 yr, 24 h

FedEx when old unit received, 800-822-3940

**Independent Testing:** TSA, HSDB, AFFPB

**Applicable Regulations:** 49 CFR 173.4

## GENERAL

Seeker Handheld Explosives & Narcotics Detector

Model: CDU220

DetectaChem, LLC.  
710 N. Post Oak Rd., Ste 400  
Houston, Texas 77024  
832-472-2437 (Tel)  
info@detectachem.com

**Information Source:** <http://www.detectachem.com>

**Unit Cost:** < \$10K



**Type:** Trace

**Availability:** April 2007

**Technology:** Automated Colorimetric

**Description:** The Seeker is a multi-purpose handheld detection system. A single Seeker provides capabilities for the detection and identification of trace explosives, drugs and narcotics, biological agents, and industrial chemicals. The Seeker also includes data storage and a computer interface for downloading and archiving test results and data. Also available is an optional GPS receiver that will store the test results along with the location of the test for mapping positive results.

**Use of the device:** The Seeker requires minimal training for operation. Once the proper swipe card is selected (i.e., general explosives, homemade explosives, narcotics, etc.), the card may be swiped on an area, article, surface, or subject under investigation. Almost anything can be swiped from plastic, to metal, to zippers, to skin, even rubber tires.

After a sample is collected on the collection pad of the swipe card, the Seeker identifies the unique ID of the card and test type with a barcode scan. The card is inserted into the Seeker and test results are displayed within 1 min to 2 min, depending on the type of test. These results are automatically stored into memory along with the date and time of the test, along with the GPS location if this option is enabled.

**Swipe—Scan—Insert:** The simple three-step process of completing a test makes the Seeker CDU220 one of the quickest and easiest trace detection systems available. There is no complicated calibration routines or long warm-up times—the Seeker CDU220 can be powCard inserted into and available for testing in seconds.

Once the surface under test has been swiped, begin a test by scanning the unique barcode on the swipe card with the Seeker's built-in barcode scanner. After the barcode has been scanned, simply insert the swipe card into the Seeker and the test will begin. Within 1 min to 2 min, the results will be displayed on the full color display of the Seeker CDU220. With the test complete, the user can dispose of the swipe card, or write any notes on the card for future reference. All of the test results are safely stored within the Seeker CDU220 and can be easily downloaded to a PC and viewed on the DetectaChem desktop utility software at a later date.

**Additional features:** The Seeker accepts multiple power sources, including standard batteries (alkaline or lithium), rechargeable batteries, or external power via ac adapter or 12 V vehicle adapter. The Seeker CDU220 includes a full color daylight visible display. The screen will adjust to the lighting conditions during use for visibility in any situation, day or night. The Seeker also features a removable door for easy cleaning of the inside of the test chamber. While all of the testing done within the Seeker CDU220 is noncontact, some users prefer the additional confidence and convenience of manually cleaning the internal surfaces. The internal software of the Seeker (firmware) is upgradeable via a standard PC USB connection to support new detection cards, features and other improvements. Upgrade announcements will be available on this website to registered users. The Seeker CDU220 provides for future hardware accessories and expandability with the onboard Bluetooth wireless connectivity option. This feature will allow for easy integration with future peripherals.

**DetectaChem Swipe Cards:** The swipe card is the key to the flexibility of the Seeker. Each swipe card contains within it the colorimetric chemistries required for detecting a variety of substances. Presently, there are three different types of swipe cards available: general explosives, homemade explosives, and narcotics. DetectaChem swipe cards are designed for one-time use, and each card is marked with a unique serial number for associating it uniquely with the test results. To use a swipe card: 1) wipe the contact pad of the card along the surface under test; 2) read the scan the card's barcode with the Seeker's barcode reader; and 3) insert the card into the Seeker and begin the test. Once inserted, everything is automated and handled by the device. Results will be ready in about 1 min (depending on the test) and will be displayed on the screen of the Seeker. After the test is complete, the user can write notes on the card, bag the card for future examination, or dispose of the card.

Custom swipe cards can be designed by DetectaChem's scientists to determine the presence of a wide range of substances—from foodborne pathogens or biological agents, to industrial chemicals or benign substances.

**Length of Time Fielded:** New

**Current Users:** New

### OPERATIONAL PARAMETERS

**Explosives Detected:** TATP, TNT, TNB, DNT, DNB, HMX, RDX, PETN, GSR, and more

**LOD:** Security sensitive information

**Penetrability:** Not applicable

**Sample Collection:** Swipe method/automated colorimetric assay

**Interferents:** None known

**Start-up Time:** Seconds

**Response Time:** Seconds

**Alarm Capability:** Nanogram levels

**Detector Efficiency:** Not specified

**False Positives:** Extremely low

**Radioactivity:** None

### PHYSICAL PARAMETERS

**Size:** 15 cm x 11.9 cm x 3.0 cm (5.9 in x 4.7 in x 1.2 in) handheld

**Weight:** 0.45 kg (1 lb)

**Power Requirements:** Batteries, ac/dc adapter

**Battery Type:** Alkaline, lithium, or rechargeable

**Battery Life:** 50 tests to 100 tests

### LOGISTICAL PARAMETERS

**Portability:** Handheld, highly portable

**Ease of Use:** One of simplest systems possible: swipe sample, place in device and read result. Minimal training.

**Environmental Considerations:** IP30 Rating

**Consumables Required:** Swipe cards, batteries

**Calibration Required:** None

**Maintenance Requirements:** None, optional manual cleaning

**Service Options:** Available

**Shelf Life:** Available on request

**O&M Costs:** Not provided

### SPECIAL REQUIREMENTS

**Operator Skills:** Minimal training and no specific skills required

**Training Required:** Product demonstration, instruction manual and online support with video instruction

**Manuals Available:** Full instruction manual and online technical support

**Data Storage:** > 1000 test results stored internally and on optional removable SD card

**Communication Interface:** USB for PC download of test result data and firmware updates; Bluetooth; SD Card

**Tamper Resistance:** Both the Seeker and swipe cards are fully self-contained with tamper proof packaging

**Warranty:** 2 yr warranty with extension available; 60 d return policy

**Independent Testing:** Available

**Applicable Regulations:** Available



## GENERAL

***Seeker Detector***  
**Model:** SK1000

DetectaChem, LLC.  
710 N. Post Oak Rd., Ste 400  
Houston, Texas 77024  
832-472-2437 (Tel)  
info@detectachem.com

**Information Source:** <http://www.detectachem.com>

**Unit Cost:** No longer available



**Type:** Trace

**Availability:** No longer available

**Technology:** Optical/Chemistry

**Description:** The Seeker is a multi-purpose handheld detection system. A single Seeker provides capabilities for the detection and identification of trace explosives, drugs and narcotics, biological agents, and industrial chemicals. The Seeker also includes data storage and a computer interface for downloading and archiving test results and data.

**Use:** The Seeker requires minimal training for operation. Once the proper DetectaSwipe card is selected (i.e., general explosives, narcotics, etc.), the card may be swiped on an area, article, surface, or subject under investigation. Almost anything can be swiped—from plastic, to metal, to zippers, to skin—even rubber tires. After a sample is collected on the collection pad of the DetectaSwipe card, the Seeker identifies the unique ID of the card and test type with a barcode scan. The card is inserted into the Seeker and test results are displayed within 1 min to 2 min, depending on the type of test. These results are automatically stored into memory along with the date and time of the test.

The Seeker accepts multiple power sources, including standard alkaline batteries, rechargeable batteries, as well as external power via ac adapter or 12 V vehicle adapter.

The internal software of the Seeker (firmware) is upgradeable via a standard PC USB connection to support new detection cards, features, and other improvements. Upgrade announcements will be available on this website to registered users.

**DetectaSwipe Cards:** The flexibility of the Seeker is linked to the features of the DetectaSwipe detection cards. Depending on the card selected, the Seeker can detect a broad variety of explosives down to the nanogram level, as well as most common drugs and narcotics. The scientific methods used in the seeker and DetectaSwipe cards provide an extremely low false positive rate and are immune to the most common interfering agents. Each card has a unique identification code that is read by the Seeker's barcode reader and stored along with the time, date, and results of the test. DetectaSwipe cards can be easily marked with notes as well as the result to provide a permanent record for evidence.

When the data from the Seeker is later downloaded to a computer, the unique identifier can be used to match the data to the card. In addition, the ID code tells the Seeker what type of test is being run, thereby minimizing user error and the training necessary to operate the Seeker.

**Cards currently available:** There are currently two types of DetectaSwipe cards available: narcotics and general explosives. Group 1 explosives include TNT, TNB, DNT (2,4- and 2,6-), DNB (1,3- and 1,2-), Teteryl. Group 2 explosives include HMX, PETN, Semtex, nitroglycerin (NG), EGDN, ammonium nitrate (AN), Pyrodex/Triple 7, and gunshot residue (GSR). DetectaSwipe cards in development for release include detection of TATP and peroxide based explosives, as well as TNT+RDX (Comp B) and gun propellants.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** TNT, TNB, HMX, RDX, PETN, NG, EGDN, ammonium nitrate, acetone-peroxide type, pyrodex, and GSR

**LOD:** Trace levels below TSA threshold limits

**Penetrability:** Not applicable

**Sample Collection:** Swipe method with automated colorimetric assay

**Interferents:** None known

**Start-up Time:** < 10 s

**Response Time:** Not specified

**Alarm Capability:** Not specified  
**Detector Efficiency:** Not specified  
**False Positives:** Not specified  
**Radioactivity:** Not applicable

### PHYSICAL PARAMETERS

**Size:** 21.6 cm x 11.4 cm (8 1/2 in x 4 1/2 in) handheld  
**Weight:** 1.36 kg (3 lb)  
**Power Requirements:** Batteries or ac adapter  
**Battery Type:** Alkaline, rechargeable NiMH  
**Battery Life:** Not specified

### LOGISTICAL PARAMETERS

**Portability:** Pocket or belt-mount, rugged case for transport  
**Ease of Use:** One of simplest systems possible: swipe sample, place in device and read result. Minimal training.  
**Environmental Considerations:** Not specified  
**Consumables Required:** Self-contained chemistry swipe cards, batteries  
**Calibration Required:** Not specified  
**Maintenance Requirements:** Not specified  
**Service Options:** Not specified  
**Shelf Life:** Not specified  
**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Minimal training and no specific skills required  
**Training Required:** Product demonstration, instruction manual and online support with video instruction  
**Manuals Available:** Full instruction manual and online technical support  
**Data Storage:** Internal data storage is standard along with test result logging  
**Communication Interface:** USB (Universal Serial Bus) for PC download of test result data  
**Tamper Resistance:** Both seeker unit and swipe cards are fully self-contained with tamper proof packaging  
**Warranty:** 2 yr guarantee on Seeker unit with extension available.  
**Independent Testing:** Available upon request  
**Applicable Regulations:** 49 CFR 173.4

## GENERAL

Explosive Detector

Model: GVD-4

ElectroMax International, Inc.  
11152 Westheimer Ave.  
Suite #905  
Houston, Texas 77042  
281-531-7437 (Tel)  
spystuff@electromax.com

**Information Source:** <http://www.electromax.com>

**Unit Cost:** \$11K U.S.



**Type:** Trace

**Availability:** Now available

**Technology:** Thermo-Redox

**Description:** When the equipment is switched on, a continuous sample of air is drawn in via the nozzle. A concentration of explosive vapor in the sampled air exceeding 1 part in 109 by volume will cause the instrument to emit a high pitched tone. The frequency excursion of the tone is an approximate measure of the concentration of explosive vapor sampled. The source can be located by passing the probe across the area from which the response was obtained and listening to the variations in response. When desirable, the tone can be fed through the earphone so that it is audible to the operator only. A red light, which is visible to the operator but not to the person being searched, also appears when a strong sample is obtained.

The GVD4 is a further development of an existing range of detectors designed to facilitate the searching of people, luggage, parcels, etc., for hidden explosives. The unit is powered entirely from its own 12 V rechargeable battery pack, which is connected to the unit by a quick-release, weatherproof connector.

**Controls:** The GVD4 is extremely simple to operate. The unit is controlled by a single weatherproof on/off push button switch. Once activated it will automatically adjust to the surrounding environment, avoiding possible operator error. Warm-up time is approximately 10 s, and the emission of a low frequency tone indicates the unit is ready for use.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** C4, RDX, Semtex, HMX, TNT, dynamite, PETN, MHX, and ammonium nitrate

**LOD:** A concentration of explosive vapor in the sampled air exceeding 1 part in 109 by volume

**Penetrability:** Not applicable

**Sample Collection:** Air sampling

**Interferents:** Not specified

**Start-up Time:** 10 s

**Response Time:** Not specified

**Alarm Capability:** Audio and visual

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** Hand unit: 345 mm x 68 mm x 50 mm (13.6 in x 2.7 in x 1.97 in), Carrying case: 475 mm x 370 mm x 95 mm (19 in x 15 in x 3.7 in)

**Weight:** Hand unit: 820 g (29 oz), Case: 4.5 kg (9.9 lb)

**Power Requirements:** Battery included

**Battery Type:** 12 V dc rechargeable nickel cadmium battery

**Battery Life:** Minimum 6.5 h constant use, 12 h to 14 h normal intermittent use

## LOGISTICAL PARAMETERS

**Portability:** Small, easy to transport  
**Ease of Use:** Easy, one on/off button  
**Environmental Considerations:** Weatherproof  
**Consumables Required:** Not specified  
**Calibration Required:** Autocalibrates to environment  
**Maintenance Requirements:** Not specified  
**Service Options:** Not specified  
**Shelf Life:** Not specified  
**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Minimal  
**Training Required:** Not specified  
**Manuals Available:** Yes  
**Data Storage:** Not specified  
**Communication Interface:** Not specified  
**Tamper Resistance:** Not specified  
**Warranty:** Not specified  
**Independent Testing:** Not specified  
**Applicable Regulations:** Not specified

## GENERAL

### E.L.I.T.E. Explosives Detection

**Model:** Model EL100

Field Forensics, Inc.  
1583 Pinellas Bayway S  
St. Petersburg, Florida 33715  
727-647-3052 (Tel)  
info@fieldforensics.com

**Information Source:** <http://www.fieldforensics.com>

**Unit Cost:** As low as \$13. Dependent on order size.



**Type:** Trace

**Availability:** October 1, 2005

**Technology:** Colorimetric

**Description:** The Model EL100 tests for a broad range of explosives including all TNT-based explosives and explosives such as PETN, RDX, HMX; and inorganic explosives such as sodium nitrate and ammonium nitrate. E.L.I.T.E.<sup>TM</sup> explosives detection technology allows a portable, disposable, low-cost, reliable, robust, and easy-to-use device. Winner of 2006 R&D100 Award for one of the year's top 100 new technologies, and winner of Federal Lab Consortium Award.

The EL100 is designed for single usage and after use can be disposed of as regular waste (i.e., nonhazardous). Several of the devices can fit easily into a policeman's shirt pocket ready for use, for example, on vehicle door handles during routine traffic stops, on surfaces and door handles of suspicious parked vehicles, or, on suspicious packages. The sample is tabbed for ease of handling and to allow recording of date, time, and/or sample location information, etc. The EL100 is also for use in detecting gun shot residue (GSR).

Imagine the power of having large numbers of law enforcement personnel equipped with sensitive but robust explosives detectors. Due to its low cost, reliability, ease of use, sensitivity to explosives, and portability, it can be out into the hands of homeland defense and police personnel across the country.

**Length of Time Fielded:** The EL100, in its first version, was fielded in December 2005

**Current Users:** The EL100, in its first version, was fielded in December 2005

## OPERATIONAL PARAMETERS

**Explosives Detected:** Broad range of nitroaromatics, aliphatics, inorganics, and nitramines

**LOD:** Independently verified from 25 ng

**Penetrability:** Not applicable

**Sample Collection:** Swab

**Interferents:** None known - contact vendor for details

**Start-up Time:** No start-up time, immediate availability

**Response Time:** Immediate response depending on explosive encountered, 90 s maximum to complete range

**Alarm Capability:** Visible color change

**Detector Efficiency:** Not specified

**False Positives:** Not applicable

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** Fits in pocket

**Weight:** With optional battery powered heater, 227 g (0.5 lb); without heater 28 g (1 oz)

**Power Requirements:** Heat source required. Can use either optional battery-powered heater or lighter.

**Battery Type:** In optional battery-powered heater: NiMH

**Battery Life:** Rechargeable. Recharge required, use dependent, at from 2 d to > 1 mo.

## LOGISTICAL PARAMETERS

**Portability:** Designed to be carried in a shirt pocket

**Ease of Use:** Designed for use by soldiers and policeman. Explosives is either there or it isn't.

**Environmental Considerations:** Extreme environmental conditions -40 °C to 70 °C (-40 °F to 158 °F) storage and operating

**Consumables Required:** The kit itself is disposable

**Calibration Required:** None

**Maintenance Requirements:** None

**Service Options:** Not routinely required. Free telephone tech support. Training programs available.

**Shelf Life:** 18 mo in extreme environmental conditions

**O&M Costs:** No significant O&M cost

## SPECIAL REQUIREMENTS

**Operator Skills:** Field guide is a visual and written procedure that is easy to follow. Very low training requirement.

**Training Required:** Vendor provided training on kit; training on general screening procedures are available

**Manuals Available:** Field Guide is pocket size guide with laminated pages, photographs, and identification chart

**Data Storage:** Not applicable

**Communication Interface:** Not applicable

**Tamper Resistance:** Each kit comes in an hermetically sealed pouch. Each is uniquely identified by barcode.

**Warranty:** 100 % return to factory warranty on labor and materials

**Independent Testing:** Yes. Contact vendor.

**Applicable Regulations:** None known

## GENERAL

***Itemiser Explosives Trace Detector*****Model:** P0007018

GE Homeland Protection  
 GE Infrastructure, Security  
 205 Lowell Street  
 Wilmington, Massachusetts 01887  
 800-433-5346 (Tel)  
 978-658-3767 (Tel)  
 sales.homelandprotection.us@ge.com

**Information Source:** <http://www.gesecurity.com>**Unit Cost:** \$45.2K (\$38.8K for GSA/1122)**Type:** Trace**Availability:** Available**Technology:** Ion Trap Mobility Spectrometry

**Description:** Organic in nature, explosives constantly emit microscopic particles. Particles transfer easily to solid surfaces that come in physical contact with a “contaminated” person or item. Detecting these traces on individuals, baggage, personal items, or a container’s surface may indicate the presence of bulk quantities.

Using the Itemiser: Operators collect trace samples by wiping surfaces with special Teflon<sup>®</sup>-coated fiberglass strips, called “sample traps.” The system analyzes samples in seconds to identify specific target substances. By identifying particles at nanogram (billionths of a gram) levels, trace detection helps detect explosives where other methods, particularly those that rely on visual detection, may fail.

The Itemiser with simultaneous dual-mode detection brings additional capabilities that assure the detection of the broadest range of explosives. It achieves this with GE’s patented Ion Trap Mobility Spectrometer<sup>®</sup> (ITMS) technology and an advanced switching system that enables simultaneous dual-mode (positive and negative ions) detection. While negative mode operation detects the majority of explosives, TATP and smokeless powders are among the few explosives more readily detected in positive mode. Therefore, to rule out the presence of these types of explosives, single-mode detectors require operators to sample and test in one mode, then switch modes and resample and test again. As expected, this greatly reduces throughput. The most effective way to detect the broadest range of explosives and improve throughput is to use simultaneous dual-mode detection, which has the added ability to simultaneously screen for narcotics.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Security Sensitive Information (SSI)**LOD:** SSI**Penetrability:** Not applicable**Sample Collection:** SSI**Interferents:** SSI**Start-up Time:** 30 min to stabilize**Response Time:** Variable 4 s to 10 s, standard is 8 s**Alarm Capability:** Nanogram levels of all substances in library**Detector Efficiency:** Not specified**False Positives:** < 1 % false positive**Radioactivity:** Ni-63, NRC license in place

## PHYSICAL PARAMETERS

**Size:** 50 cm x 48 cm x 38 cm (19.8 in x 18.9 in x 15 in) d,w,h with display opened; 18 cm (7.1 in) with display closed**Weight:** 12 kg (26.5 lb)**Power Requirements:** 100 V ac to 120 V ac or 200 V ac to 240 V ac, 47 Hz to 63 Hz, 150 W; 11 V ac to 18 V ac 10 A max**Battery Type:** NiMH**Battery Life:** 4.5 h average

## LOGISTICAL PARAMETERS

**Portability:** Carrying handle and fold-down screen allows for portability; can interrupt power for relocation

**Ease of Use:** High ease of use

**Environmental Considerations:** 0 °C to 40 °C (32 °F to 104 °F), up to 95 % humidity noncondensing, IP 20 rating

**Consumables Required:** Sample traps, dopants, membranes, filters, cleaning materials

**Calibration Required:** Daily

**Maintenance Requirements:** Daily: calibrate; weekly: check dopants, filters, and blow out air line

**Service Options:** Tiered service plan options, phone and field service engineer support

**Shelf Life:** Minimum expected life: 5 yr

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Light training sufficient

**Training Required:** Training included with installation; various training packages available for purchase, CBT

**Manuals Available:** User's manual; Maintenance Log manual

**Data Storage:** > 1000 alarm files

**Communication Interface:** Built-in 10/100 Base-T Ethernet Port; IRDA port for wireless data transfer

**Tamper Resistance:** Various levels of allowable access for security

**Warranty:** 1 yr

**Independent Testing:** Upon request/need to know

**Applicable Regulations:** NRC, CE



## GENERAL

VaporTracer Explosives Trace Detector

Model: P0007019

GE Homeland Protection  
 GE Infrastructure, Security  
 205 Lowell Street  
 Wilmington, Massachusetts 01887  
 800-433-5346 (Tel)  
 978-658-3767 (Tel)  
 sales.homelandprotection.us@ge.com

**Information Source:** <http://www.gesecurity.com>

**Unit Cost:** \$24.5K (\$21K to GSA / 1122)



Type: Trace

**Availability:** Available

**Technology:** Ion Trap Mobility Spectrometry

**Description:** Organic in nature, explosives constantly give off microscopic particles and vapors. Particles transfer easily to solid surfaces that come in physical contact with a “contaminated” person or item. Detecting trace amounts of explosives on an individual, bag or package, vehicle, or other surface may indicate the presence of bulk quantities. In sufficient amounts, explosives—confined in a container—accumulate detectable high concentrations of vapors. Operators collect trace samples by wiping surfaces with special, coated fiberglass strips, called “sample traps,” or “sniffing” concentrated vapors. The VaporTracer handheld trace detector sets new standards in sensitivity and portability for particle and vapor sampling. Efficient and inexpensive to operate, the robust, easy-to-use VaporTracer delivers grab-and-go portability, speed, and accuracy even in the most demanding and dirty environments. Simple, noninvasive screening protocols assure rapid throughput. The flexibility and portability of the seven-pound VaporTracer also makes it useful for alarm resolution, handling overflow and relieving bottlenecks during peak periods.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Sensitive Security Information (SSI)

**LOD:** SSI

**Penetrability:** Not applicable

**Sample Collection:** SSI

**Interferents:** SSI

**Start-up Time:** 20 min

**Response Time:** Variable from 2 s and up; 8 s default

**Alarm Capability:** Nanogram detection

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Ni-63, NRC license in place

## PHYSICAL PARAMETERS

**Size:** 47 cm x 12 cm x 20.5 cm (18.5 in x 4.72 in x 8.07 in; 24.5 cm (9.65 in) with battery, l,w,h

**Weight:** 3.2 kg (7 lb) without battery; 4.4 kg (9.63 lb) with battery

**Power Requirements:** 110 V ac to 120 V ac or 200 V ac to 240 V ac, 47 Hz to 63 Hz; 15 V dc @ 8.6 A (130W max)

**Battery Type:** Ni-MH battery for installation; portable extended run battery also available

**Battery Life:** 90 min average; optional extended run battery up to 6 h operation

## LOGISTICAL PARAMETERS

**Portability:** Highly transportable

**Ease of Use:** Requires skill and training

**Environmental Considerations:** 0 °C to 50 °C (32 °F to 125 °F); 0 % to 95 % relative humidity (noncondensing)

**Consumables Required:** Sample traps, dopants, filters, cleaning supplies, membranes, dryer material

**Calibration Required:** Daily

**Maintenance Requirements:** Daily calibration; Weekly: change dryer material, check dopants and filters, membrane

**Service Options:** Variable service option packages available; field service and phone support

**Shelf Life:** 5 yr minimum expected life

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Operator training provided at installation

**Training Required:** On-site and OEM training packages available; CBT

**Manuals Available:** User's Manual

**Data Storage:** > 500 alarm files

**Communication Interface:** RS-232 port, IrDA port

**Tamper Resistance:** Access security in place

**Warranty:** 1 yr

**Independent Testing:** Upon request

**Applicable Regulations:** NRC, CE

## GENERAL

**EntryScan Explosives & Narcotics Trace Detector****Model:** P0007026-001

GE Homeland Protection  
 GE Infrastructure, Security  
 205 Lowell Street  
 Wilmington, Massachusetts 01887  
 800-433-5346 (Tel)  
 978-658-3767 (Tel)  
 sales.homelandprotection.us@ge.com

**Information Source:** <http://www.gesecurity.com>**Unit Cost:** \$143K**Type:** Trace**Availability:** Available**Technology:** Ion Trap Mobility Spectrometry

**Description:** Organic in nature, explosives constantly emit microscopic particles that transfer easily and adhere to the clothing, skin and hair of “contaminated” individuals that have come in contact with explosive substances. Detecting explosives traces on a person may indicate the presence of bulk quantities.

Used alone or in conjunction with metal detectors, x-ray scanners, or canine patrols, the EntryScan walk-through portal offers maximum checkpoint security with minimal disruption and no physical contact. Using gentle jets of air to loosen microscopic particles of explosives from clothing, skin, and hair, the EntryScan optimizes the natural upward flow of air generated by the body to draw explosives particles into the detector for analysis and results in as little as 13 s.

EntryScan utilizes GE Security’s patented Ion Trap Mobility Spectrometer (ITMS<sup>®</sup>) technology, which detects a wider range of substances with greater accuracy and speed. ITMS detectors increase ionization efficiency, the main factor for determining detection sensitivity. Due to the trap and membrane design, ITMS technology operates well in dusty and humid high traffic areas, maintaining its precision performance even in harsh “real world” environments.

The EntryScan automatically controls traffic with a clear visual prompt, signaling individuals to enter the portal. If traces of explosives or narcotics are detected—or a person leaves before being prompted to exit—an alarm instantly sounds to facilitate rapid containment. By maintaining traffic control, the EntryScan helps avoid rescreening subjects or allowing individuals to leave the area before complete results are obtained. The EntryScan has been successfully deployed worldwide at airports, embassies, nuclear power plants, correctional facilities, and other high-security buildings and events.

**Length of Time Fielded:** > 20 yr**Current Users:** > 20 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** Not specified**LOD:** Not specified**Penetrability:** Not applicable**Sample Collection:** 13 s**Interferents:** Not specified**Start-up Time:** 30 min from cold start**Response Time:** 13 s**Alarm Capability:** Visual and audio alarms**Detector Efficiency:** Not specified**False Positives:** < 1 %**Radioactivity:** Ni-63

## PHYSICAL PARAMETERS

**Size:** 235 cm x 138 cm x 102 cm (92.5 in x 54.3 in 40 in) h,w,d**Weight:** 338 kg (745 lb)**Power Requirements:** 220 V ac to 240 V ac, 20 A, single phase**Battery Type:** UPS**Battery Life:** 20 min

## LOGISTICAL PARAMETERS

**Portability:** Installed on site and fixed in place

**Ease of Use:** GUI software with touchscreen menus

**Environmental Considerations:** Semi-permeable membrane excludes dirt, dust, humidity, or contamination

**Consumables Required:** Dopants, membrane, preconcentrator, line dryers, and bag

**Calibration Required:** Daily

**Maintenance Requirements:** Weekly, bi-monthly, and monthly

**Service Options:** Telephone service, on-site repair

**Shelf Life:** 10 yr

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Training of operators is provided

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Yes

**Communication Interface:** Yes

**Tamper Resistance:** Yes

**Warranty:** Yes

**Independent Testing:** Yes

**Applicable Regulations:** Yes

## GENERAL

Explosives Trace Detection System

Model: DS-120E

Hitachi, Ltd.  
RKB Provided**Information Source:**[http://www.hitachi.co.jp/ICSFiles/afieldfile/2006/04/07/ds\\_4001\\_en.pdf](http://www.hitachi.co.jp/ICSFiles/afieldfile/2006/04/07/ds_4001_en.pdf)**Unit Cost:** Not specified**Type:** Trace**Availability:** Not specified**Technology:** Quadrupole Mass Spectrometer**Description:** Operation: No special gas or liquid required. Unlike conventional ETDs, the DS-120E does not use any radioactive source for ionization.

Easy to use: Simple graphical user interface on the touch-screen enables easy operation and minimal operator training. The large LCD allows operators to easily see messages on the display screen. The compact desktop design allows it to be easily moved and requires little space to be set up in. Automated setup routines bring it to ready status quickly.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Not specified**LOD:** Not specified**Penetrability:** Not applicable**Sample Collection:** Not specified**Interferents:** Not specified**Start-up Time:** ~30 min**Response Time:** 10 s**Alarm Capability:** Not specified**Detector Efficiency:** Not specified**False Positives:** Not specified**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 580 mm x 600 mm x 710 mm (23 in x 24 in x 28 in) with display closed**Weight:** Not specified**Power Requirements:** 1200 W**Battery Type:** Not specified**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified**Ease of Use:** Not specified**Environmental Considerations:** Not specified**Consumables Required:** Not specified**Calibration Required:** Not specified**Maintenance Requirements:** Not specified**Service Options:** Not specified

**Shelf Life:** Not specified  
**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Not specified  
**Training Required:** Not specified  
**Manuals Available:** Not specified  
**Data Storage:** Not specified  
**Communication Interface:** Not specified  
**Tamper Resistance:** Not specified  
**Warranty:** Not specified  
**Independent Testing:** Not specified  
**Applicable Regulations:** Not specified

## GENERAL

Portable Explosive Detector**Model:** Fido XT

ICx-Nomadics  
 1024 S. Innovation Way  
 Stillwater, Oklahoma 74074  
 405-372-9535 (Tel)  
 fido@nomadics.com  
**Information Source:** <http://www.nomadics.com>

**Unit Cost:** \$20.8K GSA for 1 unit**Type:** Trace**Availability:** Now**Technology:** Amplifying Fluorescent Polymer

**Description:** The Fido XT with tethered head and pistol grip is designed for convenient use in the field and can be easily adapted to unmanned vehicles and robots for remote applications. The Fido is suitable for handheld, bench-top, and robot mounted applications. It is designed for ease of operation and provides the operator with real-time information. The device has a touch pad with clearly labeled keys and an LCD display. Powering up the Fido typically takes less than 3 min. Once in operation, sample results are displayed in real-time on the LCD screen or through an optional audio signal.

The Fido operates for approximately 4 h on a single rechargeable battery (two provided). Actual detection of explosive materials occurs in the sensing element which has a reversible response allowing it to be reused many times. After each target is analyzed, the Fido takes only seconds to baseline before sensing the next target. Replacement of the sensing element and battery is simple and requires no tools.

Fido has a number of applications for detecting concealed explosives such as people, vehicle, and portal screening. The Fido is incredibly sensitive with a detection range that goes as low as a few femtograms. With this level of sensitivity, it is possible to detect trace residue left on the hands and clothing of a suspect as well as the residue transferred to a surface he touched (i.e., door handles, cell phones, or the trunk of a car).

**Length of Time Fielded:** Since 2005**Current Users:** Since 2005

## OPERATIONAL PARAMETERS

**Explosives Detected:** Nitroaromatics (e.g., TNT), plastics, some powders, other**LOD:** TNT (1 fg to 10 fg), plastics (pg)**Penetrability:** Not applicable**Sample Collection:** Vapor and particle modes; no changes needed for either mode**Interferents:** Classified**Start-up Time:** < 5 min**Response Time:** 1 s to 10 s**Alarm Capability:** Limited**Detector Efficiency:** Not specified**False Positives:** Depends upon application**Radioactivity:** No radioactive source required

## PHYSICAL PARAMETERS

**Size:** Controller: 25 cm x 12 cm x 5.1 cm (9.8 in x 4.8 in x 2 in); sensor head: 8.9 cm x 8.9 cm x 3.8 cm (3.5 in x 3.5 in x 1.5 in); tether 3 in (optional)**Weight:** < 1.36 kg (3 lb)**Power Requirements:** Battery, 110 V ac to 250 V ac, 50 Hz to 60 Hz**Battery Type:** Rechargeable lithium ion (camcorder type battery)**Battery Life:** 4 h typical

## LOGISTICAL PARAMETERS

**Portability:** Entire kit including manual and supplies is under 13 lb

**Ease of Use:** Typically 4 h to 8 h training for basic proficiency

**Environmental Considerations:** Indoor, outdoor, high temperature, and high humidity

**Consumables Required:** Sensing element, sample collection swipes (if used in particle mode)

**Calibration Required:** None

**Maintenance Requirements:** Minor cleaning and occasional o-ring replacement

**Service Options:** 24/7 tech support, 24 h turnaround typical, loaner program if necessary

**Shelf Life:** Indefinite

**O&M Costs:** \$2.5K to \$5K/yr typical

## SPECIAL REQUIREMENTS

**Operator Skills:** No special skills required

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** 256 MB (10 d continuous data logging)

**Communication Interface:** USB, RS-232

**Tamper Resistance:** Limited

**Warranty:** 12 mo, optional to 60 mo

**Independent Testing:** Yes, contact manufacturer

**Applicable Regulations:** N/A



## GENERAL

**Detector Kit**  
**Model:** KD40

Ketech Defence  
 Defence Head Office  
 Sellers Wood Drive  
 Bulwell, Nottingham,  
 NG6 8AL  
 QPI (USA)  
 11207 Single Oak Road  
 Fredericksburg, Virginia NG6 8AL  
 540-548-4050 (Tel)  
 dbaggett@goqpi.com

**Information Source:** <http://www.goqpi.com>

**Unit Cost:** \$140



**Type:** Trace

**Availability:** Currently available

**Technology:** Colorimetric

**Description:** The kits have been designed to identify whether a suspect material is either a homemade or high explosive. The principle of operation in both cases is similar, although the HM explosive uses a two-stage test to positively confirm the presence while the HE test is a single stage. The concept of the test is very similar to that of a pregnancy test kit: take a swab of material, expose it to the chemicals and monitor the reaction. Detailed instructions are on the inside of the lid and initial training takes about 15 min. Subsequently if the kit has to be used, the user follows the simple instructions.

In the case of the homemade test kit (the KeTech ExDet HM) a drop of water from the enclosed tube is applied to the end of a test strip, which is then placed in contact with the suspect material. If the test strip pads turn purple it is possible that the suspect material is homemade explosive and so the second test is used as confirmation. This test involves putting a few drops of water, again from the plastic bottle enclosed within the kit, onto a collection pad and pressing the pad onto the suspect material to obtain a sample. Two test pads from the kit are then pressed, in turn, onto the collection pad and their color changes are monitored. In the event that these both change color, a drop of a confirmation chemical is added to one of the pads for final confirmation of the presence of an ANS based HM explosive.

With the high explosive test kit (the KeTech ExDet HE kit) a cotton swab is moistened with a few drops of acetone from the enclosed bottle and used to wipe the suspect area/material. Note that if there is a suspicion that the acetone may mark the area, for instance if it is a highly polished table or people object to their hands being swabbed with acetone, then it is possible to wipe the suspect area with a nonabsorbent pad and then swab that (the only requirement is to transfer some of the suspect material onto the cotton bud).

The "contaminated" cotton swab is then inserted into a reagent bottle and agitated to transfer some of the suspect material before being discarded. A test strip, which looks very similar to a pregnancy test strip, is then inserted into the bottle and left for 1 min. The reaction of the colored bands on this strip confirms whether or not the suspect material is high explosive. Note that each standard HM kit contains 20 Test 1 and 2 Test 2 packets whilst each HE kit contains 4 tests, although other quantities can be provided if required. Disposal bags are also provided within the kits to allow used materials to be controlled. Each kit is packaged in a pocket sized case and is totally self-contained. Since it uses chemical reactions, no batteries or other consumables are required. The low cost and ease of use allows the kits to be widely distributed to potential points of use including police cars, border police, airport security personnel, etc.

**Areas of use:** Obviously, a number of areas in which these kits have been used over the past few years fall within the Official Secrets Act and therefore cannot be discussed in an open paper such as this. We are, however, able to discuss in general some of the scenarios in which the kits have been used. The approach adopted has been to use the kits to decide whether or not there is a need to deploy the Bomb Disposal Squad if there is any suspicious material discovered, either during a building or person search, or following a call from the public. There is no doubt that the decision as to whether or not to call the Bomb Squad has traditionally been a difficult one for officials: calling them out to a false alarm causes major disruption to the public for no benefit while not calling them out to a real threat could have very serious consequences. These kits allow that the decision whether the suspect material is explosive or not is based on fact rather than uncertainty. Note that the low cost and ease of use allows kits to be kept in vehicles, buildings, etc., so that the first responders and even front line police have a number readily available at the point of need. This ensures that the time delay between finding suspicious material and identifying whether or not it is explosive can be less than 2 min or 3 min and so permits fast and accurate decision making often without the public even needing to be aware that suspicious material has been found.

In addition to the confirmation whether or not suspicious material is explosive, the kits are also often used to gather intelligence and help in locating explosive material in the first place, as well as confirming whether or not suspect individuals have been handling explosive materials. As examples, there are a number of potential points of entry into an area: in the case of a country these include ports and airports while, in the case of a building there are doors. It is likely that, unless considerable care is taken, traces of any explosive material will reside on the hands or, in the case of large volume explosives such as fertilizer bombs, or shoes of the people involved. These residues are likely to be transferred to room/car door handles, car/lorry pedals and foot wells, door mats, etc. The use of these swabbing kits can confirm the presence of these traces and therefore assist in the identification of the people involved in the manufacture/transport of the explosives. Note that techniques such as swabbing door handles, brake pedals, etc., can often be done without the knowledge of the individuals under suspicion. This therefore can be used to provide confirmation of intelligence without having to abort the surveillance of these individuals.

**Length of Time Fielded:** 2 yr

**Current Users:** 2 yr

### OPERATIONAL PARAMETERS

**Explosives Detected:** Ammonium nitrate and sugar based home explosives

**LOD:** Not specified

**Penetrability:** Not applicable

**Sample Collection:** The swabbing kits can confirm the presence of explosives room/car door handles, car/lorry pedals, etc.

**Interferents:** None known

**Start-up Time:** Not applicable

**Response Time:** < 60 s

**Alarm Capability:** Not specified

**Detector Efficiency:** Not specified

**False Positives:** None known

**Radioactivity:** Not applicable

### PHYSICAL PARAMETERS

**Size:** 16.5 cm x 7.1 cm x 2.8 cm (6.5 in x 2.8 in x 1.1 in)

**Weight:** 113 g (4 oz)

**Power Requirements:** None

**Battery Type:** None

**Battery Life:** Not specified

### LOGISTICAL PARAMETERS

**Portability:** Pocket size

**Ease of Use:** Easy

**Environmental Considerations:** Not specified

**Consumables Required:** Not applicable

**Calibration Required:** N/A

**Maintenance Requirements:** Not specified

**Service Options:** Not specified

**Shelf Life:** 18 mo

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Instructions in the lid	<b>Data Storage:</b> Not applicable
<b>Training Required:</b> Yes	<b>Communication Interface:</b> Not applicable
<b>Manuals Available:</b> Yes	<b>Tamper Resistance:</b> Not applicable
<b>Warranty:</b> Not specified	<b>Independent Testing:</b> Not specified

**Applicable Regulations:** Not specified

## GENERAL

**Detector Kit**  
**Model:** KD60

Ketech Defence  
 Defence Head Office  
 Sellers Wood Drive  
 Bulwell, Nottingham,  
 NG6 8AL  
 QPI (USA)  
 11207 Single Oak Road  
 Fredericksburg, Virginia NG6 8AL  
 540-548-4050 (Tel)  
 dbaggett@goqpi.com

**Information Source:** <http://www.goqpi.com>

**Unit Cost:** \$140



**Type:** Trace

**Availability:** Not specified

**Technology:** Colorimetric

**Description:** These kits are not designed to replace electronic explosive vapor detectors. Electronic vapor detectors are typically 100 to 200 times more expensive to procure than these kits and, therefore, the quantities that can be procured are usually low, especially when the specialist training and ongoing costs are factored in. This means that, to quote a senior police chief, "They are never where you need them when you need them." The low cost and ease of use of the ExDet HM and ExDet HE kits allows explosive detector kits to be widely distributed to security forces that do not normally have access to the expensive electronic explosive detector equipment. This note provides information on how the kits should be operated and typical examples of where the kits have already been used.

**Method of use:** The kits have been designed to identify whether a suspect material is either a homemade or high explosive. The principle of operation in both cases is similar, although the HM explosive uses a two-stage test to positively confirm the presence while the HE test is a single stage. The concept of the test is very similar to that of a pregnancy test kit: take a swab of material, expose it to the chemicals and monitor the reaction. Detailed instructions are on the inside of the lid and initial training takes about 15 min. Subsequently, if the kit has to be used, the user follows the simple instructions. In the case of the homemade test kit (the KeTech ExDet HM), a drop of water from the enclosed tube is applied to the end of a test strip, which is then placed in contact with the suspect material. If the test strip pads turn purple it is possible that the suspect material is a homemade explosive and so the second test is used as confirmation. The second test involves putting a few drops of water, again from the plastic bottle enclosed within the kit, onto a collection pad and pressing the pad onto the suspect material to obtain a sample. Two test pads from the kit are then pressed, in turn, onto the collection pad and their color changes monitored. In the event that these both change color, a drop of a confirmation chemical is added to one of the pads for final confirmation of the presence of an ANS based HM explosive.

With the high explosive test kit (the KeTech ExDet HE kit), a cotton swab is moistened with a few drops of acetone from the enclosed bottle and used to wipe the suspect area/material. Note that if there is a suspicion that the acetone may mark the area, for instance if it is a highly polished table or people object to their hands being swabbed with acetone, then it is possible to wipe the suspect area with a nonabsorbent pad and then swab that: the only requirement is to transfer some of the suspect material onto the cotton bud. The 'contaminated' cotton swab is then inserted into a reagent bottle and agitated to transfer some of the suspect material before being discarded. A test strip, which looks very similar to a pregnancy test strip, is then inserted into the bottle and left for 1 min. The reaction of the colored bands on this strip confirms whether or not the suspect material is high explosive.

Note that each standard HM kit contains 20 Test 1 and 2 Test 2 packets while each HE kit contains 4 tests, although other quantities can be provided if required. Disposal bags are also provided within the kits to allow used materials to be controlled. Each kit is packaged in a pocket-sized case and is totally self-contained. Since it uses chemical reactions no batteries or other consumables are required whilst the low cost and ease of use allows the kits to be widely distributed to potential points of use including, e.g., police cars, border police, airport security personnel, etc.

**Length of Time Fielded:** 2 yr

**Current Users:** 2 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** PETN, RDX, TNT, and C4

**LOD:** Not specified  
**Penetrability:** Not applicable  
**Sample Collection:** Not specified  
**Interferents:** None known  
**Start-up Time:** Not specified  
**Response Time:** < 60 s  
**Alarm Capability:** Not specified  
**Detector Efficiency:** Not specified  
**False Positives:** None Known  
**Radioactivity:** Not specified

### PHYSICAL PARAMETERS

**Size:** 16.5 cm x 7.1 cm x 2.8 cm (6.5 x 2.8 x 1.1 in)  
**Weight:** 113 g (4 oz)  
**Power Requirements:** None  
**Battery Type:** None  
**Battery Life:** Not specified

### LOGISTICAL PARAMETERS

**Portability:** Pocket size  
**Ease of Use:** Not specified  
**Environmental Considerations:** Not specified  
**Consumables Required:** Not specified  
**Calibration Required:** Not specified  
**Maintenance Requirements:** Not specified  
**Service Options:** Not specified  
**Shelf Life:** 18 mo  
**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Instruction in the lid  
**Training Required:** Yes  
**Manuals Available:** Not specified  
**Data Storage:** None  
**Communication Interface:** Not specified  
**Tamper Resistance:** Sealed by tape and special packaging  
**Warranty:** Not specified  
**Independent Testing:** Not specified  
**Applicable Regulations:** None specified

## GENERAL

Explosive Detection Kit

Model: EDK123

Law Enforcement Associates  
 100 Hunter Place  
 Youngsville, North Carolina 27596  
 919-554-4700 x266 (Tel)  
 aondrick@leacorp.com

**Information Source:** <http://www.leacorp.com/>

**Unit Cost:** \$99.95



**Type:** Trace

**Availability:** Max 30 d A.R.O.

**Technology:** Diphenylamine, Sulfuric Acid

**Description:** Portable explosive detection is an important part of force protection. The EDK Kit allows for a fast, easy way to field test for the presence of possibly harmful explosives. The EDK Kit is as simple to use as 1-2-3.

- 1.) Remove the evidence collector pad from pouch and press against the suspected person's hands or the suspect vehicle's entry handles, steering wheel, or gearshift.
- 2.) Place ampoule on adhesive side of evidence collector pad, return to pouch and crush ampoule.
- 3.) Shake pouch well to moisten collector pad. If there is any presence of a nitrate-based explosive residue then the pad will turn blue.

Contains 10 tests per box.

**Length of Time Fielded:** Sept. 13, 2003 to present

**Current Users:** Sept. 13, 2003 to present

## OPERATIONAL PARAMETERS

**Explosives Detected:** Nitrate based: TNT, Dynamite, Sentext, RDX, and ammonium nitrates

**LOD:** Not Specified

**Penetrability:** Not applicable

**Sample Collection:** Disposable testing swabs

**Interferents:** Not specified

**Start-up Time:** Not specified

**Response Time:** Up to 10 s

**Alarm Capability:** Not specified

**Detector Efficiency:** Not specified

**False Positives:** Not Specified

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** 10.2 cm x 7.6 cm x 5.1 cm (4 in x 3 in x 2 in)

**Weight:** < 0.45 kg (1 lb)

**Power Requirements:** None

**Battery Type:** N/A

**Battery Life:** N/A

## LOGISTICAL PARAMETERS

**Portability:** Simple

**Ease of Use:** Simple

**Environmental Considerations:** Well ventilated [best in 21 °C to 32 °C (70 °F to 90 °F)]

**Consumables Required:** Not applicable

**Calibration Required:** Not applicable

**Maintenance Requirements:** Not applicable

**Service Options:** Not applicable

**Shelf Life:** None: keep out of direct heat

**O&M Costs:** Not Specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Included in Instruction Manual

**Training Required:** Refer questions to 800-354-9669

**Manuals Available:** Included in package

**Data Storage:** Not applicable

**Communication Interface:** Not applicable

**Tamper Resistance:** Not applicable

**Warranty:** Not applicable: Disposable

**Independent Testing:** MSDS

**Applicable Regulations:** Sulfuric acid can be found in right-to-know lists

## GENERAL

Expray: Explosive Detection & Identification

Model: MSI 1553

Mistral Security, Inc.  
7910 Woodmont St.  
Bethesda, Maryland 20814  
301-913-9366 (Tel)  
security@mistralgroup.com

**Information Source:**

[http://www.mistralgroup.com/SEC\\_explosives.asp](http://www.mistralgroup.com/SEC_explosives.asp)

**Unit Cost:** \$260



**Type:** Trace

**Availability:** Now

**Technology:** Colorimetric

**Description:** Pre-Blast and Post-Blast Investigative Tool to Detect and Identify Explosives. Used for both field and laboratory testing. Expray™ is a portable, aerosol test kit for the immediate detection and identification of explosives; pre/post blast for Group A (i.e., TNT, etc.), Group B (i.e., Semtex, etc.) and Group C (i.e., inorganic nitrates).

**Size:** Each kit provides 100 explosive tests. Also available in a 50 test size as well as Expray Plus which provides the additional detection of improvised explosives such as TATP.

**Benefits:** Simple—No additional equipment needed, works in all conditions and environments.

Easy—Three simple steps, just swipe, spray/drop and read the results.

Fast—Instantaneous results.

Safe—Meets international standards including OSHA.

Reliable—Will detect minute traces of explosives (20 ng). No false negative, low false positive rate.

Cost efficient—Low cost per test.

**Length of Time Fielded:** 3 yr

**Current Users:** 3 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** Includes: ANFO, TNT, PETN, TATP, chlorates, peroxides, nitrates, C4, bromates, and HMTD

**LOD:** Trace—nanogram

**Penetrability:** Not applicable

**Sample Collection:** Colorimetric—swab, spray, read color

**Interferents:** Not specified

**Start-up Time:** Seconds to perform the test

**Response Time:** Immediate

**Alarm Capability:** Color displayed on swab

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 22.2 cm x 20.3 cm x 7.6 cm (8.75 in x 8 in x 3 in)

**Weight:** < 0.91 kg (2 lb)

**Power Requirements:** None

**Battery Type:** None

**Battery Life:** Not applicable

## LOGISTICAL PARAMETERS

**Portability:** Portable

**Ease of Use:** Very easy: 3 steps (swipe suspect area, spray swipe, read color)

**Environmental Considerations:** Most any

**Consumables Required:** Aerosols, swipes

**Calibration Required:** None

**Maintenance Requirements:** None

**Service Options:** Training programs offered, telephone/email support available

**Shelf Life:** 1 yr to 2 yr from purchase

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** No special skills required (must be able to see color), training available

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** No

**Communication Interface:** Not applicable

**Tamper Resistance:** Not applicable

**Warranty:** Shelf Life

**Independent Testing:** Yes

**Applicable Regulations:** Follows all OSHA, Manufactured under ISO 9001–2000 regulations



## GENERAL

**Expray Plus: Explosive Detection & Identification****Model:** MSI 1555

Mistral Security, Inc.  
7910 Woodmont St.  
Bethesda, Maryland 20814  
301-913-9366 (Tel)  
security@mistralgroup.com

**Information Source:** <http://www.mistralgroup.com>**Unit Cost:** \$439.50**Type:** Trace**Availability:** Now**Technology:** Colorimetric

**Description:** ExpPre-Blast and Post-Blast Investigative Tool to detect and identify explosives. Used for both field and laboratory testing. Expray™ Plus is a portable aerosol test kit for the immediate detection and identification of explosives—pre and post blast—for Group A (i.e., TNT, etc.), Group B (i.e., Semtex, etc.) and Group C (i.e., inorganic nitrates), Group D (i.e., chlorates, bromates), & Category 7 (i.e., peroxide, TATP).

**Size:** Each kit provides 100 explosive tests. Also available in a 50 test size kit.

**Benefits:** Simple—No additional equipment needed, works in all conditions and environments.

Easy—Three simple steps, just swipe, spray/drop and read the results.

Fast—Instantaneous results.

Safe—Meets international standards including OSHA

Reliable—Will detect minute traces of explosives (20 ng). No false negative, low false positive rate

Cost efficient—Low cost per test

**Length of Time Fielded:** 3 yr**Current Users:** 3 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** Group A, B, C, D, Category 7 (TNT, PETN, TATP, chlorates, peroxides, nitrates, C4, bromates, and HMTD)

**LOD:** Trace—nanograms**Penetrability:** Not applicable**Sample Collection:** Colorimetric—swab, spray, read color**Interferents:** Not specified**Start-up Time:** Seconds to perform the test**Response Time:** Under 5 s**Alarm Capability:** Color displayed on swab**Detector Efficiency:** Not specified**False Positives:** Not specified**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** 22.2 cm x 20.3 cm x 7.6 cm (8.75 in x 8 in x 3 in)**Weight:** < 0.91 kg (2 lb)**Power Requirements:** Not applicable**Battery Type:** Not applicable**Battery Life:** Not applicable

## LOGISTICAL PARAMETERS

**Portability:** Portable

**Ease of Use:** Very easy: 3 steps (swipe suspect area, spray swipe, read color)

**Environmental Considerations:** Most any

**Consumables Required:** Aerosols, swabs

**Calibration Required:** None

**Maintenance Requirements:** None required

**Service Options:** Training programs offered, telephone/email support available

**Shelf Life:** 1 yr to 2 yr

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** No special skills required (must be able to see color), training available

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Not applicable

**Communication Interface:** Not applicable

**Tamper Resistance:** Not applicable

**Warranty:** Shelf Life

**Independent Testing:** Yes

**Applicable Regulations:** Follows all OSHA, Manufactured under ISO 9001–2000 regulations

## GENERAL

**DropEx Plus: Explosive Detection & Identification****Model:** MSI 1585

Mistral Security, Inc.  
7910 Woodmont St.  
Bethesda, Maryland 20814  
301-913-9366 (Tel)  
security@mistralgroup.com

**Information Source:**

[http://www.mistralgroup.com/SEC\\_explosives.asp](http://www.mistralgroup.com/SEC_explosives.asp)

**Unit Cost:** \$209**Type:** Trace**Availability:** Now**Technology:** Colorimetric

**Description:** Pre-Blast and Post-Blast Investigative Tool to detect and identify explosives including improvised explosives (TATP, etc.). Used for both field and laboratory testing. DropEx Plus is a portable, liquid drop test kit for the immediate detection and identification of most all military and commercially available and improvised explosives including: TNT, Semtex, RDX, PETN, EGDN, nitroglycerin, C4, smokeless powder, nitrates, chlorates, bromates, peroxides, black powder, ANFO, TATP, HMTD, etc.

Operational applications:

- Counter-Sabotage—Sweeping and searching for explosives at sensitive installations, airports, roadblocks, checkpoints, VIP events, vehicles, suspect houses, etc.
- Screen Suspects—Immediate checks on suspects detained in the area of an explosion or according to intelligence: hands (fingertips and nails, palms, wrist watch, rings), cellular phones, laptops, and interior of pockets.
- Screen incoming mail/suspect packages—Anywhere and anything that may have been in direct or indirect contact with explosives.
- Vehicles—Door handles, locks, steering wheel, glove compartment, luggage compartment (interior, exterior), etc.
- Luggage—Handles, straps, buckles, inner linings, and zippers.
- Houses/offices—Door handles, table tops and other working surfaces, shelves, tools, plastic/paper bags, adhesive tapes, storage spaces, etc.

**Length of Time Fielded:** 3 yr**Current Users:** 3 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** What it detects:

- Group A (e.g., TNT, TNB, etc.)
- Group B (e.g., Semtex, RDX, C-4, etc.)
- Group C (improvised explosives containing Nitrates)
- Group D (chlorate-based improvised explosives)
- Category 7 (TATP -Triacetone Triperoxide and HMTD)

**LOD:** Trace—nanograms**Penetrability:** Not applicable**Sample Collection:** Colorimetric—swab, spray, read color**Interferents:** Not specified**Start-up Time:** Seconds to perform the test**Response Time:** Immediate**Alarm Capability:** Color displayed on swab**Detector Efficiency:** Not specified**False Positives:** No false negative, low false positive rate**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 22.9 cm x 17.8 cm x 5.1 cm (9 in x 7 in x 2 in)

**Weight:** 0.68 kg (1.5 lb)

**Power Requirements:** None

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Portable

**Ease of Use:** Very easy: 3 steps (swipe suspect area, place drops on swipe, read color)

**Environmental Considerations:** Most every environment

**Consumables Required:** Testing liquid, swabs

**Calibration Required:** None

**Maintenance Requirements:** None

**Service Options:** Phone/Email assistance available, training available

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** No special skills required (must be able to see color), training available

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** Not specified

**Independent Testing:** Yes

**Applicable Regulations:** Follows all OSHA standards, Manufactured under ISO 9001–2000 regulations

## GENERAL

Handheld Explosive Trace Detectors

Model: EVD-2500

Scintrex Trace Corp.  
300 Parkdale Avenue  
Ottawa, Ontario K1Y 1G2  
Canada  
613-224-1061 (Tel)  
info@scintrextrace.com

**Information Source:** <http://www.scintrextrace.com>

**Unit Cost:** ~\$13.5K



Type: Trace

**Availability:** Now

**Technology:** Electrochemical (Thermo-Redox)

**Description:** The Handheld Explosive Trace Detectors are thermo-redox based systems specifically designed for search applications requiring immediate detection and location of concealed explosives, including commercial, military, and plastic explosives such as RDX and PETN. Completely portable, the detectors are handheld, lightweight and powered by rechargeable batteries. The units require no external gases, have very low consumable cost, require very limited operator training, and are very user friendly while being easy to maintain by the user. The units are capable of detecting both high vapor and low vapor pressure explosives with sensitivities in  $\mu\text{g}/\text{m}^3$  (ppb) for vapors.

**Length of Time Fielded:** 3 yr

**Current Users:** 3 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** Dynamite, EGDN, DMNB, nitroglycerine, and ICAO taggants

**LOD:** Low  $\mu\text{g}/\text{m}^3$  (ppb) for vapors

**Penetrability:** Not applicable

**Sample Collection:** Vapors by advanced sample collection and processing techniques

**Interferents:** Not specified

**Start-up Time:** < 1 min

**Response Time:** 10 s

**Alarm Capability:** LED indicators, LCD display, Audible Alarm

**Detector Efficiency:** Not specified

**False Positives:** < 2 %

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** 51 cm x 14 x 11cm (20 in x 5.5 in x 4.3 in) w,l,d

**Weight:** < 3 kg (6.6 lb)

**Power Requirements:** Not specified

**Battery Type:** 12 V rechargeable battery pack

**Battery Life:** 3 h to 4 h

## LOGISTICAL PARAMETERS

**Portability:** Shoulder strap standard; carrying case for all accessories

**Ease of Use:** One button operation

**Environmental Considerations:** -5 °C to 55 °C (23 °F to 131 °F)

**Consumables Required:** Not specified

**Calibration Required:** Not specified

**Maintenance Requirements:** 1 yr to 2 yr recommended overhaul

**Service Options:** Service depots available, phone support, maintenance contracts

**Shelf Life:** Not specified  
**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** No special skill required  
**Training Required:** Yes  
**Manuals Available:** Yes  
**Data Storage:** 856 accessible data  
**Communication Interface:** Serial Cable  
**Tamper Resistance:** Yes  
**Warranty:** 1 yr all parts and labor  
**Independent Testing:** Not specified  
**Applicable Regulations:** Not specified

## GENERAL

Handheld Explosive Trace Detectors

Model: EVD-3000

Scintrex Trace Corp.  
300 Parkdale Avenue  
Ottawa, Ontario K1Y 1G2  
Canada  
613-224-1061 (Tel)  
info@scintrextrace.com

**Information Source:** <http://www.scintrextrace.com>

**Unit Cost:** ~\$19.5K



**Type:** Trace

**Availability:** Now

**Technology:** Electrochemical (Thermo-Redox)

**Description:** The Handheld Explosive Trace Detectors are thermo-redox based systems specifically designed for search applications requiring immediate detection and location of concealed explosives, including commercial, military, and plastic explosives such as RDX and PETN. Completely portable, the detectors are handheld, lightweight and powered by rechargeable batteries. The units require no external gases, have very low consumable cost, require very limited operator training, and are very user friendly while being easy to maintain by the user. The units are capable of detecting both high vapor and low vapor pressure explosives with sensitivities in  $\mu\text{g}/\text{m}^3$  (ppb) for vapors and better than 10 ng detection levels for particles.

**Length of Time Fielded:** 12 yr

**Current Users:** 12 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** NO<sub>2</sub> based explosives including ICAO taggants

**LOD:** Low ppb for vapors and low nanogram for particle

**Penetrability:** Not applicable

**Sample Collection:** Vapors and particulates

**Interferents:** Low

**Start-up Time:** 1 min with regular use

**Response Time:** 10 s

**Alarm Capability:** Not specified

**Detector Efficiency:** Not specified

**False Positives:** < 2 %

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** 51 cm x 14 x 11 cm (20 in x 5.5 in x 4.3 in) l,w,h

**Weight:** 3 kg (6.6 lb)

**Power Requirements:** Not specified

**Battery Type:** 12 V dc rechargeable battery pack

**Battery Life:** 3 h to 4 h

## LOGISTICAL PARAMETERS

**Portability:** Shoulder strap standard; carrying case for all accessories

**Ease of Use:** One push button operation

**Environmental Considerations:** -5 °C to 55 °C (23 °F to 131 °F)

**Consumables Required:** Not specified

**Calibration Required:** Minor

**Maintenance Requirements:** 1 yr to 2 yr recommended overhaul

**Service Options:** service depots available, phone support, maintenance contracts

**Shelf Life:** Not specified  
**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** User Friendly  
**Training Required:** Yes  
**Manuals Available:** Yes  
**Data Storage:** 896 retrievable data records  
**Communication Interface:** Serial Connector  
**Tamper Resistance:** Yes  
**Warranty:** 1 yr standard, all part and labor  
**Independent Testing:** Yes  
**Applicable Regulations:** Not specified



## GENERAL

### Portable Advanced Explosives Detector

**Model:** E 3500

Scintrex Trace Corp.  
300 Parkdale Avenue  
Ottawa, Ontario K1Y 1G2  
Canada  
613-224-1061 (Tel)  
info@scintrextrace.com

**Information Source:** <http://www.scintrextrace.com>

**Unit Cost:** ~\$ 21.5K



**Availability:** Now

**Technology:** Chemiluminescence (Luminol)

**Description:** The Handheld Explosive Trace Detectors are thermo-redox based systems specifically designed for search applications requiring immediate detection and location of concealed explosives, including commercial, military, and plastic explosives such as RDX and PETN. Completely portable, the detectors are handheld, lightweight and powered by rechargeable batteries. The units require no external gases, have very low consumable cost, require very limited operator training, and are very user friendly while being easy to maintain by the user. The units are capable of detecting both high vapor and low vapor pressure explosives with sensitivities in  $\mu\text{g}/\text{m}^3$  (ppb) for vapors and better than 10 ng detection levels for particles. The latest unit, the E3500 Explosive Trace Detector uses a patented chemi-luminance system that has the ability not only to detect various NO<sub>2</sub> based explosives but peroxide based explosives like TATP and HMDT.

**Length of Time Fielded:** 2 yr

**Current Users:** 2 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** NO<sub>2</sub> based explosives, ICAO Taggants and peroxide based explosives like TATP

**LOD:** Low ppb for vapors and low nanogram levels for particle

**Penetrability:** Not applicable

**Sample Collection:** 5 s to 30 s (user selectable)

**Interferents:** Low

**Start-up Time:** 60 s maximum

**Response Time:** 16 s

**Alarm Capability:** LED indicator lights, LCD display, and audio warning

**Detector Efficiency:** Not specified

**False Positives:** < 2 %

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** 51 cm x 14 cm x 11cm (20 in x 5.5 in x 4.3 in) l,w,h

**Weight:** 3 kg (6.6 lb)

**Power Requirements:** Operate via Battery Pack, ac/dc converter, or car lighter

**Battery Type:** 12 V rechargeable battery pack

**Battery Life:** 3 h to 4 h continuous use

## LOGISTICAL PARAMETERS

**Portability:** Shoulder strap standard; carrying case for all accessories

**Ease of Use:** One button operation

**Environmental Considerations:** -5 °C to 55 °C (23 °F to 131 °F)

**Consumables Required:** Test wipes, cotton gloves for particle mode, test vial for vapor mode

**Calibration Required:** Self-calibration

**Maintenance Requirements:** 3 yr recommended overhaul

**Service Options:** Service depots available, phone support, maintenance contracts

**Shelf Life:** Not applicable

**O&M Costs:** < \$1.8K/yr

### SPECIAL REQUIREMENTS

**Operator Skills:** Very Low

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** 1000 retrievable data records

**Communication Interface:** RS232 serial output port, wireless connection available

**Tamper Resistance:** Yes

**Warranty:** 1 yr all parts and labor

**Independent Testing:** Yes

**Applicable Regulations:** CE

## GENERAL

Trace Explosive Detector for ID and Travel Documents

Model: MO-2D

Sibel Ltd.  
 BAHIA 21 Corporation  
 15200 Shady Grove Road, Suite 202  
 Rockville, Maryland 20850  
 301-296-4246 (Tel)  
 securityproducts@bahia21.com  
**Information Source:** <http://www.bahia21.com>

**Unit Cost:** ~\$ 22K



**Type:** Trace

**Availability:** Available now

**Technology:** Field Asymmetric Ion Mobility Spectrometry

**Description:** The MO-2D is a lightweight portable Explosive Trace Detector/Document Scanner designed to check passports, ID cards, and travel documents for the presence of residues of explosives. The MO-2D can also be used to check other suspicious objects by analyzing samples from them. Samples can be collected on paper swipes or on a concentrator using an air sampler. The MO-2D detects all military and industrial explosives that are based on NG, TNT, PETN, RDX, and their derivatives. Documents such as passports, ID cards, or travels documents are checked by inserting them directly into the detector.

**Length of Time Fielded:** 1 yr

**Current Users:** 1 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** All explosives based on NG, TNT, PETN, RDX, and their derivatives

**LOD:** 10 ng/m<sup>3</sup> [ppt] (part per trillion)] vapor concentration; quantities of 5 ng

**Penetrability:** Not applicable

**Sample Collection:** Direct vapor sampling from documents or samples inserted in the detector

**Interferents:** Not specified

**Start-up Time:** 10 min to 15 min warm-up time

**Response Time:** 8 s to 15 s

**Alarm Capability:** Audio and visual (text and graphic display)

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** No

## PHYSICAL PARAMETERS

**Size:** 180 mm x 200 mm x 420 mm (7.1 in x 7.9 in x 16.5 in)

**Weight:** 5.5 kg (12.1 lb)

**Power Requirements:** 80 VA; 110 V/220V, 50 Hz/60 Hz ac adapter, or external battery (12 V), car power cable

**Battery Type:** Optional: any 12 V battery (car battery)

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** In its transportation case with accessories, total weight: 9.5 kg (lb)

**Ease of Use:** Very easy to use

**Environmental Considerations:** 5 °C to 45 °C (41 °F to 113 °F) operation; -10 °C to 50 °C (14 °F to 122 °F) storage

**Consumables Required:** None for document checking; paper swipes when checking other objects

**Calibration Required:** Automatic calibration during start-up phase

**Maintenance Requirements:** Routine maintenance limited to cleaning in case of contamination

**Service Options:** Not specified

**Shelf Life:** Not specified  
**O&M Costs:** Low O&M cost

### SPECIAL REQUIREMENTS

**Operator Skills:** Not specified  
**Training Required:** Yes  
**Manuals Available:** Yes  
**Data Storage:** Up to 4000 measurements (monograms)  
**Communication Interface:** Connection to PC  
**Tamper Resistance:** Not specified  
**Warranty:** 1 yr manufacturer warranty  
**Independent Testing:** Not specified  
**Applicable Regulations:** Not specified

## GENERAL

Hand Held Explosive Detector

Model: MO-2M

Sibel Ltd.  
 BAHIA 21 Corporation  
 15200 Shady Grove Road, Suite 202  
 Rockville, Maryland 20850  
 301-296-4246 (Tel)  
 securityproducts@bahia21.com

**Information Source:** <http://www.bahia21.com>

**Unit Cost:** ~\$ 25K



**Type:** Trace

**Availability:** Available

**Technology:** Field Asymmetric Ion Mobility Spectrometry

**Description:** The MO-2M is a lightweight hand-held explosive detector. It is capable of detecting the presence of all military and commercial explosives based on TNT, NG, PETN, RDX, and ICAO Taggants including EGDN, o-MNT, p-MNT. It also detects HMX, and TATP. Explosives are collected either in vapor mode or in particle mode. The MO-2M detector relies on the FA-IMS technology (Field Asymmetric Ion Mobility Spectrometry) to achieve a very high sensitivity. When used in vapor mode, MO-2M detects explosives with a vapor concentration as low as  $\sim 10 \text{ ng/m}^3$ . When used in particle mode, MO-2M can detect quantities of explosives of 50 pg.

In vapor mode, the MO-2M directly collects and analyzes air samples from the inspected object. The MO-2M vortex generator allows to efficiently collect samples from a distance of 5 cm to 10 cm (1.97 in to 3.9 in) in a contact-less, nonintrusive manner. In particle mode, the MO-2M is fitted with a small thermal chamber (TVIN). Samples are collected on paper swipes and introduced in the TVIN. Any trace of explosives is vaporized and then analyzed by the MO-2M detector.

When conditions warrant it, an air sampler can be used to trap vapors or airborne particles of explosives on a metallic grid. The grids are then introduced in the TVIN where any trapped explosives is vaporized and analyzed by the detector.

The MO-2M detector is fast and easy to use. There is no warm-up time required. After start-up, the MO-2M is ready to operate after a 10 s automatic calibration phase. The MO-2M has a response time of 1 s to 2 s. The MO-2M provides audio and visual alarm on its large [29 mm x 38 mm (1.14 in x 1.5 in)] color LCD display. The MO-2M has a fast clear down time: it recovers from an alarm in typically less than 15 s. The MO-2M does not require any carrier gas or any dopant to operate. The MO-2M has a very low operating cost. In vapor mode, no consumables are required, and in particle mode, the only consumables are inexpensive paper swipes made of ordinary paper. The MO-2M can store up to 4000 measurements (ionograms) in its internal memory. The MO-2M has an embedded wireless Bluetooth communication capability that allows it to send its data and alarms to a remote computer for oversight by security managers, display, or archiving. The MO-2M is powered by an internal rechargeable battery (14.4 V Li-Ion battery) that provides for 4 h of operation in vapor mode. The MO-2M can also be powered from the mains (110 V/220 V, 50 Hz/60 Hz adapter).

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** All explosives based on NG, TNT, PETN, RDX, ICAO Taggants (EGDN, o-MNT, p-MNT), and also HMX, TATP

**LOD:**  $10 \text{ ng/m}^3$  vapor concentration in vapor mode; quantity as low as 50 pg in particle mode

**Penetrability:** Not applicable

**Sample Collection:** Direct vapor sampling through the vortex enhance nozzle, particle collection with paper swipes

**Interferents:** Not specified

**Start-up Time:** No warm-up time, ready after 10 s automatic calibration phase

**Response Time:** 1 s to 2 s

**Alarm Capability:** Audio and visual (text and graphic display on color LCD); wireless transmission to remote computer

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Yes

## PHYSICAL PARAMETERS

**Size:** 305 mm x 86 mm x 116 mm (12 in x 3.4 in x 4.6 in) l,w,h

**Weight:** 1.35 kg (2.98 lb)

**Power Requirements:** Internal battery (14.4 V) or from the mains (110 V/220 V, 50Hz/60Hz adapter)

**Battery Type:** Rechargeable Li-Ion battery (14.4 V)

**Battery Life:** 4 h per charge

## LOGISTICAL PARAMETERS

**Portability:** In small attaché case: 495 mm x 355 mm x 120 mm (in x in x in) with all accessories. Total weight: 7 kg (lb)

**Ease of Use:** Easy to use

**Environmental Considerations:** -10 °C to 45 °C (14 °F to 113 °F) particle mode; 10 °C to 45 °C (50 °F to 113 °F) vapor mode; -30 °C to 50 °C (-22 °F to 122 °F) storage

**Consumables Required:** None in vapor mode, paper swipes in particle mode

**Calibration Required:** Autocalibration at start-up, then continuous autocalibration

**Maintenance Requirements:** Call for detail. No periodic maintenance required. Routine maintenance limited to decontamination.

**Service Options:** Not specified

**Shelf Life:** 10 yr

**O&M Costs:** Call for details. Annual O&M cost very low.

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Up to 4000 data records (ionograms) stored internally

**Communication Interface:** Embedded wireless (Bluetooth) and USB connection

**Tamper Resistance:** Not specified

**Warranty:** Standard 1 yr manufacturer warranty. Warranty extension available.

**Independent Testing:** Not specified

**Applicable Regulations:** US NRC (sealed source device)

## GENERAL

Sentinel II**Model:** Not specified

Smiths Detection, Inc.  
 30 Hook Mountain Road  
 PO Box 410  
 Pine Brook, New Jersey 07058  
 Susan Cooper  
 973-830-2131 (Tel)  
 USinfo@smithsdetection.com

**Information Source:** <http://www.smithsdetection.com>**Unit Cost:** \$125K**Type:** Trace**Availability:** Immediate**Technology:** Ion Mobility Spectrometry

**Description:** The challenge of detecting threats being carried by a person onto public transportation systems and into public and private buildings is one that is made easier with the Ionscan Sentinel II from Smiths Detection. Sentinel II walk-through portal offers true head-to-toe, noncontact screening of people for trace explosive or narcotic substances. Designed specifically for this challenge and to reduce the need for time-consuming physical searches, the Sentinel II uses gentle puffs of air to dislodge particles trapped on hair, the body, clothing, and shoes. Aided by gravity and a downward airflow, these particles are then directed into the Sentinel II for analysis. Trace amounts of more than 40 explosives or drugs are detected and identified in seconds. The high throughput screening of up to 6 people per minute is made possible through the use of Ionscan technology combined with preconcentration technology developed by Sandia National Laboratories, licensed exclusively to Smiths Detection. Operator interface is through a color touch screen display with results displayed in an easy-to-understand fashion. If there is an alarm, the color printer will automatically make prints of digital photos taken during the screening process. In direct response to customer needs and as a result of field experiences, this new edition of the Ionscan Sentinel II requires less power, has a more modular frame design for easier installation, and, as a result, weighs less than earlier models of the Sentinel. Further enhancements include a more ergonomic design, improved passenger interface, and easier maintenance. All these improvements are made while maintaining the high sensitivity and reliability that you expect from a Smiths Detection Ionscan instrument.

**Applications:** The Ionscan Sentinel II answers the need for screening people for trace explosives or narcotics. With its high throughput, the Sentinel II is ideal for applications where large numbers of people need to be screened for threats quickly, such as at airports, customs, military bases, correctional facilities, and at high profile facilities and public events. Past security incidents, evidenced by the "shoe bomber," show the lengths that terrorists will go when attempting to carry out their plans. Sentinel II from Smiths Detection dislodges particles from head-to-toe for sampling. By increasing the area from where samples are taken, the Sentinel II is better equipped to help you determine whether explosives or narcotics may be concealed on a person, or when traces of these substances may remain on someone after handling explosives or narcotic material.

**Length of Time Fielded:** 5 yr**Current Users:** 5 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** RDX, PETN, TNT, Semtex, NG, and others**LOD:** Detects at the sub-ng level**Penetrability:** Not applicable**Sample Collection:** Not specified**Interferents:** Not specified**Start-up Time:** Not specified**Response Time:** 10 s**Alarm Capability:** Yes**Detector Efficiency:** Not specified**False Positives:** < 1 %**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 188 cm x 140 cm x 229 cm (74 in x 55 in x 90 in)

**Weight:** 805 kg (1775 lb)

**Power Requirements:** 208 V ac/220 V ac, 50 Hz or 60 Hz 30A maximum (explosives), 40 A maximum (narcotics/dual)

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Full assembly is required for transportation through shipment. Optional wheels.

**Ease of Use:** Easy

**Environmental Considerations:** 0 °C to 40 °C (°F to °F) < 95 % relative humidity indoor/outdoor, no severe weather conditions

**Consumables Required:** Yes

**Calibration Required:** Not specified

**Maintenance Requirements:** Minimal, replacement of consumables

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Basic operator training can be obtained in a single session and high school level is sufficient

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** 1 yr

**Independent Testing:** TSA Certified, tested by ISA/IAA, Indiana Department of Corrections, TSWG, and HM Customs

**Applicable Regulations:** Not specified



## GENERAL

*Ionscan Desktop Explosives/Narcotics Detector***Model:** Ionscan 400B

Smiths Detection, Inc.  
 30 Hook Mountain Road  
 PO Box 410  
 Pine Brook, New Jersey 07058  
 Susan Cooper  
 973-830-2131 (Tel)  
 USinfo@smithsdetection.com

**Information Source:** <http://www.smithsdetection.com>**Unit Cost:** \$37K**Type:** Trace**Availability:** Immediate**Technology:** Ion Mobility Spectrometry

**Description:** With billions of U.S. dollars in drug and asset seizures being made with the assistance of an Ionscan, and thousands being used at major international airports by the military and law enforcement agencies, the Ionscan 400B is a popular desktop explosives or narcotics trace detector. A simple wipe with a swab over items such as checked or carry-on luggage, portable electronic devices, and packages is all that is necessary to collect a sample which is then placed into the Ionscan for analysis. In 8 s the color coded display presents results to the operator (red for a detection and green for the “all clear”). If a contraband substance is detected, the specific name is identified on the display. A detection of trace explosives indicates that an explosives device may be present or that the person may have been handling explosive material in preparing a bomb and further investigation is necessary.

**Sample collection:** Proper sample collection is key to the success of any trace detector. The swab sampler provided with every Ionscan is the most effective sample collector available. The design allows sufficient force to be applied in sample collection without tiring the operator. The long arm of the swab sampler allows the sample to be collected without risk of hand injury to the operator from hidden sharp objects.

**Length of Time Fielded:** 8 yr**Current Users:** 8 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** RDX, PETN, TNT, Semtex, Teteryl, NG, nitrates, HMX, and others**LOD:** Detects at the sub-ng level**Penetrability:** Not applicable**Sample Collection:** Swipe Test**Interferents:** Not specified**Start-up Time:** 20 min**Response Time:** 6 s to 8 s**Alarm Capability:** Yes**Detector Efficiency:** Not specified**False Positives:** < 1 %**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 40 x 34 x 32 cm (15.5 in x 13.5 in x 13 in)**Weight:** 22 kg (47 lb)**Power Requirements:** 110 V to 220 V**Battery Type:** Not specified**Battery Life:** Optional UPS and battery provides up to 3 h of operation time.

## LOGISTICAL PARAMETERS

**Portability:** A transport case is available as an option, as well as a trolley during use

**Ease of Use:** Simple operation

**Environmental Considerations:** 0 °C to 40 °C (°F to °F) < 95 % relative humidity

**Consumables Required:** Swipe samples

**Calibration Required:** Not specified

**Maintenance Requirements:** Minimal, service repair is only required during a hardware failure

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Basic operator training can be obtained in a single session and high school level is sufficient

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** 1 yr

**Independent Testing:** FAA/TSA, Transport Canada, BAA in the United Kingdom

**Applicable Regulations:** Not specified

## GENERAL

Ionscan Document Scanner Trace Detection System

Model: Ionscan

Smiths Detection, Inc.  
 30 Hook Mountain Road  
 PO Box 410  
 Pine Brook, New Jersey 07058  
 Susan Cooper  
 973-830-2131 (Tel)  
 USinfo@smithsdetection.com

**Information Source:** <http://www.smithsdetection.com>

**Unit Cost:** \$43K



**Type:** Trace

**Availability:** Commercially available

**Technology:** Ion Mobility Spectrometry

**Description:** Based on the highly successful and trusted Ionscan series of trace detection instruments, the Document Scanner offers a way to detect and identify traces of over 40 different explosive or narcotic substances in a quick 8 s analysis. Samples can either be collected using the optional swab sampler or by simply swiping passports and other travel documents over the sample disc. With a flip of a switch, the sample disc arm is automatically brought into the detector for analysis. The color-coded display presents instrument status information and results to the operator in an easy to understand fashion. If a detection is made, the specific explosive or narcotic is identified on the display. A detection of explosives means that trace amounts of a particular explosive has been found on the item sampled. It indicates that an explosive device may be present or that the person may have been handling explosive material in preparing a bomb.

**Length of Time Fielded:** 8 yr

**Current Users:** 8 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** RDX, PETN, TNT, Semtex, NG, nitrates, HMX, TATP, and others

**LOD:** Detects at the sub-ng level

**Penetrability:** Not applicable

**Sample Collection:** Swipe test

**Interferents:** Not specified

**Start-up Time:** 15 min

**Response Time:** 6 s to 8 s

**Alarm Capability:** Audio and visual

**Detector Efficiency:** Not specified

**False Positives:** < 1%

**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 40 cm x 34 cm x 32 cm (15.5 in x 13.5 in x 13 in)

**Weight:** 24 kg (53 lb)

**Power Requirements:** 110 V to 220 V

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** A trolley equipped with wheels and a handle is available during use

**Ease of Use:** Easy

**Environmental Considerations:** 0 °C to 40 °C (°F to °F) < 95 % relative humidity indoor/outdoor, no severe weather conditions

**Consumables Required:** Yes

**Calibration Required:** Not specified

**Maintenance Requirements:** Minimal, service repair is only required during a hardware failure

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Basic operator training can be obtained in a single session and high school level is sufficient

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** 1 yr

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

***Sabre 2000 Explosives Detector*****Model:** 2000

Smiths Detection, Inc.  
 30 Hook Mountain Road  
 PO Box 410  
 Pine Brook, New Jersey 07058  
 Susan Cooper  
 973-830-2131 (Tel)  
 USinfo@smithsdetection.com

**Information Source:** <http://www.smithsdetection.com>**Unit Cost:** Not specified**Type:** Trace**Availability:** Not specified**Technology:** Ion Mobility Spectrometry

**Description:** The technology is already an integral and essential tool for security and law enforcement specialists. In field applications where true portability is required the Sabre 2000 is independently capable of detecting and identifying explosives, chemical warfare agents, TICs, and narcotic substances. Weighing less than 2.5 kg (5.8 lb), including a battery with 120 min power, the Sabre 2000 is a powerful tool.

**Applications:**

- Raw materials identification
- Pesticide analysis
- Toxic and industrial chemicals (TIC) analysis
- Wide range of vapor monitoring
- Residual solvent analysis
- Off-odor analysis
- Quantitative analysis

**True portability:**

- Lightest trace detector available for true field applications

**Most versatile hand-held:**

- Can analyze both trace solid and vapor samples
- Quantitative, sensitive, and selective

**Simple operation:**

- Automatic analysis
- No computer necessary
- Results in seconds

**Specifications:**

- Ion Mobility Spectrometry (IMS) technology
- 15 s to 20 s analysis time
- Ready in less than 10 min

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** RDX, PETN, TNT, Semtex, NG, ammonium nitrate, CWAs, and TICs**LOD:** Not specified**Penetrability:** Not applicable**Sample Collection:** Particle or vapor samples**Interferents:** Not specified**Start-up Time:** 10 min**Response Time:** 15 s to 20 s**Alarm Capability:** Not specified**Detector Efficiency:** Not specified**False Positives:** Not specified

**Radioactivity:** Not specified

### PHYSICAL PARAMETERS

**Size:** 33 cm x 11 cm x 13 cm (13 in x 4 in x 4.5 in)

**Weight:** < 2.63 kg (5.8 lb)

**Power Requirements:** Not specified

**Battery Type:** Not specified

**Battery Life:** 2 h

### LOGISTICAL PARAMETERS

**Portability:** Very light and easy to transport

**Ease of Use:** Simple

**Environmental Considerations:** Not specified

**Consumables Required:** Not specified

**Calibration Required:** Not specified

**Maintenance Requirements:** Not specified

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Little training required

**Training Required:** Not specified

**Manuals Available:** yes

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** Not specified

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

***Sabre 4000 Explosives Detector*****Model:** 4000 (single), 4000M (dual), 4000E (tri) modes

Smiths Detection, Inc.  
 30 Hook Mountain Road  
 PO Box 410  
 Pine Brook, New Jersey 07058  
 Susan Cooper  
 973-830-2131 (Tel)  
 USinfo@smithsdetection.com

**Information Source:** <http://www.smithsdetection.com>**Unit Cost:** Single mode—\$23.5K; dual (M) mode—\$25.5K; triple (E) mode—\$26.5K**Type:** Trace**Availability:** Immediate**Technology:** Ion Mobility Spectrometry

**Description:** This handled Trace Detector utilizes Ion Mobility Spectrometry (IMS) Technology. The Sabre 4000 can detect and identify over 40 threat substances in approximately 15 s. With a cold time start of 10 min and weighing approximately 3.2 kg (7 lb) including the 4 h battery, the Sabre 4000 is a small powerful tool in the war on terror and drug trafficking. This unit is enhanced by the addition of TIC detection capability with a 8.9 cm (3.5 in) color TFT display, a standard 4 h battery, this unit remains the lightest hand-held trace detector available. It is also the only one that can detect and identify all the threats facing the first responders on a daily basis. The versatile Sabre 4000 is capable of analyzing either trace particles or vapor samples, allowing the operator to apply the ideal sampling technique for the substance suspected. The speed of the Analysis time of less than 15 s is outstanding.

**Length of Time Fielded:** 2 yr, predecessor Sabre 2000 in use for 7 yr**Current Users:** 2 yr, predecessor Sabre 2000 in use for 7 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** RDX, PETN, TNT, Semtex, NG, ammonium nitrate, and others**LOD:** Detects at the sub-ng level**Penetrability:** Not applicable**Sample Collection:** Trace particle or vapor samples**Interferents:** Not specified**Start-up Time:** < 10 min**Response Time:** 15 s analysis time**Alarm Capability:** Audible and visual**Detector Efficiency:** Not specified**False Positives:** < 1 %**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 36.8 cm x 10.2 cm x 11.4 cm (14.5 in x 4.0 in x 4.5 in)**Weight:** 3.2 kg (7 lb) including a battery**Power Requirements:** Optional dc adapter**Battery Type:** Custom 4 h lithium-ion rechargeable battery included with unit**Battery Life:** 4 h per charge

## LOGISTICAL PARAMETERS

**Portability:** Handheld stationary**Ease of Use:** Not specified**Environmental Considerations:** Indoor/outdoor, temperature range of 0 °C to 45 °C (32 °F to 113 °F), 95 % humidity noncondensing.

**Consumables Required:** Not specified

**Calibration Required:** Autocalibration

**Maintenance Requirements:** Little verification, cleaning and bakeout. Depot maintenance is only required for a hard failure.

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Basic, high school education, operator level

**Training Required:** Yes, included with purchase of equipment, CD

**Manuals Available:** Owner's manual

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** 1 yr manufacturer's warranty, parts and labor included

**Independent Testing:** Tested for explosive performance by the Naval Surface Warfare Center at Indian Head

**Applicable Regulations:** Contains a radioactive source licensed for use by the U.S. Nuclear Regulatory Commission (NRC)



## GENERAL

Explosive Trace Detection System**Model:** EGIS Defender

Thermo Electron Corporation  
 27 Forge Parkway  
 Franklin, Massachusetts 02038  
 978-232-1037 (Tel)  
 stephanie.kubina@thermo.com

**Information Source:**

<http://www.thermo.com/egisdefender>

**Unit Cost:** Please contact vendor at 800-274-4212 or 203-605-2534

**Type:** Trace**Availability:** Immediate**Technology:** High-Speed Gas Chromatography with Micro Differential Ion Mobility Spectrometry

**Description:** The EGIS Defender combines Thermo's patented High-Speed Gas Chromatography (HSGC) technology combined with Micro Differential Ion Mobility Spectrometry (DMx) to set a new benchmark in explosives trace detection, providing the industry's highest sensitivity with the lowest false positives in a compact, portable unit. With the combination of these dual technologies the EGIS Defender offers the highest performance available and simultaneously detects plastic, commercial, and military explosives, TATP, HMTD, and nitrates, in a lightweight package. The EGIS Defender Explosives Trace Detection (ETD) system manufactured by Thermo Electron Corporation combines forensic laboratory instrument performance with operationally tested reliability and application knowledge to assure the success of security missions around the world.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Nitrates (AN/UN), EGDN, NG, DNT/TNT, PETN, RDX, TATP, HMTD, Tetryl, and DNMB**LOD:** Nanogram level**Penetrability:** Not applicable**Sample Collection:** Direct wipe**Interferents:** None known**Start-up Time:** 30 min**Response Time:** 16 s**Alarm Capability:** Audible and visual**Detector Efficiency:** Not specified**False Positives:** < 1.5 %**Radioactivity:** Ni63/5 mCi (millicurie)

## PHYSICAL PARAMETERS

**Size:** 56 cm x 56 cm x 25 cm (22 in x 22 in x 10 in) w,l,h**Weight:** 27 kg (60 lb)**Power Requirements:** 100 V ac to 120 V ac/200 V ac to 240 V ac; 47 Hz to 63 Hz**Battery Type:** None**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Yes**Ease of Use:** Yes**Environmental Considerations:** Temperature Range: 0 °C to 40 °C (32 °F to 103 °F)**Consumables Required:** Yes

**Calibration Required:** None

**Maintenance Requirements:** Customer Maintenance

**Service Options:** Extended Warranty Packages (on-site or factory repair)

**Shelf Life:** None

**O&M Costs:** Variable

### SPECIAL REQUIREMENTS

**Operator Skills:** Some

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** 40 GB

**Communication Interface:** Yes

**Tamper Resistance:** Yes

**Warranty:** 1 yr

**Independent Testing:** None

**Applicable Regulations:** None

## GENERAL

### Explosive Detection System

**Model:** EGIS Series

Thermo Electron Corporation  
27 Forge Parkway  
Franklin, Massachusetts 02038  
978-232-1037 (Tel)  
stephanie.kubina@thermo.com

**Information Source:** <http://www.thermo.com/egis>

**Unit Cost:** Not specified



**Type:** Trace

**Availability:** Immediate

**Technology:** GC and Chemiluminescence

**Description:** EGIS Explosive Detection Systems, EGIS II and EGIS III, combine high speed gas chromatography and chemiluminescence detection to provide a highly sensitive and selective device for detecting plastic, commercial and military explosives. Unlike other detectors, which respond to the thousands of non-nitro compounds in a sample, the chemiluminescent detector of the EGIS will only respond to nitro-based compounds of certain structures in the sample, making the EGIS more selective with less false positives. As all nitrogen-based high explosives contain nitro groups, the nitro-selective chemiluminescent detector of EGIS is ideal due to its unique selectivity.

The EGIS Explosives Detection Systems, EGIS II and EGIS III, are highly sensitive devices developed to detect various types of commercial and military explosives, including dynamite, Semtex, C4, and TNT. EGIS Systems are designed to be used in conjunction with other techniques in order to provide a comprehensive program to screen for explosives. The EGIS II is designed to provide excellent sensitivity and selectivity under demanding operating conditions such as high sample throughput and environment.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Dynamite, Semtex, C4, and TNT

**LOD:** Not specified

**Penetrability:** Not applicable

**Sample Collection:** Not specified

**Interferents:** Not specified

**Start-up Time:** Not specified

**Response Time:** Not specified

**Alarm Capability:** Not specified

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Ease of Use:** Not specified

**Environmental Considerations:** Not specified

**Consumables Required:** Not specified

**Calibration Required:** Not specified

**Maintenance Requirements:** Not specified

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Training Required:** Not specified

**Manuals Available:** Not specified

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** Not specified

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

***Biosens*****Model:** Not specified

Biosensor  
QPI  
11207 Single Oak Road  
Fredericksburg, Virginia NG6 8AL  
540-548-4050 (Tel)  
dbaggett@goqpi.com  
**Information Source:** <http://www.goqpi.com>

**Unit Cost:** \$56K**Type:** Trace**Availability:** 6 wk from order**Technology:** Biosensor—Antigen/Antibody

**Description:** The system has a probability of detection (POD) in detecting drugs and/or explosives such as TNT, PETN, RDX, NG, and more with outstanding selectivity. The system also has a low false alarm rate (FAR) under field conditions due to its antibody technology, which is designed to only react with target substances rather than other chemicals which may be present in the sampled environment.

**Sample collection system:** The collection system comprises various techniques to collect vapors and traces onto a disposable filter. Sample collection techniques are as important as the analysis of the substance. Biosensor has developed efficient means of capturing substance traces from the tested environment. A vacuum collection system allows sweeping of clothing, car seats, and other soft surfaces. A wipe collection pad is specifically designed to gather samples from hard surfaces and an ionizing collection system will gather particulates from the atmosphere such as in a closed environment as would be the case in a freight container. These collection systems utilize a proprietary chemically treated sample collection pad to trap vapors and particles for testing.

**The filter:** This filter is impregnated with a coating that maximizes the preferential absorption of target substances. When the filter is placed in the analysis system, the filter is rapidly heated and the trapped contents vaporized (desorbed), and the collected molecules are dissolved in a liquid (the “analyte”), which is injected into the BioCell.

**BioCell™:** The BioCell is a replaceable module which contains antibodies specific to the substance being tested. The Biosens analysis system can hold up to four BioCells, thus allowing testing of up to four different substances (e.g., drugs, explosives) simultaneously. Multiple detection capability can also be grouped into a single BioCell, thus allowing an operator to test for many more substances (e.g., several different antibodies can be loaded into one BioCell, freeing up the remaining three BioCells for other substance antibodies). The BioCells do not need to be replaced after a substance detection.

**Analysis system:** The Biosens analysis system hosts the subsystems required for accurate and reliable functioning of the total process. It provides the means to remove the substances from the filter (desorption), transfer those substances to the BioCell, and analyze the output signal from the BioCell. The analysis system also features the user interface and the analysis software, which operates quickly and accurately to show presence of a substance through red or green lamp indications. The system has a built in printer and, as an option, can be connected to a network or PC should the operator desire to transfer analysis data for scientific, statistical, or administrative work.

**Analysis system specifications:** Detects: substances including TNT, DNT, Tetryl, PETN, RDX, NG, and most drugs.

**Detection technology:** high specific antibody reaction Quartz Crystal Microbalance. **User interface provisions:** indicator lamps, display, and printouts. **Analysis time:** Variable, less than 60 s. **Data storage:** 40GB storage space, each analysis 3Kb; limit is adjustable. **Data transmission:** RJ45.

**Sample collection unit specifications:** Type: Side channel vacuum pump with filter holder and backpack. **Sample collection filter:** glass fiber with plastic handle. Optimized for narcotics and explosives. **Dimensions:** 30 cm x 20 cm x 10 cm (11.8 in x 7.9 in x 3.9 in). **Weight:** 5.6 kg (12.3 lb). **Power source:** rechargeable NiMH battery. **Battery charger:** 100 V ac to 240 V ac, 47 Hz to 63 Hz. **Temperature range:** usage and storage 0 °C to 40 °C (32 °F to 104 °F). **Relative air humidity:** maximum 90 %; noncondensing.

**Length of Time Fielded:** 2 yr**Current Users:** 2 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** TNT, PETN, RDX, C4, and NG**LOD:** Up to 8 different explosives at one time

**Penetrability:** Not applicable

**Sample Collection:** Various techniques to collect vapors and traces onto a disposable filter

**Interferents:** None known

**Start-up Time:** Start up time: Cold start ~5 min; warm start ~1 min

**Response Time:** 60 s

**Alarm Capability:** Printed results and sounds

**Detector Efficiency:** Not specified

**False Positives:** < 2 %

**Radioactivity:** Not specified

### PHYSICAL PARAMETERS

**Size:** ~51 cm x 46 cm x 25 cm (20 in x 18 in x 10 in)

**Weight:** 17 kg (37.5 lb)

**Power Requirements:** Sample collection power source: rechargeable NiMH battery

Battery charger: 100 V ac to 240 V ac, 47 Hz to 63 Hz

Analysis system: 100 V ac to 240 V ac, 50 Hz/60 Hz. Vehicle 12 V utility outlet or rechargeable battery pack providing 12 V.

**Battery Type:** Sample collection unit: rechargeable NiMH battery

**Battery Life:** Not specified

### LOGISTICAL PARAMETERS

**Portability:** Yes

**Ease of Use:** Simple LED instructions

**Environmental Considerations:** 5 °C to 40.6 °C (41 °F to 105 °F); 90 %; noncondensing rh

**Consumables Required:** Biocells, antigen, and eluent

**Calibration Required:** Described in training

**Maintenance Requirements:** Described in training

**Service Options:** On-site or in-house

**Shelf Life:** 48 h life on Biocells

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** 2 d training

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Yes

**Communication Interface:** Yes

**Tamper Resistance:** Yes

**Warranty:** 1 yr standard Manufacturer's

**Independent Testing:** In progress

**Applicable Regulations:** Not specified

## GENERAL

*Gemini*  
Model: 6040

American Science and Engineering, Inc.  
829 Middlesex Turnpike  
Billerica, Massachusetts 01821  
978-262-8700 (Tel)  
rsmith@as-e.com  
**Information Source:** <http://www.as-e.com>



**Type: Bulk**

**Unit Cost:** Not specified

**Availability:** 7/1/2006

**Technology:** X-ray (Dual Energy)

**Description:** Gemini's Dual-Energy Transmission x-rays generate a high resolution image in which metallic threats such as guns and knives are easily detected and fine details such as tiny wires that could indicate an improvised explosive device are discerned. Dual-energy transmission technology uses two x-ray energy levels to determine the "effective" atomic number of objects in the parcel and then colorizes the image based on material type. Gemini's Z Backscatter x-rays generate an image that highlights organic materials—such as sheet explosives, bulk explosives, narcotics, and plastic weapons—frequently missed in transmission-only detection systems. Z Backscatter's photo-like images facilitate image interpretation and reduce operator fatigue.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** X-ray imaging of anomalies including explosives

**LOD:** Not specified

**Penetrability:** Not specified

**Sample Collection:** N/A

**Interferents:** N/A

**Start-up Time:** Not applicable

**Response Time:** Not applicable

**Alarm Capability:** Not applicable

**Detector Efficiency:** Not specified

**False Positives:** Not applicable

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** 198 cm x 85 cm x 135 cm (78 in x 33.5 in x 53.2 in) l,w,t

**Weight:** 794 kg (1750 lb)

**Power Requirements:** 120 V ac +/-10 % (50/60 Hz), circuit 20A

**Battery Type:** Not applicable

**Battery Life:** Not applicable

## LOGISTICAL PARAMETERS

**Portability:** Equipped with swivel casters and leveling feet

**Ease of Use:** User friendly interface and only 1 operator required

**Environmental Considerations:** 0 °C to 40 °C (32 °F to 104 °F)

**Consumables Required:** Not applicable

**Calibration Required:** Not applicable

**Maintenance Requirements:** Annual preventative maintenance

**Service Options:** Extended warranty, service agreements

**Shelf Life:** Not applicable

**O&M Costs:** Not applicable

## SPECIAL REQUIREMENTS

**Operator Skills:** Image analysis

**Training Required:** Operator, Service and Maintenance, and Train the Trainer

**Manuals Available:** Operator

**Data Storage:** Up to 15000 images

**Communication Interface:** Not applicable

**Tamper Resistance:** Key locks; system interlocks

**Warranty:** 1 yr parts and labor

**Independent Testing:** N/A

**Applicable Regulations:** ANSI N42.44, CDRH 21 CFR 1020.40



## GENERAL

### Personnel Screening System

**Model:** SmartCheck

American Science and Engineering, Inc.  
829 Middlesex Turnpike  
Billerica, Massachusetts 01821  
978-262-8700 (Tel)  
rsmith@as-e.com  
**Information Source:** <http://www.as-e.com>



**Type:** Bulk

**Unit Cost:** Not specified

**Availability:** Not specified

**Technology:** X-ray (Z Backscatter)

**Description:** SmartCheck personnel screening system safely and quickly detects and displays threats or contraband hidden on a person—both in and under clothing, including plastic explosives, composite weapons, currency, and drugs. Designed to replace intrusive and time-consuming pat down searches, the system provides better security than pat-downs wherever these procedures are regularly performed. SmartCheck utilizes proprietary Z Backscatter technology to provide outstanding detection capabilities. Z Backscatter images clearly display both organic and inorganic materials hidden on a person's body.

SmartCheck is safe for both the operator and the person undergoing inspection. With AS&E's patented technology, the subject receives a radiation dose of less than 10 mRm per scan—equivalent to 2 min of airplane flight at altitude. SmartCheck also offers an optional privacy filter that protects the privacy of screened persons and still effectively reveals threats.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** X-ray imaging of anomalies including explosives

**LOD:** Not specified

**Penetrability:** Not specified

**Sample Collection:** N/A

**Interferents:** N/A

**Start-up Time:** Not applicable

**Response Time:** Not applicable

**Alarm Capability:** Not applicable

**Detector Efficiency:** Not specified

**False Positives:** Not applicable

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** 163 cm x 117 cm x 229 cm (64 in x 46 in x 90 in)

**Weight:** 680 kg (1500 lb)

**Power Requirements:** 115 V ac +/-10 % (50/60 Hz), circuit 20A

**Battery Type:** Not applicable

**Battery Life:** Not applicable

## LOGISTICAL PARAMETERS

**Portability:** Equipped with swivel casters and leveling feet

**Ease of Use:** User friendly interface and only 1 operator required

**Environmental Considerations:** 0 °C to 40 °C (32 °F to 104 °F)

**Consumables Required:** Not applicable

**Calibration Required:** Not applicable

**Maintenance Requirements:** Warranty includes semi annual preventative maintenance

**Service Options:** Extended warranty, service agreements

**Shelf Life:** Not applicable

**O&M Costs:** Not applicable

### SPECIAL REQUIREMENTS

**Operator Skills:** Image analysis

**Training Required:** Operator, Service and Maintenance, and Train the Trainer

**Manuals Available:** Operator

**Data Storage:** Up to 15000 images

**Communication Interface:** Headset provided with remote operator's console option

**Tamper Resistance:** Key locks, system interlocks

**Warranty:** 1 yr parts and labor

**Independent Testing:** N/A

**Applicable Regulations:** ANSI N43.17

## GENERAL

Buster Contraband Detector**Model:** K910B

Campbell Security Equipment Company (CSECO)  
 P.O. Box 23952  
 Pleasant Hill, California 23952  
 925-689-7221 (Tel)  
 tony.cseco@sbcglobal.net  
**Information Source:** <http://www.cseco.net>

**Type:** Bulk**Unit Cost:** < \$10K**Availability:** Currently available**Technology:** Gamma Backscatter

**Description:** The Buster K910B Contraband Detector can positively detect drugs, explosives, weapons, currency, and much more. It is a fast and effective way of detecting contraband in objects such as containers, tires, car doors, fuel tanks, and other objects, which can contain illegal substances such as vehicles, trucks, boats, and airplanes. Buster will positively detect concealed drugs, explosives, weapons, secret compartments, currency, works of art, and jewelry. The Buster K910B Contraband Detector is a one piece assembly requiring only one hand for operation. During routine field use, no components or subassemblies are required, other than replacement of the single standard 9 V transistor battery; attachment of a separate, audible alarm headset; or the optional remote arm. The unit has a rubber grip pad surface for comfort and an integrally mounted safety wrist strap. The unit has an easily replaceable Velcro anti-scratch pad. A spare Velcro pad and display overlay panel are provided with each Buster.

**Length of Time Fielded:** 18 yr**Current Users:** 18 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** Bulk detector senses density changes**LOD:** Depth of scan: 152 mm (in)**Penetrability:** Depth of scan: 152 mm (in)**Sample Collection:** Detects contraband concealed in objects such as containers, tires, car doors, and fuel tanks**Interferents:** Not specified**Start-up Time:** Not specified**Response Time:** 0.25 s per reading**Alarm Capability:** One standard deviation +1 count. 50 db pulses of 0.50 s deviations.**Detector Efficiency:** Not specified**False Positives:** Not specified**Radioactivity:** Sealed source of 10 mci (minimal size)

## PHYSICAL PARAMETERS

**Size:** 140 mm x 64 mm x 64 mm (5.5 in x 2.5 in x 2.5 in)**Weight:** 1.1 kg (2.5 lb)**Power Requirements:** Not specified**Battery Type:** 9V alkaline disposable. Low battery warning.**Battery Life:** Several months

## LOGISTICAL PARAMETERS

**Portability:** Easy**Ease of Use:** Easy**Environmental Considerations:** Not applicable**Consumables Required:** Not applicable

**Calibration Required:** Raw data, data scan (alarm), zero scan (alarm), calibration, self-diagnosis modes, plus lock mode

**Maintenance Requirements:** Easy

**Service Options:** Not specified

**Shelf Life:** 7 yr

**O&M Costs:** < \$10K

### SPECIAL REQUIREMENTS

**Operator Skills:** Easily accessible

**Training Required:** Not applicable

**Manuals Available:** Yes

**Data Storage:** Not applicable

**Communication Interface:** Not applicable

**Tamper Resistance:** Not applicable

**Warranty:** 12 mo

**Independent Testing:** Not applicable

**Applicable Regulations:** Not applicable

## GENERAL

**OpenVision™ LT**  
**Model: OV III LT**

Envision Product Design LLC.  
 7800 King St.  
 Anchorage, Alaska 99518  
 907-563-1141 (Tel)  
 johnp@cmosxray.com

**Information Source:** <http://envisionproductdesign.com>

**Unit Cost:** \$69.9K



**Type: Bulk**

**Availability:** August 1, 2005

**Technology:** X-ray (Real-time Video Imaging)

**Description:** A light-weight portable x-ray system for hand-held and robot-deployed inspection of suspect packages. Includes a highly sensitive x-ray imager and battery-operated 70Kv x-ray tube designed for portable field operation. This unit's 10 cm x 15 cm (4 in x 6 in) imaging area and real-time video allow the operator to scan a range of object sizes much more quickly than any previously available x-ray system. Images are presented on a high-resolution 20 cm (8 in) LCD display or on a heads-up display mounted to standard safety glasses. A solid-state video recorder with 10 cm (4 in) LCD display provides an optional viewing station and also provides storage of inspection images in video or still format on memory stick media or digital video tape.

**Length of Time Fielded:** 1 yr

**Current Users:** 1 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** Plastics, metals, solids, liquids, electronics, fuses, switches, wires, and batteries

**LOD:** Standard model up to (3/8 in) steel, options up to (1 in) steel

**Penetrability:** Standard model up to (3/8 in) steel, options up to (1 in) steel

**Sample Collection:** Visual analysis of real-time digital x-rays

**Interferents:** > mm to mm (3/8 in or 1 in) steel

**Start-up Time:** Instant

**Response Time:** Real time video

**Alarm Capability:** Not applicable

**Detector Efficiency:** Not specified

**False Positives:** Operator dependent

**Radioactivity:** Less than 2mR/h to operator at low setting

## PHYSICAL PARAMETERS

**Size:** 36 cm to 61 cm (14 in to 24 in) package size standard, extensions available

**Weight:** C-arm 6.8 kg (15 lb), handle/display 2.27 kg (5 lb), controller/battery 3.2 kg (7 lb)

**Power Requirements:** 28 V dc

**Battery Type:** Readily available rechargeable 28 V lithium ion battery

**Battery Life:** 1 h continuous use, 8 h intermittent use

## LOGISTICAL PARAMETERS

**Portability:** Field portable in single cm x cm x cm (12 in x 18 in x 29 in) Pelican case

**Ease of Use:** Set up in less than 2 min, instant on

**Environmental Considerations:** -23 °C to 48.9 °C (-10 °F to 120 °F)

**Consumables Required:** None

**Calibration Required:** None

**Maintenance Requirements:** None

**Service Options:** 48 h repair turn-around

**Shelf Life:** Unlimited

**O&M Costs:** None

## SPECIAL REQUIREMENTS

**Operator Skills:** Radiation safety training

**Training Required:** On-site

**Manuals Available:** Operator's manual and survey document

**Data Storage:** Optional digital still and video storage on flash card and DV tape

**Communication Interface:** Interfaces video and trigger to robot

**Tamper Resistance:** Not applicable

**Warranty:** 1 yr limited

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

### X-ray unit

**Model:** XRS-3

Golden Engineering, Inc.  
P.O. Box 185  
Centerville, Indiana 47330  
765-855-3493 (Tel)  
sales@goldenengineering.com

**Information Source:** <http://www.goldenengineering.com>

**Unit Cost:** \$5.6K



**Type:** Bulk

**Availability:** March 21, 2000

**Technology:** X-ray

**Description:** The XRS-3 is a 270 kV, single package, pulsed x-ray source used by the military and law enforcement personnel to examine suspect items in remote locations. The XRS-3 works with digital imaging systems and instant film systems to penetrate up to 1 in of steel. The XRS-3 weighs 5.9 kg (13 lb) including the 14.4 V DeWalt battery pack that powers the unit.

**Length of Time Fielded:** 6 yr

**Current Users:** 6 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** X-ray unit produces x-ray image. Detection depends on training.

**LOD:** (1 in) of steel

**Penetrability:** (1 in) of steel

**Sample Collection:** Not applicable

**Interferents:** Not applicable

**Start-up Time:** none

**Response Time:** Several seconds to 1 min depending on the imaging system

**Alarm Capability:** Not applicable

**Detector Efficiency:** Not specified

**False Positives:** Not applicable

**Radioactivity:** 270 kvp

## PHYSICAL PARAMETERS

**Size:** 35.6 cm x 11.4 cm x 19.1 cm (14 in x 4.5 in x 7.5 in)

**Weight:** 5.4 kg (12 lb)

**Power Requirements:** 14.4 V battery, 110 V for battery charger

**Battery Type:** NiCad

**Battery Life:** 4000 pulses per charge. Average life 5 yr.

## LOGISTICAL PARAMETERS

**Portability:** Unit stored in water proof case. Can ship by common carrier. Weight less than (50 lb).

**Ease of Use:** Easy to use with basic training

**Environmental Considerations:** -23 °C to 48.9 °C (-10 °F to 120 °F). Rain resistant.

**Consumables Required:** Rechargeable batteries (5 yr average life). Film, if used with Polaroid film system.

**Calibration Required:** None

**Maintenance Requirements:** None

**Service Options:** None

**Shelf Life:** 15 yr

**O&M Costs:** > \$100/yr depending on usage. \$400/100 000 pulses.

### **SPECIAL REQUIREMENTS**

**Operator Skills:** Basic training recommended

**Training Required:** Safe operation training from manufacturer, interpretation training available from third party

**Manuals Available:** Yes

**Data Storage:** Film or digital files

**Communication Interface:** Not applicable

**Tamper Resistance:** Not applicable

**Warranty:** 1 yr

**Independent Testing:** Not applicable

**Applicable Regulations:** Units must be registered with appropriate state health agency



## GENERAL

X-Ray Source**Model:** XR-150

Golden Engineering, Inc.  
 P.O. Box 185  
 Centerville, Indiana 47330  
 765-855-3493 (Tel)  
 sales@goldenengineering.com  
**Information Source:** <http://www.goldenengineering.com>

**Unit Cost:** \$4.5K**Type:** Bulk**Availability:** 1993**Technology:** X-ray

**Description:** The XR150 is a battery powered pulsed x-ray machine used for security and light industrial applications. The entire system weighs less than 2.3 kg (5 lb), but is capable of penetrating 1.27 cm (½ in) of steel making it an ideal tool for use remote locations.

Specifications include:

Number of counts per exposure—1 to 99

Pulses per visible count—3

Number of counts per battery charge—2500

Number of counts per second—10 (nominal)

Expected tube life—50000 counts

X-ray source size—3 mm (1/8 in)

Maximum photon energy—150 KVP

X-ray pulse width—50 nanoseconds. (.00000005 s)

Battery voltage—7.2 V

Battery type—6 nickel cadmium sub C cells

Battery capacity—2400 mAh

Battery recharge time—5 h

Battery charger—BC 150 charger/conditioner

Optional chargers—Makita 7.2 /9.6 V, 1 h charger

Electric input current.—14 A (when connected to charged battery)

Temperature range—23 C° to 50 °C (-10 F° to 120 °F)

Maximum duty cycle—200 counts every 8 min (3000/h)

**Length of Time Fielded:** 13 yr**Current Users:** 13 yr

## OPERATIONAL PARAMETERS

**Explosives Detected:** X-Ray source only—not a detector**LOD:** X-Ray source only—not a detector**Penetrability:** Not applicable**Sample Collection:** X-Ray source only—not a detector**Interferents:** Not specified**Start-up Time:** Not specified**Response Time:** Not applicable**Alarm Capability:** Not applicable**Detector Efficiency:** Not specified**False Positives:** N/A**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 26.7 cm x 7.6 cm x 10.2 cm (10.5 in x 3 in x 4 in)

**Weight:** 1.96 kg (4 lb 5 oz)

**Power Requirements:** 7.2 V battery, 110 V charger

**Battery Type:** NiCad

**Battery Life:** 3 yr to 4 yr average life

## LOGISTICAL PARAMETERS

**Portability:** Unit stored in water proof case. Can ship by common carrier. Weight in case kg (35 lb).

**Ease of Use:** Easy to use with basic training.

**Environmental Considerations:** Can be used in remote locations

**Consumables Required:** Batteries, possibly film

**Calibration Required:** None

**Maintenance Requirements:** Minimal

**Service Options:** None

**Shelf Life:** 15 yr

**O&M Costs:** \$0 to \$250/yr depending on usage

## SPECIAL REQUIREMENTS

**Operator Skills:** Basic training recommended

**Training Required:** Safe operation training from manufacturer, interpretation training available from third party

**Manuals Available:** Yes

**Data Storage:** Film or digital files

**Communication Interface:** Not applicable

**Tamper Resistance:** Not applicable

**Warranty:** 1 yr

**Independent Testing:** Not applicable

**Applicable Regulations:** State regulated, must register unit with local state board of health

## GENERAL

X-ray Unit  
**Model:** XR-200

Golden Engineering, Inc.  
P.O. Box 185  
Centerville, Indiana 47330  
765-855-3493 (Tel)  
sales@goldenengineering.com  
**Information Source:** <http://www.goldenengineering.com>

**Unit Cost:** \$4.3K



**Type:** Bulk

**Availability:** Not specified

**Technology:** X-ray

**Description:** The XR200 is a single package pulsed 150 kV x-ray unit used by bomb technicians and other personnel for bomb detection applications or crime scene investigations.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Not applicable

**LOD:** Not applicable

**Penetrability:** Not applicable

**Sample Collection:** Not applicable

**Interferents:** (1/2 in) steel penetration

**Start-up Time:** Immediate

**Response Time:** Several seconds to 1 min depending on the imaging system.

**Alarm Capability:** n/a

**Detector Efficiency:** Not specified

**False Positives:** Not applicable

**Radioactivity:** 150 kvp

## PHYSICAL PARAMETERS

**Size:** 31.8 cm x 11.4 cm x 19.1 cm (12.5 in x 4.5 in x 7.5 in)

**Weight:** 5.4 kg (12 lb)

**Power Requirements:** 14.4 V battery, 110 V for battery charger

**Battery Type:** NiCad

**Battery Life:** 4000 pulses per charge. Average life 5 yr.

## LOGISTICAL PARAMETERS

**Portability:** Unit stored in water proof case. Can ship by common carrier. Weight less than (50 lb).

**Ease of Use:** Easy to use with basic training.

**Environmental Considerations:** -23 °C to 48.9 °C (-10 °F to 120 °F)

**Consumables Required:** Batteries, possibly film

**Calibration Required:** None

**Maintenance Requirements:** Minimal

**Service Options:** None

**Shelf Life:** 15 yr

**O&M Costs:** ~\$0 to \$250/yr

## SPECIAL REQUIREMENTS

**Operator Skills:** Basic training recommended

**Training Required:** Manufacturer training for safe operation. Third party for x-ray interpretation.

**Manuals Available:** Yes

**Data Storage:** Film or digital files

**Communication Interface:** Not applicable

**Tamper Resistance:** Not applicable

**Warranty:** 1 yr

**Independent Testing:** Not applicable

**Applicable Regulations:** State regulated, must register unit with local state board of health

## GENERAL

**Portable Explosives Detector/Identifier****Model:** SIEGMA™ 3M3

HiEnergy Technologies  
 1601 Alton Parkway  
 Suite B  
 Irvine, California 92606  
 949-757-0857 (Tel)  
 smoore@hienergyinc.com

**Information Source:** <http://www.hienergyinc.com>**Unit Cost:** \$325K**Type:** Bulk**Availability:** August 15, 2006**Technology:** Atometry™

**Description:** The SIEGMA™ system is operated remotely via a fiber optic connection to a portable computer and employs our proprietary analysis and an intuitive graphical user interface, which is designed to be user friendly and allow for operation without extensive training. When deployed to interrogate a suspicious object, the system can automatically determine whether or not an object contains explosives in a time ranging from 15 s to 5 min (depending on the quantity of explosive and the distance from target), with “false positive” and “false negative” rates of 97 %, without human intervention.

The graphical user interface signals “This is Explosive” when an explosive is found. It also identifies: (1) the type of explosive; (2) the relative abundance of several chemical elements; and (3) the probability that the object contains explosives or other illicit substances.

**Features:** Portable two piece unit, rechargeable battery for extended field use, industry leading explosives detection with accuracy > 97 % and a false alarm rate < 3 %, able to identify class of explosives, remote operation via portable computer, parallel architecture for ease of upgrades, ruggedized plastic case, with wheels for easy maneuverability, ready time 90 s, analysis time 5 s to a few minutes, noninvasive, standoff detection through metal and other barriers.

**Operational benefits:** Positive identification within a few minutes, data logging and storage for 24/7 analysis/documentation.

**Operability:** Operations training included; radiation safety training included; radiation licensing and application assistance included; and modular design for easy maintenance and transport.

**Technical specifications:**

Sensor head dimensions: 25 cm x 53 cm x 76 cm (10 in x 20.7 in x 29.9 in) w,h,l

Electronics dimensions: 50 cm x 30 cm x 63 cm (19.6 in x 11.9 in x 24.7 in) w,h,l

System: minimum idle power requirement 150 W

Peak maximum power requirement 600 W during battery charge

Charger: (1) input 110 V@ 800 W; (2) output 24 V, 2600 W maximum (80 % efficiency)

**Length of Time Fielded:** 8 mo**Current Users:** 8 mo

## OPERATIONAL PARAMETERS

**Explosives Detected:** TNT, Semtex, RDX, nitrates, chlorine and potassium-based, and black powder**LOD:** 97 % accuracy rate and a false alarm rate of 3 %**Penetrability:** Not specified**Sample Collection:** Neutron activation**Interferents:** Extreme temperatures**Start-up Time:** 90 s**Response Time:** From 5 s to a few minutes**Alarm Capability:** Graphical user interface signals “This is Explosive.” Also identifies the type and abundance.**Detector Efficiency:** Not specified**False Positives:** 3 %**Radioactivity:** 2 m/h inside a 30 ft perimeter

## PHYSICAL PARAMETERS

**Size:** Sensor: 25.4 cm x 52.6 cm x 75.9 cm (10 in x 20.7 in x 29.9 in) w,h,l

Electronics: 49.8 cm x 30.2 cm x 62.7 cm (19.6 in x 11.9 in x 24.7 in) w,h,l

**Weight:** It is to be installed in a trench, a permanent location, it is not portable thus weight is not applicable

**Power Requirements:** Minimum idle power required 250 peak maximum. Power required 600 W during battery change.

**Battery Type:** Lithium

**Battery Life:** N/A

## LOGISTICAL PARAMETERS

**Portability:** Portable modular two piece unit

**Ease of Use:** Rechargeable battery for extended field use (4 h), easy maintenance and transportation

**Environmental Considerations:** Regular law enforcement field environment

**Consumables Required:** Rechargeable battery

**Calibration Required:** Not provided

**Maintenance Requirements:** Maintenance and 24/7 technical support provided by Siemens Maintenance Services, LLC

**Service Options:** Our Equipment Technical Assistance Program (training, support, calibration, and radiation safety licensing)

**Shelf Life:** Not applicable

**O&M Costs:** Not applicable

## SPECIAL REQUIREMENTS

**Operator Skills:** Radiation Safety Certification and Licensing

**Training Required:** Yes, being provided through a relationship between HiEnergy and Radiation Safety Academy

**Manuals Available:** Yes

**Data Storage:** On laptop and suitcase server administrator

**Communication Interface:** It is fiberoptic thus not susceptible to wireless interference

**Tamper Resistance:** Up to 41 °C (120 °F) and approximately 0 °C (-32 °F)

**Warranty:** 1 yr factory warranty

**Independent Testing:** Not applicable

**Applicable Regulations:** State or Federal radiation licensing requirements

## GENERAL

Robot-Borne Detector/Identifier**Model:** STARRAY™

HiEnergy Technologies  
1601 Alton Parkway  
Suite B  
Irvine, California 92606  
949-757-0857 (Tel)  
smoore@hienergyinc.com

**Information Source:** <http://www.hienergyinc.com>**Unit Cost:** \$450K**Type:** Bulk**Availability:** August 15, 2006**Technology:** Atometry™

**Description:** STARRAY™ is a remotely operated, all-terrain detector of IEDs and unexploded ordnance (UXO). The system is configured for the Andros mark V robotic remote vehicle, which is currently in use by many bomb squads across the U.S. and overseas. STARRAY evolved from HiEnergy's suitcase-borne SIEGMA™ and is designed to quickly cover rough terrain, climb stairs, clear obstacles, and cross ditches in any weather and heat condition, including desert terrains. The system can identify whether or not an object contains explosives in a time ranging from 40 s to 5 min (depending on the quantity of explosives and the distance from target), with "false positive" and "false negative" rates of 2.25 % and a probability of detection of 97.75 %.

**Length of Time Fielded:** 9 mo**Current Users:** 9 mo

## OPERATIONAL PARAMETERS

**Explosives Detected:** TNT, Semtex, RDX, nitrates, chlorine and potassium-based, and black powder**LOD:** 97 % accuracy rate and a false alarm rate of 3 %**Penetrability:** Not specified**Sample Collection:** Neutron activation**Interferents:** N/A**Start-up Time:** 90 s**Response Time:** from 5 s to a few minutes**Alarm Capability:** Graphical user interface signals "This is Explosive." Also identifies the type and abundance.**Detector Efficiency:** Not specified**False Positives:** 3 %**Radioactivity:** 2 mR/h inside a 30 ft perimeter

## PHYSICAL PARAMETERS

**Size:** Robot 118 cm x 109 cm x 122 cm (46.5 in x 43 in x 48 in) h,w,l

Sensor and electronics suitcases are attached to the robot

**Weight:** The robot is 358 kg (790 lb) and the suitcases are 32 kg plus 29 kg (70 lb plus 65 lb)**Power Requirements:** 24 V dc, 65 amp-h. 12 V dc spiral-cell batteries for robot. Idle power required 250 peak for suitcase.**Battery Type:** Lithium**Battery Life:** N/A

## LOGISTICAL PARAMETERS

**Portability:** Articulated tracks and quick release wheels, slope > 45, speed 0 mph to 3.5 mph, traverse openings up to 24 in**Ease of Use:** Variable speed control for precision, dual sided, quick change accessory mounting system**Environmental Considerations:** Operates in normal as well as in some extreme environment**Consumables Required:** Not applicable**Calibration Required:** N/A

**Maintenance Requirements:** Maintenance and 24/7 technical support provided by Siemens Maintenance Services, LLC.

**Service Options:** Our Equipment Technical Assistance Program (training, support, calibration, and radiation safety licensing)

**Shelf Life:** Not applicable

**O&M Costs:** Not applicable

### SPECIAL REQUIREMENTS

**Operator Skills:** 2.5 d of operator/maintenance training in Oak Ridge, Tennessee for robot and Radiation Safety Certification

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** On laptop and suitcase server administrator

**Communication Interface:** It is fiberoptic thus not susceptible to wireless interference

**Tamper Resistance:** Not applicable

**Warranty:** 1 yr factory warranty

**Independent Testing:** Not applicable

**Applicable Regulations:** State or Federal radiation licensing requirements



## GENERAL

Compact X-ray Inspection System

Model: DS-400L

Hitachi, Ltd.  
RKB Provided**Information Source:**[http://www.hitachi.co.jp/ICSFiles/afieldfile/2006/04/07/ds\\_400l\\_en.pdf](http://www.hitachi.co.jp/ICSFiles/afieldfile/2006/04/07/ds_400l_en.pdf)**Unit Cost:** Not specified**Type:** Bulk**Availability:** Not specified**Technology:** X-ray

**Description:** Easy operation: Just open the door on the front, put the item in the screener, close the door, then push a button to inspect. 38 cm (15 in) high resolution LCD: Provides a clear image that can help an operator find a threat easily. Simple design and small footprint: Suitable for use at rooms or area where space is limited. Fits to interior or design of office or lobby. Material discrimination capability: organic, inorganic, and metal are displayed in different colors.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Material discrimination capability: Indicate with color for organic, inorganic, and metal.**LOD:** 10 mm (in) penetration for steel plate**Penetrability:** 10 mm (in) penetration for steel plate**Sample Collection:** Not specified**Interferents:** Not specified**Start-up Time:** Not specified**Response Time:** 6 s**Alarm Capability:** Monochrome and color switch

Image magnification (times 2)

Brightness control

Display function: Edge enhancement, Hazmat alarm

**Detector Efficiency:** 10 mm (in) for steel plate**False Positives:** Not specified**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 920 mm x 650 mm x 1.57 mm (36 in x 26 in x 0.06 in) w,d,h**Weight:** 500 kg (1102 lb)**Power Requirements:** 400V ac or 200V ac (decided when delivered to a customer)**Battery Type:** Not specified**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified**Ease of Use:** Easy operation: Only open the slide door on the front, put item in, close the door, then push a button to inspect**Environmental Considerations:** Not specified**Consumables Required:** Not specified**Calibration Required:** Not specified**Maintenance Requirements:** Not specified**Service Options:** Not specified**Shelf Life:** Not specified

**O&M Costs:** Not specified

## **SPECIAL REQUIREMENTS**

**Operator Skills:** Not specified

**Training Required:** Not specified

**Manuals Available:** Not specified

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** Not specified

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

Flatscan 27**Model:** Not specified

ICM  
 QPI (provided information)  
 11207 Single Oak Road  
 Fredericksburg, Virginia NG6 8AL  
 540-548-4050 (Tel)  
 dbaggett@goqpi.com  
**Information Source:** <http://www.goqpi.com>

**Unit Cost:** \$55K**Type:** Bulk**Availability:** 6 wk from order**Technology:** X-ray (Dual Energy)

**Description:** The dual energy FlatScan 27 incorporates a state-of-the-art 2D (two dimensional) self-contained robust scanning detector, a laptop computer, and a CP120 or CP160 portable constant potential x-ray generator for real time image processing. The FlatScan 27 is deployed very easily and quickly in the field for: The EOD evaluations of suspicious packages located in public areas (e.g., bombs, arms, etc.); mobile customs searches (weapons and all illegal substances); oversized objects that cannot be scanned in conventional x-ray machines for airport and customs applications; industrial nondestructive testing of complex assemblies (e.g., welds); principally of interest to military, police, prisons, customs applications, quality control and NDT managers.

**Detector:** Incorporating a large number of unique technological features the FlatScan 27 provides a versatile and a very thin detector [thickness of 52 mm (2 in)], which enables objects to be scanned even if they are located in very tight places (e.g., close to a wall). As well, the FlatScan 27 provides an impressive image quality with a high penetration capability [up to 30 mm (1.2 in) of steel at 120 kV, 1 mA], an excellent sensitive 800  $\mu$  resolution (200  $\mu$  detector optional), and the possibility to slow down the speed of the scanning detector.

**Software:** The operator can select all the standard following processing operations: reverse black and white, pseudo color, zoom, an extraordinary contrast stretch mode and most usefully, the possibility to change all parameters of the CP120 and CP160 for progressive depth penetration studies.

**Dual energy:** Additionally, the very specific design of the detector, and the CP120 and CP160, the optional Materials ID software provides dual energy images in order to highlight on the laptop's screen organic (e.g., explosives and drugs) and nonorganic (metals) substances located in the suspicious piece of luggage.

**The CP120 and CP160 x-ray generators:** The CP120 and the CP160 are advanced battery powered portable x-ray generators. Powered by a 36 V dc battery, its constant potential output produces a stable, penetrating and contrast-rich beam. The mini focal spot makes up to 5 times magnification possible without loss of image sharpness. Because the kV and mA of the constant potential series can be regulated, the right quality of x-rays and the correct dose can be selected to suit each, individual suspect item. The wide beam angle allows the generator to be placed very close to the image capture unit, thereby increasing the effective penetration capability of the system as a whole.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** All known organic and in-organic**LOD:** Metal over (1 in) thick**Penetrability:** Metal over (1 in) thick**Sample Collection:** Not specified**Interferents:** Not specified**Start-up Time:** 30 s to 45 s**Response Time:** 15 s up to 2 min (operator choice)**Alarm Capability:** Not specified**Detector Efficiency:** Not specified**False Positives:** Not specified**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** Detector 72.4 cm x 62.2 cm x 5.1 cm (28.5 in x 24.5 in x 2 in)

**Weight:** Detector: 7.9 kg (17.5 lb)

Generator: 6.4 kg (14 lb)

**Power Requirements:** Battery Operated

**Battery Type:** Lithium ion and NiCad

**Battery Life:** Generator 10 min; detector 2.5 h

## LOGISTICAL PARAMETERS

**Portability:** Several options available with or without cases

**Ease of Use:** Very simple all software driven

**Environmental Considerations:** Not specified

**Consumables Required:** Not specified

**Calibration Required:** Generator every 5 yr must be sent back to manufacturer

**Maintenance Requirements:** Not specified

**Service Options:** Backup unit at QPI and local on-site and in house service

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** 1 d training

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Unlimited based on hardware storage

**Communication Interface:** Yes

**Tamper Resistance:** Yes, proprietary software

**Warranty:** 1 yr standard manufacturer warranty

**Independent Testing:** In progress

**Applicable Regulations:** Not specified

## GENERAL

### Logos Digital Imaging System

**Model:** Not specified

Logos Imaging LLC.  
P.O. Box 765  
Richmond, Indiana 47375  
765-939-4044 (Tel)  
sales@logosimaging.com

**Information Source:**

<http://www.logosimaging.com/index.html>

**Unit Cost:** Contact manufacturer



**Type:** Bulk

**Availability:** Contact manufacturer

**Technology:** X-ray

**Description:** Description: Logos Imaging is a truly portable, CR product to the EOD/IEDD community. Our new Digital Imaging System offers users a lightweight, larger format alternative to the instant print film systems currently in use worldwide. In addition, the properties of the phosphor image plates give even novice users a level of confidence in their ability to capture quality radiographs in nearly every situation. That means less time on target and less risk to the operator.

T100 Scanner: Height: 39.4 cm (15.5 in)

Width: 49.3 cm (19.4 in)

Depth: 27.4 cm (10.8 in)

Weight (empty): 16 kg (35 lb)

Interface Cable: USB 2.0 cable

Voltage: 100 V ac to 240 V ac

Frequency: 50 Hz/60 Hz

Power: 110 W maximum

Laser classification: Compliance per DHHS Radiation Performance Standards 21 CFR, Ch I, Subch. J+EN60825 Class 1 Laser Device

Imaging plates: Dimensions: 20.3 cm x 25.4 cm (8 in x 10 in) and 20.3 cm x 43.2 cm (8 in x 17 in)

Resolution: 300 DPI: 85  $\mu$  square pixels, approximately 4 lp/mm

150 DPI: 170  $\mu$  square pixels, approximately 2 lp/mm

Storage: Store in their plastic shipping envelope

Minimum computer requirements

Pentium CPU: 1.0 GHz

Program Memory: 256 MB RAM

Display: 24-bit, 800 x 600 resolution

Operating system: Windows XP Professional

USB 2.0 port: Required

Hard drive: At least 5 dedicated gigabytes

Printer: Optional

The Logos Imaging Application is a proprietary Incident Management system designed to be used in conjunction with the T100 Scanner. Its purpose is to create and maintain incidents, which consist of event specific information (technicians name, incident location and address, and note field) along with a series of scanned x-ray images. In addition to incident management capabilities, the application will also function as an x-ray image enhancer with image processing filters and annotation capabilities. The software application is designed with simplicity and ease of use being the highest priorities. Even novice computer users will have little difficulty creating and managing incidents. While the image editor is powerful in its filtering and enhancement capabilities, the user interface is kept quite simple with all file management done behind the scenes.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Not applicable

**LOD:** Over 25 mm (in) steel

**Penetrability:** Over 25 mm (in) steel

**Sample Collection:** NA

**Interferents:** NA

**Start-up Time:** Not specified

**Response Time:** 1 min to 3 min scan time

**Alarm Capability:** Not specified

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Not specified

### PHYSICAL PARAMETERS

**Size:** 39.4 cm x 49.2 cm x 27.4 cm (15.5 in x 19.4 in x 10.8 in)

**Weight:** 16 kg (35 lb)

**Power Requirements:** 100 V ac to 240 V ac

**Battery Type:** Not specified

**Battery Life:** Not specified

### LOGISTICAL PARAMETERS

**Portability:** Easily transportable

**Ease of Use:** Very easy

**Environmental Considerations:** Not specified

**Consumables Required:** Not specified

**Calibration Required:** Not specified

**Maintenance Requirements:** Not specified

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Training Required:** Not specified

**Manuals Available:** Not specified

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** Not specified

**Independent Testing:** None specified

**Applicable Regulations:** Not specified

## GENERAL

***Rapiscan 515***  
**Model:** RAP 515

Rapiscan Systems  
8 Commerce Way  
Suite 115  
Robbinsville, New Jersey 08691  
609-406-9000 (Tel)  
sales@rapiscansystems.com  
**Information Source:** <http://www.rapiscansystems.com>



**Type:** Bulk

**Unit Cost:** Contact company for pricing

**Availability:** Now

**Technology:** X-ray (Dual Energy)

**Description:** The Rapiscan 515 is a dual energy, compact x-ray system for space restricted installations. Dual energy imaging provides automatic color coding of materials with different atomic numbers so that screeners can easily identify objects within the parcel. The system is equipped with a removable control panel to facilitate mobility. The Rapiscan 515 offers a tunnel opening of 640 mm (25.2 in) wide by 430 mm (16.9 in) high to accommodate large parcels.

**Features and options:** Threat Image Projection (TIP) inserts digital threat images at configurable frequencies into the regular flow of bags. TIP is a reliable method for continually improving the skill level of screeners and is the preferred training method used by regulatory agencies worldwide.

Network display station (NDS) improves threat detection, throughput, and simplifies operating procedures by enabling the operator performing a manual search of suspect bags to reconcile the actual bag contents with the scanned image.

Network management system (NMS) allows a supervisor to monitor the performance of many x-ray checkpoints in a large facility from a single location.

Enhanced performance x-ray (EPX) enables consistent detection of materials having characteristics of explosives, narcotics, gold, currency and agricultural products.

Operator training program (OTP) enables the x-ray system to be used as a training terminal without running parcels.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Explosives, narcotics, gold, currency, and agricultural products

**LOD:** Threat image projection inserts digital threat images at configurable frequencies

**Penetrability:** Not specified

**Sample Collection:** Not specified

**Interferents:** Not specified

**Start-up Time:** Not specified

**Response Time:** Not specified

**Alarm Capability:** Not specified

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 2016 mm x 1347 mm x 831 mm (79.37 in x 53.03 in x 32.72 in)

**Weight:** 748 kg (1650 lb) gross

**Power Requirements:** Not specified

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified  
**Ease of Use:** Not specified  
**Environmental Considerations:** Not specified  
**Consumables Required:** Not specified  
**Calibration Required:** Not specified  
**Maintenance Requirements:** Not specified  
**Service Options:** Not specified  
**Shelf Life:** Not specified  
**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Supervisor can monitor many x-ray checkpoints in a large facility from a single location  
**Training Required:** Operator Training Program enables the x-ray system to be used as a training terminal  
**Manuals Available:** Not specified  
**Data Storage:** Not specified  
**Communication Interface:** Not specified  
**Tamper Resistance:** Not specified  
**Warranty:** Not specified  
**Independent Testing:** Not specified  
**Applicable Regulations:** Not specified



## GENERAL

***Rapiscan***  
**Model:** RAP 519

Rapiscan Systems  
 8 Commerce Way  
 Suite 115  
 Robbinsville, New Jersey 08691  
 609-406-9000 (Tel)  
 sales@rapiscansystems.com  
**Information Source:** <http://www.rapiscansystems.com>



**Type:** Bulk

**Unit Cost:** Contact company for pricing

**Availability:** Now

**Technology:** X-ray (Single Energy)

**Description:** The Rapiscan 519 is a compact single energy x-ray system for space restricted installations. The system is equipped with a key lock cabinet at its base where the monitor can be safely stored when not in use. The folding control panel can also be locked. Its superior image quality and enhanced features provide the essential tools for contraband detection. The Rapiscan 519 system offers a tunnel opening of 520 mm (20.47 in) wide by 320 mm (12.6 in) high to accommodate small and medium sized parcels.

Features and options: Threat Image Projection (TIP) inserts digital threat images at configurable frequencies into the regular flow of bags. TIP is a reliable method for continually improving the skill level of screeners and is the preferred training method used by regulatory agencies worldwide.

Network Display Station (NDS) improves threat detection, throughput, and simplifies operating procedures by enabling the operator performing a manual search of suspect bags to reconcile the actual bag contents with the scanned image.

Operator Training Program (OTP) enables the x-ray system to be used as a training terminal without running parcels.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Explosives, narcotics, gold, currency, and agricultural products

**LOD:** Threat image projection inserts digital threat images at configurable frequencies

**Penetrability:** Not specified

**Sample Collection:** Not specified

**Interferents:** Not specified

**Start-up Time:** Not specified

**Response Time:** Not specified

**Alarm Capability:** Not specified

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 1554 mm x 1336 mm x 792 mm (61.18 in x 52.29 in x 31.18 in) l,h,w

**Weight:** 313 kg (690 lb) gross

**Power Requirements:** Not specified

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Ease of Use:** Not specified

**Environmental Considerations:** Not specified

**Consumables Required:** Not specified

**Calibration Required:** Not specified

**Maintenance Requirements:** Not specified

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

### **SPECIAL REQUIREMENTS**

**Operator Skills:** Not specified

**Training Required:** Not specified

**Manuals Available:** Not specified

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** Not specified

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

**Rapiscan Secure 1000®****Model:** Secure 1000

Rapiscan Systems  
 8 Commerce Way  
 Suite 115  
 Robbinsville, New Jersey 08691  
 609-406-9000 (Tel)  
 sales@rapiscansystems.com  
**Information Source:** <http://www.rapiscansystems.com>

**Unit Cost:** Contact company for pricing**Type:** Bulk**Availability:** Now**Technology:** X-ray (Backscatter)

**Description:** The Rapiscan Secure 1000® is the most effective people screening solution available. The system produces high resolution images that enable the operator to easily identify concealed threat and contraband items. The Rapiscan Secure 1000 is ideal for high security environments because both organic (e.g., explosives, narcotics, ceramic weapons) and inorganic (e.g., metal) materials are apparent in the image. Rapiscan Systems has developed advanced techniques to protect the privacy of the person being screened while enabling effective detection of threat items. In a recent study, 19 out of 20 persons preferred a Secure 1000 scan to an invasive pat-down physical search. The system is completely safe for all persons and exceeds the requirements of health authorities worldwide. The dependable Rapiscan Secure 1000 is easy to use and is the most widely deployed image-based people screening solution.

A Backscatter image is produced as a result of Compton Scattering. When the emitted beam contacts organic materials, it is “scattered back” toward the system. The information is received by high resolution detectors and passed to advanced image processing software to display both organic and inorganic materials to the operator while protecting the privacy of the person being screened.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** All categories including sheet and liquid**LOD:** Contact Rapiscan Systems**Penetrability:** Not specified**Sample Collection:** Image based technology**Interferents:** Not specified**Start-up Time:** 1 min**Response Time:** 8 s**Alarm Capability:** Operator interprets image**Detector Efficiency:** Not specified**False Positives:** < 5 % but depends on detection**Radioactivity:** Not applicable

## PHYSICAL PARAMETERS

**Size:** 127 cm x 94 cm x 216 cm (50 in x 37 in x 85 in) w,d,h**Weight:** 496 kg (1097 lb)**Power Requirements:** Not specified**Battery Type:** Not specified**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified  
**Ease of Use:** Not specified  
**Environmental Considerations:** Not specified  
**Consumables Required:** Not specified  
**Calibration Required:** Not specified  
**Maintenance Requirements:** Not specified  
**Service Options:** Not specified  
**Shelf Life:** Not specified  
**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified  
**Training Required:** Not specified  
**Manuals Available:** Not specified  
**Data Storage:** Not specified  
**Communication Interface:** Not specified  
**Tamper Resistance:** Not specified  
**Warranty:** 1 yr  
**Independent Testing:** Not specified  
**Applicable Regulations:** Not specified

## GENERAL

Portable Digital X-Ray Inspection System**Model:** RTR-4N™

SAIC  
16701 West Bernardo Drive  
San Diego, California 92127  
866-723-8726 (Tel)  
sectrans@saic.com

**Information Source:**

<http://www.saic.com/products/security>

**Unit Cost:** \$23.6K (GSA \$18.9K) base system; \$44.9K  
(GSA \$36K) with large area imager

**Type:** Bulk

**Availability:** Currently available

**Technology:** X-ray (Standard Transmission)

**Description:** SAIC's standard transmission RTR-4® x-ray imaging systems are fully portable and compact, designed to rapidly perform x-ray based inspections in the field. The RTR-4N™ configuration consists of a portable x-ray source, an integrated digital imager, and powerful notebook computer. It is used for both EOD and nondestructive inspection applications. RTR-4 systems are the only fully-digital portable x-ray systems with ground level imaging available to EOD professionals, meeting the intended purpose of enhancing the safety margin for EOD technicians and innocent civilians. The RTR-4N imaging system, with its optional integrated wireless feature, provides the ability to quickly and efficiently search for weapons, drugs, and contraband in areas too difficult or time-consuming to search by hand.

Features:

Portable notebook control unit—The lightweight and powerful notebook computer possesses all the capabilities necessary to acquire and process images, enabling rapid threat assessment.

Powerful and fast processor—Notebook computer with Pentium® IV processor provides rapid processing of acquired data.

Large display for image evaluation—The notebook computer display is large, with additional pixels to allow easy image evaluation and enhancement.

Image analysis software—Software includes full image analysis methods, such as smoothing, contrast stretch, subtracting, embossing, etc.

High-capacity hard disk, increased memory, built-in CD/RW and USB ports—Some of the many notebook features that increase the effectiveness and productivity of the user.

Single case for transport and storage—All components are conveniently stored in one hardened foam-lined case for easy, safe, efficient transport and storage. See photo.

Wireless capability—A new integrated wireless option provides a digital and encrypted wireless connection from the control unit to the imager and x-ray source with no add-on boxes. The operator, as well as other personnel and property, remain a safe distance from the potentially dangerous item being evaluated.

Upgrades: Several available options allow easy upgrade from the RTR-4/ARS system to the RTR-4N Notebook computer based system, creating an all-in-one case design.

**Length of Time Fielded:** Since 1997

**Current Users:** Since 1997

## OPERATIONAL PARAMETERS

**Explosives Detected:** Not applicable

**LOD:** Total penetration of over 25 mm (1 in) steel

**Penetrability:** Total penetration of over 25 mm (1 in) steel

**Sample Collection:** Imager orientation recorded on each image

**Interferents:** Not specified

**Start-up Time:** < 5 min

**Response Time:** Immediate

**Alarm Capability:** Not available

**Detector Efficiency:** Not specified

**False Positives:** Not available

**Radioactivity:** < 3.6 mR/pulse at 1 ft; behind source < 0.1 mR/pulse at 2.4 in

### PHYSICAL PARAMETERS

**Size:** 48.3 cm x 81.2 cm x 27.9 cm (19 in x 32 in x 11 in) in protective transport case, w,h,d

**Weight:** 12 kg (26 lb)

**Power Requirements:** Rechargeable 14.4 V battery packs or external 115 V ac/230 V ac 50 Hz/60 Hz

**Battery Type:** Lithium-Ion Smart Batteries

**Battery Life:** System operates for several hours on battery power

### LOGISTICAL PARAMETERS

**Portability:** Portable

**Ease of Use:** Easy

**Environmental Considerations:** Controlling unit: 10 °C to 35 °C (50 °F to 95 °F); Imager: -29 °C to 52 °C (-20 °F to 126 °F)

**Consumables Required:** None

**Calibration Required:** Not specified

**Maintenance Requirements:** Easy

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Easy

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Internal DVD/CD-RW drive plus internal 30 GB (minimum) hard drive

**Communication Interface:** 2 USB ports, RJ-45 LAN, Cardbus, RJ-11 phone jack for internal modem

**Tamper Resistance:** Not applicable

**Warranty:** 1 yr

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

Compact Flat Panel Portable X-ray System**Model:** Scanwedge 2520

Scanna MSC, Inc.  
4370 S Tamiami Trail  
Sarasota, Florida 34231  
941-925-9730 (Tel)  
scanna@comcast.net

**Information Source:** <http://www.scanna-msc.com>**Unit Cost:** Not specified**Type:** Bulk**Availability:** August 2006**Technology:** X-ray

**Description:** Scanwedge 2520 (portable flat panel x-ray technology) was developed specifically for portable x-ray screening in tough law enforcement and EOD environments. Scanwedge 2520 has a unique flat panel design which allows it to be used in even the most confined spaces. Scanwedge 2520 is available as a complete flat panel portable x-ray system or as a flat panel upgrade or accessory to Scantrak or your existing conventional digital portable x-ray units or Polaroid (wet film) x-ray unit. Scanwedge can be used from different orientations (upright, on its side) using either the front or the reverse of the panel and produces high quality x-ray images. The Scanwedge 2520 has a flat imaging area of 25 cm x 20 cm (8 in x 10 in) and provides operators with a compact, rugged, man-portable x-ray system.

Because safety, robustness and speed of use were some of the key concerns for EOD and police operators, Scanwedge is specifically designed with these features in mind: For the safety of operators and others in the vicinity, Scanwedge 2520 is used with the well tried and tested Golden x-ray generators and does not rely on hazardous generators containing pressurized or toxic gases. For speed and safety, Scanwedge images are sent immediately to a laptop so that operators do not have to reapproach a potential suspect bomb to retrieve film or imaging plates. For increased robustness, Scanwedge contains no moving parts, mirrors, nor fragile components, which makes it ideal for use in tough EOD, military, and law enforcement environments.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Not applicable**LOD:** Not specified**Penetrability:** Not specified**Sample Collection:** Not specified**Interferents:** Not specified**Start-up Time:** Not specified**Response Time:** Not specified**Alarm Capability:** Not specified**Detector Efficiency:** Not specified**False Positives:** Not specified**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified**Weight:** Not specified**Power Requirements:** Not specified**Battery Type:** Not specified**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified  
**Ease of Use:** Not specified  
**Environmental Considerations:** Not specified  
**Consumables Required:** Not specified  
**Calibration Required:** Not specified  
**Maintenance Requirements:** Not specified  
**Service Options:** Not specified  
**Shelf Life:** Not specified  
**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified  
**Training Required:** Not specified  
**Manuals Available:** Not specified  
**Data Storage:** Not specified  
**Communication Interface:** Not specified  
**Tamper Resistance:** Not specified  
**Warranty:** Not specified  
**Independent Testing:** Not specified  
**Applicable Regulations:** Not specified



## GENERAL

Flat Panel Portable X-ray System**Model:** Scanwedge 3325

Scanna MSC, Inc.  
4370 S Tamiami Trail  
Sarasota, Florida 34231  
941-925-9730 (Tel)  
scanna@comcast.net

**Information Source:** <http://www.scanna-msc.com>**Unit Cost:** Not specified**Type:** Bulk**Availability:** August 2006**Technology:** X-ray

**Description:** Scanwedge 3325 is available as a complete flat panel portable x-ray system or as a flat panel upgrade or accessory to Scantrak or your existing conventional digital portable x-ray units or Polaroid (wet film) x-ray unit. Scanwedge 3325 was developed specifically for portable x-ray screening in tough law enforcement and EOD environments. Scanwedge 3325 has a unique flat panel design which allows it to be used in even the most confined spaces. Scanwedge can be used from different orientations (upright, on its side) using either the front or the reverse of the panel and produces high quality x-ray images. With a flat imaging area of 25 cm x 33 cm (10 in x 13 in), the Scanwedge 3325 model provides more than 50 % coverage than other conventional portable x-ray systems in its class and can be supplied in a single rugged transport case. Because safety, robustness, and speed of use were some of the key concerns for EOD and law enforcement operators, Scanwedge is specifically designed with these features in mind: For the safety of operators and others in the vicinity, Scanwedge 3325 is used with the well tried and tested Golden x-ray generators and does not rely on hazardous generators containing pressurized or toxic gases. For speed and safety, Scanwedge images are sent immediately to a laptop so that operators do not have to reapproach a potential suspect bomb to retrieve film or imaging plates. For increased robustness, Scanwedge contains no moving parts, mirrors, nor fragile components, which makes it ideal for use in tough EOD, military, and law enforcement environments.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Not applicable**LOD:** Not specified**Penetrability:** Not specified**Sample Collection:** Not specified**Interferents:** Not specified**Start-up Time:** Not specified**Response Time:** Not sp**Alarm Capability:** Not specified**Detector Efficiency:** Not specified**False Positives:** Not specified**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified**Weight:** Not specified**Power Requirements:** Not specified**Battery Type:** Not specified**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Ease of Use:** Not specified

**Environmental Considerations:** Not specified

**Consumables Required:** Not specified

**Calibration Required:** Not specified

**Maintenance Requirements:** Not specified

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Training Required:** Not specified

**Manuals Available:** Not specified

**Data Storage:** Not specified

**Communication Interface:** Not specified

**Tamper Resistance:** Not specified

**Warranty:** Not specified

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

### Portable X-ray System

**Model:** Scantrak

Scanna MSC, Inc.  
4370 S Tamiami Trail  
Sarasota, Florida 34231  
941-925-9730 (Tel)  
scanna@comcast.net

**Information Source:** <http://www.scanna-msc.com>

**Unit Cost:** Not specified



**Type:** Bulk

**Availability:** August 2006

**Technology:** X-ray

**Description:** Scantrak is a multiple application portable digital x-ray unit used by police, military, EOD, customs, law enforcement agencies, prisons, and building security managers for security checking unattended bags and suspicious packages. Scantrak is easily set up and deployed in minutes by one person and can be configured to suit different environments. It comes with a choice of x-ray sources, adjustable exposure settings, different size ICUs and has both wireless and ROV capabilities. Unit can be ruggedized for military applications. Scantrak's powerful image enhancement software allows fast evaluation and identification of hard-to-detect objects. Scantrak offers a wide range of image processing features including: zoom, inverse image, B/W, pseudo color, pseudo 3D, contrast enhancement, clean image, rotation, distance, measure and show gradients. Scantrak has multi-lingual options in addition to online help and quick start guides. Scantrak's database software allows you to store over 32 000 images on hard disc or CD. Live and stored images can be exported by email or across a network via built in modem. A range of annotation tools allow you to insert text, notes, and highlight suspect areas.

Scantrak is now available with a range of flat imaging panels including the new Scanwedge imager which replace the standard 20 cm x 25 cm (8 in x 10 in) camera box. Standard features include: 1) Search and examine suspicious packages or unattended bags on the spot. 2) Portable and easy to set up and use in 2 min. 3) Image analysis includes zoom, reverse black and white, pseudo-color, pseudo 3D and measure, show gradients, rotation, distance, contrast enhancement, and more. 4) Works with most portable x-ray sources including golden XR150, golden XR200, golden XRS-3 and also recommended continuous x-ray sources. 5) Image print and email. archive in excess of 32 000 images on PC or CD. 6) Annotation tools. 7) Full database management tools.

Standard system includes: Robust xr200 (golden) or lightweight xr150 (golden) x-ray source. Notebook PC with windows XP. 20 cm x 25 cm (8 in x 10 in) scanna image capture unit; 50 m (164 ft) cable drum; spare batteries; battery charger; and instruction manuals.

Options include: Wire free system; range of carry cases, larger size image capture units [25 cm x 33 cm x 38 cm (10 in x 13 in) or 28 cm x 38 cm (11 in x 15 in)] or customer specification; Golden XR200, golden XR150, or golden XRS-3 x-ray source; multi-lingual interface and operating guides; and external camera.

Applications include: Bomb disposal; suspect package investigation; check unattended bags; search for narcotics and hidden contraband; searching behind walls for bugs/weapons; vehicle panel/tire inspection (customs); NDT (nondestructive testing). Scantrak minimum specifications include: Processor: Centrino, Pentium IV, Celeron, 1.6 GHz minimum. Drives: Hard Disk 40 GB min. CD/DVD RW. Memory: 128 Mb RAM expandable. Operating System: Windows XP (or 98/NT/ME/2000).

Image storage: Exceeds 32 000 stored images in .bmp or .jpg. Power source: 220 V ac 50 Hz or rechargeable battery. Record and export facility: Video, audio and data, Fax, LAN and Modem 56K. Image enhancement: Rotate, zoom, invert b/w, pseudo color, pseudo 3-D, and measurement in mm or inches.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Not applicable

**LOD:** Not specified

**Penetrability:** Not specified

**Sample Collection:** Not specified

**Interferents:** Not specified

**Start-up Time:** Not specified  
**Response Time:** Not specified  
**Alarm Capability:** Not specified  
**Detector Efficiency:** Not specified  
**False Positives:** Not specified  
**Radioactivity:** Not specified

### PHYSICAL PARAMETERS

**Size:** Not specified  
**Weight:** Not specified  
**Power Requirements:** Not specified  
**Battery Type:** Not specified  
**Battery Life:** Not specified

### LOGISTICAL PARAMETERS

**Portability:** Not specified  
**Ease of Use:** Not specified  
**Environmental Considerations:** Not specified  
**Consumables Required:** Not specified  
**Calibration Required:** Not specified  
**Maintenance Requirements:** Not specified  
**Service Options:** Not specified  
**Shelf Life:** Not specified  
**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Not specified  
**Training Required:** Not specified  
**Manuals Available:** Not specified  
**Data Storage:** Not specified  
**Communication Interface:** Not specified  
**Tamper Resistance:** Not specified  
**Warranty:** Not specified  
**Independent Testing:** Not specified  
**Applicable Regulations:** Not specified

## GENERAL

*foX Trekker Back Pack Digital X-ray System***Model:** FXR2-T-10

Vidisco  
Delta-Xray, Inc.  
2111 Wilson Boulevard  
Suite 700  
Arlington, Virginia 22201  
888-521-8221 (Tel)  
sales@delta-xray.com

**Information Source:** <http://www.delta-xray.com>**Unit Cost:** ~\$25.5K**Type:** Bulk**Availability:** 56 d/ARO**Technology:** X-ray

**Description:** The foX Trekker is a uniquely designed lightweight system. The complete system is housed in a comfortable, small backpack that holds the video camera unit (VCU), control display unit (CDU)—Computer, 50 m (164 ft) cable, any Golden XR- x-ray source, and all other needed accessories.

Standard system: CDU Laptop\*:

Screen: 34 cm (13.3 in) active; Matrix TFT color; 1024 x 768 resolution; 16.7 million colors/256 gray levels; processor—Pentium M, 1.6 GHZ (or higher); drive—hard disk 60 GB or more; two (PC card) slots—Type IIIx1/IIx2; DVD/CDR-W drive, external; \*ruggedized with sun-readable and touch screen; 256 MB RAM (or higher), expandable to 512 MB; 32 Bit Local Bus Video, 2MB EDO Video RAM; two USB Ports; RJ-45 10/100/1000 Ethernet; external monitor port; internal 56 kbps internal modem; Operating System—Windows XP Professional; image storage—greater than 50 000 pictures in jpeg; and Windows environment and program application.

Menu bar with hints; adjustable exposure time; sum functions enable greater exposure than 99 pulses.

Visual database: storage of images including data: image name, user name, project name, date, time, category, type of VCU, type of x-ray, and target description. Capability to backup/restore the data base. Split Screen with Sync Scrolling capabilities.

Image enhancement/functions: Histogram equalization, hisocontrast equalization, overlay capability, image sharpening, brightness and contrast, Gamma correction and stretch intensity, average, median, and emboss (3D effect), and optional true 3D. Multiple undo/redo and restore original functions; image rotation, polarity and pseudo color measurement (inches or millimeters); annotations including sound recordings; zoom up to 400 % including full image scroll; built in E-mail access, import/export, save to CD; multi-lingual software main languages: English, Japanese, Spanish, French, Italian, Hebrew, German, Russian, Czech, and more; online help; and quick save capability.

Standard specifications: VCU 10 (Imager)

Imaging area: 20 cm x 25 cm (8 in x 10 in) (larger VCUs available)

Camera type: High performance CCD

Horizontal resolution: 752 pixels (560 TV lines)

Video S/N: better than 50 DB

Compatible x-ray sources: Golden Inspector 200 pulsed 150KV. Golden XR150 or XR200 pulsed 150KV. All continuous x-ray sources (e.g., MiniXray, SixRay hpr, Ray 100, etc.).

Power sources: auto-sensing ac power supply input voltage: 100 V ac to 240 V ac, 50 Hz/60 Hz. Computer—rechargeable internal lithium ion battery and built-in charger provides up to 3 h of continuous operation. VCU—rechargeable nickel metal battery. Cables—50 m (164 ft) on reel built into the carrying case.

Standard foX Trekker physical dimensions:

Item dimension, weight: VCU: (10: 2 in x 7 in x 3.7 in), (6.9 lb); CDU: (9 in x 7.5 in x 1.8 in), 1.7 kg (3.8 lb)

Backpack including VCU, CDU, and all accessories: (21.6 in x 13.8 in x 9.8 in); 17 kg (37.3 lb) with XR150

System options: Small VCU 6 imaging area 15 cm x 11 cm (6 in x 4.5 in). Larger VCU 15 imaging area 28 cm x 37 cm (11 in x 14.5 in) available in back pack. Larger VCU 17 imaging area 36 cm x 43 cm (14 in x 17 in). Wireless x-ray operation: eliminates the cable VCU (imager) to x-ray source. Wireless video eliminates the cable VCU to CDU. External camera captures picture of object simultaneously with x-ray. Spare batteries for the computer and VCU. Automobile dc inverter powers the system with dc/ac inverter connected to vehicle cigarette lighter socket. Cables: 100 m (328 ft) VCU to CDU, on internal reel. Stereoscopic imaging: True 3D viewing to discern spatial relationships of internal components.

\* Vidisco reserve the right to change any foX Trekker technical specifications without prior notice.

**Length of Time Fielded:** 10 yr

**Current Users:** 10 yr

### OPERATIONAL PARAMETERS

**Explosives Detected:** IEDs; WMDs; bomb components: initiators, detonator cord, power supplies, and explosive materials

**LOD:** Not specified

**Penetrability:** Not specified

**Sample Collection:** Not specified

**Interferents:** Not specified

**Start-up Time:** 2 min

**Response Time:** 2 s from source initiation to viewing x-ray image

**Alarm Capability:** Not specified

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Zero, the source generates x-rays electrically

### PHYSICAL PARAMETERS

**Size:** Back pack 54.9 cm x 35.1 cm x 24.9 cm (21.6 in x 13.8 in x 9.8 in)

**Weight:** 16.9 kg (37.3 lb) with XR150 x-ray source

**Power Requirements:** Auto-sensing ac power supply input or full battery operation

**Battery Type:** Computer: rechargeable internal Li-Ion; VCU: rechargeable nickel metal battery

**Battery Life:** Computer: up to 3 h; VCU: up to 2 wk

### LOGISTICAL PARAMETERS

**Portability:** One-person portable; can be checked on airline

**Ease of Use:** Very user friendly; intuitive, with full online help menus

**Environmental Considerations:** Currently operating in all areas of the world

**Consumables Required:** None, all batteries are rechargeable

**Calibration Required:** None

**Maintenance Requirements:** Keep batteries charged

**Service Options:** 24/7 tech assistance by Delta-Xray telephone. 1 yr warranty.

**Shelf Life:** Not specified

**O&M Costs:** Zero

### SPECIAL REQUIREMENTS

**Operator Skills:** Computer and Windows literate. Half day training for basic operation.

**Training Required:** Yes, at customer's site or at Delta-Xray

**Manuals Available:** User manual for operation and trouble shooting. Quick Start sheet.

**Data Storage:** Minimum 40 GB; more than 30 000 images in JPEG.

**Communication Interface:** USB, Ethernet, Serial, PCMCIA slots, and internal modem

**Tamper Resistance:** Standard computer barriers; shielded communications

**Warranty:** 1 yr

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

Anomaly Detector**Model:** M600

EMIT Technologies, LLC.  
 511 Boren Avenue North  
 Suite 300  
 Seattle, Washington 98109  
 206-378-5518 (Tel)  
 info@emittech.com  
**Information Source:** <http://www.emittech.com>

**Unit Cost:** ~\$25K**Type:** Bulk**Availability:** Not specified**Technology:** Microwave Energy Spectrum

**Description:** The M600 portable dielectric anomaly detector operators can collect data about the known response of a specific material and use that data as a basis for a search. The M600 portable dielectric anomaly detector is a hand-held instrument that utilizes patented near-field technology to locate hidden contraband. It is used by law enforcement in various countries to locate drugs and other contraband that are hidden in blocks of frozen fish/shrimp, suspended in bottled beverages, and stored in false compartments in walls, floors, boat hulls, etc. The energy format is noncumulative, and sustains a safe level even after repeated microwave exposures.

The M600 utilizes the EMIT technology measuring system to detect the presence of an anomaly. EMIT Technology measurement systems do not attempt to identify specific materials. Instead, they create a very detailed set of parameters for one material and use that data as a reference against which an unknown volume of material may be compared. The system then presents the differences between the unknown and the known reference to an operator. Put simply, the EMIT Technology determines anomalies against established reference data points. The M600, when placed against the material in question, such as a boat hull, car tire, etc., analyzes the density of its surface using microwave technology. It is capable of penetrating a variety of materials including wood, plastic, metal, ceramic, and textiles. Any variance from the known density signals a need for further interrogation. Because different materials have varying densities, unexpected changes are obvious. The measurements taken by the M600 translate into relative density readings that can be easily interpreted to detect anomalies, or differences in materials that indicate the presence of hidden contraband. The result is a rapid, comprehensive, portable, and cost-effective method for locating hidden goods.

**Noncontacting/nondestructive:** No intrusive probes are used and the test material is not damaged in any way during the interrogation.

**Safe:** This technology's measured level of EMF is less than that emitted by overhead fluorescent lights.

**Penetrating:** The depth for the M600 is about 1.22 m (4 ft) in the air and is correspondingly less depending on the dielectric properties of the materials being tested.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Organic and inorganic compounds**LOD:** m (4 ft) of penetration**Penetrability:** m (4 ft) of penetration**Sample Collection:** Analyzes the density of boat hull, car tire, etc., surface using microwave technology**Interferents:** Not specified**Start-up Time:** Not specified**Response Time:** < 3 ms**Alarm Capability:** Not specified**Detector Efficiency:** Not specified**False Positives:** Low**Radioactivity:** Not applicable

## PHYSICAL PARAMETERS

**Size:** Compact

**Weight:** Lightweight

**Power Requirements:** 2 rechargeable battery packs with ac adapter included

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Easy; compact

**Ease of Use:** Easy

**Environmental Considerations:** Not specified

**Consumables Required:** Not applicable

**Calibration Required:** Not specified

**Maintenance Requirements:** Very easy

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Easily accessible

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Not applicable

**Communication Interface:** Not applicable

**Tamper Resistance:** Not applicable

**Warranty:** Not specified

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified



## GENERAL

Letterbomb Visualizer Spray

Model: LBV1000

Law Enforcement Associates  
 100 Hunter Place  
 Youngsville, North Carolina 27596  
 919-554-4700 x266 (Tel)  
 aondrick@leacorp.com  
**Information Source:** <http://www.leacorp.com/>

**Unit Cost:** \$39.95



**Type:** Bulk

**Availability:** Max 30 d A.R.O.

**Technology:** Spray

**Description:** This unique spray makes opaque paper temporarily translucent allowing the user to see what is inside. The solution dries in 60 s or less and does not leave traces or watermarks or cause ink to run. Great for inspecting envelopes and packages for potential security hazards such as explosives or drugs. Solution is nonflammable, nonconductive, and nondestructive. Comes in an 237 mL (8 oz) spray bottle.

**Length of Time Fielded:** 2002 to present

**Current Users:** 2002 to present

## OPERATIONAL PARAMETERS

**Explosives Detected:** None: physical opacity

**LOD:** Physical

**Penetrability:** Not specified

**Sample Collection:** Mail, paper envelopes

**Interferents:** Not specified

**Start-up Time:** N/A

**Response Time:** 60 s or less

**Alarm Capability:** Not Specified

**Detector Efficiency:** Not specified

**False Positives:** Not Specified

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** < 0.91 kg (2 lb)

**Power Requirements:** None / Manual

**Battery Type:** Not applicable

**Battery Life:** Not applicable

## LOGISTICAL PARAMETERS

**Portability:** Simple

**Ease of Use:** Simple

**Environmental Considerations:** Well ventilated area

**Consumables Required:** Not applicable

**Calibration Required:** Not applicable

**Maintenance Requirements:** Not applicable

**Service Options:** Call 800-354-9669 with questions

**Shelf Life:** Not applicable

**O&M Costs:** Not Specified

## **SPECIAL REQUIREMENTS**

**Operator Skills:** Instructions on bottle

**Training Required:** Call 800-354-9669 with questions

**Manuals Available:** Instructions on bottle

**Data Storage:** Not applicable

**Communication Interface:** Not applicable

**Tamper Resistance:** Not applicable

**Warranty:** Not applicable

**Independent Testing:** None specified

**Applicable Regulations:** None specified

## GENERAL

LabSpec® 2500 NIR Spectrometer**Model:** 2500 NIR

Analytical Spectral Devices, Inc.  
5335 Sterling Drive, Suite A  
Boulder, Colorado 80301  
303-444-6522 (Tel)  
info@asdi.com

**Information Source:** <http://www.asdi.com/default.asp>**Unit Cost:** Base Price: \$34K to \$42K**Type:** Bulk**Availability:** 30 d delivery**Technology:** Near-Infrared Spectroscopy

**Description:** Portable Vis/NIR spectroscopy is well suited and convenient for real-time, on-site, in-situ identification of solid explosives, liquids, raw materials, powders, tablets, and most other organic compounds. By referencing a database the device can classify unknown materials almost instantly, enabling EOD personnel, QASAS, ammunition handlers, law enforcement, and others, to quickly and more safely assess a danger zone. Assistance in developing a database is available through Analytical Spectral Devices.

**Length of Time Fielded:** March 1, 2006**Current Users:** March 1, 2006

## OPERATIONAL PARAMETERS

**Explosives Detected:** Any organic based compound**LOD:** 1 % of active constituent**Penetrability:** Not specified**Sample Collection:** Fiber-optic cable**Interferents:** Some contaminants can cause problems**Start-up Time:** 5 min**Response Time:** Real-time analysis**Alarm Capability:** Instant identification**Detector Efficiency:** Not specified**False Positives:** Not applicable**Radioactivity:** Not applicable

## PHYSICAL PARAMETERS

**Size:** 36.8 cm x 12.7 cm x 29.2 cm (14.5 in x 5 in x 11.5 in)**Weight:** 8.16 kg (18 lb)**Power Requirements:** Multiple battery options along with dc and ac power**Battery Type:** Gel cell**Battery Life:** 4 h

## LOGISTICAL PARAMETERS

**Portability:** Fully field-portable**Ease of Use:** Very easy**Environmental Considerations:** Just about anywhere**Consumables Required:** None**Calibration Required:** Spectral database required**Maintenance Requirements:** Minimal**Service Options:** 1 yr standard warranty, extended service contracts available

**Shelf Life:** > 10 yr

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Minimal

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Yes

**Communication Interface:** Ethernet; optional wireless

**Tamper Resistance:** Not applicable

**Warranty:** Yes

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

LabSpec® 5000 NIR Spectrometer**Model:** 5000 NIR

Analytical Spectral Devices, Inc.  
5335 Sterling Drive, Suite A  
Boulder, Colorado 80301  
303-444-6522 (Tel)  
info@asdi.com

**Information Source:** <http://www.asdi.com/default.asp>**Unit Cost:** Base Price: \$37K to \$45K**Type:** Bulk**Availability:** 30 d delivery beginning September 1, 2006**Technology:** Near-Infrared Spectroscopy

**Description:** Portable Vis/NIR spectroscopy is well suited and convenient for real-time, on-site, in-situ identification of solid explosives, liquids, raw materials, powders, tablets, and most other organic compounds. By referencing a database the device can classify unknown materials almost instantly, enabling EOD personnel, QASAS, ammunition handlers, law enforcement, and others, to quickly and more safely assess a danger zone. Assistance in developing a database is available through Analytical Spectral Devices.

**Length of Time Fielded:** September 1, 2006**Current Users:** September 1, 2006

## OPERATIONAL PARAMETERS

**Explosives Detected:** Any organic based compound**LOD:** 1 % of active constituent**Penetrability:** Not specified**Sample Collection:** Fiber-optic cable**Interferents:** Some contaminants can cause problems**Start-up Time:** 5 min**Response Time:** Real-time analysis**Alarm Capability:** Instant identification**Detector Efficiency:** Not specified**False Positives:** Not applicable**Radioactivity:** Not applicable

## PHYSICAL PARAMETERS

**Size:** 36.8 cm x 12.7 cm x 29.2 cm (14.5 in x 5 in x 11.5 in)**Weight:** 8.62 kg (19 lb)**Power Requirements:** Multiple battery options along with dc and ac power**Battery Type:** Gel cell**Battery Life:** 4 h

## LOGISTICAL PARAMETERS

**Portability:** Fully field-portable**Ease of Use:** Very easy**Environmental Considerations:** Just about anywhere**Consumables Required:** None**Calibration Required:** Spectral database required**Maintenance Requirements:** Minimal**Service Options:** 1 yr standard warranty, extended service contracts available**Shelf Life:** > 10 yr

**O&M Costs:** Not applicable

## **SPECIAL REQUIREMENTS**

**Operator Skills:** Minimal

**Training Required:** Yes

**Manuals Available:** Yes

**Data Storage:** Yes

**Communication Interface:** Ethernet; optional wireless

**Tamper Resistance:** Not applicable

**Warranty:** Yes

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

StreetLab Portable, Substance Identification System

Model: P0007021

GE Homeland Protection  
 GE Infrastructure, Security  
 205 Lowell Street  
 Wilmington, Massachusetts 01887  
 800-433-5346 (Tel)  
 978-658-3767 (Tel)  
 sales.homelandprotection.us@ge.com

**Information Source:** <http://www.gesecurity.com>

**Unit Cost:** \$24.5K list price



**Type:** Bulk

**Availability:** Available

**Technology:** Raman Spectroscopy

**Description:** The StreetLab portable substance identification system utilizes laser-based Raman technology to deliver fast, accurate, low-cost identification of unknown substances seized in the field. StreetLab analyzes and identifies a broad range of explosives and drugs in seconds, without sample destruction or subjective interpretation. Weighing just 3.18 kg (7 lb) and as easy and safe to operate as a CD player, this compact instrument accurately identifies liquids, solids, and powders in a single step, and requires no chemicals to mix or dispose, making it safe, fast and economical. The battery-operated StreetLab comes with an extensive and easily expanded substance library for greater versatility.

Utilizing Raman spectroscopy, StreetLab identifies substances based on their molecular structure. Raman spectroscopy permits samples to be analyzed nondestructively and can be used to identify a wide range of substances from narcotics to solvents to explosives. Unlike chemical tests, results are clear, repeatable, and completed in a single operation. Equipped with a near-infrared laser, StreetLab analyzes frequency shifts in the light scattered off a sample to recognize the "spectral fingerprint" of a substance, even those dissolved in water or other liquids. StreetLab analyzes pills, powders, pastes, liquids, and odd-shaped samples with no reconfiguration. Often, substances in transparent glass or plastic containers can be analyzed in their original packaging, preventing contamination of evidentiary material, and eliminating physical contact with potentially hazardous materials. To accommodate a wider range of sample types, StreetLab incorporates a unique, rotating sample turret with four positions and spring-loaded plungers (or in the case of bottles, a spring-loaded arm) to hold samples securely in place without subjecting them to crushing or distorting pressures.

**Length of Time Fielded:** Since June 2004

**Current Users:** Since June 2004

## OPERATIONAL PARAMETERS

**Explosives Detected:** TATP, HMTD, TNT, RDX, PETN, NG, HMX, NC, TEGDN, Am nitrate, many liquid explosives, and precursors

**LOD:** Mass: 5 mg to 10 mg (typical); Concentration: 30 % by weight (typical for solids)

**Penetrability:** Not specified

**Sample Collection:** Samples are placed into small (2 in x 3 in) ziploc bags or 1.8 mL sample vials for analysis

**Interferents:** Not specified

**Start-up Time:** < 2 min

**Response Time:** Sample dependent; from 15 s to 3 min

**Alarm Capability:** Yes

**Detector Efficiency:** Not specified

**False Positives:** Not specified

**Radioactivity:** Not specified

## PHYSICAL PARAMETERS

**Size:** 18.8 cm x 12.7 cm x 24.6 cm (7.4 in x 5 in x 9.7 in) h,w,d

**Weight:** 3.18 kg (7 lb)

**Power Requirements:** 12 V dc (battery, wall transformer, cigarette lighter adapter, and generator)

**Battery Type:** Single lithium ion battery

**Battery Life:** 6 h to 8 h (longer with power saving features enabled)

## LOGISTICAL PARAMETERS

**Portability:** Portable

**Ease of Use:** 3 levels of operation: 1-step user GUI; more feature-laden; and supervisor/administrator levels

**Environmental Considerations:** 0 °C to 40 °C (32 °F to 104 °F)

**Consumables Required:** Sample vials, sample bags, and fan filters

**Calibration Required:** One-step calibration in less than 1 min

**Maintenance Requirements:** Periodically check/replace fan filters, clean sampling lens (Ipoh swab)

**Service Options:** Standard 1 yr service/maintenance contract; extended contracts available

**Shelf Life:** > 3 yr (validated units in the field)

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Nonchemist, HazMat, and EOD

**Training Required:** Training courses for all software functions, CBT-style MM Flash demo/tutorial

**Manuals Available:** Included

**Data Storage:** Internal Compact Flash will store ~1000 test results

**Communication Interface:** USB connection to PC via ActiveSync<sup>®</sup> for data transfer and software/library upgrades

**Tamper Resistance:** Not specified

**Warranty:** 1 yr standard. Extended warranties available.

**Independent Testing:** PSDB (Explosives); FIU (Narcotics); Kentucky Crime Lab (Narcotics); FBI (white powders)

**Applicable Regulations:** UL, CSA, ETL, IEC, FCC, FDA, and OSHA



## GENERAL

***Handheld Passive Millimeter-Wave Imager*****Model:** aPat

Sago Systems, Inc.  
 10455 Pacific Center Ct.  
 San Diego, California 92037-2747  
 858-646-5300 (Tel)  
 cmartin@sagosystems.com

**Information Source:** <http://www.sagosystems.com>**Unit Cost:** ~\$10k**Type:** Bulk**Availability:** 9/25/06**Technology:** Passive Millimeter-Wave Imaging

**Description:** The aPat handheld passive millimeter-wave imager creates an image of concealed objects under a person's clothing using the subject's own body heat. The operator holds the imager from 20 cm to 46 cm (8 in to 18 in) from the subject and moves the imager up or down over their body. The aPat sweeps out a 20 cm (8 in) wide swath and presents the image of this area to the operator on the aPat's display screen. The aPat is able to see any object that blocks a significant portion of the millimeter-wave heat energy emitted by the body. This includes all metal objects and any nonmetal objects more substantial than clothing, including liquids. The aPat creates an image 64 pixels wide, with a pixel approximately every 0.32 cm (1/8<sup>th</sup> in). The imager can resolve targets 1.3 cm x 1.3 cm (1/2 in x 1/2 in) in size. The imager does not emit any electromagnetic radiation and does not reveal any anatomical details of the person being imaged. The aPat imager runs for about 4 h on a single rechargeable battery and weighs < 2.3 kg (5 lb). The images collected on the device can be saved or wirelessly linked to a remote security station. The aPat is easy to use, with operator training taking only a couple of hours. The aPat images are not material specific; it reveals all concealed objects as a colder area against the subject's warm body. It can image through multiple layers of clothing, including jackets.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Bulk explosives, not material specific**LOD:** (1/2 in x 1/2 in) area**Penetrability:** (1/2 in x 1/2 in) area**Sample Collection:** Millimeter-wave imagery**Interferents:** Not applicable**Start-up Time:** 5 min**Response Time:** Immediate**Alarm Capability:** None**Detector Efficiency:** Not specified**False Positives:** Not available**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** Handheld**Weight:** 2.27 kg (5 lb)**Power Requirements:** 18 V battery**Battery Type:** Not specified**Battery Life:** ~4 h

## LOGISTICAL PARAMETERS

**Portability:** Handheld

**Ease of Use:** Trigger and 2-button operation, images presented to operator

**Environmental Considerations:** Indoor or limited outdoor environment

**Consumables Required:** None

**Calibration Required:** 2 min calibration routine at turn-on, 10 s calibration correction

**Maintenance Requirements:** None

**Service Options:** Replacement available during warranty repairs

**Shelf Life:** Not applicable

**O&M Costs:** Not applicable

## SPECIAL REQUIREMENTS

**Operator Skills:** 15-min basic operator training

**Training Required:** On site training available

**Manuals Available:** Operator manual

**Data Storage:** Imagery stored internally

**Communication Interface:** 802.11 wireless link

**Tamper Resistance:** Not specified

**Warranty:** 1 yr full replacement

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

Stand-off Passive Millimeter-Wave Imager

Model: ST-150

Sago Systems, Inc.  
 10455 Pacific Center Ct.  
 San Diego, California 92037-2747  
 858-646-5300 (Tel)  
 cmartin@sagosystems.com

**Information Source:** <http://www.sagosystems.com>

**Unit Cost:** ~\$50k



**Type:** Bulk

**Availability:** Available now

**Technology:** Passive Millimeter-Wave Imaging

**Description:** The ST-150 passive millimeter-wave imager is used to screen personnel entering a secure area for concealed threats from a safe distance. The ST-150 images a 12° wide by 20° high field of view, encompassing one person at a range of about 5 m (1.6 ft). In a scan time of 2 s, the imager creates a 72 x 128 pixel passive millimeter-wave image of the subject. Clothing is mostly transparent to millimeter-waves, allowing the operator to see the size, shape, and location of concealed objects on the subject's body. The imagery is not material specific, and while metal targets produce the largest signatures, nonmetal objects are also detectable. The ST-150 imager can resolve targets of 2.54 cm (1 in) in size from a distance of 5 m (1.6 ft) and has a temperature resolution of 1 °K to 2 °K (-457 °F). The ST-150 is designed to be operated remotely from a command center via a wireless laptop (included) or desktop computer. The ST-150 collects naturally occurring millimeter-waves and does not emit any radiation. Despite the penetration of clothing, the imagery produced does not reveal details of personal anatomy. The ST-150 imager is designed for use in a checkpoint setting where some stand-off from the target is desired. For complete scanning, a subject must be scanned from front and back, as millimeter-waves do not pass through skin.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosives Detected:** Bulk explosives, not material specific

**LOD:** (1 in x 1 in) resolution cell size at 5 m (ft) range

**Penetrability:** (1 in x 1 in) resolution cell size at 5 m (ft) range

**Sample Collection:** Imaging

**Interferents:** None

**Start-up Time:** 5 min

**Response Time:** 2 s to 2 s

**Alarm Capability:** None

**Detector Efficiency:** Not specified

**False Positives:** Not available

**Radioactivity:** None

## PHYSICAL PARAMETERS

**Size:** 61 cm x 61 cm x 91 cm (2 ft x 2 ft x 3 ft) high

**Weight:** (65 lb) (standard); kg (240 lb) (military ruggedized)

**Power Requirements:** 110 V ac, 50 W

**Battery Type:** Uses any battery with ac inverter

**Battery Life:** Not applicable

## LOGISTICAL PARAMETERS

**Portability:** Designed for field use, rapid set-up

**Ease of Use:** 1 h to 2 h training time

**Environmental Considerations:** Outdoors, 0 °C to 50 °C (32 °F to 122 °F)

**Consumables Required:** None

**Calibration Required:** 5 min calibration procedure at turn-on

**Maintenance Requirements:** Not applicable

**Service Options:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** ~\$50k

### SPECIAL REQUIREMENTS

**Operator Skills:** 1 h to 2 h operator training, 1d full system training

**Training Required:** Training available from Sago Systems

**Manuals Available:** Manual included

**Data Storage:** Data stored to computer

**Communication Interface:** 802.11 wireless

**Tamper Resistance:** Not specified

**Warranty:** 1 yr replacement

**Independent Testing:** Not specified

**Applicable Regulations:** Not specified

**APPENDIX D—VISUAL INSPECTION EQUIPMENT DATA FIELDS**



## **APPENDIX D—VISUAL INSPECTION EQUIPMENT DATA FIELDS**

Thirty-eight data fields were used to provide information relating to visual inspection equipment. The 38 data fields are comprised of data fields from the market survey vendor questionnaire requesting specifics about their products. Because of the database limitations, several data fields on the vendor questionnaire were combined, but all the vendor-supplied information was entered into the database. All data fields were developed using input from the emergency responder community.

The data fields are organized into five categories:

- General (12 data fields).
- Operational (4 data fields).
- Physical (5 data fields).
- Logistical (9 data fields).
- Special Requirements (8 data fields).

### **1.0 General**

The Title is the full commercial name of the equipment plus appropriate acronyms and pseudonyms (military/commercial versions of identical equipment).

### **1.2 Information Provided By**

Information Provided By identifies the person or organization that submitted the product. This may be a distributor or the product manufacturer. The address, telephone, email, and website information is also provided.

### **1.3 Manufacturer**

The Manufacturer is the company that developed the equipment. This data field includes the manufacturer's name, address, telephone and fax numbers, point of contact, and e-mail addresses.

### **1.4 Detector Technology**

Detector Technology identifies the broad technology area employed by the detector. Specific examples include ion mobility spectrometry or chemiluminescence.

### **1.5 Model Number**

The Model Number is the unique number identifying a specific line of equipment.

### **1.6 Part Number**

The Part Number is the manufacturer's part number for ordering, if applicable.

## **1.7 Summary and Description**

The Summary and Description are provided by the manufacturer to describe the features and uses of the product.

## **1.8 Keywords**

Keywords are descriptive of the product capabilities and applications and are used to support product searches within the data base.

## **1.9 Availability Date**

Availability Date refers to how readily available a piece of equipment is (e.g., how long it takes to receive equipment upon ordering).

## **1.10 Manufacturer Suggested Retail Price (MSRP)**

MSRP is the cost of the piece of equipment for immediate use upon receipt. The cost includes the set-up cost and initial consumables. Many items have discounts available and the manufacturer should be consulted.

## **1.11 Length of Time Fielded**

Length of Time Fielded permits an evaluation of the maturity of a product.

## **1.12 Current User/Period of Use**

Current User/Period of Use identifies organizations (i.e., military use, commercial applications, civil-service instrument, etc.) that are currently using the piece of equipment. This information may include the average number of units each client has in operation and the average number of years these units have been in use.

## **2.0 Operational**

### **2.1 Set-up Time**

Set-up Time describes the length of time that the equipment requires for assembly before start-up.

### **2.2 Field of View (FOV)**

Field of View (FOV) describes the search coverage area of the visual inspection device.



## **2.3 Illumination Source**

Illumination Source describes whether the observation system has a self-contained light source or requires an external light source.

## **2.4 Mirror Type**

Mirror Type describes the physical characteristics of mirrors that will influence their use. These categorized include mirror type, mirror shape, and mirror material.

- Mirror type—Mirrors may be either convex or flat. Convex mirrors provide a wider field of view, but make objects look smaller and may distort shapes of objects. Flat mirrors provide an undistorted, full sized view of an object at the expense of a smaller field of view.
- Mirror shape—Mirrors come in a variety of shapes including round, square, rectangular, and trapezoidal. Depending on the application, mirror shape may prove important to the search process.
- Mirror material—Plastic mirrors may be offered to provide lighter weight but may have a higher risk of being scratched or broken.

## **3.0 Physical**

### **3.1 Size**

Size indicates the external dimensions of the equipment, including height, width, and depth.

### **3.2 Weight (including batteries)**

Weight (including batteries) provides the total weight of the equipment in operational status.

### **3.3 Power Requirements**

Power Requirements indicates the type of power required to operate the equipment and any ancillary components. This field may apply to some equipment that is portable but must be stationary to operate.

### **3.4 Battery Type**

Battery Type describes whether the batteries are consumable or rechargeable and whether they are commonly available.

### **3.5 Battery Lifetime**

Battery Lifetime indicates the length of time the instrument can operate with full functionality before replacing or recharging the batteries.

## **4.0 Logistical**

### **4.1 Transportability**

Transportability is the ability of the equipment to be readily packed, shipped, or transported under typical and atypical conditions. The equipment dimensions and weight are two important factors to consider, because they determine if a single person can transport the equipment or if the equipment requires vehicular transport.

### **4.2 Durability**

Durability describes the ruggedness of the equipment under environmental and transportation extremes and still operate.

### **4.3 Ease of Use**

Ease of Use provides information on whether the equipment can be accurately used by an operator under challenging circumstances, such as wearing personal protective equipment (PPE). This data field also provides the number of steps and level of accuracy needed to obtain a result.

### **4.4 Operating Environment**

Operating Environment identifies the conditions under which a piece of equipment may be used and still be accurate. For example, some equipment is designed to operate in the field under extreme outdoor weather conditions and climates, while other equipment requires climate-controlled environments.

### **4.5 Consumables Required**

Consumables Required lists the consumables needed to perform one assay, if applicable.

### **4.6 Maintenance**

Maintenance indicates how often equipment requires maintenance, the complexity of maintenance, and whether it can be maintained in the field.

### **4.7 Service Options**

Service Options describes how the equipment is supported in the field. This includes availability of loaner equipment and whether field support and/or factory support is available.

### **4.8 Shelf Life**

Shelf Life is the length of time the equipment may be stored and be ready for immediate use, if applicable.

## **4.9 Operational and Maintenance (O&M) Costs**

O&M Costs include the annual cost to keep the equipment in a state of full readiness, including maintenance, calibration, and consumables, if applicable.

## **5.0 Special Requirements**

### **5.1 Operator Skills and Training**

Operator Skills and Training refers to the level of skill required (awareness or technician) and the specific training required to operate the equipment and interpret data for a final analysis.

### **5.2 Training Available**

Training Available may range from reading a manual or viewing a video to participating in formal courses offered through the manufacturer or an outside training contractor.

### **5.3 Manuals Available**

Manuals Available indicate which manuals are supplied as standard equipment or if they need to be ordered separately. Manuals may include user manuals, repair manual with illustrated components and parts, or training documentation.

### **5.4 Data Storage**

Data Storage indicates if the data obtained in the field can be stored in the system to be printed out at a later time or if a connected computer is required to save the data.

### **5.5 Communications Interface Capability**

Communications Interface Capability refers to the ability of the equipment to interface with a communications system. This section also includes any optional interface components that are available as an upgrade to the specific equipment (including command control communication, computers, intelligence standardization, interoperability, or commonality).

### **5.6 Warranty**

Warranty information describes the specific terms and conditions as set by the manufacturer, including any restrictions by the manufacturer.

### **5.7 Independent Testing Information Available**

Independent Testing Information Available describes any testing that has been done by a third party to confirm the equipment performance.

## **5.8 Applicable Regulations**

Applicable Regulations includes any government and/or safety regulations that may apply to the possession, use, or storage of a piece of equipment (e.g., some detectors may require the use of a radioactive source material, which requires licensure by the Nuclear Regulatory Commission).

**APPENDIX E—VISUAL INSPECTION EQUIPMENT INDEX AND DATA SHEETS**



## APPENDIX E—VISUAL INSPECTION EQUIPMENT INDEX AND DATA SHEETS

ID#	Detector Name (Model)	Manufacturer	Type	Page E-#
1	Pocket Search Mirrors (CMT and TACM2)	Allen-Vanguard Corporation	Mirror	E-1
2	Under Vehicle Search Mirror (VM-X1)	Allen-Vanguard Corporation	Mirror	E-3
3	Panther Search Mirrors (SM2 and SM3)	Allen-Vanguard Corporation	Mirror	E-5
4	Telescopic Mirror Kit (TSK1/00)	Allen-Vanguard Corporation	Mirror	E-7
5	Under Vehicle Search Mirror (VMBD/2)	Allen-Vanguard Corporation	Mirror	E-9
6	ExPack Expeditionary Pack Inspection Toolkit (EP-1000)	Lumenyte International Corporation	Mirror	E-11
7	Security Lighted Assessment Mirror with Surefire Flashlight (SLAM-1000)	Lumenyte International Corporation	Mirror	E-13
8	Security Lighted Assessment Mirror with Vortex Flashlight (SLAM-V-1000)	Lumenyte International Corporation	Mirror	E-15
9	Telescoping Search Mirror (TSM-1000)	Lumenyte International Corporation	Mirror	E-17
10	Security Assessment Mirror (SAM-1000)	Lumenyte International Corporation	Mirror	E-19
11	Search and Inspection Mirrors (Varies)	Sas R & D Services, Inc.	Mirror	E-21
12	Under Vehicle Inspection Mirror (Hannibal Series)	Sas R & D Services, Inc.	Mirror	E-23
13	Under Vehicle Search Mirror (Centurion Series)	Sas R & D Services, Inc.	Mirror	E-24
14	High Tech Telescoping Inspection Mirror (HTC-2)	Ullman Devices Corporation	Mirror	E-25
15	Inspection Mirror (S-2 Series)	Ullman Devices Corporation	Mirror	E-26
16	Inspection Mirror (K-2 Series)	Ullman Devices Corporation	Mirror	E-27
17	Inspection Mirror (C-2 Series)	Ullman Devices Corporation	Mirror	E-28
18	Eagle Video Search Kit (SM1)	Allen-Vanguard Corporation	Camera/Video	E-29
19	Camera System for Undercarriage Vehicle Inspection (VIC-103)	PowerLinx, Inc.	Camera/Video	E-31
20	iVACST <sup>TM</sup>	Stratech, Inc.	Camera/Video	E-33
21	Und-Aware (AG-500 Series)	Vehicle Inspection Technologies	Camera/Video	E-35
22	Contraband Detection Kit (CT 30)	Campbell Security Equipment Company (CSECO)	Fiber Optics, Light Pipes, Lights	E-37
23	Fiberscopes for Search and Surveillance (FO Series)	Campbell Security Equipment Company (CSECO)	Fiber Optics, Light Pipes, Lights	E-39

<b>ID#</b>	<b>Detector Name (Model)</b>	<b>Manufacturer</b>	<b>Type</b>	<b>Page E-#</b>
24	Solid State Security Illumination Mat System (SS-SIMS-1000)	Lumenyte International Corporation	Fiber Optics, Light Pipes, Lights	E-41
25	SIMS Security Illuminated Mat System (SIMS-1000)	Lumenyte International Corporation	Fiber Optics, Light Pipes, Lights	E-43
26	PypeLyte Inspection Wand with Vortex Flashlight (IWV-1000)	Lumenyte International Corporation	Fiber Optics, Light Pipes, Lights	E-45
27	PypeLyte Inspection Wand IW with Surefire Flashlight (IW-1000-C)	Lumenyte International Corporation	Fiber Optics, Light Pipes, Lights	E-47
28	PypeLyte Inspection Light with Surefire Flashlight (IW-2000-C)	Lumenyte International Corporation	Fiber Optics, Light Pipes, Lights	E-49
29	PypeLyte Inspection Light with Vortex Flashlight (IWV-2000-C)	Lumenyte International Corporation	Fiber Optics, Light Pipes, Lights	E-51
30	Readyscope Economical Fiberscopes (RS Series)	Sas R & D Services, Inc.	Fiber Optics, Light Pipes, Lights	E-53



## GENERAL

### Pocket Search Mirrors

**Model:** CMT and TACM2

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>  
Responder Knowledge Data Base

**Unit Cost:** Contact sales@allen-vanguard.com



**Type:** Mirror

**Availability:** Contact sales@allen-vanguard.com

**Description:** Pocket Search Mirrors provide a quick and effective visual search capability for law enforcement officers and individuals with personal security concerns. Allen-Vanguard provides 2 types of pocket sSearch mirrors:

**CMT:** This compact search mirror can be carried as an aid to personal security or as individual issues by operational personnel. It is fitted with a convex glass mirror, telescopic arm, and a miniature flashlight. The CMT folds flat for easy carry and minimal storage space. The convex mirror can be adjusted for angle and provides a wide field of view. The unique telescopic handle extends to 460 mm (18.1 in) and is completely rigid to ensure a stable image. The integral flashlight can be used with the mirror opened or closed.

**TACM2:** This is a tactical version of the pocket mirror fitted with an acrylic mirror. The TACM2 can be used in scenarios (e.g., police SWAT) where unobstructive close-in observation is required by individual officers. During IEDD tasks the TACM2 allows for quick visual check before action is taken against a suspected hazardous device. Ideal where other visual search mirrors would be too large or awkward. The small, lightweight and robust nature of the TACM2 is ideal for these and similar situations where other visual search mirrors would be too large or unwieldy.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Refer to manufacturer

**Illumination Source:** Supplied with a spare lamp in a stowage department

**Mirror Type:** Convex

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Overall dimensions: 15 cm x 9 cm x 2 cm (6.1 in x 3.54 in x 0.79 in)

**Weight:** 0.26 kg (9.2 oz)

**Power Requirements:** Supplied: 2 x AAA batteries and spare lamp

**Battery Type:** AAA batteries

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

<b>Portability:</b> Yes	<b>Consumables Required:</b> Batteries
<b>Durability:</b> Yes	<b>Maintenance Requirements:</b> Not specified
<b>Ease of Use:</b> Yes	<b>Service Options:</b> Not specified
<b>Environmental Considerations:</b> Not specified	<b>Shelf Life:</b> Refer to manufacturer

**O&M Costs:** Refer to manufacturer

**SPECIAL REQUIREMENTS**

<b>Operator Skills:</b> Not specified	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> Not specified	<b>Warranty:</b> Refer to manufacturer
<b>Manuals Available:</b> Not specified	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

### Under Vehicle Search Mirror

**Model:** VM-X1

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>  
Responder Knowledge Data Base

**Unit Cost:** contact sales@allen-vanguard.com



**Type:** Mirror

**Availability:** Contact sales@allen-vanguard.com

**Description:** The VM-X1 Under Vehicle Search Mirror provides the capability to conduct rapid and effective searches of vehicles. The ultra-low profile design includes a unique shatter-proof polycarbonate mirror fitted to a chassis with corner-mounted castors. Large convex mirror with LED light pod assembly, offers a wide field of view with excellent visual resolution. The hinged handle can be lowered to ground level for maximum reach under vehicle penetration as the 3-way locking collar allows the unit to be parked (i.e., handle upright or collapsed).

**Features:** Illumination is provided by a single energy-efficient light pod assembly containing 20 LEDs. Rechargeable light pod is housed in a acyclic housing (continuous use for 7 h). Fastens to trolley chassis with two holding clip brackets. Light pod assembly has three modes of operation (ON, OFF, and Movement sensitive mode). In movement sensitive mode, the lamp will switch on automatically and when moved will remain on for approx 15 s, unless moved again. In ON mode the lamp will remain on until turned off by operator. The VM-X1 can be fitted with up to 2 light pods.

The VM-X1 Under Vehicle Search Mirror Kit consists of under vehicle search mirror, light pod, charger, and spare mirror. These items are available separately.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Not specified

**Illumination Source:** 5.1 cm x 25 cm (2 in x 10 in) light pod (530 g/1.2 lb) containing 20 LEDs

**Mirror Type:** 40 cm x 40 cm (15.75 in x 15.75 in) convex mirror

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Compact dimensions: 580 mm x 540 mm x 30 mm (22.8 in x 21.3 in x 5.1 in). Ground clearance: 114 mm (4.5 in).

Handle length: 930 mm (36.6 in).

**Weight:** 2.4 kg (5.3 lb)

**Power Requirements:** Battery

**Battery Type:** Refer to manufacturer

**Battery Life:** 7 h (for a fully charged battery)

## LOGISTICAL PARAMETERS

<b>Portability:</b> Yes	<b>Consumables Required:</b> Not specified
<b>Durability:</b> Yes	<b>Maintenance Requirements:</b> Not specified
<b>Ease of Use:</b> Yes	<b>Service Options:</b> Not specified
<b>Environmental Considerations:</b> Not specified	<b>Shelf Life:</b> Not specified

**O&M Costs:** Not specified

**SPECIAL REQUIREMENTS**

<b>Operator Skills:</b> Not specified	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> Not specified	<b>Warranty:</b> Refer to manufacturer
<b>Manuals Available:</b> Not specified	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

### Panther Search Mirrors

**Model:** SM2 and SM3

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>  
Responder Knowledge Data Base

**Unit Cost:** Contact sales@allen-vanguard.com



**Type:** Mirror

**Availability:** Contact sales@allen-vanguard.com

**Description:** The Panther Search Mirrors are designed for specific purposes, responding to operational demands of security and tactical personnel. These mirrors are manufactured with lightweight nonrotational aluminum poles, padded forearm rests, and foam grips. The mirrors on all Panther models are modular in design. The separate mirror assembly simply locks on to the end of the poles for easy replacement or maintenance. The range of search mirrors is used by police forces military units, fire departments, airport and facility security personnel, and border patrol groups. These mirrors are supplied in two models:  
Panther SM2 Straight Leg Mirror: This mirror is compact, consisting of a two-piece aluminum pole that snaps together and extends as far as 114 cm (45 in). This model uses the same hardware as our telescopic models [padded forearm rest, foam grip, 17 h halogen light and 20 cm (8 in) convex mirror]; and comes complete with a padded carry case.

Panther SM3 Telescoping Mirror: With the same added features as the SM2, this mirror can be maneuvered to view areas that are difficult to access, such as attics and false ceilings. A forearm strap provides the operator with comfort and balanced capability to look around corners and frees the other hand for personal protection. This Panther model comes complete with a padded carry case. Contact sales@allen-vanguard.com for complete list of components. "Due to continual product development, descriptions and specifications are subject to change without prior notification and such details must not be used for contractual purposes."

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Not specified

**Illumination Source:** 17 h halogen light with replaceable batteries

**Mirror Type:** 20 cm (8 in) convex mirror with swivel base

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 0.9 m x 1.8 m (36 in to 72 in)

**Weight:** Panther SM2: convex mirror 1.2 kg (2.5 lb); Panther SM3: 1.4 kg (3.0 lb)

**Power Requirements:** Battery

**Battery Type:** 12 V rechargeable battery supplied with product

**Battery Life:** Refer to manufacturer

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Consumables Required:** Replaceable batteries

**Durability:** Yes

**Maintenance Requirements:** Not specified

**Ease of Use:** Yes

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Not specified	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> Not specified	<b>Warranty:</b> Limited lifetime
<b>Manuals Available:</b> Not specified	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

Telescopic Mirror Kit**Model:** TSK1/00

Allen-Vanguard Corporation  
 5459 Canotek Road  
 Ottawa, Ontario K1J 9M3  
 Canada  
 613-747-3590 (Tel)  
 sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>  
 Responder Knowledge Data Base

**Unit Cost:** Contact sales@allen-vanguard.com

**Type:** Mirror

**Availability:** Contact sales@allen-vanguard.com

**Description:** A convenient and highly effective search kit for ships, vehicles, and buildings is supplied in a fitted storage case, providing protection to the mirrors when not in use. The kit contains 1 x CEM/ILL telescopic mirror arm and five interchangeable mirrors.

Telescoping mirror arm—CEM/ILL: A modern design long-reach telescopic arm provides a straightforward, yet highly effective method of searching inaccessible areas. The lightweight, 5-section arm has a unique injection-molded bearing and locking mechanism, which holds the arm in the extended position during use. Manufactured from extruded aluminum with grey anodized finish, the ergonomic profile prevents unwanted arm section rotation and maximizes stability in use. The nonslip rubberized handle provides improved grip and comfort for users. The arm retracts fully into the handle section for ease of carrying and storage. The robust injection-molded head assembly can be fitted with any one of Allen-Vanguard interchangeable mirrors. A friction joint on the head allows positive adjustment to the angle of view and allows the head assembly to fold back to lock the unit shut when in the fully closed position.

Light pod: The telescopic arm is available with or without a unique LED light pod assembly. The light pod assembly, containing six ultra-bright LEDs, is deployed on the head adjacent to the mirror, which delivers maximum effective illumination to the search area. The light pod is environmentally tested to the IP-64 standard against dust and water spray ingress. Allen-Vanguard's visual search equipment is issued to numerous government agencies and military units world-wide and provides users with a versatile search capability.

Visual search activities by: Customs, police, military force protection, border control, prison/correctional services, counter terrorist forces, and general security.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Not specified

**Illumination Source:** Not specified

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Incorporating advanced power-saving technology, the light pod is powered by 2 x AAA alkaline batteries with a continuous use life of over 7 h

**Battery Type:** Not specified

**Battery Life:** Not specified

### LOGISTICAL PARAMETERS

<b>Portability:</b> Not specified	<b>Consumables Required:</b> Not specified
<b>Durability:</b> Not specified	<b>Maintenance Requirements:</b> Not specified
<b>Ease of Use:</b> Not specified	<b>Service Options:</b> Not specified
<b>Environmental Considerations:</b> Not specified	<b>Shelf Life:</b> Not specified

O&M Costs: Not specified

### SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Not specified	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> Not specified	<b>Warranty:</b> Not specified
<b>Manuals Available:</b> Not specified	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified



## GENERAL

### Under Vehicle Search Mirror

**Model:** VMBD/2

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>  
Responder Knowledge Data Base

**Unit Cost:** contact sales@allen-vanguard.com



**Type:** Mirror

**Availability:** Contact sales@allen-vanguard.com

**Description:** The Under Vehicle Search Mirror (trolley type) is capable of conducting rapid and effective visual searches of vehicles for the protection of potential targets and in the search of contraband materials. Allen-Vanguard's visual search equipment is issued to numerous government agencies and military units worldwide and provides users with a versatile search capability. A large convex mirror with fluorescent lighting is mounted on castors for searching underside of vehicles. The mirror provides a wide field of view and the hinged handle can be lowered to ground level for maximum under vehicle penetration. Illumination is provided by an energy efficient 12 W fluorescent lamp which has a 2 m (6.6 ft) flying lead and may be used independently as a search lamp. The VMBD/2 (convex glass mirror) and VMBD/3 (convex, polycarbonate mirror) units are powered by 10 D-cell batteries which fit into the handle and provide up to 8 h of continuous operation.

Features: 12 W fluorescent lamp. Unit powered by 10 D-cell batteries (placed in handle).

Specifications: Mirror 330 mm x 265 mm (13 in x 10.4 in) convex glass or convex polycarbonate. Two 6 W fluorescent lamps (splash-proof acrylic housing). Handle is 950 mm (3 ft) hinged aluminum. 3-way switch (OFF, Latching, and Momentary positions). 10 D-cell batteries. 10 cell rechargeable NiCad Battery Pack.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Not specified

**Illumination Source:** 12 W fluorescent lamp

**Mirror Type:** 33 cm x 26 cm (13 in x 10.4 in) convex polycarbonate mirror

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** See description

**Weight:** See description

**Power Requirements:** Batteries

**Battery Type:** 10 D-cell batteries

**Battery Life:** Up to 8 h

## LOGISTICAL PARAMETERS

<b>Portability:</b> Yes	<b>Consumables Required:</b> Batteries
<b>Durability:</b> Yes	<b>Maintenance Requirements:</b> Not specified
<b>Ease of Use:</b> Yes	<b>Service Options:</b> Not specified
<b>Environmental Considerations:</b> Not specified	<b>Shelf Life:</b> Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Not specified	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> Not specified	<b>Warranty:</b> Refer to manufacturer
<b>Manuals Available:</b> Not specified	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

***ExPack Expeditionary Pack Inspection Toolkit*****Model:** EP-1000

Lumenyte International Corporation  
 74 Icon  
 Foothill Ranch, California 92610  
 949-829-5214 (Tel)  
 bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
 Responder Knowledge Data Base

**Unit Cost:** \$2.45K USD

**Type:** Mirror

**Availability:** Currently available (COTS)

**Description:** This lightweight [181 kg (40 lb)] toolkit is intended for field deployment as a stand alone inspection kit or to complement the Lumenyte vehicle or truck inspection products. Designed for durability and rugged use under the most adverse conditions, this kit is ideal for rapid deployment forces. The Expeditionary Pack Inspection Toolkit consists of the following components: Lightweight, high impact, all black rifle case with precise cut outs for placement of all components. The case is filled with a closed foam material that will not absorb moisture and will protect all components from shock damage.

**SLAM-1000 Security Lighted Assessment Mirror.** Designed in accordance with U.S. Navy Naval Facilities Engineering Service Center (NFESC) specifications, this self-illuminated under vehicle inspection mirror is a tool to assist security personnel. Used for the detection of explosives, contraband or smuggled goods under any type of vehicle, this versatile and highly portable system is easy to use and offers rapid deployment.

**Maximum performance:** The unique mirror shape and optical fiber lighting system provides security personnel with the utmost in performance. The large, trapezoidal mirror optimizes the viewing area. Continuous optical fiber around the mirror edge provides even illumination of the subject without creating shadows that are typical with a single point light source or multiple LEDs. The durable plastic optical fiber will not break or shatter like other conventional sources. Flat surface mirror reflects the subject area without the distortion that is common with convex mirror systems. Hinged mirror plate allows 90° range of movement to accommodate optimized viewing angle.

**Maximum comfort:** The light-weight aluminum frame is ergonomically engineered and balanced to provide security personnel with the maximum comfort level required for extended periods of use. Weight balanced top to bottom. Adjustable arm support bar to accommodate individual users. Arm cradle and vinyl hand grip provides positive control while maximizing comfort.

**Maximum strength and reliability:** The SLAM is constructed of high quality and durable anodized aluminum, stainless steel and plastic to ensure years of service to the user, even under the most adverse conditions. Replaceable mirror surface.

Reinforced ball joint material for maximum wear against rough surfaces. Nylon protection bar under mirror plate to guard against abrasion. Impact and corrosion resistant.

**IW-1000 Inspection Wand.** The IW-1000 Inspection Wand is designed to provide security personnel with the ability to inspect confined and hard to reach areas. The 3.7 m (12 in) long flexible fiber optic wand emits a bright, 360° light pattern along its entire length, making it an ideal tool for inspecting engine compartments, wheel wells, and other spaces where a conventional flashlight fails to provide adequate illumination. The wand is fabricated from a single, nonconductive fiber optic element and attaches to a Surefire® 8NX flashlight (not included). As convenient and easy to use as a standard flashlight, this wand is ideal for vehicle, aircraft and small vessel inspection as well as traffic control operations.

**IW-1000 Features:** Optional red colored filter available. Single unit construction, no parts to lose or replace. Optical fiber jacketed with Teflon® for optimum protection. Patented LUMENYTE® LEFT™ optical fiber for illumination. 360° illumination from the optical fiber. Fuel, oil, and solvent resistant. Safe to use around flammable materials. Robust and virtually unbreakable. Provides uniform area lighting. Returns to original shape. (2) Extra rechargeable batteries for the Surefire 8NX. Two battery chargers for the Surefire 8NX. One extra mirror surface for the SLAM mirror. Three replacement lamps for the Surefire 8NX. One TSM-1000 Telescoping Search Mirror. Engineered by Lumenyte International Corporation in accordance with U.S. Navy Naval Facilities Engineering Service Center (NFESC) specifications, this telescoping search mirror is a valuable tool to assist security personnel. Capable of extending to as much as 3.7 m (12 ft) in total length, this mirror will allow inspection of otherwise difficult to reach places such as under, over, and around vehicles, machinery, and other large objects. It is also ideal for viewing around corners and high overhead areas where use of a conventional inspection mirror would require a ladder.

**Maximum performance:** The unique mirror shape provides security personnel with the utmost in performance. The large, trapezoidal mirror optimizes the viewing area. Flat surface mirror reflects the subject area without the distortion that is

common with convex mirror systems. Hinged mirror plate allows 90° range of movement to accommodate optimized viewing angle.

**Maximum strength and reliability:** The TSM is constructed of high quality and durable anodized aluminum, stainless steel, and plastic to ensure years of service to the user, even under the most adverse conditions. Replaceable mirror surface. Reinforced ball joint material for maximum wear against rough surfaces. Nylon protection bar under mirror plate to guard against abrasion. Impact and corrosion resistant. Textured cushion grip keeps handle secure in wet or oily hands. Optional LyteClip™ LED Illumination Accessory: This lightweight, high-intensity (8.9 lumens and 6000 candlepower) clip-on LED light provides compact, hands-free illumination for your TSM. This light is powered by 4 replaceable LR144 1.5 V alkaline coin cells, providing 100 h of battery life. Two VL-03 Blue VestLyte personal body markers. Developed by Lumentyte International Corporation in accordance with U.S. Navy Naval Facilities Engineering Service Center (NFESC), the VestLyte™ is engineered to be military tough and military functional. This product is designed to be worn or used as a protective marker system for personnel, equipment and traffic control. The VestLyte is visibly as bright as any disposable chemical light. Unlike the chemical light stick which must be discarded after only 3 h to 5 h of use, the VestLyte is capable of continuous operation for up to 1 wk on one set of AA batteries. Assembled in the USA; 360° illumination; available in 5.1 cm, 10.2 cm, and 20.3 cm (2 in, 4 in, and 8 in) fiber lengths; optional map shield for directional illumination control; available in white, red, blue, green, and amber (solid or flashing); available with IR Illumination for night vision operations (solid or flashing); interchangeable LED Cups to facilitate color change in the field; waterproof to 76 m (250 ft). Fuel, oil, and solvent resistant; impact resistant; and vest clip and lanyard connections. One VestLyte will replace hundreds of chemical light sticks. One set of AA batteries will produce one full week of continuous illumination. Compact and lightweight, 3.8 cm (1.5 in) wide and < 113 g (1/4 lb). Two VestLyte Map Shields. Three 4 packs of AA batteries VestLytes. One plastic case for miscellaneous parts.

**Length of Time Fielded:** 3 yr

**Current Users:** 3 yr

### OPERATIONAL PARAMETERS

**Set-up Time:** 3 min (flashlight to body connections)

**Field of View:** Not specified

**Illumination Source:** Not specified

**Mirror Type:** Trapezoidal, flat surface

**Mirror Type (Additional Comments):** Not specified

### PHYSICAL PARAMETERS

**Size:** Toolkit—152 cm x 41 cm x 23 cm (60 in x 16 in x 9.1 in) l,w,h. VestLyte Map Shields—3.8 cm (1.5 in) wide.

**Weight:** Toolkit—18 kg (40 lb). VestLyte Map Shields—< 113 g (1/4 lb).

**Power Requirements:** Battery operated flashlights

**Battery Type:** Rechargeable and AA

**Battery Life:** Not specified

### LOGISTICAL PARAMETERS

<b>Portability:</b> Hand carried or strapped to a HMMV vehicle	<b>Consumables Required:</b> Not specified
<b>Durability:</b> Battle proven in Iraq	<b>Maintenance Requirements:</b> Not specified
<b>Ease of Use:</b> Not specified	<b>Service Options:</b> Owners manuals and parts diagrams supplied
<b>Environmental Considerations:</b> Not specified	<b>Shelf Life:</b> Not specified

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

<b>Operator Skills:</b> None required	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> None required	<b>Warranty:</b> 1 yr
<b>Manuals Available:</b> Owners manuals and parts diagrams supplied	<b>Independent Testing:</b> U.S. Navy NFESC Technical Bulletin 05/02
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

### Security Lighted Assessment Mirror with Surefire Flashlight

**Model:** SLAM-1000

Lumenyte International Corporation  
74 Icon  
Foothill Ranch, California 92610  
949-829-5214 (Tel)  
bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
Responder Knowledge Data Base

**Unit Cost:** \$575 USD



**Type:** Mirror

**Availability:** COTS

**Description:** Designed in accordance with U.S. Navy, Naval Facilities Engineering Service Center (NFESC) specifications, the SLAM is used for the detection of explosives, contraband or smuggled goods under any type of vehicle. This versatile and highly portable system is easy to use and offers rapid deployment. The SLAM is constructed of high quality and durable anodized aluminum, stainless steel and plastic to ensure years of service to the user, even under the most adverse conditions. Lumenyte International Corporation is proud to say that there are thousands of these units in service today to support our troops in the war effort in Iraq. Made in the U.S.A. Complete with Surefire 8NX flashlight, extra rechargeable battery and a battery charger.

**Product highlights:** This unique mirror shape and optical fiber lighting system provides security personnel with the utmost in performance. The large, trapezoidal mirror optimizes the viewing area. Continuous optical fiber around the mirror edge provides even illumination of the subject without creating shadows that are typical with a single point light source or multiple LEDs. The durable plastic optical fiber will not break or shatter, like other conventional sources. Flat surface mirror reflects the subject area without the distortion that is common with convex mirror systems. Hinged mirror plate allows 90° range of movement to accommodate optimized viewing angle.

**Maximum comfort:** The light-weight aluminum frame is ergonomically engineered and balanced to provide security personnel with the maximum comfort level required for extended periods of time.

**Weight—balanced top to bottom.** Adjustable arm support bar to accommodate individual users. Arm cradle and vinyl hand grip provides positive control while maximizing comfort.

**Maximum strength and reliability:** Replaceable mirror surface. Reinforced ball joint material for maximum wear against rough surfaces. Nylon protection bar under mirror plate to guard against abrasion. Impact and corrosion resistant.

**Length of Time Fielded:** 3 yr

**Current Users:** 3 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** 2 min (attachment of flashlight to mirror body)

**Field of View:** Mirror reflected view

**Illumination Source:** Surefire 8NX flashlight

**Mirror Type:** Trapezoidal, flat surface mirror

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 155 cm x 29 cm x 18 cm (61.2 in x 11.3 in x 7) in l,w,h

**Weight:** 2.18 kg (4.8 lb)

**Power Requirements:** Additional rechargeable battery and battery charger supplied with SLAM

**Battery Type:** Rechargeable

**Battery Life:** 50 min on full charge

## LOGISTICAL PARAMETERS

<b>Portability:</b> Hand-carried unit	<b>Consumables Required:</b> Not specified
<b>Durability:</b> Stainless steel, aluminum, and plastic; impact and corrosion resistant	<b>Maintenance Requirements:</b> Replaceable plastic mirror surface
<b>Ease of Use:</b> Ergonomically engineered and balanced	<b>Service Options:</b> Surefire 8NX flashlight, extra rechargeable battery and battery charger supplied
<b>Environmental Considerations:</b> Not specified	<b>Shelf Life:</b> Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> None required	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> None required	<b>Warranty:</b> 1 yr warranty on body components. See Surefire warranty for flashlight.
<b>Manuals Available:</b> None required	<b>Independent Testing:</b> U.S. Navy NFESC Technical Bulletin 05/02, New Vehicle Products for Vehicle Inspection
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

Security Lighted Assessment Mirror with Vortex Flashlight

Model: SLAM-V-1000

Lumenyte International Corporation  
74 Icon  
Foothill Ranch, California 92610  
949-829-5214 (Tel)  
bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
Responder Knowledge Data Base

**Unit Cost:** \$380 USD



**Type:** Mirror

**Availability:** COTS

**Description:** SLAM-V is the second generation of the highly successful SLAM mirror system. SLAM-V uses all the basic SLAM components but incorporates LED technology as the primary light source rather than an incandescent lamp. The Vortex 3 W LED flashlight provides maximum, focused intensity to the optical fiber and is more than comparable in all aspects of the original design. Incorporating the Vortex LED flashlight to the SLAM now creates a system that is affordable to both the commercial market as well as the military. Designed in accordance with U.S. Navy Naval Facilities Engineering Service Center (NFESC) specifications, the SLAM is used for the detection of explosives, contraband, or smuggled goods under any type of vehicle. This versatile and highly portable system is easy to use and offer rapid deployment. The SLAM is constructed of high quality and durable anodized aluminum, stainless steel, and plastic to ensure years of service to the user, even under the most adverse conditions. Made in the U.S.A.

Military: Complete with Vortex 3 W flashlight plus a set of CR123 batteries.

Product highlights: This unique mirror shape and optical fiber lighting system provides security personnel with the utmost in performance. The large, trapezoidal mirror optimizes the viewing area. Continuous optical fiber around the mirror edge provides even illumination of the subject with creating shadows that are typical with a single point light source. The durable plastic optical fiber will not break or shatter like other conventional sources. Flat surface mirror reflects the subject area without the distortion that is common with convex mirror systems. Hinged mirror plate allows 90° range of movement to accommodate optimized viewing angle.

Maximum comfort: Weight—balanced top to bottom. Adjustable arm support bar to accommodate individual users. Arm cradle and vinyl hand grip provides positive control while maximizing comfort.

Maximum strength and reliability: Reliable LED technology for long life. Replaceable mirror surface. Reinforced ball joint material for maximum wear against rough surfaces. Nylon protection bar under mirror plate to guard against abrasion. Impact and corrosion resistant.

Maximum strength and reliability: Reliable LED technology for long life. Replaceable mirror surface. Reinforced ball joint material for maximum wear against rough surfaces. Nylon protection bar under mirror plate to guard against abrasion. Impact and corrosion resistant.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** 2 min (attachment of flashlight to mirror body)

**Field of View:** Mirror reflected view

**Illumination Source:** Vortex 3 W LED flashlight

**Mirror Type:** Trapezoidal, flat surface mirror

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 149 cm x 29 cm x 18 cm (58.8 in x 11.3 in x 7 in) l,w,h

**Weight:** 1.95 kg (4.3 lb)

**Power Requirements:** Replaceable batteries

**Battery Type:** CR123

**Battery Life:** 1 h 40 min

### LOGISTICAL PARAMETERS

<b>Portability:</b> Hand-carried unit	<b>Consumables Required:</b> Not specified
<b>Durability:</b> Stainless steel, aluminum, and plastic; impact and corrosion resistant	<b>Maintenance Requirements:</b> Replaceable plastic mirror surface
<b>Ease of Use:</b> Ergonomically engineered and balanced	<b>Service Options:</b> Vortex TC3 flashlight, CR123 batteries
<b>Environmental Considerations:</b> Not specified	<b>Shelf Life:</b> Not specified

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

<b>Operator Skills:</b> None required	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> None required	<b>Warranty:</b> 1 yr warranty on body components, see Vortex warranty
<b>Manuals Available:</b> None required	<b>Independent Testing:</b> U.S. Navy NFESC testing verification
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified



## GENERAL

### Telescoping Search Mirror

**Model:** TSM-1000

Lumenyte International Corporation  
74 Icon  
Foothill Ranch, California 92610  
949-829-5214 (Tel)  
bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
Responder Knowledge Data Base

**Unit Cost:** \$165 USD



**Type:** Mirror

**Availability:** COTS

**Description:** Engineered by Lumenyte International Corporation in accordance with U.S. Navy Naval Facilities Engineering Service Center (NFESC) specifications, this telescoping search mirror is a valuable tool to assist security personnel. Capable of extending to as much as 3.7 m (12 ft) in total length, this mirror will allow inspection of otherwise difficult to reach places such as under, over and around vehicles, machinery and other large objects. It is also ideal for viewing around corners and high overhead areas where use of a conventional inspection mirror would require a ladder. **Maximum Performance:** The unique mirror shape provides security personnel with the utmost in performance. The large, trapezoidal mirror optimizes the viewing area. Flat surface mirror reflects the subject area without the distortion that is common with convex mirror systems. Hinged mirror plate allows 90° range of movement to accommodate optimized viewing angle.

**Maximum strength and reliability:** The TSM is constructed of high quality and durable anodized aluminum, stainless steel, and plastic to ensure years of service to the user, even under the most adverse conditions. Replaceable mirror surface. Reinforced ball joint material for maximum wear against rough surfaces. Nylon protection bar under mirror plate to guard against abrasion. Impact and corrosion resistant. Textured cushion grip keeps handle secure in wet or oily hands.

**Optional LyteClip™ LED illumination accessory.** This lightweight, high-intensity (8.9 lumens and 6000 candlepower) clip-on LED light provides compact, hands-free illumination for your TSM. This light is powered by 4 replaceable LR144 1.5 V alkaline coin cells, providing 100 h of battery life.

**Length of Time Fielded:** 2 yr

**Current Users:** 2 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** Immediate

**Field of View:** Mirror reflected view

**Illumination Source:** Not specified

**Mirror Type:** Trapezoidal, flat surface mirror

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 126 cm x 28.7 cm x 4.3 cm (49.8 in x 11.3 in x 1.7 in) l,w,h closed; 347 cm x 28.7 cm x 4.3 cm (136.8 in x 11.3 in x 1.7 in) open

**Weight:** 0.91 kg (2 lb)

**Power Requirements:** Not specified

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Hand-carried unit

**Consumables Required:** Not specified

**Durability:** Stainless steel, aluminum, and plastic; impact and corrosion resistant

**Maintenance Requirements:** Replaceable plastic mirror surface

**Ease of Use:** Light weight and balanced

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

**SPECIAL REQUIREMENTS**

**Operator Skills:** None required

**Communication Interface:** Not specified

**Training Required:** None required

**Warranty:** 1 yr warranty

**Manuals Available:** Parts diagram supplied with TSM

**Independent Testing:** U.S. Navy NFESC testing verification

**Data Storage:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

Security Assessment Mirror

Model: SAM-1000

Lumenyte International Corporation  
74 Icon  
Foothill Ranch, California 92610  
949-829-5214 (Tel)  
bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
Responder Knowledge Data Base

**Unit Cost:** \$299 USD



**Type:** Mirror

**Availability:** COTS

**Description:** Engineered by Lumenyte International Corporation in accordance with U.S. Navy Naval Facilities Engineering Service Center (NFESC) specifications, this under vehicle inspection mirror is a tool to assist security personnel. When used in conjunction with the SIMS™, this mirror is extremely effective for the detection of explosives, contraband, or smuggled goods under any type of vehicle. **Maximum Performance:** The unique mirror shape provides security personnel with the utmost in performance. The large, trapezoidal mirror optimizes the viewing area. Flat surface mirror reflects the subject area without the distortion that is common with convex mirror systems. Hinged mirror plate allows 90° range of movement to accommodate optimized viewing angle.

**Maximum comfort:** The light-weight aluminum frame is ergonomically engineered and balanced to provide security personnel with the maximum comfort level required for extended periods of use.

**Weight balanced:** Top to bottom. Adjustable arm support bar to accommodate individual users. Arm cradle and vinyl hand grip provide positive control while maximizing comfort.

**Maximum strength and reliability:** The SAM is constructed of high quality and durable anodized aluminum, stainless steel, and plastic to ensure years of service to the user, even under the most adverse conditions. Replaceable mirror surface. Reinforced ball joint material for maximum wear against rough surfaces. Nylon protection bar under mirror plate to guard against abrasion. Impact and corrosion resistant.

**Length of Time Fielded:** 4 yr

**Current Users:** 4 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** Immediate

**Field of View:** Mirror reflected view

**Illumination Source:** Not specified

**Mirror Type:** Trapezoidal, flat surface mirror

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 140 cm x 29 cm x 18 cm (55 in x 11.3 in x 7 in) l,w,h

**Weight:** 1.6 kg (3.6 lb)

**Power Requirements:** Not specified

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Hand-carried unit

**Consumables Required:** Not specified

**Durability:** Stainless steel, aluminum, and plastic; impact and corrosion resistant

**Maintenance Requirements:** Replaceable plastic mirror surface

**Ease of Use:** Ergonomically engineered and balanced

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> None required	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> None required	<b>Warranty:</b> 1 yr on body components, less plastic mirror surface
<b>Manuals Available:</b> None required	<b>Independent Testing:</b> U.S. Navy NFESC Technical Bulletin 05/02, New Vehicle Products for Vehicle Inspection
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

### Search and Inspection Mirrors

**Model:** Varies

Sas R & D Services, Inc.  
2714 SW 183 Ave.  
Miramar, Florida 33029  
954-432-2345 (Tel)  
tedsas@sasrad.com

**Information Source:** <http://www.sasrad.com>  
Responder Knowledge Data Base

**Unit Cost:** < \$100



**Type:** Mirror

**Availability:** Current

**Description:** The Centurion Series has a 12 W or 20 W bulb, with a 19° wide beam and is lightweight, designed for counterbalance to prevent fatigue or arm strain.

Applications: SWAT, surveillance, vehicle inspection, VIP security, event security, and cargo inspection.

Hannible series—An under vehicle inspection mirror. Length is 91.4 cm (36 in) collapsed to 191 cm (75 in) extended. Light is 12 W or 20 W 19° wide beam.

Model 75 folding mirror—For all law enforcement applications. Lightweight and portable made from fiberglass and aluminum for strength without weight. Replaceable mirror lenses eliminate disruption of service and extend operational life. Widely used for military, police, and civilian security.

Mini-Mirrors Bomb Disposal Search-Inspection—The mini-mirror search series offers innovative small tools to suit a variety of problem solving needs and retrieval situations. No job is too small for these rugged and versatile units. Whether the search criteria requires reflection, magnification or recovery, the mini-mirrors can conquer obstacles. Each item has the unique feature of allowing it to be used individually or combined in kits increasing the user's flexibility.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Not specified

**Illumination Source:** Not specified

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Centurian weight complete: 2.49 kg (5 1/2 lb) with attached hook.

Hannible weight complete: 5.44 kg (12 lb).

**Power Requirements:** Not specified

**Battery Type:** 2.0 amp, 12 V sealed lead acid, rechargeable

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Consumables Required:** Not specified

**Durability:** Not specified

**Maintenance Requirements:** Not specified

**Ease of Use:** Not specified

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Not specified	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> Not specified	<b>Warranty:</b> Not specified
<b>Manuals Available:</b> Not specified	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

### Under Vehicle Inspection Mirror

**Model:** Hannibal Series

Sas R & D Services, Inc.  
2714 SW 183 Ave.  
Miramar, Florida 33029  
954-432-2345 (Tel)  
tedsas@sasrad.com

**Information Source:** <http://www.sasrad.com>  
Responder Knowledge Data Base

**Unit Cost:** < \$500



**Type:** Mirror

**Availability:** Current

**Description:** An under-vehicle inspection mirror on wheels for use under larger vehicles such as trucks, SUVs, and buses with illumination

**Length of Time Fielded:** 7 yr

**Current Users:** 7 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** Instant

**Field of View:** Light: 12 W or 20 W. with a 48 cm (19 in) wide beam

**Illumination Source:** 12 W or 20 W lamp

**Mirror Type:** Acrylic for easy changes

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Length: collapsed 91 cm (36 in); extended 191 cm (75 in)

**Weight:** Complete with batteries 5.4 kg (12 lb)

**Power Requirements:** 2 A, 23 V sealed lead acid rechargeable

**Battery Type:** Lead acid

**Battery Life:** Depends on use

## LOGISTICAL PARAMETERS

**Portability:** Easy

**Consumables Required:** Acrylic mirrors easily changed in field

**Durability:** Rugged

**Maintenance Requirements:** Battery charging

**Ease of Use:** Simple

**Service Options:** Not specified

**Environmental Considerations:** Any

**Shelf Life:** Indefinite

**O&M Costs:** On request

## SPECIAL REQUIREMENTS

**Operator Skills:** Not required

**Communication Interface:** Not specified

**Training Required:** Not required

**Warranty:** 90 d

**Manuals Available:** Supplied with unit

**Independent Testing:** Not specified

**Data Storage:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

### Under Vehicle Search Mirror

**Model:** Centurion Series

Sas R & D Services, Inc.  
2714 SW 183 Ave.  
Miramar, Florida 33029  
954-432-2345 (Tel)  
tedsas@sasrad.com

**Information Source:** <http://www.sasrad.com>  
Responder Knowledge Data Base

**Unit Cost:** < \$500



**Type:** Mirror

**Availability:** Current

**Description:** The Centurion series is lightweight and designed for counterbalance to prevent fatigue or arm sprain.

**Length of Time Fielded:** 6 yr

**Current Users:** 6 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** Instant

**Field of View:** Not specified

**Illumination Source:** 12 W or 20 W bulb, with a 48 cm (19 in) wide beam

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Closed length is 91 cm (36 in) and extended length is 191 cm (75 in)

**Weight:** Complete is 2.5 kg (5.5 lb)

**Power Requirements:** The battery is 2 amp 12 V sealed lead acid and rechargeable

**Battery Type:** Lead acid

**Battery Life:** Depends on usage

## LOGISTICAL PARAMETERS

**Portability:** Easy

**Consumables Required:** Acrylic mirror easily field replaceable

**Durability:** Rugged

**Maintenance Requirements:** Charge batteries

**Ease of Use:** Simple

**Service Options:** Not required

**Environmental Considerations:** Any

**Shelf Life:** Indefinite

**O&M Costs:** On request

## SPECIAL REQUIREMENTS

**Operator Skills:** Not required

**Communication Interface:** Not specified

**Training Required:** Not required

**Warranty:** 90 d

**Manuals Available:** Supplied with equipment

**Independent Testing:** Not specified

**Data Storage:** Not specified

**Applicable Regulations:** Not specified



## GENERAL

High Tech Telescoping Inspection Mirror

Model: HTC-2

Ullman Devices Corporation  
664 Danbury Road  
Ridgefield, Connecticut 06877  
203-438-6577 (Tel)  
ullman@ntplx.net

**Information Source:** <http://www.ullman-devices.com>  
Responder Knowledge Data Base

**Unit Cost:** HTC—\$9.79; HTS—\$11.32



**Type:** Mirror

**Availability:** Immediately

**Description:** Clear glass mirror for perfect reflection. Mirror encased in rugged corrosion resistant brushed stainless steel. Stainless steel telescoping handle is strong, long, and lightweight. Comfortable textured cushion grip keeps handle secure in wet or oily hands.

HTC-2: 5.7 cm (2.25 in) mirror diameter. Telescopes from 16.5 cm to 92 cm (6.5 in to 36.3 in).

Standard packaging: 1 doz.

Package weight: 1.4 kg (3.125 lb).

HTS-2: > 8.3 cm (3.25 in) mirror diameter. Telescopes from 16.5 cm to 75 cm (6.5 in to 29.5 in).

Standard packaging: 1 doz. Package weight: 1.6 kg (3.625 lb).

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** All-angle ball joint holds mirror firmly for 360° viewing

**Illumination Source:** Not specified

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Varies, see description

**Weight:** Varies, see description

**Power Requirements:** None

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Consumables Required:** None

**Durability:** Not specified

**Maintenance Requirements:** Not specified

**Ease of Use:** Easy

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Communication Interface:** Not specified

**Training Required:** Not specified

**Warranty:** Not specified

**Manuals Available:** Not specified

**Independent Testing:** Not specified

**Data Storage:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

Inspection Mirror  
Model: S-2 Series

Ullman Devices Corporation  
664 Danbury Road  
Ridgefield, Connecticut 06877  
203-438-6577 (Tel)  
ullman@ntplx.net

**Information Source:** <http://www.ullman-devices.com>  
Responder Knowledge Data Base

**Unit Cost:** \$9.20 to \$12.32 each



**Type:** Mirror

**Availability:** Immediately

**Description:** S-2 Series. 8.3 cm (3.25 in) diameter mirror with brushed finish stainless steel mirror back, all angle ball joint, nonrotating inner hex rod, and vinyl grip.

S-2 Circular Telescoping Mirror: Overall length 27.9 cm (11 in), extends to 38 cm (15 in).

S-2L Circular Telescoping Mirror, extra long handle: Overall length 43 cm (17 in), extends to 69 cm (27.25 in).

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Not specified

**Illumination Source:** Not specified

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Varies, see description

**Weight:** Not specified

**Power Requirements:** None

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Consumables Required:** None

**Durability:** Not specified

**Maintenance Requirements:** Not specified

**Ease of Use:** Easy

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Communication Interface:** Not specified

**Training Required:** Not specified

**Warranty:** Not specified

**Manuals Available:** Not specified

**Independent Testing:** Not specified

**Data Storage:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

Inspection Mirror**Model:** K-2 Series

Ullman Devices Corporation  
664 Danbury Road  
Ridgefield, Connecticut 06877  
203-438-6577 (Tel)  
ullman@ntplx.net

**Information Source:** <http://www.ullman-devices.com>  
Responder Knowledge Data Base

**Unit Cost:** \$7.03 to \$15.85 each



**Type:** Mirror

**Availability:** Immediately

**Description:** K-2 Series. 5.6 cm x 8.9 cm (2 1/8 in x 3 1/2 in) rectangular mirror with brushed finish stainless steel mirror back, all angle ball joint, replaceable mirrors, nonrotating inner hex rod, and vinyl grip.

K-2 Rectangular Telescoping mirror: Overall length 28.6 cm (11 1/4 in) extends to 38.7 cm (15 1/4 in).

K-2L Rectangular Telescoping mirror, extra long handle. Overall length 43.8 cm (17 1/4 in) extends to 69.9 cm (27 1/2 in).

K-2M Rectangular Magnifying Telescoping mirror. Overall length 28.6 cm (11 1/4 in) extends to 38.7 cm (15 1/4 in).

K-2ML Rectangular Magnifying Telescoping mirror, extra long handle. Overall length 43.8 cm (17 1/4 in), extends to 69.9 cm (27 1/2 in).

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Not specified

**Illumination Source:** Not specified

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Varies, see description

**Weight:** Not specified

**Power Requirements:** None

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Consumables Required:** None

**Durability:** Not specified

**Maintenance Requirements:** Not specified

**Ease of Use:** Easy

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Communication Interface:** Not specified

**Training Required:** Not specified

**Warranty:** Not specified

**Manuals Available:** Not specified

**Independent Testing:** Not specified

**Data Storage:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

Inspection Mirror  
Model: C-2 Series

Ullman Devices Corporation  
664 Danbury Road  
Ridgefield, Connecticut 06877  
203-438-6577 (Tel)  
ullman@ntplx.net

**Information Source:** <http://www.ullman-devices.com>  
Responder Knowledge Data Base

**Unit Cost:** \$7.02 to \$14.24 each



**Type:** Mirror

**Availability:** Immediately

**Description:** C-2 Series: 5.7 cm (2 1/4 in) diameter mirror with brushed finish stainless steel mirror back; all angle ball joint, nonrotating inner hex rod, and vinyl grip.

C-2 Circular Telescoping mirror: Overall length 25 cm (10 in), extends to 36 cm (14 in).

C-2L Circular Telescoping mirror, extra long handle: Overall length 41 cm (16 in) extends to 66 cm (26 in).

C-2M Circular Magnifying Telescoping mirror: Overall length 25 cm (10 in), extends to 36 cm (14 in).

C-2ML Circular Magnifying Telescoping mirror, extra long handle: Overall length 41 cm (16 in), extends to 66 cm (26 in).

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Not specified

**Illumination Source:** Not specified

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Varies, see description

**Weight:** Not specified

**Power Requirements:** None

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Consumables Required:** None

**Durability:** Not specified

**Maintenance Requirements:** Not specified

**Ease of Use:** Easy

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Communication Interface:** Not specified

**Training Required:** Not specified

**Warranty:** Not specified

**Manuals Available:** Not specified

**Independent Testing:** Not specified

**Data Storage:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

### Eagle Video Search Kit

**Model:** SM1

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>  
Responder Knowledge Data Base

**Unit Cost:** Contact sales@allen-vanguard.com



**Type:** Camera/Video

**Availability:** Contact sales@allen-vanguard.com

**Description:** The Eagle Video Search Kit offers versatile tactical search technology for both day and night operations. This complete kit contains a variety of user-friendly components, to give end users a premium search device. It is used in the same way as a tactical search mirror but with greater flexibility and without the need for end users to bend over on their hands and knees to view underneath vehicles. Designed with a flexible under vehicle trolley, an LCD screen for viewing images, and a color camera with IR sensors, the Eagle Video Search Kit converts from a single-use tool to a multi-purpose search system depending on situational demands. The color infrared camera is designed for use in both day and night operations. A tiny sensor located next to the lens of the camera senses the amount light. The IR lights are activated if the amount of light is too low, and the camera automatically switches from color to black and white. This unique video system is so versatile, it can be shared by all departments, and can be applied to numerous situations and scenarios.

**Under-vehicle configuration:** Using the swivel trolley, the video and mirror configuration can be rolled under a vehicle for a picture perfect view of the undercarriage. The low axis of the system makes it ideal for viewing under the smallest of vehicles. Operators can sweep the trolley from side to side and view the image on the 4 in (10 cm) screen that rests around the user's neck. This system can also be used for viewing under office furniture, airplane seats and other locations that can be reached with the low profile trolley. Immediately, images can be viewed in full color for quick identification of unusual or suspicious items.

**Pole cam search:** The Eagle Video Search Kit's modular design allows operators to take only a few moments to change from the under-vehicle search mode to a pole cam method for searching attics, overhead compartments, trunks, or the back of transport trucks. The Telescopic pole extends as far as 72 in (183 cm) to see in difficult-to-reach places. No tools are required to change from one mode to another. The pole cam search configuration can be used in the same way that other Allen-Vanguard search mirrors are utilized: hold the pole cam configuration with the camera close to the ground and search under office furniture or any objects close to the ground.

**Features:** Designed with under vehicle trolley. LCD screen for viewing images. Color camera with IR sensors. Converts from single-use to multi-purpose search system.

**Components:** Color Camera W/IR Sensor: Automatically changes from color to black and white when sensor detects low light. Manual 360° camera swivel and tilt function. 4 in (10 cm) high resolution LCD screen. Rests on neck, lightweight, sun screen, plugs into battery pack. Under-vehicle trolley. 3 swivel casters. Camera cover to reduce glare. Protective case.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified

**Field of View:** Not specified

**Illumination Source:** Not specified

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Telescopic pole 36 in (92 cm) to 72 in (183 cm) extended aluminum pole

**Weight:** Not specified

**Power Requirements:** 12 V dc battery; 2.9 h sealed lead acid battery; 12 V charger; wall mount charger with float meter to protect over-charging

**Battery Type:** Not specified

**Battery Life:** Not specified

### LOGISTICAL PARAMETERS

**Portability:** Not specified

**Consumables Required:** Not specified

**Durability:** Not specified

**Maintenance Requirements:** Not specified

**Ease of Use:** Not specified

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

### SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Communication Interface:** Not specified

**Training Required:** Not specified

**Warranty:** Not specified

**Manuals Available:** Not specified

**Independent Testing:** Not specified

**Data Storage:** Not specified

**Applicable Regulations:** Not specified

## GENERAL

Camera System for Undercarriage Vehicle Inspection

Model: VIC-103

PowerLinx, Inc.  
 10901 A Roosevelt Blvd N  
 Suite 200  
 St. Petersburg, Florida 33710  
 727-471-0921 (Tel)  
 cmutlu@power-linx.com  
**Information Source:** <http://www.power-linx.com>  
 Responder Knowledge Data Base  
**Unit Cost:** \$2K



Type: Camera/Video

**Availability:** Allow 1 wk for shipping

**Description:** High-resolution video and composite output drives TV monitors, VCRs, DVRs, or video-capture computer cards for an evidentiary recording of any inspection. VIC is compact and light weight. Long-life rechargeable belt pack provides hours of continuous operation. Lightweight alloy components resist corrosion and lessen operator fatigue.

\*Heavy duty

\*Light weight material

\*Compact and portable, folds up for easy storage

\*White infrared equipped camera to see in total darkness

\*Color and black and white video automatically changes depending on the light levels

\*Low profile camera allowing inspections 12.7 cm (5 in) from the ground

\*Easy maneuverability

\*Free standing and balanced

**Length of Time Fielded:** 5 yr

**Current Users:** 5 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** Ready to use, no set up required

**Field of View:** 85° but different lenses can be applied for different applications

**Illumination Source:** White infrared diodes in camera board

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 117 cm x 224 cm (46 in x 88 in) open for usage or 117 cm x 26.7 cm (46 in x 10 1/2 in) folded for storage

**Weight:** 5.4 kg (12 lb)

**Power Requirements:** 12 V dc

**Battery Type:** 12 V 7 AHR

**Battery Life:** Long-life rechargeable belt pack provides hours of continuous operation

## LOGISTICAL PARAMETERS

**Portability:** Easy

**Consumables Required:** Not specified

**Durability:** Heavy duty

**Maintenance Requirements:** Rechargeable battery

**Ease of Use:** Not specified

**Service Options:** Battery and DVR

**Environmental Considerations:** LCD monitor not waterproof

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

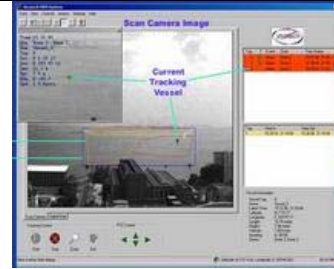
<b>Operator Skills:</b> No training needed	<b>Communication Interface:</b> RCA connections NTSC video
<b>Training Required:</b> Not specified	<b>Warranty:</b> 1 yr full replacement guarantee
<b>Manuals Available:</b> Manual available with purchase	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> DVR add on available	<b>Applicable Regulations:</b> Not specified



## GENERAL

iVACS™**Model:** Not specified

Stratech, Inc.  
 1420 Spring Hill Rd  
 McLean, Virginia 22102  
 703-507-4914 (Tel)  
 Patrick\_M\_Troy@stratech.com  
**Information Source:** <http://www.stratech.com>  
 Responder Knowledge Data Base

**Unit Cost:** Not specified**Type:** Camera/Video**Availability:** Not specified

**Description:** iVACS™ allows vehicle inspection with its unique capability to scan vehicle undercarriages, capture high quality images, allow zoom-in capabilities, and automatically compare historical images with newly taken ones to automatically detect any discrepancy. A breakthrough solution, iVACS™ integrates other essential security procedures such as vehicle number plate capture, driver verification and explosive detection into a singular system, hence providing complete, all-in-one security inspection system for vehicle access.

VIPS™—The next generation vessel traffic management and port, ship, waterside strategic asset protection, security and surveillance System. VIPS™ automatically detects, identifies, tracks, and predicts the sea vessels passing through a waterway. It provides day/night, all year round, all weather coastal surveillance with remote centralized command and control management.

Super Track™ constitutes a radical approach to real-time video security surveillance applications, able to conduct fully automatic intelligent event monitoring that detects, identifies, tracks and predicts pre-specified events. Based on nonintrusive computer vision techniques, SuperTrack™ is a suite of automatic real-time surveillance and tracking applications. The system can be easily customized and operated to track different types of moving objects predefined to the system, for example.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Not specified**Field of View:** Not specified**Illumination Source:** Not specified**Mirror Type:** Not specified**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified**Weight:** Not specified**Power Requirements:** Not specified**Battery Type:** Not specified**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified**Consumables Required:** Not specified**Durability:** Not specified**Maintenance Requirements:** Not specified**Ease of Use:** Not specified**Service Options:** Not specified**Environmental Considerations:** Not specified**Shelf Life:** Not specified**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Not specified	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> Not specified	<b>Warranty:</b> Not specified
<b>Manuals Available:</b> Not specified	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

### Und-Aware

**Model:** AG-500 Series

Vehicle Inspection Technologies  
22800 Executive Drive  
Suite 100  
Oak Hill, Virginia 20166-9506  
703-834-1064 (Tel)  
b1peters@mindspring.com

**Information Source:** <http://www.mindspring.com>  
Responder Knowledge Data Base

**Unit Cost:** Please contact manufacturer



**Type:** Camera/Video; visual with comparison and database lookup

**Availability:** Currently available

**Description:** VIT's newest product family includes the 500-Series Und-Aware™ brand portable or fixed installation Under-Vehicle-Inspection-System. This newest generation system provides the most comprehensive under-vehicle scanning technology with high-resolution color imagery. A composite image is generated that can be compared with the same vehicle's earlier image scan. This allows one to see changes that may have taken place beneath the vehicle. System configurations range from 4 to 8 cameras to cover the widest cars and trucks, wheel-to-wheel. Straight up camera viewing allows all parts of the vehicle's underside to be seen. The world's only patented UVSS covers the AirWash™ camera and light lens cleaning system. This cleaning system contains no moving parts, yet removes water, snow, dust, sand, leaves, and debris to ensure a clear, well lighted camera image.

The AG-500 series is a fully open-architecture system that can interface and exchange data with virtually any database in the world. This allows the optional Automatic License Plate Reader (ALPR) to provide lookup requests to any DHS or police database. The ALPR is fully integrated with the 500-series product and will store the visual license plate along with the extracted number and all this is stored with the under-vehicle scan and a driver image. In addition to English, Arabic, and Kuwaiti, plates can be read automatically with other languages available. Additional biometrics can be integrated with the vehicle scan to provide additional access-point security. These might include, RFID, fingerprint, Iris scan, facial recognition, etc. The modular design of the hardware allows for ready field upgrades or repair of cameras or lights. Software upgrades can be performed on-line or via CDs. Illumination is provided via high-intensity long-life white LEDs with up to 100 000 h life expectancy. The system hardware is rust-free and weather resistant to IP-67. It is designed to be installable by one person in < 1 h and can be ordered in optional weatherproof portable cases. Systems are in use worldwide and operate from any voltage and current without modification. Unique interface available in virtually any language. Currently English and Arabic are available.

**Length of Time Fielded:** 5 yr

**Current Users:** 5 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** 1 h

**Field of View:** Entire underside of any size or length vehicle

**Illumination Source:** White LED

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Below ground: 244 cm x 28 cm x 6.4 cm (96 in x 11 in x 2.5 in). Above ground—same size but includes ramps.

**Weight:** Shipping weight: 225 kg (496 lb)

**Power Requirements:** 100 V ac to 240 V ac, 50 Hz to 60 Hz

**Battery Type:** Not specified

**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

<b>Portability:</b> Portable case option	<b>Consumables Required:</b> None
<b>Durability:</b> Rugged cast aluminum	<b>Maintenance Requirements:</b> Wipe lenses as necessary
<b>Ease of Use:</b> Easiest system to use	<b>Service Options:</b> Not needed
<b>Environmental Considerations:</b> -40 °C to +60 °C (-40 °F to 140 °F)	<b>Shelf Life:</b> Indefinite

**O&M Costs:** Virtually Zero

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Minimal as images are “lifelike”	<b>Communication Interface:</b> Anything, open-architecture system
<b>Training Required:</b> Factory or field	<b>Warranty:</b> 1 yr, all parts and labor
<b>Manuals Available:</b> Included and on-line	<b>Independent Testing:</b> CE
<b>Data Storage:</b> As required, no limit	<b>Applicable Regulations:</b> None

## GENERAL

Contraband Detection Kit

Model: CT 30

Campbell Security Equipment Company (CSECO)  
 5046-D Commercial Circle  
 Concord, California 94520  
 925-689-7221 (Tel)  
 tony.cseco@sbcglobal.net  
**Information Source:** <http://www.cseco.net>  
 Responder Knowledge Data Base

**Unit Cost:** < \$20K



**Type:** Gamma Radiation Backscatter  
 Fiber Optics, Light Pipes, Lights

**Availability:** Current

**Description:** CT-30 Kit of assorted instruments and tools for the detection of contraband materials in confined spaces. Supplied with a reinforced custom padded case, and complete with hi-light handle and safe-ground feature.

Each kit includes the following items:

K-910B Contraband detector complete with remote display.

FO-10 fiber optics inspection kit 4 way 2.3 cm (80 in) long.

LRF-1 laser rangefinder.

PM-10 extending inspection mirror.

PN-30 (6) pocket pencil probes.

DCA digital camera adapter for use with cameras that have provision for filter rings.

P-41 heavy duty inspection probe.

CT-30C heavy duty carrying case.

CT-30M manuals for all equipment.

**Length of Time Fielded:** 20 yr

**Current Users:** 20 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** Immediate

**Field of View:** Not applicable

**Illumination Source:** Not specified

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Case with equipment 0.5 m x 0.3 m x 0.6 m (21 in x 13 in x 25 in)

**Weight:** 22 kg (49 lb)

**Power Requirements:** 9 V battery

**Battery Type:** Standard

**Battery Life:** 22 h continuous or several months operational

## LOGISTICAL PARAMETERS

**Portability:** In case with wheels and handle

**Consumables Required:** Not specified

**Durability:** Rugged

**Maintenance Requirements:** Easy

**Ease of Use:** Easy

**Service Options:** Not specified

**Environmental Considerations:** Any

**Shelf Life:** Indefinite

**O&M Costs:** On request

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Read manual or 4 h training	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> On request	<b>Warranty:</b> 12 mo
<b>Manuals Available:</b> Yes	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

### Fiberscopes for Search and Surveillance

**Model:** FO Series

Campbell Security Equipment Company (CSECO)  
5046-D Commercial Circle  
Concord, California 94520  
925-689-7221 (Tel)  
tony.cseco@sbcglobal.net

**Information Source:** <http://www.cseco.net>  
Responder Knowledge Data Base

**Unit Cost:** \$8K to \$20K



**Type:** Fiber Optics, Light Pipes, Lights

**Availability:** Current

**Description:** Fiberscopes for all applications, articulating or nonarticulating in various lengths and diameters to suit any application. Accessories include lighting and video recording options. May be used in gas or diesel tanks.

FO-10 is a flexible fiberscope that delivers high-resolution images of remote, difficult to reach areas. The ability to deflect the end of the fiberscope greatly enhances inspection capabilities, which allows the user to direct the instrument around bends and corners to view inaccessible areas of vehicles (such as fuel tanks or dash boards), machinery and equipment or conduct visual inspections in clandestine or hard to reach places. Standard features: locking detent articulating control knob; high resolution fiber imaging bundle; custom foam lined carrying case; and self contained light guide with adapter.

Options: Right angle viewing (prism type). 150 W illuminator (FO-150); 35 mm/digital still camera adapter; "C" mount video camera adapter; "C" mount video camera and monitor; and various connectors for light sources.

TD-13 is a general purpose fiberscope [7.9 mm (0.312 in) diameter] stainless steel "stay-put" construction; 10 000 fibers; minimum bend radius 1.5 in ( 38 cm ) depth of field 5 mm x 75 mm (0.2 in x 3 in). Designed to be a valuable inspection device, ideal for use in searching vehicle dashboards and similar places.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Immediate

**Field of View:** 50° field of view

**Mirror Type (Additional Comments):** Not specified

**Illumination Source:** 25 W

**Mirror Type:** Not specified bulb

## PHYSICAL PARAMETERS

**Size:** Various lengths 1 m, 1.5 m and 2 m (40 in, 60 in, and 80 in)

**Weight:** 0.9 kg (2 lb) scope plus 1.4 kg (3 lb) battery; packed weight 10.9 kg (24 lb)

**Power Requirements:** Internal rechargeable battery

**Battery Type:** NiCad

**Battery Life:** Indefinite

## LOGISTICAL PARAMETERS

**Portability:** Easy

**Consumables Required:** Not specified

**Durability:** Rugged

**Maintenance Requirements:** Charge batteries

**Ease of Use:** Read manual

**Service Options:** Not specified

**Environmental Considerations:** Any

**Shelf Life:** Indefinite

**O&M Costs:** On request

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Read manual 4 h training	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> Yes	<b>Warranty:</b> 12 mo
<b>Manuals Available:</b> Yes	<b>Independent Testing:</b> Not specified
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified



## GENERAL

### Solid State Security Illumination Mat System

**Model:** SS-SIMS-1000

Lumenyte International Corporation  
74 Icon  
Foothill Ranch, California 92610  
949-829-5214 (Tel)  
bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
Responder Knowledge Data Base

**Unit Cost:** \$1.75K USD



**Type:** Fiber Optics, Light Pipes, Lights

**Availability:** 4 wk to 6 wk lead time

**Description:** The SS-SIMS™, jointly developed by Lumenyte International Corporation and ExeLED Corporation is a patent-pending, modular, mobile, and rugged inspection system combining Lumenyte's patented, light emitting fiber optic (LEF®) technology and Luxeon® III HB-LEDs. The solid-state under-vehicle illumination system will fully illuminate any vehicle undercarriage without glare or shadows. This system is designed specifically to assist military, law-enforcement and gate security personnel with their search for explosives and/or contraband. The SS-SIMS is fully portable and can be installed at a temporary inspection point or a permanent facility such as border crossings, military and law enforcement checkpoints, entrances to buildings or parking structures and other locations where a quick but thorough vehicle inspection is required. The system can be set up in minutes by one person and requires no hand-tools.

Solid state illumination technology eliminates lamp or filament breakage in demanding field applications. Over 30 000 h of lamp life resulting in lower maintenance costs. Resists vibration, impact, sudden movements and shock. Instant on/off—no lamp warm-up required. Linear Emitting Fiber (LEF®) technology. Efficient light transmission and emission. Predetermined light emission pattern for maximum effectiveness. Optimized for minimum scatter and coupling loss. Environmentally protective coatings for maximum durability and long life. Proprietary concentrator lenses. Efficient collection of light and transmission for maximum brightness.

Modular and compact, offering shape formats such as long strips and squares. Easily assembled in minutes by one person without hand-tools. Portable or permanent installation capabilities. Low voltage/low energy consumption. Available in 120 V ac, portable battery or vehicle battery powered configurations. Long field life.

Rugged construction: Water-tight; crush-proof connectors; and vulcanized rubber construction for resistance to harsh environments and UV.

SS-SIMS specifications: Standard system consists of 6 modules to form 3 sections.

Electrical specifications. Source: 12 Luxeon™ III LEDs for standard system.

Power requirements: 100 V ac to 240 V ac, 50 Hz to 60 Hz. AC to dc converter, supplied standard, 110 V ac to 230 V ac to 12 V dc; UL, CE marked. Over-molded, integral male connectors.

Power consumption: 40 W/h for standard system. Add 7 W/h for each additional module added.

Light emission distribution: Symmetric direct illumination. Light emission beam angle: 60° half-angle.

Environmental specifications: Storage temperature -40 °F to 140 °F (-40 °C to 60 °C). Operating temperature -40 °F to 140 °F (-40 °C to 60 °C). Watertight, suitable for outdoor use, NOT suitable for submersion.

Physical specifications: Aluminum and vulcanized rubber construction with built-in Lumenyte® LEF™ illumination element.

Lumenyte LEF illumination element: UV stabilized jacketing, fluoropolymer cladding, and proprietary polymer core.

Overall dimensions (standard system)—305 cm x 89 cm x 4.6 cm (120 in x 35 in x 1.8 in), section length 102 cm (40 in).

Weight—36 kg (80 lb), including all wiring and connectors (standard system).

Power consumption—7 W/h for each additional module added to the standard 3 section system.

**Length of Time Fielded:** New Item

**Current Users:** New Item

## OPERATIONAL PARAMETERS

**Set-up Time:** 10 min by a single person without the use of any hand tools

**Field of View:** Complete illumination of underside of vehicle

**Illumination Source:** 12 Luxeon II LED's for standard system

**Mirror Type:** Use in conjunction with SAM mirror system

**Mirror Type (Additional Comments):** Not specified

**PHYSICAL PARAMETERS**

**Size:** 305 cm x 89 cm x 4.6 cm (120 in x 35 in x 1.8 in) l,w,h [section length is 102 cm (40 in)]

**Weight:** 36 kg (80 lb) including all wiring and connectors (standard system)

**Power Requirements:** 100 V ac to 240 V ac, 50 Hz to 60 Hz

**Battery Type:** Not specified

**Battery Life:** Not specified

**LOGISTICAL PARAMETERS**

<b>Portability:</b> Man portable, single box	<b>Consumables Required:</b> Not specified
<b>Durability:</b> Suitable for outdoor use, not suitable for submersion	<b>Maintenance Requirements:</b> Not specified
<b>Ease of Use:</b> No training required	<b>Service Options:</b> SAM and TSM mirror system
<b>Environmental Considerations:</b> -40 °C to 60 °C (-40 °F to 140 °F)	<b>Shelf Life:</b> Indefinite

**O&M Costs:** Not specified

**SPECIAL REQUIREMENTS**

<b>Operator Skills:</b> None required	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> None required	<b>Warranty:</b> 1 yr
<b>Manuals Available:</b> Full installation and maintenance manual supplied with kit	<b>Independent Testing:</b> Currently being tested by US Navy NFESC and MWAA
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

***SIMS Security Illuminated Mat System*****Model:** SIMS-1000

Lumenyte International Corporation  
 74 Icon  
 Foothill Ranch, California 92610  
 949-829-5214 (Tel)  
 bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
 Responder Knowledge Data Base

**Unit Cost:** \$5.98K USD**Type:** Fiber Optics, Light Pipes, Lights**Availability:** 6 wk to 8 wk lead time

**Description:** Proper lighting is the key to effective under vehicle inspection. The lighting needed to perform under vehicle inspections poses some unique problems. High intensity area or spot lighting produces glare and deep shadows that can mask suspicious items. Flashlights, floodlights and daylight all share this problem. The SIMS uses fiber optic technology to produce a soft, uniform, no-glare light devoid of obscuring shadows. The system is designed to be portable and can be deployed virtually anywhere with a set-up time of approximately 25 min. The SIMS is capable of operating 24 h a day in all weather conditions. Vehicles drive over the system, which illuminates the entire underside of a full size car or truck, allowing security personnel to rapidly and effectively scan the vehicle underside, improving throughput. Uses a single light bulb rated for 4000 h of continuous operation. Expected field life is > 2 yr of continuous outdoor operation. Can be deployed on any surface (pavement, dirt, grass, sand, gravel or snow). No site preparation required. Will provide for increased vehicle throughput at check points. Light shut off capability. Installs in 25 min. Simple on/off operation requires no training of personnel. Very low maintenance requirements. Fuel, oil and solvent resistant. Easily stored for later deployment. Replacement parts available.

**Length of Time Fielded:** 4 yr**Current Users:** 4 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** 25 min, no hand tools required**Field of View:** Complete illumination of the underside of the vehicle**Illumination Source:** 150 W metal halide lamp**Mirror Type:** Used in conjunction with Lumenyte SAM mirror**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified**Weight:** Not specified**Power Requirements:** All voltages and plug types available**Battery Type:** Not specified**Battery Life:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Portable wood or plastic crating**Consumables Required:** Not specified**Durability:** Fuel, oil and solvent resistant, 20 000 rated drive covers supplied**Maintenance Requirements:** Not specified**Ease of Use:** Can be deployed on any surface, no site preparation required**Service Options:** Lumenyte SAM mirror system**Environmental Considerations:** Set up on any surface: pavement, dirt, sand, grass, gravel, or snow**Shelf Life:** Indefinite**O&M Costs:** Lamp life rated at 4000 h

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Can be set up or torn down without the use of any hand tools	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> Not specified	<b>Warranty:</b> 1 yr warranty on all components except the lamp
<b>Manuals Available:</b> Full installation and maintenance manual supplied with unit	<b>Independent Testing:</b> U.S. Navy NFESC Technical Bulletin 05/02 New Security Products for Vehicle Inspections
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

***PyteLyte Inspection Wand with Vortex Flashlight*****Model:** IWV-1000

Lumenyte International Corporation  
 74 Icon  
 Foothill Ranch, California 92610  
 949-829-5214 (Tel)  
 bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
 Responder Knowledge Data Base

**Unit Cost:** \$150 USD**Type:** Fiber Optics, Light Pipes, Lights**Availability:** Small quantities are COTS, lead time will vary with large quantities

**Description:** The IWV-1000 is a variation of IW-1000 using a Vortex LED Flashlight. The IWV-1000 Inspection Wand is designed to provide security personnel with the ability to inspect confined and hard to reach areas. The 30 cm (12 in) long flexible fiber optic wand emits a bright, 360° light pattern along its entire length, making it an ideal tool for inspecting engine compartments, wheel wells and other spaces where a conventional flashlight fails to provide adequate illumination. The wand is fabricated from a single, nonconductive fiber optic element and attaches to a Vortex TC3 flashlight. As convenient and easy to use as a standard flashlight, this wand is ideal for vehicle, aircraft and small vessel inspection as well as traffic control operations.

IWV-1000 features: Optional red colored filter available. Single unit construction, no parts to lose or replace. Optical fiber jacketed with Teflon® for optimum protection. Patented LUMENYTE® LEF™ optical fiber for illumination. 360° illumination from the optical fiber. Fuel, oil, and solvent resistant. Safe to use around flammable materials. Robust and virtually unbreakable. Provides uniform area lighting. Returns to original shape.

**Length of Time Fielded:** Not specified**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** 2 min (flashlight to body connection)**Field of View:** 360° illumination**Illumination Source:** Vortex 3 W LED flashlight**Mirror Type:** Not specified**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 3.3 cm (1.3) in OD max x 58 cm (23 in) long (including fiber optic)**Weight:** 0.31 kg (0.68 lb) including batteries**Power Requirements:** Battery powered**Battery Type:** CR123**Battery Life:** 1 h 40 min

## LOGISTICAL PARAMETERS

**Portability:** Hand-carried**Consumables Required:** Not specified**Durability:** Teflon jacketed optical fiber for optimum protection**Maintenance Requirements:** Replacement of CR123 batteries**Ease of Use:** Flexible for bending in and around engine compartments and wheel wells**Service Options:** Not specified**Environmental Considerations:** Not specified**Shelf Life:** Not specified**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> None required	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> None required	<b>Warranty:</b> 1 yr
<b>Manuals Available:</b> Exploded parts diagram supplied with unit	<b>Independent Testing:</b> U.S. Navy NFESC Technical Bulletin 05/02
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

***PyreLyte Inspection Wand IW with Surefire Flashlight*****Model:** IW-1000-C

Lumenyte International Corporation  
 74 Icon  
 Foothill Ranch, California 92610  
 949-829-5214 (Tel)  
 bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
 Responder Knowledge Data Base

**Unit Cost:** \$350 USD (with Surefire 8NX)



**Type:** Fiber Optics, Light Pipes, Lights

**Availability:** COTS

**Description:** The IW-1000 Inspection Wand is designed to provide security personnel with the ability to inspect confined and hard to reach areas. The 30 cm (12 in) long flexible fiber optic wand emits a bright, 360° light pattern along its entire length, making it an ideal tool for inspecting engine compartments, wheel wells and other spaces where a conventional flashlight fails to provide adequate illumination. The wand is fabricated from a single, nonconductive fiber optic element and attaches to a Surefire® 8NX flashlight. As convenient and easy to use as a standard flashlight, this wand is ideal for vehicle, aircraft, and small vessel inspection as well as traffic control operations.

IW-1000 features: Optional red colored filter available. Single unit construction, no parts to lose or replace. Optical fiber jacketed with Teflon® for optimum protection. Patented LUMENYTE® LEF™ optical fiber for illumination. 360° illumination from the optical fiber. Fuel, oil, and solvent resistant. Safe to use around flammable materials. Robust and virtually unbreakable. Provides uniform area lighting. Returns to original shape.

**Length of Time Fielded:** 4 yr

**Current Users:** 4 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** 2 min (flashlight to body connection)

**Field of View:** 360° illumination

**Illumination Source:** Xenon lamp

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 3.6 cm (1.4 in) OD max x 70 cm (27.5 in) long (including optical fiber)

**Weight:** 0.45 kg (1 lb) including NiCad rechargeable battery

**Power Requirements:** Battery powered

**Battery Type:** Rechargeable NiCad

**Battery Life:** 50 min run time

## LOGISTICAL PARAMETERS

**Portability:** Hand-carried

**Consumables Required:** Not specified

**Durability:** Teflon jacketed optical fiber for optimum protection

**Maintenance Requirements:** Charging of extra rechargeable battery (supplied)

**Ease of Use:** Flexible for bending in and around engine compartments and wheel wells

**Service Options:** Extra battery and battery charger (supplied)

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> None required	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> None required	<b>Warranty:</b> 1 yr
<b>Manuals Available:</b> Exploded parts diagram supplied with unit	<b>Independent Testing:</b> U.S. Navy NFESC Technical Bulletin 05/02
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified



## GENERAL

*PypeLyte Inspection Light with Surefire Flashlight***Model:** IW-2000-C

Lumenyte International Corporation  
74 Icon  
Foothill Ranch, California 92610  
949-829-5214 (Tel)  
bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
Responder Knowledge Data Base

**Unit Cost:** \$750 USD with Surefire M6 and 2 Meter  
Optical Fiber



**Type:** Fiber Optics, Light Pipes, Lights

**Availability:** COTS

**Description:** The PypeLyte Inspection Light (IW-2000) is designed to be immersed into gasoline, fuels, and solvents. Initially intended to assist in fuel tank inspections. With a camera, the product has a wide range of applications such as small vessel inspections, aircraft inspections, and machinery maintenance. The fiber optic element is 0.6 cm (¼ in) diameter and is available in 2 m or 3 m (79 in or 118 in) lengths, and functions the same as the IW-1000, providing the same lighting effect. The IW-2000 mounts onto a SureFire® M6 flashlight, is easily man-portable and safe to use around flammable materials. IW-2000 features: Optical fiber jacketed and capped with Teflon® for optimum protection; 360° illumination from the optical fiber; replaceable fiber optic element; easy attachment to a SureFire® M6 flashlight (sold separately); and patented LUMENYTE® LEF™ optical fiber for illumination. It is flexible yet stiff enough for insertion into tanks. Easy maintenance and repair. Waterproof, fuel, oil, and solvent proof. Lightweight and convenient.

**Length of Time Fielded:** 3 yr

**Current Users:** 3 yr

## OPERATIONAL PARAMETERS

**Set-up Time:** 2 min (flashlight to body connection)

**Field of View:** 360° illumination

**Illumination Source:** Xenon Lamp

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 7.6 cm (3 in) OD max x 37 cm (14.5 in) long [(not including 2 m or 3 m (5.6 ft x 9.8 ft) optical fiber]

**Weight:** 0.77 kg (1.7 lb) including 6 lithium batteries

**Power Requirements:** Battery powered

**Battery Type:** CR123

**Battery Life:** High bright lamp—1 h, ultra bright lamp—20 min

## LOGISTICAL PARAMETERS

**Portability:** Hand-carried

**Consumables Required:** Not specified

**Durability:** Teflon jacketed optical fiber for optimum protection

**Maintenance Requirements:** Replacement of CR123 batteries

**Ease of Use:** Flexible for bending in and out of fuel tanks

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> None required	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> None required	<b>Warranty:</b> 1 yr
<b>Manuals Available:</b> Exploded parts diagram supplied with unit	<b>Independent Testing:</b> U.S. Navy NFESC Technical Bulletin 05/02
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

*PypeLyte Inspection Light with Vortex Flashlight***Model:** IWV-2000-C

Lumenyte International Corporation  
 74 Icon  
 Foothill Ranch, California 92610  
 949-829-5214 (Tel)  
 bgrothe@lumenyte.com

**Information Source:** <http://www.lumenyte.com>  
 Responder Knowledge Data Base

**Unit Cost:** Not specified



**Type:** Fiber Optics, Light Pipes, Lights

**Availability:** COTS

**Description:** The PypeLyte Inspection Light (IWV-2000-C) is a variation of IW-2000 using a Vortex LED flashlight. The IWV-2000 Inspection Light is designed to be immersed into gasoline, fuels, and solvents. Initially intended to assist in fuel tank inspections, with a camera the product has a wide range of applications such as small vessel inspections, aircraft inspections, and machinery maintenance. The fiber optic element is 0.6 cm (¼ in) diameter and is available in 2 m or 3 m (79 in or 118 in) lengths and functions the same as the IWV-1000, providing the same lighting effect. The IWV-2000 mounts onto a Vortex TC3 flashlight, is easily man-portable and safe to use around flammable materials.

IWV-2000 features: Optical fiber jacketed and capped with Teflon® for optimum protection; 360° illumination from the optical fiber; replaceable fiber optic element; easy attachment to a Vortex TC3 flashlight (sold separately); and patented LUMENYTE® LEF™ optical fiber for illumination. Flexible yet stiff enough for insertion into tanks. Easy maintenance and repair. Waterproof, fuel, oil, and solvent proof. Lightweight and convenient.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** 2 min (flashlight to body connection)

**Field of View:** 360° illumination

**Illumination Source:** Vortex 3 W LED flashlight

**Mirror Type:** Not specified

**Mirror Type (Additional Comments):** Not specified

## PHYSICAL PARAMETERS

**Size:** 3.3 cm (1.3 in) OD max. x 23 cm (9.1 in) long (not including optical fiber)

**Weight:** 0.29 kg (0.66 lb) including 2 lithium batteries

**Power Requirements:** Battery powered

**Battery Type:** CR123

**Battery Life:** 1 h 40 min

## LOGISTICAL PARAMETERS

**Portability:** Hand-carried

**Consumables Required:** Not specified

**Durability:** Teflon jacketed optical fiber for optimum protection

**Maintenance Requirements:** Replacement of CR123 batteries

**Ease of Use:** Flexible for bending in and out of fuel tanks

**Service Options:** Not specified

**Environmental Considerations:** Not specified

**Shelf Life:** Not specified

**O&M Costs:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> None required	<b>Communication Interface:</b> Not specified
<b>Training Required:</b> None required	<b>Warranty:</b> 1 yr
<b>Manuals Available:</b> Exploded parts diagram supplied with unit	<b>Independent Testing:</b> U.S. Navy NFESC Technical Bulletin 05/02
<b>Data Storage:</b> Not specified	<b>Applicable Regulations:</b> Not specified

## GENERAL

Readyscope Economical Fiberscopes**Model:** RS Series

Sas R & D Services, Inc.  
2714 SW 183 Ave.  
Miramar, Florida 33029  
954-432-2345 (Tel)  
tedsas@sasrad.com

**Information Source:** <http://www.sasrad.com>  
Responder Knowledge Data Base

**Unit Cost:** < \$1K



**Type:** Fiber Optics, Light Pipes, Lights

**Availability:** Currently

**Description:** The budget price enables these fiberscopes to be used by virtually untrained operators and replacement cost is minimal. Superior optics and lighting provide quick and easy viewing. Glare-free close-up and distant inspections. Fatigue reducing lightweight single unit. Handle design for long term inspections. Economically priced, allows wider use of fiberscopes by operators in the field. One piece design, nothing additional required. Supplied in lockable carrying case with foam insert, for protection and transportation. Custom lengths available on request.

**Length of Time Fielded:** Not specified

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Set-up Time:** Instant out-of-the-box

**Mirror Type:** Not specified

**Field of View:** Not applicable

**Mirror Type (Additional Comments):** Not specified

**Illumination Source:** 6 mm (0.24 in) halogen bulb; 10 mm (0.39 in) LEDs

## PHYSICAL PARAMETERS

**Size:** Standard 61 cm and 91 cm (24 in and 36 in); shaft lengths in 6 mm and 10 mm (0.24 in and 0.36 in) diameters; also 122 cm (48 in) in 10 mm (0.39 in) diameter.

**Weight:** ~0.45 kg (1 lb)

**Power Requirements:** Disposable batteries

**Battery Type:** 6 mm version uses battery pack; 10 mm version uses AA batteries

**Battery Life:** 6 mm = 2 h; 10 mm = 50 h continuous "ON"

## LOGISTICAL PARAMETERS

**Portability:** In individual carrying case

**Consumables Required:** Batteries

**Durability:** Rugged

**Maintenance Requirements:** Wipe with cloth after insertion in liquids

**Ease of Use:** Simple

**Service Options:** Batteries, right angle mirror, and pick-up magnet

**Environmental Considerations:** Any

**Shelf Life:** Indefinite

**O&M Costs:** On request

## SPECIAL REQUIREMENTS

**Operator Skills:** Single sheet instruction sheet; easy to use out-of-the-box

**Communication Interface:** Not specified

**Training Required:** Not required

**Warranty:** 90 d

**Manuals Available:** Supplied with unit

**Independent Testing:** Not specified

**Data Storage:** Not specified

**Applicable Regulations:** Not specified



**APPENDIX F—BLAST MITIGATION EQUIPMENT DATA FIELDS**





## **APPENDIX F—BLAST MITIGATION EQUIPMENT DATA FIELDS**

Thirty-two data fields were used to provide information relating to blast mitigation equipment. The 32 data fields are comprised of data fields from the market survey vendor questionnaire requesting specifics about their products. Because of the database limitations, several data fields on the vendor questionnaire were combined, but all the vendor-supplied information was entered into the database. All data fields were developed using input from the emergency responder community.

The data fields are organized into five categories:

- General (12 data fields).
- Operational (3 data fields).
- Physical (3 data fields).
- Logistical (7 data fields).
- Special Requirements (7 data fields).

### **1.0 General**

#### **1.1 Title**

The Title is the full commercial name of the equipment plus appropriate acronyms and pseudonyms (military/commercial versions of identical equipment).

#### **1.2 Information Provided By**

Information Provided By identifies the person or organization that submitted the product. This may be a distributor or the product manufacturer. The address, telephone, email, and website information is also provided.

#### **1.3 Manufacturer**

The Manufacturer is the company that developed the equipment. This data field includes the manufacturer's name, address, telephone and fax numbers, point of contact, and e-mail addresses.

#### **1.4 Detector Technology**

Detector Technology identifies the broad technology area employed by the detector. Specific examples include ion mobility spectrometry or chemiluminescence.

#### **1.5 Model Number**

The Model Number is the unique number identifying a specific line of equipment.

## **1.6 Part Number**

The Part Number is the manufacturer's part number for ordering, if applicable.

## **1.7 Summary and Description**

The Summary and Description are provided by the manufacturer to describe the features and uses of the product.

## **1.8 Keywords**

Keywords are descriptive of the product capabilities and applications and are used to support product searches within the data base.

## **1.9 Availability Date**

Availability Date refers to how readily available a piece of equipment is (e.g., how long it takes to receive equipment upon ordering).

## **1.10 Manufacturer Suggested Retail Price (MSRP)**

MSRP is the cost of the piece of equipment for immediate use upon receipt. The cost includes the set-up cost and initial consumables. Many items have discounts available and the manufacturer should be consulted.

## **1.11 Length of Time Fielded**

Length of Time Fielded permits an evaluation of the maturity of a product.

## **1.12 Current User/Period of Use**

Current User/Period of Use identifies organizations (i.e., military use, commercial applications, civil-service instrument, etc.) that are currently using the piece of equipment. This information may include the average number of units each client has in operation and the average number of years these units have been in use.

## **2.0 Operational**

### **2.1 Explosive Detected**

The Explosives Detected field describes which materials are detected. Depending on the technology employed, the equipment may also identify specific explosives.

## **2.2 Ballistic Performance**

Ballistic performance of the equipment is measured in terms of the NIJ classification levels.

- NIJ Class III-A reference velocity is 427 m/s (1400 ft/s) for both 9 mm and 44 magnum
- NIJ Class II reference velocity is 367 m/s (1205 ft/s) for 9 mm or 427 m/s (1400 ft/s) for 357 magnum.
- NIJ Class II-A reference velocity is 332 m/s (1090 ft/s) for 9 mm or 312 m/s (1025 ft/s) for 40 S&W.
- NIJ Class I reference.

## **2.3 Set-up Time**

Set-up Time describes the length of time that the equipment requires for assembly before start-up.

## **3.0 Physical**

### **3.1 Size**

Size indicates the external dimensions of the equipment, including height, width, and depth.

### **3.2 Weight (including batteries)**

Weight (including batteries) provides the total weight of the equipment in operational status.

### **3.3 Power Requirements**

Power Requirements indicates the type of power required to operate the equipment and any ancillary components. This field may apply to some equipment that is portable but must be stationary to operate.

## **4.0 Logistical**

### **4.1 Transportability**

Transportability is the ability of the equipment to be readily packed, shipped, or transported under typical and atypical conditions. The equipment dimensions and weight are two important factors to consider, because they determine if a single person can transport the equipment or if the equipment requires vehicular transport.

## **4.2 Ease of Use**

Ease of Use provides information on whether the equipment can be accurately used by an operator under challenging circumstances, such as wearing personal protective equipment (PPE). This data field also provides the number of steps and level of accuracy needed to obtain a result.

## **4.3 Operating Environment**

Operating Environment identifies the conditions under which a piece of equipment may be used and still be accurate. For example, some equipment is designed to operate in the field under extreme outdoor weather conditions and climates, while other equipment requires climate-controlled environments.

## **4.4 Durability**

Durability describes the ruggedness of the equipment under environmental and transportation extremes and still able to operate.

## **4.5 Shelf Life**

Shelf Life describes how long equipment may be stored and be ready for immediate use, if applicable.

## **4.6 Maintenance**

Maintenance indicates how often equipment requires maintenance, the complexity of maintenance, and whether it can be maintained in the field.

## **4.7 Operational and Maintenance (O&M) Costs**

O&M Costs include the annual cost to keep the equipment in a state of full readiness, including maintenance, calibration, and consumables, if applicable.

## **5.0 Special Requirements**

### **5.1 Operator Skills and Training**

Operator Skills and Training refers to the level of skill required (i.e., awareness or technician level) and the specific training required to operate the equipment and interpret data for a final analysis.

### **5.2 Training Available**

Training Available may range from reading a manual or viewing a video to participating in formal courses offered through the manufacturer or an outside training contractor.

### **5.3 Manuals Available**

Manuals Available indicate which manuals are supplied as standard equipment or if they need to be ordered separately. Manuals may include user manuals, repair manual with illustrated components and parts, or training documentation.

### **5.4 Support Equipment and Accessories**

Support Equipment and Accessories includes additional equipment needed for operation or other equipment that may increase functionality.

### **5.5 Warranty**

Warranty information describes the specific terms and conditions as set by the manufacturer, including any restrictions by the manufacturer.

### **5.6 Independent Testing Information Available**

Independent Testing Information Available describes any testing that has been done by a third party to confirm the equipment performance.

### **5.7 Applicable Regulations**

Applicable Regulations includes any government and/or safety regulations that may apply to the possession, use, or storage of a piece of equipment (e.g., some detectors may require the use of a radioactive source material, which requires licensure by the Nuclear Regulatory Commission).



**APPENDIX G—BLAST MITIGATION EQUIPMENT INDEX AND DATA SHEETS**





**APPENDIX G—BLAST MITIGATION EQUIPMENT INDEX AND DATA SHEETS**

<b>ID#</b>	<b>Detector Name (Model)</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Page G-#</b>
1	Non-Magnetic Tools (NMT-200, NMT-300)	Allen-Vanguard Corporation	Tool kit	G-1
2	Non-Magnetic Tools Comprehensive (NMT-EOD)	Allen-Vanguard Corporation	Nonmagnetic and nonsparking tools	G-2
3	Special Operations Tool Kit (SO TK1/00)	Allen-Vanguard Corporation	Tool kit	G-4
4	EOD Operators Tool Kit (SKT-EOD)	Allen-Vanguard Corporation	Tool kit	G-5
5	HAL® BombTec™ Kit (BT1/00)	Allen-Vanguard Corporation	Detection kit	G-6
6	HAL® Heavy Duty Kit (MK3)	Allen-Vanguard Corporation	Rigging kit	G-8
7	HAL® Special Operations Hook & Line Kit (SO1/00 & SO2/00)	Allen-Vanguard Corporation	Special operations kit	G-9
8	HAL® Building Accessory Kit (BAK1/00)	Allen-Vanguard Corporation	Rigging tools	G-11
9	HAL® Key Equipment Schedule Pack (KESP1/00)	Allen-Vanguard Corporation	Rigging system	G-13
10	HAL® Vehicle Access Kit (VAK1/00)	Allen-Vanguard Corporation	Remote vehicle entry and clearance	G-14
11	HAL® Lightweight IEDD Tripod (TRI2/00)	Allen-Vanguard Corporation	Portable tripod	G-16
12	HAL® Heavy Duty Tripod TRI1/00)	Allen-Vanguard Corporation	Portable tripod	G-17
13	Bomb Blast Suppression Blankets	Allen-Vanguard Corporation	Containment	G-18
14	Suspect Package Container (SPC-1000)	Allen-Vanguard Corporation	Containment	G-19
15	Ballistic Containment Blanket (TD-BG-025)	Allen-Vanguard Corporation	Containment	G-21
16	Air Foam Dolly System (TD-DS-025-M1)	Allen-Vanguard Corporation	Containment	G-22
17	Advanced Enclosure [(AE) (TD-AE-00-00-000)]	Allen-Vanguard Corporation	Containment	G-24
18	Universal Containment System (TD-DS-025-M1)	Allen-Vanguard Corporation	Containment	G-25
19	Dual Initiator (DX10)	Allen-Vanguard Corporation	Initiator	G-27

<b>ID#</b>	<b>Detector Name (Model)</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Page G-#</b>
20	Remote RF Initiator Firing System (RFI-RFA KIT)	Allen-Vanguard Corporation	Initiator	G-28
21	Bomb Containment Vessels, Detonation Chambers	American Innovations, Inc.	Bomb containment vessels, detonation chambers	G-30
22	Blast Mitigation Trash Bins	American Innovations, Inc.	Containment	G-31
23	BlastWrap	BlastGard International, Inc.	Blast mitigation	G-33
24	Mitigated Trash Receptacle (MTR 81, MTR 91, and MTR 101)	BlastGard International, Inc.	Blast mitigation	G-35
25	Blast Mitigated Unit Load Device (BlastWrap BMULD)	BlastGard International, Inc.	Blast mitigation	G-37
26	Global Defender Blast Mitigation Trailer System (GD-130/60-TC)	Burner Fire Control	Containment foam	G-39
27	Global Defender Portable Blast Mitigation System (GD-60-C)	Burner Fire Control	Blast mitigation foam	G-41
28	Octatron Explosive Release Pole System (OERPS)	CHANG Industry, Inc.	Initiator	G-43
29	Frag Bag Bomb Box (30233ASSY80975010)	Foster-Miller Inc., LAST Armor Division	Containment	G-44
30	Rapid Deployment Fortification Wall (RDFW MK 4)	Geocell Systems, Inc.	Containment	G-45
31	PAN Disrupter (12 Gauge)	Ideal Products, Inc.	Disrupters	G-46
32	12 Gauge Titanium Disrupter (T-3)	Ideal Products, Inc.	Disrupters	G-47
33	EOD .357 Gauge Magnum Micro Disrupter (K7000)	Ideal Products, Inc.	Disrupters	G-48
34	Magnum Microdisrupter (.357 Gauge)	Ideal Products, Inc.	Disrupters	G-49
35	Disrupter (410 Gauge)	Ideal Products, Inc.	Disrupters	G-50
36	BlastSafe—Golans: Fully Confined Containment Systems for Explosives (MSI Golan)	Mistral Security, Inc.	Containment	G-51
37	Blast Containment Receptacles (MSI BCR)	Mistral Security, Inc.	Containment	G-53
38	Total Containment Vessel (42-SCS)	NABCO, Inc.	Containment	G-54
39	IED Jammer to Counter RCIED Weapons (VIP-300 X Series)	Security Intelligence Technologies	Jammer	G-56

## GENERAL

### Non-Magnetic Tools

**Model:** NMT-200, NMT-300

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales @allen-vanguard.com



**Technology:** Tool kit

**Availability:** Contact: sales@allen-vanguard.com

**Description:** A 35 piece nonmagnetic tool kit for EOD operations. All tools are manufactured in beryllium copper alloy. All tools are suitable for contact use. The tool kit is supplied in a foam-lined protective carrying bag. Replacement tools can be supplied individually. Also available in an 84 piece set.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** 12.5 kg (27.6 lb)

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Non-Magnetic Tools Comprehensive

**Model:** NMT-EOD

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales @allen-vanguard.com



**Technology:** Nonmagnetic and nonsparking tools

**Availability:** Contact: sales@allen-vanguard.com

**Description:** Developed in response to the specific requirements of NATO EOD units, the NMT-EOD 1' comprehensive set of nonmagnetic and nonsparking tools provides explosives disposal specialists with a definitive, dependable and versatile equipment resource. The NMT-EOD 1' Tool Kit gives the capability to deal with older unexploded ordnance (UXO) while meeting the challenges of modern and potentially unknown types of weapons and devices. All operators can use this equipment with unquestioned confidence. Threat/strong. The legacy of world wars and numerous recent regional conflicts is that EOD teams are frequently exposed to the threat of conventional and chemical/biological-filled UXO. Older UXO can become more hazardous with age as components deteriorate and explosive fillings decay. Modern weapons invariably have sensitive and complicated firing systems. In all cases a particular threat exists from UXO incorporating magnetic influence systems. For this reason EOD tasks involving magnetically-actuated UXO require special precautions—when manual entry is made into UXO it is essential that all tools and equipment used meet the stringent nonmagnetic requirements of NATO STANAG 2897 EOD.

Nonsparking: The inherent nonsparking property of NMT-EOD 1' Tools make them suitable for all EOD/IEDD tasks where an external hazard or risk of explosion exists (e.g., close proximity to oil fuel tanks or inside flammable gas-filled compartments). Conveniently embodied into three separate sub-sets, each of which is available separately. The overall scope of application of the comprehensive kit encompasses:

NMT-EOD Set A'—A general-purpose tool set for generic, nonspecific, EOD tasks including mines/munitions disposal operations.

NMT-EOD Set B'—An additional enhancement to Set A, increasing its capability to include specialized mines/munitions investigation tasks.

NMT-EOD Set C'—A lightweight multi-purpose, adjustable pin wrench set for mines/munitions keep ring removal and similar tasks. All NMT-EOD Tools and cases are NSN codified.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Not specified	<b>Warranty:</b> Not specified
<b>Training Available:</b> Not specified	<b>Independent Testing:</b> Not specified
<b>Manuals Available:</b> Not specified	<b>Applicable Regulations:</b> Each tool individually certified to (NATO STANAG 2897 EOD Annex C. NATO Standardization Agreement for Magnetic Signature Design Criteria for EOD Equipment).
<b>Support Equipment:</b> Not specified	

**GENERAL****Special Operations Tool Kit****Model:** SO TK1/00

Allen-Vanguard Corporation  
 5459 Canotek Road  
 Ottawa, Ontario K1J 9M3  
 Canada  
 613-747-3590 (Tel)  
 sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>**Unit Cost:** Contact: sales@allen-vanguard.com**Technology:** Tool kit**Availability:** Contact: sales@allen-vanguard.com

**Description:** Special Operations Tool Kit. A lightweight and highly portable tool kit for use in counter-terrorist tasks and other tactical situations. The Special Operations Tool Kit gives the EOD/IEDD operator the capability to deploy with a compact but comprehensive range of tools that will enable him to carry out various tasks in the most demanding of environments and under hostile tactical conditions if required. The Special Operations Tool Kit has been designed with help from ex-British EOD/IEDD Special Forces personnel. The tools are contained in a specifically designed Backpack that offers a comfortable ergonomic design combined with the practicality of equipment stowage. The internal color-coded compartments are designed to hold the specific tooling in a range of removable internal pouches and fixed netting compartments. Layout is based on Tool Set grouping and operational precedents when using manual equipment. The layout may be changed at the bomb tech's discretion. The Backpack has also been designed to include extra free space allowing a bomb tech to insert some of their own personal equipment. All the tools have been selected for their quality and reliability with a number offering multi role capability to reduce total weight. The Tools offer the capabilities for search, access, diagnostics, and render safe. The make-up and construction of the Special Operations Backpack makes it a suitable comprehensive tool kit for any conventional EOD/IEDD team to deploy with. For freight movement and stowage of the main Backpack and all ancillary equipment (chargers and consumables) an additional hardened air transport case is available upon request.

**Current Users:** Not specified**OPERATIONAL PARAMETERS****Explosive Amount Contained/Mitigated:** Not specified**Ballistic Performance:** Not specified**Set-up Time:** Not specified**PHYSICAL PARAMETERS****Size:** Refer to manufacturer**Weight:** Refer to manufacturer**Power Requirements:** None**LOGISTICAL PARAMETERS****Portability:** Yes**Shelf Life:** Not specified**Ease of Use:** Yes**Maintenance Requirements:** Not specified**Durability:** Yes**O&M Costs:** Not specified**Environmental Considerations:** Not specified**SPECIAL REQUIREMENTS****Operator Skills:** Not specified**Warranty:** Not specified**Training Available:** Not specified**Independent Testing:** Refer to manufacturer**Manuals Available:** Not specified**Applicable Regulations:** Not specified**Support Equipment:** Not specified

## GENERAL

### EOD Operators Tool Kit

**Model:** SKT-EOD

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact sales@allen-vanguard.com



**Technology:** Tool kit

**Availability:** Contact sales@allen-vanguard.com

**Description:** The EOD Operators Tool Kit is a portable kit for use by Bomb Technicians. This bomb disposal tool kit contains a large selection of over 60 hand tools for access, investigation, and render safe procedures during EOD/IEDD tasks. The complete kit is supplied in a soft-sided carrying roll for convenient and quick access. The Allen-Vanguard SKT-EOD tool kit is lightweight and user friendly and was developed in conjunction with UK military EOD operators. Contact sales@allen-vanguard for complete list of contents including sizes.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** 45 cm 21 cm x 11 cm (17.7 in x 8.3 in x 4.3 in)

**Weight:** 6.5 kg (14.3 lb)

**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Not specified

**Ease of Use:** Yes

**Maintenance Requirements:** Not specified

**Durability:** Yes

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Limited lifetime

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### HAL® BombTec™ Kit Model: BT1/00

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales@allen-vanguard.com



**Technology:** Detection kit

**Availability:** Contact: sales@allen-vanguard.com

**Description:** The Allen-Vanguard HAL® BombTec Kit is a fully comprehensive stand-alone kit, where the equipment can be deployed in a wide range of IEDD scenarios involving buildings, vehicles (road, water/air), and urban/rural locations. The extensive range of components easily achieve the essential functions of movement, attachment, anchoring, reach, and manipulation and handling.

Specific features: Total of 95 components with over 30 different usable component types. Two color-coded, high strength, low stretch Kevlar® core lines. Robust reels with winding handle, brake, and adjustable clutch. Reel bags, to protect the lines and reels, also to provide essential carrying capacity. High strength, heat-treated, hooks. Standard and break-away pulleys for changing the direction of movement. Standard pulleys for rigging in combination to achieve mechanical advantage. Unique heavy duty “Jet Clamp” anchor for clamping to door/window frames. Heavy duty cantilever—design crocodile grips for attaching to heavy sheet materials.

Complete rigging system includes the HAL® BombTec Kit and provides the core capability of the full HAL® BombTec. EOD/IEDD rigging system includes BombTec Kit, Vehicle Access Kit, choice of tripods, and the HAL® Tactical Procedures Manual.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Not specified

**Ease of Use:** Yes

**Maintenance Requirements:** Not specified

**Durability:** Yes

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified



## SPECIAL REQUIREMENTS

**Operator Skills:** Yes, if bought with full hook and line rigging system

**Warranty:** Life time warranty: Allen-Vanguard recognizes that in the high risk environment of bomb disposal, no item can afford to fail. Reliability is the key to the Allen Lifetime Warranty against defects in materials and workmanship on all HAL<sup>®</sup> equipment assuring reliability to the bomb technician. The HAL<sup>®</sup> BombTec Kit provides the bomb technician with an expanded choice of options and enables the disposal of hazardous devices to be completed successfully.

**Training Available:** Not specified

**Independent Testing:** Limited lifetime

**Manuals Available:** Full technical manual supplied with each kit

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

**GENERAL****HAL® Heavy Duty Kit**  
**Model: MK3**

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales@allen-vanguard.com



**Technology:** Rigging kit

**Availability:** Contact: sales@allen-vanguard.com

**Description:** A heavy duty rigging kit to assist vehicle towing and moving large devices. Since producing the first operational HAL® Kit for the British Army in 1972, Allen-Vanguard has developed the Hook and Line range (through operational experience) into the world's leading and most effective system for remote access and movement of objects and hazardous devices. The use of HAL® equipment greatly improves the range of disposal options available to the bomb technician. Developed in close cooperation with British Army EOD units, the HAL® Mk3 is a heavy duty single line Kit to assist vehicle towing and moving large devices or items. In particular the HAL® Mk3 provides an essential capability during vehicle clearance tasks. The Kit is specifically designed for use where the load limitations of other Allen-Vanguard HAL® Kits are likely to be exceeded. Components in the HAL® Mk3 include slings, hooks, shackles, snatch blocks/pulleys and ground anchors. The Kit enables the 150 m (492 ft) low-stretch line to be attached to a suspect vehicle or container quickly and securely with a minimum of disturbance. Snatch blocks allow the operator to change the direction of the line to gain protection or to operate in confined areas. Ground anchors enable the snatch blocks/pulleys to be used where there are no natural anchorage points. Allen-Vanguard offers professional training in the tactical use of HAL® techniques.

**Current Users:** Not specified

**OPERATIONAL PARAMETERS**

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

**PHYSICAL PARAMETERS**

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

**LOGISTICAL PARAMETERS**

**Portability:** Yes

**Shelf Life:** Not specified

**Ease of Use:** Yes

**Maintenance Requirements:** Not specified

**Durability:** Yes

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

**SPECIAL REQUIREMENTS**

**Operator Skills:** Yes, if bought with full hook and line rigging system

**Warranty:** Part of full hook and line rigging system

**Training Available:** Not specified

**Independent Testing:** Limited lifetime

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

**HAL® Special Operations Hook & Line Kit**  
**Model: SO1/00 & SO2/00**

Allen-Vanguard Corporation  
 5459 Canotek Road  
 Ottawa, Ontario K1J 9M3  
 Canada  
 613-747-3590 (Tel)  
 sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales@allen-vanguard.com



**Technology:** Special operations kit

**Availability:** Contact: sales@allen-vanguard.com

**Description:** The HAL® Special Operations Kit (HAL SO1/00) contains specialist equipment suitable for both semi-remote and manual stages of an IEDD task. Developed with input from lead schools and units within the British EOD/IEDD community, the HAL® Special Operations Kit is the latest in the established line of Allen-Vanguard Hook & Line Kits. A lightweight EOD/IEDD Rigging Kit, which combines maximum capability with exceptional portability, the Kit permits rapid and straightforward deployment. The ability to deploy the various components quickly in all operational settings is achieved through use of a custom-designed backpack, which is at the heart of each HAL® Special Operations Kit. This backpack provides dedicated stowage for the comprehensive rigging kit as well as other essential EOD/IEDD items (e.g., Disruptor with Firing Cable and Exploder). The stowage pockets inside the main compartment can be re-configured easily by the user to reflect individual requirements. The mesh fronts on each pocket allow easy recognition and swift access to all items, reducing valuable time spent on equipment selection and preparation. Up to 100 m (325 ft) of high-strength, low-stretch, Kevlar® core line is carried in a detachable side pocket. Other features include external front pockets for a Tactical Mirror and a small EOD Tool Kit.

**Quality and reliability:** The HAL® Special Operations Kit uses tried-and-tested components from the extensive Allen-Vanguard Hook & Line equipment range.

**Enhancements:** Additional HAL® components can be added to the HAL SO1/00 standard load to provide extra capability to meet specific client requirements.

**HAL SO1/00 Kit:** The extensive range of over 80 standard components easily achieve all the essential functions of an EOD/IEDD Rigging Kit (as listed below). **Movement:** Main line, secondary line attachment and anchoring: hooks and eyes, lightweight spring grip, vice jaw grip, self-adhesive anchor pads, suction anchors, shock cord, seizers, rope and wire slings, pitons, karabiners, Allen-Vanguard Grip, D-clamp, stoppers, screw eye, and door stops.

**Reach:** Extension rods, telescopic arm and hooks, manipulation and handling: standard snatch block/pulleys, self-opening snatch block/break-away pulley, and splitter ball.

**Visual Search:** Tactical Search Mirror and telescopic arm.

**Manual Tools:** Pocket EOD Tool Kit (HAL26).

**HAL SO2/00 Kit:** The HAL® Special Operations Kit (Enhanced), HAL SO2/00, contains all the items in the Standard Kit and, in addition, two specialist access tools, the Vehicle Key/Handle Clamp and Multi-Purpose Clamp. The HAL® Special Operations Kits are integrated and inter-operable with the full HAL® BombTec EOD/IEDD Rigging System.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Carrying equipment: SO HAL Backpack

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:**

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Warranty:** All Allen- Vanguard HAL<sup>®</sup> components carry a limited Lifetime Warranty against defects in materials and workmanship.

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### HAL<sup>®</sup> Building Accessory Kit Model: BAK1/00

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales@allen-vanguard.com



**Technology:** Rigging tools

**Availability:** Contact: sales@allen-vanguard.com

**Description:** Special rigging tools to assist with building access and clearance tasks. Dealing successfully with an IEDD or other tactical task in a building may require the use of specially designed rigging equipment. The HAL<sup>®</sup> Building Accessory Kit contains a range of special tools for use when opening building doors remotely in order to gain access and for providing anchor points for lines and pulleys. All items in the Kit adhere to the cardinal rules of EOD equipment design: they are simple to operate and can be rigged in seconds, thus minimizing the time that the bomb technician remains at risk from a suspect device. Specifically designed as a complementary accessory kit to the HAL BT1/00 Kit or HAL BT2/00 Kit, the HAL<sup>®</sup> Building Accessory Kit is a key and integrated part of the full HAL<sup>®</sup> BombTec EOD/IEDD Rigging System.

**Building Remote Door Opener (HAL83):** The centerpiece of the Kit is a hydraulic-arm mechanism designed to open doors swiftly and effectively. The Remote Door Opener is rigged using a standard HAL Doorway Anchor, or spreader bar, (HAL4/42, included) and a Multi-Purpose Clamp (HAL57, included), which is attached to the door handle. When the single operating line is pulled remotely the clamp releases the door catch, the swing arm forces the door open and prevents it from closing again. Registered design/patent pending. Note: The Remote Door Opener must be used with a Doorway Anchor (HAL4/42) and Multi-Purpose Clamp (HAL57) for correct deployment. These items are included in the HAL BAK1/00 Kit.

**Doorway Anchor (HAL4/42):** A telescopic metal bar brace with two fixed eyes for quick installation across doorways and openings. Used separately or with the Remote Door Opener.

**HAL<sup>®</sup> Multi-Purpose Clamp (HAL57):** The unique triple-prong gripping function attaches to a wide variety of handles and fixtures. Registered design/patent pending.

**Building Thru-Wall Anchor (HAL85):** Designed to provide a firm anchor point through thick drywall, the unique saw cutting edge ensures that the integrity and strength of the internal drywall surface is not compromised. Registered design/patent pending.

**Building Door Hinge Anchor (HAL86):** A secure anchor point placed over door hinges on open or closed doors. Registered design/patent pending.

**HAL<sup>®</sup> Key/Handle Clamp (600-759):** A versatile clamp with short arms for turning door keys and a powerful gripping action to attach to handles and fixtures. Due to continual product development descriptions and specifications are subject to change without prior notification.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not applicable

**Ballistic Performance:** Not applicable

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Request from manufacturer

**Weight:** Request from manufacturer

**Power Requirements:** No

**LOGISTICAL PARAMETERS**

<b>Portability:</b> Yes	<b>Shelf Life:</b> Not specified
<b>Ease of Use:</b> Yes	<b>Maintenance Requirements:</b> Minimal
<b>Durability:</b> Yes	<b>O&amp;M Costs:</b> Not specified
<b>Environmental Considerations:</b> Buildings	

**SPECIAL REQUIREMENTS**

<b>Operator Skills:</b> Yes	<b>Warranty:</b> Part of full hook and line rigging system
<b>Training Available:</b> Not specified	<b>Independent Testing:</b> Limited lifetime
<b>Manuals Available:</b> Yes	<b>Applicable Regulations:</b> Not specified
<b>Support Equipment:</b> Yes	

## GENERAL

**HAL® Key Equipment Schedule Pack**  
**Model: KESP1/00**

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales@allen-vanguard.com



**Technology:** Rigging system

**Availability:** Contact: sales@allen-vanguard.com

**Description:** The complete recommended HAL® BombTec Rigging System comprises: 1) HAL KESP1/00: HAL® BombTec Rigging Kit (HAL BT1/00); 2) HAL® Vehicle Access Kit (HAL VAK1/00); and 3) HAL® Lightweight Tripod (HAL TRI2/00), and is available under a single convenient part number.

HAL® Key Equipment Schedule Pack 2 (HAL KESP2/00), an enhanced version of the complete HAL® BombTec Rigging System, is comprised of HAL KESP2/00: HAL® BombTec Rigging Kit (HAL BT1/00); HAL® Vehicle Access Kit (HAL VAK1/00); HAL® Building Accessory Kit (HAL BAK1/00); and HAL® Lightweight Tripod (HAL TRI2/00), and is available under a single convenient part number.

Quality and reliability: Allen-Vanguard HAL® BombTec' components are produced to the exacting standards required by the UK Defence Department.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Refer to manufacturer

**Weight:** Refer to manufacturer

**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Not specified

**Ease of Use:** Yes

**Maintenance Requirements:** Not specified

**Durability:** Yes

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Available

**Warranty:** Lifetime warranty: Allen-Vanguard recognizes that in the high risk environment of bomb disposal, no item can afford to fail. Reliability is the key to the Allen-Vanguard lifetime warranty against defects in materials and workmanship on all HAL® components, which is Allen-Vanguard's assurance of reliability to the bomb technician.

**Training Available:** Not specified

**Independent Testing:** Limited lifetime

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### HAL® Vehicle Access Kit

**Model:** VAK1/00

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales@allen-vanguard.com



**Technology:** Remote vehicle entry and clearance

**Availability:** Contact: sales@allen-vanguard.com

**Description:** An improved range of special tools for remote vehicle entry and clearance tasks. Dealing successfully with an IEDD task involving a vehicle can be both physically demanding and technically complex and successful execution may require the use of special access equipment. The HAL® Vehicle Access Kit contains a range of special access tools for use when opening vehicles remotely in order to gain access during IEDD tasks. All items in the Kit adhere to the cardinal rules of EOD equipment design: they are simple to operate and can be rigged in seconds, thus minimizing the time that the bomb technician remains at risk from a suspect device. Specifically designed as a complementary accessory kit to the HAL BT1/00 Kit or HAL BT2/00 Kit, the Vehicle Access Kit is a key and integrated part of the full HAL® BombTec Rigging System.

**Remote Window Breaker (600-757):** A unique remotely operated, spring plunger device with a primary purpose to gain swift and effective access into locked vehicles. The Remote Window Breaker is attached to a standard vehicle side window by means of a powerful suction anchor. When the operating line is pulled remotely to operate the trigger mechanism the ceramic tipped plunger strikes and shatters the window using a nonexplosive means of entry. Registered design/patent pending.

**Vehicle Door Handle Lifter (600-758):** Used to open lift-type handles at heights up to 1320 mm (52 in). The telescopic leg sections are first adjusted to the correct height until the "lifter" is gently braced under the door handle. A line is attached to the eye at the opposite end of the lift lever. When the line is pulled the door catch is released and the door lifter falls away as the door opens (a second line or shock cord is used to pull the door open). A key feature of this tool is that it can be rigged without moving any part of the target vehicle.

**HAL® Key/Handle Clamp (600-759):** A versatile clamp with short arms for turning door keys and a powerful gripping action to attach to handles and fixtures.

**Vehicle Door Button Pusher (600-760):** Developed to operate push button door handles, this access tool is attached to the vehicle door by means of a powerful suction anchor. The lever action button push is aligned with the door button and a line is attached to the opposite end of the lever arm. When the line is pulled the button is depressed, the door catch is released and the door can be pulled open.

**HAL® Multi-Purpose Clamp (HAL57):** The unique triple-prong gripping function attaches to a wide variety of handles and fixtures. Note: The HAL VAK 1/00 contains one Remote Window Breaker, one Door Handle Lifter, two Key/Handle Clamp, one Door Button Pusher, and one Multi-Purpose Clamp (plus miscellaneous accessories). All components are available as individual items if required. Due to continual product development, descriptions and specifications are subject to change without prior notification.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Request from manufacturer

**Weight:** Request from manufacturer

**Power Requirements:** None



**LOGISTICAL PARAMETERS**

<b>Portability:</b> Yes	<b>Shelf Life:</b> Not specified
<b>Ease of Use:</b> Yes	<b>Maintenance Requirements:</b> Not specified
<b>Durability:</b> Yes	<b>O&amp;M Costs:</b> Not specified
<b>Environmental Considerations:</b> Not specified	

**SPECIAL REQUIREMENTS**

<b>Operator Skills:</b> Yes, if bought with full hook and line rigging system	<b>Warranty:</b> Part of full Hook and Line Rigging System
<b>Training Available:</b> Not specified	<b>Independent Testing:</b> Limited lifetime
<b>Manuals Available:</b> Not specified	<b>Applicable Regulations:</b> Not specified
<b>Support Equipment:</b> Not specified	

## GENERAL

**HAL® Lightweight IEDD Tripod**  
**Model:** TRI2/00

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales @allen-vanguard.com



**Technology:** Portable tripod

**Availability:** Contact: sales@allen-vanguard.com

**Description:** Portable tripod for providing lift during EOD, including IEDD, rigging tasks. The HAL TRI2/00 Lightweight Tripod was developed specifically to lift smaller objects up to 90 kg (200 lb) in the IEDD role; its capability matches and integrates with the Allen-Vanguard range of Hook and Line (HAL®) Kits. The tripod is easily rigged and placed by a single bomb technician in full bombsuit and can be used in any intermediate leg position. Self-leveling feet and anchor attachments increase the versatility and range of applications. The legs are manufactured from carbon-fiber to provide strength and to keep the weight to a minimum. Snatch blocks/pulleys are provided to allow the Line to be rigged to mechanical advantage. The auxiliary pulley ensures that pulling force is applied at ground level for maximum stability. A purpose-built reinforced semi-rigid nylon transport case completes the kit.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** 215 cm (84.6 in) maximum extended height

**Weight:** 13.6 kg (30 lb)

**Power Requirements:** No

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Not specified

**Ease of Use:** Yes

**Maintenance Requirements:** Not specified

**Durability:** Yes

**O&M Costs:** Visit website

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Yes, if bought with full hook and line rigging system

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Limited lifetime

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### HAL<sup>®</sup> Heavy Duty Tripod

**Model:** TRI1/00

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales@allen-vanguard.com



**Technology:** Portable tripod

**Availability:** Contact: sales@allen-vanguard.com

**Description:** Portable tripod for providing lift during EOD, including IEDD, rigging tasks. Since producing the first operational HAL<sup>®</sup> Kit for British EOD units in 1972, Allen-Vanguard has developed the Hook & Line range (through lessons learned during live EOD/IEDD operations) into the world's premier and most widely used rigging system for remote access and clearance of objects/hazardous devices. The use of HAL<sup>®</sup> equipment greatly improves the range of options available to the bomb technician. The HAL TRI1/00 Heavy Duty Tripod is robust and portable. It provides the mission essential function of lift during EOD, including IEDD, operations and is designed for lifting heavy objects up to 2260 kg (5000 lb). The 2-section telescopic legs can be locked at a range of heights enabling it to be used in areas of restricted height or on sloping ground. The head is fitted with leg stops that prevent the tripod from collapsing under load, as well as eyes and a karabiner for attaching lifting tackle and for tethering. The self-leveling feet may be pegged to the ground for extra stability. The tripod is of high strength aluminum construction and is supplied with a set of anchor pegs in a durable nylon transport case. The HAL<sup>®</sup> Heavy Duty Tripod is part of the comprehensive Allen-Vanguard Hook & Line BombTec EOD/IEDD Rigging System.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** 274 cm (108 in) (maximum working height)

**Weight:** 22 kg (50 lb)

**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Not specified

**Ease of Use:** Yes

**Maintenance Requirements:** Not specified

**Durability:** Yes

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Yes, if bought with full hook and line rigging system

**Warranty:** Part of full hook and line rigging system

**Training Available:** Not specified

**Independent Testing:** Limited lifetime

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Bomb Blast Suppression Blankets

**Model:** Not specified

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact sales@allen-vanguard.com



**Technology:** Containment

**Availability:** Contact sales@allen-vanguard.com

**Description:** Bomb Blast Suppression Blankets are used to suppress the blast fragmentation from an explosion. These blankets are particularly useful for suspected IEDs contained in packages up to brief-case size and for pipe bombs. Each blanket is used in conjunction with a ballistic collar (supplied), which is placed on its edge around the suspected explosive device. The blanket is then placed over the collar and suspect device. The collar directs the force of the blast upwards into the blanket, which contains most of the fragments created by the explosion. Two or more collars and blankets can be used to suppress large size explosive devices.

**Features:** Multilayer ballistic filler material enclosed in a heavy duty nylon water-resistant cover, fitted with lifting straps. Both blanket and collar fold into a compact easy-carry hold all bag. Blankets available in two sizes, 125 cm x 150 cm (49 in x 59 in) and 155 cm x 155 cm (61 in x 61 in). Blankets available in two threat levels (\*Threat Level 1 and \*Threat Level 2). Ballistic Collar is sized at 125 cm x 20 cm (49 in x 8 in).

\*Threat Level 1: Fragment velocity 400 m/s (1312 ft/s) V50 standard. \*Threat Level 2: Fragment velocity 500 m/s (1640 ft/s) V50 standard.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Fragment velocity 400 m/s (1312 ft/s) to 500 m/sec (1640 ft/s) V50 standard

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** A [124 cm x 150 cm (49 in x 59 in)] to B [155 cm x 155 cm (61 in x 61 in)]

**Weight:** A [5.1kg (11.2 lb)] to B [10.8 kg (23.8lb)]

**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Not specified

**Ease of Use:** Yes

**Maintenance Requirements:** Not specified

**Durability:** Yes

**O&M Costs:** Not specified

**Environmental Considerations:** Any

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Inquire during quote request

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Suspect Package Container

**Model:** SPC-1000

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact sales@allen-vanguard.com



**Technology:** Containment

**Availability:** Contact sales@allen-vanguard.com

**Description:** The Allen-Vanguard Suspect Package Container, SPC1000 is used to totally contain the blast, fragments, resulting gasses and Chemical and Biological threats. It contains an exhaust valve for controlled venting following detonation.

**Testing:** The Suspect Package Container has been subjected to rigorous field tests conducted in conjunction with the Royal Canadian Mounted Police (RCMP) Explosives Disposal Unit (EDU) and Transport Canada (TC).

**Advantages:** Protects people and property. Minimizes interruption of passenger and luggage screening. Quick and safe removal of suspicious carry-on luggage.

**Easy to use:** loading tray for simple insertion and extraction of packages from container. Compatible with EOD robots.

**Protection Factor:** Totally contains the blast, fragments, resulting gasses and Chemical and Biological threats. Exhaust Valve for controlled venting following detonation.

**Mobile**—fits through double doorways, hallways, and into elevators. Compatible with EOD robots for remote operation.

**Maneuverable.** There is also a trailer kit available for use with this product: The Allen-Vanguard Trailer Kit is designed to transport the Suspect Package Container, SPC-1000 bomb containment system. The towing trailer has a drop down ramp fitted with guide rails to facilitate loading of the bomb container onto the trailer bed. The electric 12 V winch with hand-held remote is used to either load or unload the container into the trailer. When positioned into the trailer it can be safely transported using the wheel clamps and manual locking pins to secure the unit.

**Trailer specifications:** # GVWR—1356 kg (2990 lb); # GAWR—1588 kg (3500 lb ); # Tire Size— ST 205 75R15 15 in 5 bolt; # Electrical rating—120 V ac, 60 Hz, 15A and 12 V battery charger; # Ramps—rear and side ramp.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Ballistic Containment Blanket

**Model:** TD-BG-025

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact sales@allen-vanguard.com



**Technology:** Containment

**Availability:** Contact sales@allen-vanguard.com

**Description:** Multi purpose high levels of ballistic protection:  $\frac{3}{4}$  NATO small fragment V50 of over 500 m/s. Can be used in conjunction with Universal Containment System's Ballistic Enclosure to provide Improvised Foam Dams. Ideal for use when bombs are placed in cars. Seals off doorways, windows and other openings. Flexible and lightweight 9.1 kg (20 lb). Built in carrying handles; built in grommets, bungee cords, and Velcro strips to offer the user multiple mounting options. Can be quickly and easily joined together for large area coverage. Many other uses.

**Current Users:** 7 yr

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:**  $\frac{3}{4}$  NATO Small Fragment V50 of over 500 m/s

**Set-up Time:** Situation dependent

## PHYSICAL PARAMETERS

**Size:** 1.52 m x 2.44 m (5 ft x 8 ft)

**Weight:** 9.1 kg (20 lb)

**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Unlimited

**Ease of Use:** Yes

**Maintenance Requirements:** None

**Durability:** High

**O&M Costs:** Not specified

**Environmental Considerations:** Any

## SPECIAL REQUIREMENTS

**Operator Skills:** Yes

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Yes

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Air Foam Dolly System

**Model:** TD-DS-025-M1

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact sales@allen-vanguard.com



**Technology:** Containment

**Availability:** In production now. On market since 2000.

**Description:** Allen-Vanguard's Air Foam Dolly System (AFDS) is a unique portable self-contained unit with two primary CBRNE functions: Explosive Blast Mitigation and Chemical/Biological Agent Containment and Decontamination. Area decontamination capability for a surface area of up to 130 m<sup>2</sup> (1400 ft<sup>2</sup>). The Air Foam Dolly System (AFDS) is rugged, portable, and simple to operate. A single person can deploy and operate the system which uses pressurized air and a chemical mixing tank to produce a unique suppression and decontamination foam. When used in conjunction with a UCS Enclosure (supplied as standard) the foam produced by the AFDS can contain and mitigate the blast effects from hazardous devices such as IEDs and UXO while dealing effectively with the threats from "dirty bombs" and Chem/Bio/Radiological dispersal devices. In the decontamination role, the system can perform emergency decontamination of Chem/Bio Agents on hardware or structural surfaces.

**Benefits:** Explosive Blast Mitigation and Chem/Bio Agent Containment and Decontamination. Rapid and effective CB decontamination and kill capability. Radiological particle containment and removal capability. Retention and preservation of forensic evidence.

**Features:** Decontaminant Foam neutralizes CAs and contains explosive blast effects. Straightforward and rapid manual deployment. Standard system supplied with UCS 4-panel Enclosure and Cover. 4-panel Enclosure and Air Dolly deployable by Remotely Operated Vehicle (ROV). Excellent physical handling characteristics. Dual handle positions for ease of maneuver. Available with MSA or CE type air cylinders.

**Air Foam Dolly accessories:** Dolly Heater Cover P/N TD-SM-250 & TD-SM-250E: Allen-Vanguard's Heater Cover is designed to fit over the Air Foam Dolly water tank to increase operability in cold weather. Chemical Heater Bag P/N TP-IP-072: Allen-Vanguard's specially designed chemical bag is intended to keep the chemicals at optimum operating temperature. Designed to hold 1 L x 19 L pail or 12 mL x 950 mL bottles of GCE Chemicals. Velcro closures at the top of the bag. Carrying handle provided. Thermal insulated bag with rip stop nylon outer covering. North American 110 V and European 220 V models available. 126 W output with a preset 63 °C (145 °F) thermostat. Keeps surfactant at optimal operating temperature.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Up to an area of 130 m<sup>2</sup> (1400 ft<sup>2</sup>)

**Ballistic Performance:** Not specified

**Set-up Time:** Deployable in minutes

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Power requirements: Compressed air bottle(s)



## LOGISTICAL PARAMETERS

<b>Portability:</b> Not specified	<b>Shelf Life:</b> Shelf Life: Tent and mechanical equipment is 15 yr currently. Chemicals are 5 yr. *Chemicals sold separately.*
<b>Ease of Use:</b> 1 person or 2 person team. Tent can be maneuvered by 1 person or can be delivered robotically.	<b>Maintenance Requirements:</b> Not specified
<b>Durability:</b> Not specified	<b>O&amp;M Costs:</b> Not specified
<b>Environmental Considerations:</b> Operates in common environmental conditions from -25 °C to 55 °C (-13 °F to 131 °F)	

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> Not specified	<b>Warranty:</b> Warranty 1 yr
<b>Training Available:</b> Operator training requirements include 1 d (8 h). Full operator and trainer training available by Allen-Vanguard.	<b>Independent Testing:</b> Not specified
<b>Manuals Available:</b> User manuals, training guidelines available	<b>Applicable Regulations:</b> Not specified
<b>Support Equipment:</b> Not specified	

## GENERAL

### Advanced Enclosure (AE)

**Model:** TD-AE-00-00-000

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** www.allen-vanguard.com

**Unit Cost:** Please call Allen-Vanguard for current pricing.



**Technology:** Containment

**Availability:** Immediate

**Description:** Allen-Vanguard's 4 panel Advanced Enclosure (AE) system has been developed to enhance the Blast/CBRN Mitigation and Decontamination capabilities of the Universal Containment System (UCS). Offered as a recommended optional accessory to the standard UCS system, the AE allows a first responder superior flexibility while dealing with EOD/IEDD scenarios where suspect devices may be located in areas where a normal Enclosure may not be suitable. The AE is specifically designed to protect against IEDs placed along side walls, corners, or near poles and columns. The AES allows a first responder to quickly configure the enclosure for the specific scenario and contain the threat efficiently without having to touch or move the package. The AE fabrication consists of 3-layers of ballistic felt, sandwiched between an inner and outer water resistant nylon shell. The cover is similarly fabricated with 3-layers of ballistic felt enclosed in an inner and outer water resistant nylon shell. Allen-Vanguard's Air Foam Dolly System (AFDS) is the primary delivery unit used to fill the AE with foam for Blast/CBRN Mitigation and Decontamination. Other foam delivery systems are available. Depending on the configuration the AE can be filled in less than 25 s. A full system comprises: one enclosure, one cover, one wall panel, one set of horizontal poles, one set of vertical poles, one wall flap, one roll of hydragel tape, and one roll of peel and stick hook and pile. Chemicals must be ordered separately.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** 0.062 kg to 0.249 kg (2 oz to 8 oz)

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** 27.5 CFT to 55 CFT

**Weight:** 23.6 kg (52 lb)

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Not specified

**Ease of Use:** Yes

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Refer to manufacturer

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Universal Containment System

**Model:** TD-DS-025-M1

Allen-Vanguard Inc.  
11490 Commerce Park Drive  
Reston, Virginia 20191  
USA  
sales@allen-vanguard.com  
866-747-3590 (Tel)

**Information Source:** www.allen-vanguard.com

**Unit Cost:** Contact sales@allen-vanguard.com



**Technology:** Containment

**Availability:** Contact sales@allen-vanguard.com

**Description:** The Universal Containment System is designed to minimize the time operators spend on target, allowing them to perform their Render Safe Procedures quickly and safely. At the heart of the Universal Containment System are three key elements, a lightweight enclosure, a unique family of Foam Payloads, and an appropriate Foam Delivery System (AFDS). The UCS Enclosures are designed to be placed over a suspect device, and then filled with foam in order to mitigate an explosive event and decontaminate hazardous materials. The key characteristics are: made of ballistic fabric designed to stop and contain fragmentation. Straightforward to set up. Rapidly deployed; lightweight; portable; and flexible. Can be filled by a single operator. The enclosures are fabricated of 3-layers of ballistic felt sandwiched between an inner and outer water resistant shell. These standard enclosures come in two sizes: 4-panel and 6-panel. The 4-panel enclosure can be filled with foam in approximately 25 s and the 6-panel in 1 min. The patented chemicals used by Allen-Vanguard have been developed by defense research scientists who optimized the formulation for Blast Containment/Mitigation and Decontamination of CBRN agents. The foam neutralizes CB warfare agents and mitigates explosives blast effects. They will annihilate all known chemical and biological agents. The Chemical Foam Payloads can be used for Blast Containment, CBR Mitigation, and Surface Decontamination. The Air Foam Dolly System (AFDS) uses pressurized air and a chemical mixing tank to produce a unique suppression and decontamination foam. When used in conjunction with the UCS Enclosure (4-Panel Enclosure) the foam produced by the AFDS can contain and mitigate the blast and fragmentation effects from hazardous devices such as Improvised Devices (IEDs) and Unexploded Ordnance (UXO) while dealing effectively with the threats from Chemical/Biological/Radiological dispersal devices. When the foam formulation contains the decontaminate component, it can be used on an emergency basis for surface decontamination of hardware or structural services. It is one man operable, suitable for rapid deployment and cost-effective. It has been ergonomically designed to provide rugged, yet lightweight system with excellent physical handling characteristics. Sold in a standard equipment package, the Universal Containment System (UCS) for Blast Containment/Mitigation and Decontamination comprises an Air Foam Dolly System, 4-Panel Standard Enclosure and Cover. The newest addition is the 4-Panel Advanced Enclosure (AE), a recommended accessory, which is configurable to fit against walls, corners, and around poles.

**Current Users:** 6 yr

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** 0.1 kg to 0.45 kg (4 oz to 1 lb)

**Ballistic Performance:** 450 m/s (1475 ft/s) to 500 m/s (1640 ft/s) NATO small fragment V50 rating

**Set-up Time:** 5 min to 10 min

## PHYSICAL PARAMETERS

**Size:** Refer to manufacturer for full system size

**Weight:** 227 kg (500 lb) loaded

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Unlimited

**Ease of Use:** Yes

**Maintenance Requirements:** None

**Durability:** High

**O&M Costs:** Not specified

**Environmental Considerations:** Any

**SPECIAL REQUIREMENTS**

**Operator Skills:** Yes

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Refer to manufacturer

**Manuals Available:** Training can be purchased with the full system

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

**GENERAL****Dual Initiator**  
**Model:** DX10

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact sales@allen-vanguard.com



**Technology:** Initiator

**Availability:** Contact sales@allen-vanguard.com

**Description:** The DX10 Dual Initiator is a safety initiator used for shock tube firing. The dual initiator directly fits threaded Non-Electric (NONEL) line or uses the breach block for custom length applications using standard shotgun primers. There are two safety systems to prevent unintentional firing of the initiator: a color-coded safety knob and a safety pin. The color-coded safety knob is green for safe when the trigger cannot be fired, and red for fire when the initiator can be fired. The safety pin prevents accidental firing. These lightweight initiators are coated with a hard anodize finish to Rockwell 50, giving it a hard, smooth, yet durable surface that won't wear down during repetitive firing. The casing is made of aircraft strength aluminum, which has the added advantage of being nonmagnetic and nonsparking.

**Materials:** Hi-strength aircraft quality aluminum/stainless steel hardware. **Finish:** Hard anodized to RC 50. **Breach block:** for 3.2 mm (0.125 in) NONEL line.

**Current Users:** Not specified

**OPERATIONAL PARAMETERS**

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

**PHYSICAL PARAMETERS**

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

**LOGISTICAL PARAMETERS**

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

**SPECIAL REQUIREMENTS**

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Remote RF Initiator Firing System

**Model:** RFI-RFA KIT

Allen-Vanguard Corporation  
5459 Canotek Road  
Ottawa, Ontario K1J 9M3  
Canada  
613-747-3590 (Tel)  
sales@allen-vanguard.com

**Information Source:** <http://www.allen-vanguard.com>

**Unit Cost:** Contact: sales@allen-vanguard.com



**Technology:** Initiator

**Availability:** Contact: sales@allen-vanguard.com

**Description:** The Remote RF Firing System, designed in collaboration with the explosive disposal technology section of the RCMP, consists of a command unit and multiple remote initiator units. This lightweight system provides a safe and reliable radio controlled initiation capability for the remote initiation of explosive charges over distances exceeding 1000 m (3280 ft) line of sight (LOS). Security is provided by employing high level digital encryption technology. For enhanced safety, command units and remote initiators are matched during manufacture. The command unit transmitter is designed to detonate up to five charges, independently or simultaneously, using a remote wireless radio link. Secure RF communications allow remote initiators to be triggered only by the matching Command Unit and various intrinsic protection features guard against accidental initiation.

Command unit features: Monitor status and control operation of up to five remote initiators. Individual selection of devices to be fired. Charges can be fired individually or in groups of two to five. Visual LED indication of status of remote initiators. Two button operation for maximum safety. Over 8 h mission life in Ready Mode. Rugged shock and waterproof construction. Weight: less than 1 kg (2.2 lb).

Remote initiator features: Visual LED indication of status. Over 8 h mission life in Ready Mode. Firing circuit: 300 V into 0.5 ohm pulsed (electric). Rugged shock and waterproof construction. Weight: approx 0.5 kg (1.1 lb).

Communication between the command unit and remote initiators is via 900 MHz spread spectrum RF data link with 256-bit encryption. The system is fully compatible with explosive charge initiation using both electric detonators/blasting caps and nonelectric (NONEL) shock-tube. Each remote initiator is supplied with an electric firing adaptor and a NONEL firing adaptor as standard. Firing adaptors are replaceable in case of damage or unserviceability. The system is available in several kit sizes and is supplied in an ABS waterproof transit case.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Refer to manufacturer

**Weight:** Refer to manufacturer

**Power Requirements:** Powered by four standard 9 V alkaline batteries

## LOGISTICAL PARAMETERS

**Portability:** Yes

**Shelf Life:** Not specified

**Ease of Use:** Yes

**Maintenance Requirements:** Not specified

**Durability:** Yes

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

**SPECIAL REQUIREMENTS****Operator Skills:** Not specified**Warranty:** Not specified**Training Available:** Not specified**Independent Testing:** Not specified**Manuals Available:** Not specified**Applicable Regulations:** Not specified**Support Equipment:** Yes

**GENERAL****Bomb Containment Vessels, Detonation Chambers****Model:** Not specified

American Innovations, Inc.  
 383 West Route 59  
 Spring Valley, New York 10977  
 845-371-3333 x. 901 (Tel)  
 Grant@BombDetection.com

**Information Source:** www.BombDetection.com**Unit Cost:** Call for price and performance options**Technology:** Bomb containment vessels, detonation chambers**Availability:** 90 d ARO standard delivery

**Description:** American Innovations, Inc., offers a variety of bomb containment vessels (BCV) designed to safely transport and detonate explosives. These bomb containment vessels are available in a variety of sizes with a range of explosive containment ratings and performance enhancement options. AI can deliver solutions for a security checkpoint, mailroom application, or simply seeking a reliable solution to transport or detonate explosives or IEDs. Product Acceptance Testing Policy (PTAP): Every bomb containment vessel is backed by their 100 % PTAP. All customers are required to witness a detonation inside their bomb containment vessel prior to release of any units into the field. Extensive product training is provided after testing. Compatible with EOD Robotics, certified by DoD Explosives Safety Board: Every bomb containment vessel is 100 % compatible with EOD Robots, certified by the DoD Explosives Safety Board. < 100 %—EOD Blast Ready Containment Vessels. Every bomb containment vessel is preconfigured with an interface designed to control the external to internal voltage in order to enable EOD technicians to safely detonate an explosive device within the containment vessel.

**Current Users:** Not specified**OPERATIONAL PARAMETERS****Explosive Amount Contained/Mitigated:** Varies**Ballistic Performance:** n/a**Set-up Time:** Varies**PHYSICAL PARAMETERS****Size:** Varies**Weight:** Varies**Power Requirements:** Requires no external power**LOGISTICAL PARAMETERS****Portability:** Yes**Shelf Life:** Indefinite**Ease of Use:** Very**Maintenance Requirements:** Minimal scheduled**Durability:** High**O&M Costs:** Varies based on usage**Environmental Considerations:** Any**SPECIAL REQUIREMENTS****Operator Skills:** EOD technician**Warranty:** Included or optional**Training Available:** Not specified**Independent Testing:** Varies**Manuals Available:** Yes**Applicable Regulations:** Yes**Support Equipment:** Yes



## GENERAL

### Blast Mitigation Trash Bins

**Model:** Not specified

American Innovations, Inc.  
383 West Route 59  
Spring Valley, New York 10977  
845-371-3333 x. 901 (Tel)  
Grant@BombDetection.com

**Information Source:** www.BombDetection.com

**Unit Cost:** Call for price and performance options



**Technology:** Containment

**Availability:** 90 d ARO standard delivery

**Description:** Designed to look like ordinary trash bins, American Innovations, Inc. (AI), offers a variety of Blast Mitigation Trash Bins that are capable of containing primary fragmentation, without creating secondary fragmentation during an explosion; regardless if low-velocity (black powder) or high-velocity (TNT or equivalent) explosives are used. The American Innovations' Blast Mitigation Trash bins also effectively reduce the heat, energy, and over pressure (PSI) resulting from an explosion. All components of an explosion cannot be overlooked. If not mitigated effectively, fatalities, serious injuries, and/or compromise of structural integrity of a facility may occur. The American Innovations' blast mitigation trash bins are available with a variety of explosive protective ratings and exterior finishes. They can even be produced in a variety of shapes, sizes, colors, and exterior finishes. The common denominator for every AI blast bin is that they will be manufactured to protect against a predetermined threat level and they will be tested in front of the customer to verify their legitimacy.

100 % Product Testing Acceptance Policy (PTAP). AI has implemented a Random Selection Product Acceptance Testing Policy for blast mitigation trash bins. For orders exceeding 25 units, AI will produce an extra unit at no cost to the customer. For orders less than 25 units, the customer will be required to pay for the extra unit. Before AI will ship any blast mitigation trash bins to their ultimate destination(s), the customer will be required to randomly select one unit from their entire production run and witness the testing of the same. AI will pay for the explosives, blast technician, and testing facility. (Some Restrictions Apply.) AI takes quality control very seriously. By implementing a policy of this magnitude allows customers to place orders with confidence and an understanding that the blast mitigation trash bins they deploy will protect against a predefined threat level, without exception.

100 % Protection of Sensitive but Unclassified Information (PSUI). In addition to the implementation of our PTAP, AI has implemented another policy to Protect Sensitive but Unclassified Information (PSUI), before, during, and after the procurement process. We believe publicizing via websites, brochures, and advertisements explosive protective ratings and deployment locations for blast mitigation trash bins provides an edge to any terrorist organization who may wish to circumvent or defeat this anti-terrorism technology. For this reason, AI does not publicize deployment locations or explosive protective ratings for any of their blast mitigation trash bins.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

**SPECIAL REQUIREMENTS**

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Not specified

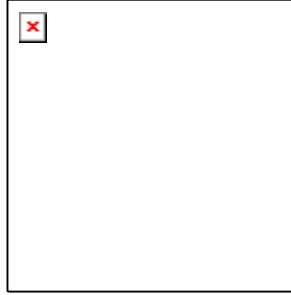
**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

**GENERAL*****BlastWrap*****Model:** Not specified

BlastGard International, Inc.  
 12900 Automobile Blvd., Suite D  
 Clearwater, Florida 33762-4715  
 727-592-9400 (Tel)  
 mgordon@blastgardintl.com

**Information Source:** <http://www.blastgardintl.com>**Unit Cost:** GSA contract GS-07F-5769R**Technology:** Blast mitigation**Availability:** Current

**Description:** BlastWrap® is made from two laminated films the bottom one of which is thermo-formed into a cavity or pocket(s) and into which is put blast attenuating filler materials including volcanic glass bead or other suitable two-phase materials and a blend of extinguishants. The top film is then sealed onto the lower film forming a durable, flexible and configurable (designed for each application) product that offers unique and revolutionary blast mitigation/protection against all blast and fire/burn threats. BlastWrap® is a blast mitigation assembly that can be wrapped around or conform to any shape. BlastWrap® is a material (not a chemical compound) from which blast protection products are built to save lives and reduce explosion damage to people and valuable assets. All BlastWrap® components are COTS. BlastWrap® technology dramatically mitigates the destructive effects of blasts of all kinds, including high explosives and other solids, gases and fuel/air deflagrations. BlastGard International's passive mitigation technology is unique and we believe that blast mitigation is a cornerstone of emergency management because it dramatically reduces the impact explosions have on people and property. BlastWrap® is scientifically engineered and designed to remove much or most of the energy from explosions that impinge upon them. BlastWrap® works by dissipating blast energy through irreversible processes while at the same time quenching flame fronts or fireballs created as a result of an explosion. When incorporated into finished products, BlastWrap® protects in two basic categories: barrier and container. Barriers include temporary and permanent wall units; linings applied to walls, blast tables, suspended ceiling panels, suspended free standing or floor mounted barriers, and modular barrier or revetment kits. Containers embrace everything from boxes to magazines, including wheeled mobile storage units in which explosives can be safely moved from one work station or site to another. BlastWrap® works 24/7/365; does not dispense chemical extinguishants; is purely passive mitigation, so it uses no power, alarms, sensors, or activation system; never fails; is light weight area density of ~0.27 cm/0.1m<sup>2</sup> (0.6 lb/ft<sup>2</sup>) for 2.54 cm (1 in) thick; and is low cost \$16/0.1 m<sup>2</sup> (ft<sup>2</sup>) for 2.54 cm (1 in) thick. BlastWrap® is used for blast protection products to save lives and valuable assets from explosions. BlastWrap® not only reduces blast impulse and pressure (including reflected and quasi-static pressure), but extremely rapidly quenches fireballs and suppresses post-blast fires. Lethal fragments and/or ballistic threats may be managed by adding armor. BlastWrap® can be used to make a wide variety of products perform better, such as: building materials; magazines; ordnance containers; aircraft (single and twin-aisle) protection systems; explosives storage units; decorative facings and linings; IED and EOD threat management (permanent or portable); wall components; barriers (permanent or portable); vehicle protection systems; and trash receptacles.

**Current Users:** Not specified**OPERATIONAL PARAMETERS****Explosive Amount Contained/Mitigated:** Entirely dependent on amount of BlastWrap deployed. Highly efficient.**Ballistic Performance:** Not applicable. Used in combination with hardening material.**Set-up Time:** Can be deployed in moments**PHYSICAL PARAMETERS****Size:** 2.54 cm, 5.08 cm and 7.62 cm (1 in, 2 in, and 3 in) thickness as standard**Weight:** Aerial density from m<sup>2</sup> [0.22 kg (0.5 lb)] per ft<sup>2</sup>**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Easy. Light weight and environmentally friendly.

**Shelf Life:** Semi-infinite

**Ease of Use:** Very easy to use; passive mitigation.

**Maintenance Requirements:** None

**Durability:** Very durable if correctly protected

**O&M Costs:** None

**Environmental Considerations:** Any blast or fire environment

## SPECIAL REQUIREMENTS

**Operator Skills:** Very low

**Warranty:** None

**Training Available:** Not specified

**Independent Testing:** Yes

**Manuals Available:** Yes

**Applicable Regulations:** Yes

**Support Equipment:** Yes

## GENERAL

### Mitigated Trash Receptacle

**Model:** MTR 81, MTR 91, and MTR 101

BlastGard International, Inc.  
12900 Automobile Blvd., Suite D  
Clearwater, Florida 33762-4715  
727-592-9400 (Tel)  
mgordon@blastgardintl.com

**Information Source:** <http://www.blastgardintl.com>

**Unit Cost:** GSA listed



**Technology:** Blast mitigation

**Availability:** Current

**Description:** Heinous acts of terrorism have caused all of us to be more cognizant of our safety and nowhere are those concerns greater than in government and public facilities. Trash receptacles, which are a necessity for waste management, pose a serious threat to Public Safety considering how easily they can conceal an explosive device planted by a terrorist. Security forces have no method to stop the placement of explosives in trash cans as the devices are inserted in ordinary bags and cups and thrown away with other refuse. The explosion occurs after the terrorist has left the premises. BlastGard MTR series of mitigated trash receptacles deals with all aspects of the detonation of an improvised explosive device (IED) explosion, primary and secondary fragments, mechanical (shock/blast pressure), thermal (fireball), afterburn threats and reflected pressure. BlastWrap<sup>®</sup> technology mitigates the destructive effects of blasts of all kinds including solids, gases and fuel/air deflagrations. BlastGard International's passive mitigation technology is unique and we believe that blast mitigation is a cornerstone of emergency management because it dramatically reduces the impact explosions have on people and property. The existing explosion proof trash receptacles that are on the market today, only deal with the first two points: primary and secondary fragmentation but does nothing to reduce: blast pressures, reflected pressures and the fireball. In fact, existing "bomb proof" products actually focus the explosive blast forces. They do not protect against the fireball, and can even produce lethal fragments. Blast and fireball will kill you just as readily as a speeding fragment. Reflected pressures can increase an explosive event by as much as 8 times and our BlastWrap<sup>®</sup> technology dramatically reduces or eliminates this phenomenon. BlastWrap interacts with the explosion and in 4/5 millisecond quenches the fireball of the explosion and simultaneously reduces the blast pressures by about 73 %. Please have a look at our web site [www.blastgardintl.com](http://www.blastgardintl.com), which has some video footage of our blast mitigation product, BlastWrap<sup>®</sup>. According to Industrial Risk Insurers Society, while explosions represent only 4 % of accidental losses, they account for 40 % of all losses and the expected loss from a single explosion is estimated at \$3.4M. The BlastWrap<sup>®</sup> technology drastically reduces the impact explosions have on people and property. The most effective way to guard against terrorist attacks is to be prepared and BlastGard's MTR 91 and MTR 101 is the protective choice and the most effective method for dealing with all types of explosions whether accidental, from criminal activity or from a terrorist.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** 0.9 kg (2 lb) TNT; 1.8 kg (4 lb) TNT and 12 lb TNT equivalent

**Ballistic Performance:** Stops all fragmentation apart from that moving vertically

**Set-up Time:** Can be installed in less than 30 min

## PHYSICAL PARAMETERS

**Size:** 132 L or 151 L (35 gal or 40 gal) size

**Weight:** 526 kg (1160 lb) up to 871 kg (1920 lb), can be bolted into ground

**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Easy

**Shelf Life:** Semi-infinite

**Ease of Use:** Very easy to use

**Maintenance Requirements:** Trash must be emptied and cleaned regularly

**Durability:** Very durable

**O&M Costs:** Varies

**Environmental Considerations:** Any public area

**SPECIAL REQUIREMENTS**

**Operator Skills:** Low

**Warranty:** None

**Training Available:** Not specified

**Independent Testing:** Yes

**Manuals Available:** Yes

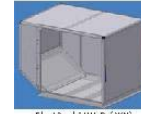
**Applicable Regulations:** Yes (Redstone Technical Test Center)

**Support Equipment:** Yes

## GENERAL

Blast Mitigated Unit Load Device**Model:** BlastWrap BMULD

BlastGard International, Inc.  
12900 Automobile Blvd., Suite D  
Clearwater, Florida 33762-4715  
727-592-9400 (Tel)  
mgordon@blastgardintl.com

**Information Source:** <http://www.blastgardintl.com>**Unit Cost:** Not specifiedBlastGard BMULD (AKE)  
Front Right Perspective ViewBlastGard BMULD (AKN)  
Front Right Perspective View**Technology:** Blast mitigation**Availability:** Current

**Description:** BlastWrap<sup>®</sup> is scientifically engineered and designed to remove most of the energy from blasts that hit them. BlastWrap<sup>®</sup> works by dissipating blast energy through irreversible mechanical shock management processes and by very rapidly quenching the thermal output of an explosion. Unit Load Devices, or ULDs, are pallets and containers used to load luggage, freight, and mail on wide-body aircraft. They allow large quantities of cargo to be bundled into large units. Since this leads to fewer units to load, it saves ground crews time and effort, and helps prevent delayed flights. Each ULD is manifested separately so that its contents can be tracked. This unique line of BlastGard BMULDs will prevent shock holing of the fuselage, effectively retaining the structural integrity of the aircraft; prevent post-blast fires and conflagration in the hold; add little or only negligible weight to the ULD; and are affordable.

**BlastGard technology:** The CAA Aircraft Hardening Programme shows without any doubt that the main threat to an aircraft is from an internal explosion that explosively holes the fuselage thus leading to complete loss of structural integrity of the airframe in a few thousandths of a second. The program looked at quantifying the amount of blast (impulse, pressure times the time applied, as it turns out) needed to hole the aircraft fuselage. Blast pressure drops off rapidly with distance and so the implications for aircraft are that the charge has to be close to the fuselage or be very large to cause the fuselage to hole. Current baggage screening technology is capable of detecting relatively large charges but as the size drops so does the probability of detecting them. An aircraft fuselage is very sensitive to explosive holing, which even a small amount of explosive material can cause and because of this there is a discrepancy between what can be detected and the charge size, which can take down an aircraft. Understanding and being able to quantify these issues led BlastGard International to develop a blast mitigated container that reduces the blast pressures at vulnerable locations on the airframe (where a bag containing an explosive charge can become close to the skin of the aircraft). This container weighs only slightly more than a standard container and the internal blast mitigating panel reduces the available volume by a few percent, and the panel can be retrofitted into an existing container. This container will give 100 % protection from a Lockerbie type device.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** 0.6 kg (1.5 lb) TNT equivalent minimum**Ballistic Performance:** Very little**Set-up Time:** No set up time. Integrated into a standard aircraft container.

## PHYSICAL PARAMETERS

**Size:** Standard AKE and AKN containers**Weight:** Depending on variant but 77 kg (170 lb) and upwards.**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Easy**Shelf Life:** Semi-infinite**Ease of Use:** Use as per standard container**Maintenance Requirements:** None**Durability:** Same durability as a standard container**O&M Costs:** None**Environmental Considerations:** Onboard aircraft in the event of an explosion in the baggage hold

**SPECIAL REQUIREMENTS**

<b>Operator Skills:</b> Low	<b>Warranty:</b> None
<b>Training Available:</b> Not specified	<b>Independent Testing:</b> Yes
<b>Manuals Available:</b> Yes	<b>Applicable Regulations:</b> Yes
<b>Support Equipment:</b> Yes	



## GENERAL

### Global Defender Blast Mitigation Trailer System

**Model:** GD-130/60-TC

Burner Fire Control  
301 Industrial Pkwy  
Lafayette, Louisiana 70508  
337-237-4547 (Tel)  
mdcruse@burnerfire.com

Global Defender is distributed exclusively by Raytheon  
Technical Services Company

**Information Source:** [www.globaldefender.net](http://www.globaldefender.net)

**Unit Cost:** \$75K to \$99.5K, depending upon configuration



**Technology:** Containment foam

**Availability:** 6 wk to 8 wk after receipt of order

**Description:** Global Defender is an effective, affordable, and flexible option for dealing with CBRNE terrorist devices. The system is completely self-contained, remotely operated, and portable. Utilizing a patent pending foam dispensing unit, the Global Defender covers devices with a specially formulated blast mitigation foam. Our enclosure automatically covers a device as it fills with foam, giving technicians up to 4 h of protection to deal with the threat.

System benefits: Completely self-contained, no external resources required (water, pumps, power, etc.), limited “down range” time (no standing over the device while the enclosure fills with foam). Our enclosure is self-contained, meaning no agents come in contact with the device. System is stored and transported “Ready to Deploy.” No on-site setup required. Small footprint (portable systems take up minimal space for transport and storage). Portable systems priced at \$40K makes them within reach of most agencies. Per shots costs of under \$1K, a small price for the added protection to personnel and property.

The Global Defender Blast Mitigation System is currently available in 3 basic configurations. Each configuration is customizable, based upon application and specifications. The 60 gallon portable systems designed for a single application, utilizing our standard 1.8 m x 1.8 m (6 ft x 6 ft) enclosures. The trailer mounted system for multiple applications, or the ability to deal with larger explosive devices [greater than 0.9 kg (2 lb)] of high explosive.

All systems utilize our patent pending foam enclosures. These enclosures, which are folded for easy storage and deployment, automatically unfold and cover the device as they fill with our foam. They are made of a synthetic material designed to expand and then give way, if necessary, as the device is detonated. This expansion is what allows our system to suppress and contain the blast effect, fragmentation, and any dispersible agents which may be attached to the device. The enclosures have a solid bottom, which prevents any foam from coming into contact with the device. This also allows the enclosure to be moved once it is filled, without spilling the foam. Our systems are compatible with most tools available today, including: dDisruptors, counter charges, perforators, etc. Once a device is covered, you have 4 h to deal with it before the foam begins to degrade. The thickness and density of our foam offer many benefits, including: longer time to deal with a device once it is covered; added suppression and containment of dispersible agents (the foam actually captures and contains the agent within its bubble structure, holding it in place for hours); and easier clean-up post blast (since the foam remains intact, it is much easier to clean up as a Haz-Mat afterwards, if necessary). Foam is environmentally friendly, therefore, if no dispersible agents are present, it can be left alone to dissipate.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Tested to mitigate/suppress up to 6 lb high explosive

**Ballistic Performance:** Suppresses and contains dispersible agents and fragmentation

**Set-up Time:** System is stored and deployed in a “ready” status. No set up time required.

## PHYSICAL PARAMETERS

**Size:** Trailer is 386 cm x 183 cm x 236 cm (152 in x 72 in x 92 in) l,w,h

**Weight:** 1588 kg (3500 lb)

**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** System is trailer mounted, so it is pulled behind a truck, SUV, etc.

**Shelf Life:** > 10 yr

**Ease of Use:** Very easy to use. One handle operation.

**Maintenance Requirements:** Annual visual inspection

**Durability:** Extremely durable construction

**O&M Costs:** N/A

**Environmental Considerations:** Any

## SPECIAL REQUIREMENTS

**Operator Skills:** One day training required for operation

**Warranty:** None

**Training Available:** Not specified

**Independent Testing:** Full manufacturer warranty

**Manuals Available:** One day training included with purchase

**Applicable Regulations:** Yes

**Support Equipment:** Yes

## GENERAL

### Global Defender Portable Blast Mitigation System

**Model:** GD-60-C

Burner Fire Control  
301 Industrial Pkwy  
Lafayette, Louisiana 70508  
337-237-4547 (Tel)  
mdcruse@burnerfire.com

**Information Source:** www.globaldefender.net

**Unit Cost:** \$40K



**Technology:** Blast mitigation foam

**Availability:** 6 wk after Receipt of Order

**Description:** Global Defender is distributed exclusively by Raytheon Technical Services Company. Global Defender is an effective, affordable, and flexible option for dealing with CBRNE terrorist devices. The system is completely self contained, remotely operated, and portable. Utilizing a patent pending foam dispensing unit, the Global Defender covers devices with a specially formulated blast mitigation foam. Our enclosure automatically covers a device as it fills with foam, giving technicians up to 4 h of protection to deal with the threat. System benefits: Completely self-contained. No external resources required (water, pumps, power, etc.). Limited “Down Range” Time (no standing over the device while the enclosure fills with foam). Our enclosure is self contained, meaning no agents come in contact with the device. System is stored and transported “Ready to Deploy.” No on-site setup required. Small footprint (portable systems take up minimal space for transport and storage). Portable systems priced at \$40K makes them within reach of most agencies. Per shots costs of under \$1K, a small price for the added protection to personnel and property. The Global Defender Blast Mitigation System is currently available in 3 basic configurations. Each configuration is customizable, based upon application and specifications. Our 60 gal portable systems are designed for a single application, utilizing our standard 6 ft x 6 ft enclosures. For those that require multiple applications, or the ability to deal with larger explosive devices (greater than 2 lb of high explosive), our trailer mounted system is for you. All systems utilize our patent pending foam enclosures. These enclosures, which are folded for easy storage and deployment, automatically unfold and cover the device as they fill with our foam. They are made of a synthetic material designed to expand and then give way, if necessary, as the device is detonated. This expansion is what allows our system to suppress and contain the blast effect, fragmentation, and any dispersible agents which may be attached to the device. The enclosures have a solid bottom, which prevents any foam from coming into contact with the device. This also allows the enclosure to be moved once it is filled, without spilling the foam. Our systems are compatible with most tools available today, including: disruptors, counter charges, perforators, etc. Once a device is covered, you have 4 h to deal with it before the foam begins to degrade. The thickness and density of our foam offer many benefits, including: Longer time to deal with a device once it is covered; added suppression and containment of dispersible agents (the foam actually captures and contains the agent within its bubble structure, holding it in place for hours); easier clean-up post blast (since the foam remains intact, it is much easier to clean up as a Haz-Mat afterwards, if necessary). Foam is environmentally friendly; therefore, if no dispersible agents are present, it can be left alone to dissipate.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Up to 0.9 kg (2 lb) high explosive devices completely contained

**Ballistic Performance:** Suppresses and contains dispersible agents and fragmentation

**Set-up Time:** System is stored and deployed in a “ready” state, meaning no set up time required

## PHYSICAL PARAMETERS

**Size:** 117 cm x 71 cm x 142 cm (46 in x 28 in x 56 in) l,w,h

**Weight:** Empty weight 113 kg (250 lb), full weight 318 kg (700 lb)

**Power Requirements:** None

## LOGISTICAL PARAMETERS

<b>Portability:</b> Transportable small truck, van, SUV, or trailer	<b>Shelf Life:</b> > 10 yr
<b>Ease of Use:</b> One handle operation. Completely deployable by robot.	<b>Maintenance Requirements:</b> Annual visual inspection of system
<b>Durability:</b> Extremely durable. Constructed of solid aluminum plate and carbon steel tank.	<b>O&amp;M Costs:</b> Approximately \$900 per use, which includes enclosure, foam, and nitrogen charge
<b>Environmental Considerations:</b> Any	

## SPECIAL REQUIREMENTS

<b>Operator Skills:</b> One day training provided with system. No special skills required.	<b>Warranty:</b> None required
<b>Training Available:</b> Not specified	<b>Independent Testing:</b> Yes, full warranty against manufacturer defects
<b>Manuals Available:</b> Yes. On site training provided with purchase of system.	<b>Applicable Regulations:</b> Yes
<b>Support Equipment:</b> Yes	

## GENERAL

### Octatron Explosive Release Pole System

**Model:** OERPS

CHANG Industry, Inc.  
877 Executive Center Drive W.  
St. Petersburg, Florida 33702  
910-540-6456 (Tel)  
sales@octatron.com

**Information Source:** Octatron.com

**Unit Cost:** Basic system \$500; deluxe system \$1000



**Technology:** Initiator

**Availability:** Available immediately

**Description:** Designed for IED/Bomb/Ordnance disposal for precision charge placement. Using a lightweight, 1.2 m (4 ft) to 4.3 m (14 ft) telescoping, aluminum pole, drop charges can be placed precisely where needed without placing the technician next to the suspect IED/ordnance. At the tip of the pole is a latch release system that holds an expendable plastic plate to which a charge can be taped. This allows the charge to be placed precisely where needed, without leaving an antenna mast or camouflage tent pole susceptible to explosion. Pulling the release line separates the plastic plate and charge from the pole itself. The Explosive Release Pole System (ERP) can be used repeatedly. Using the attached carrying hook, the receiver/transmitter (for remote detonation) can be carried and gently set down before placing the charge on/near the object to be destroyed.

ERP system features: lightweight delivery system [approximately 2.27 kg (5 lb)]. Aluminum pole extends from 1.2 m x 4.3 m (4 ft to 14 ft). Pull cord release of “package” from end of pole. Hook on pole allows for carry and quick release of equipment. Expendable plastic plates permit multiple uses of the ERP System. Basic ERP system includes: 1 each—[1.2 m x 4.3 m (4 ft to 14 ft)] telescoping pole w/ER latch system. 1 each weighted aluminum practice plate. 3 each expendable plastic plates. 1 each nylon carry case with 2 external pockets to accommodate extra plates/gear.

Deluxe ERP system includes: 1 each basic ER pole system. 25 each expendable plastic plates. 1 each [10 cm x 127 cm (4 in x 50 in)] hard case with handle, shoulder strap, and external pocket. Replacement parts available: 10-pack expendable plastic plates. Free shipping (ground to US or APO address).

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Warranty:** 1 yr warranty on parts and labor

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Frag Bag Bomb Box

**Model:** 30233ASSY80975010

Foster-Miller Inc., LAST Armor Division  
360 Second Ave.  
Waltham, Massachusetts 02451  
781-684-3900 (Tel)  
mmccormack@foster-miller.com

**Information Source:** [www.foster-miller.com/armor.htm](http://www.foster-miller.com/armor.htm)

**Unit Cost:** \$750



**Technology:** Containment

**Availability:** Available

**Description:** Frag Bag is a low-cost, highly deployable bomb containment system designed to hold all the fragments and mitigate the blast overpressure from a typical 5 cm (2 in) diameter, 20 cm (8 in) long pipe bomb charged with more than 2.2 kg (1 lb) of Pyrodex propellant. Frag Bag can be used by public safety, private security, postal service, and corporate mail room personnel. It is fitted with a number of “grab points” so that it can be opened, loaded, closed and transported by a bomb stick or remote manipulator. It can also be used to improve safety in routine transport of small pyrotechnics like detonator caps and detcord. Frag Bag contains no metal parts. It is designed to dissipate and deflect overmatch blast up and away from first responders and other personnel.

**Current Users:** Almost 10 yr. Massachusetts State Police and numerous other police departments nationwide.

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** 5 cm x 20 cm (2 in x 8 in) pipe type device

**Ballistic Performance:** Not specified

**Set-up Time:** None necessary

## PHYSICAL PARAMETERS

**Size:** 56 cm x 33 cm x 30 cm (22 in x 13 in x 12 in) l,w,h

**Weight:** About 11.3 kg (25 lb)

**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Fits easily into the trunk of a cruiser

**Shelf Life:** No limit

**Ease of Use:** Easy

**Maintenance Requirements:** None

**Durability:** Not applicable

**O&M Costs:** None

**Environmental Considerations:** Normal

## SPECIAL REQUIREMENTS

**Operator Skills:** Minimal required

**Warranty:** None

**Training Available:** Not specified

**Independent Testing:** NA

**Manuals Available:** Yes

**Applicable Regulations:** Yes

**Support Equipment:** Yes

## GENERAL

### Rapid Deployment Fortification Wall

**Model:** RDFW MK 4

Geocell Systems, Inc.  
Pier 54 Terry Francois Blvd, Suite 201  
San Francisco, California 94158-2106  
415-541-5300 (Tel)  
rdfw@aol.com

**Information Source:** www.geocellsystems.com

**Unit Cost:** \$13.3K per kit



**Technology:** Containment

**Availability:** Current

**Description:** Joint Expeditionary Field Fortification Kits (JEFF Kits) composed of 100 Rapid Deployment Fortification Wall (RDFW) components measuring 122 cm x 135 cm x 1.3 cm (48 in x 53 in x 1/2 in) are shipped collapsed in a cubed container. JEFF Kit containers measure 152 cm x 122 cm x 124 cm (60 in by 48 in by 49 in) and weigh 1043 kg (2300 lb). Each RDFW component is composed of high strength plastic and weighs 8.6 kg (19 lb). Each RDFW component is expanded in 1 s by 2 workers to transform into a three dimensional square grid matrix measuring 20 cm (8 in) high by 122 cm (48 in) wide by 122 cm (48 in) high. Each RDFW component is connected side to side and stacked vertically to form a network of interconnected 18 cm (7 in) in diameter sand confinement cells. The wall can be built in a variety of configurations. Once the wall is built to a desired configuration, the wall is filled immediately with readily available native sand or dirt. Filling is accomplished with a tractor loader, eliminating the need to fill and carry sand bags. Strength within the structure is derived by sand being confined to the cells, naturally self compacting and developing compression within the cell structure. The combination of sand and internal bracing creates both dampening effects and structural strength to withstand bomb blast compression. A 1.2 m (4 ft) high by 1.2 m (4 ft) wide by 6.1 m (20 ft) long RDFW has been demonstrated to withstand an 18 kg (40 lb) C4 charge at a 1.4 m (4.5 ft) standoff.

**Current Users:** 1 yr. USACE, USMC, and USAF.

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Effective with 18 kg (40 lb) C4 Charge

**Ballistic Performance:** Not specified

**Set-up Time:** 100 lineal ft in 1 h

## PHYSICAL PARAMETERS

**Size:** Each component: 122 cm x 122 cm 20 cm (48 in x 48 in x 8 in); Kit of 100: 152 cm x 122 cm x 124 cm (60 in x 48 in x 49 in)

**Weight:** Each component: 8.6 kg (19 lb). Kit of 100: 1043 kg (2300 lb).

**Power Requirements:** None

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Support Equipment:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Independent Testing:** RDFW has been tested by a joint effort of USMC and USAF at Force Protection Battle Lab, Lackland AFB, Texas

**GENERAL****PAN Disrupter****Model:** 12 Gauge

Ideal Products, Inc.  
700 East Loudon Avenue  
Lexington, Kentucky 40505  
859-255-7738 (Tel)  
scott@idealtool.net

**Information Source:** www.idealproductsinc.net**Unit Cost:** Call for pricing**Technology:** Disrupters**Availability:** Current

**Description:** The Original PAN disrupter is a 12 gauge shock tube initiated disrupter capable of firing up to 3.5 in rounds up to 3450 ft/s. All certification and recertification for bomb techs at the FBI Hazardous Devises School will be using the Original PAN Disrupter exclusively.

**Current Users:** 11 yr**OPERATIONAL PARAMETERS****Explosive Amount Contained/Mitigated:** Not specified**Ballistic Performance:** Not specified**Set-up Time:** Minimal**PHYSICAL PARAMETERS****Size:** 24 in barrel**Weight:** 4.1 kg (9 lb)**Power Requirements:** Shock tube initiated**LOGISTICAL PARAMETERS****Portability:** Not specified**Shelf Life:** Lifetime**Ease of Use:** Not specified**Maintenance Requirements:** Minimal**Durability:** Stainless steel**O&M Costs:** Not specified**Environmental Considerations:** Not specified**SPECIAL REQUIREMENTS****Operator Skills:** Must be a certified bomb technician**Warranty:** Not specified**Training Available:** Not specified**Independent Testing:** Lifetime**Manuals Available:** Not specified**Applicable Regulations:** Not specified**Support Equipment:** Yes



**GENERAL****12 Gauge Titanium Disrupter****Model:** T-3

Ideal Products, Inc.  
700 East Loudon Avenue  
Lexington, Kentucky 40505  
859-255-7738 (Tel)  
scott@idealtool.net

**Information Source:** www.idealproductsinc.net**Unit Cost:** Not specified**Technology:** Disrupters**Availability:** 2 wk to 3 wk ARO**Description:** 12 Gauge Disrupter system includes: Shock tube initiated breech plug assembly [43 cm x 61 cm (18 in or 24 in) barrel length], Titanium, and Acme threaded breech and barrel tips.

Not supplied: smooth bore barrel tip or standard PAN rounds; rifle bore barrel tip, specialized Sabo rounds; standard PAN ammunition; and specialized Sabo rounds.

**Current Users:** Not specified**OPERATIONAL PARAMETERS****Explosive Amount Contained/Mitigated:** Not specified**Ballistic Performance:** Not specified**Set-up Time:** Not specified**PHYSICAL PARAMETERS****Size:** Not specified**Weight:** Not specified**Power Requirements:** Not specified**LOGISTICAL PARAMETERS****Portability:** Not specified**Shelf Life:** Not specified**Ease of Use:** Not specified**Maintenance Requirements:** Not specified**Durability:** Not specified**O&M Costs:** Not specified**Environmental Considerations:** Not specified**SPECIAL REQUIREMENTS****Operator Skills:** Not specified**Warranty:** Not specified**Training Available:** Not specified**Independent Testing:** Not specified**Manuals Available:** Not specified**Applicable Regulations:** Not specified**Support Equipment:** Not specified

**GENERAL****EOD .357 Gauge Magnum Micro Disrupter****Model:** K7000

Ideal Products, Inc.  
700 East Loudon Avenue  
Lexington, Kentucky 40505  
859-255-7738 (Tel)  
scott@idealtool.net

**Information Source:** www.idealproductsinc.net**Unit Cost:** Not specified**Technology:** Disrupters**Availability:** 2 wk to 3 wk ARO

**Description:** The 0.357 Magnum Micro Disrupter is a breech loaded 0.357 gauge system used principally for disruption purposes; other uses include cutting, penetration of, and removal of I.E.D. fusing system components. This is accomplished by projecting various solid projectiles, shot, or liquid material out of a 0.357 caliber barrel. The 0.357 Magnum Micro Disrupter is shock tube initiated and percussion actuated. It is constructed of high grade stainless steel. The 0.357 kit comes with one 0.357 smooth bore barrel for water shots and one rifled bore for precision shots. The 0.357 barrels are 30 cm (12 in) long. The 0.357 Magnum Micro Disrupters have interchangeable breech parts with the original 12 gauge PAN Disrupter™. The 0.357 Magnum Micro disrupter is capable of firing shots up to 2000 ft/s. Two or more targets inside the bomb can be impacted with an isochronicity of 500  $\mu$ s of each other. The 0.357 Magnum Micro Disrupter is the only 0.357 disrupter currently on the market that can have two or more fired together within milliseconds of each other.

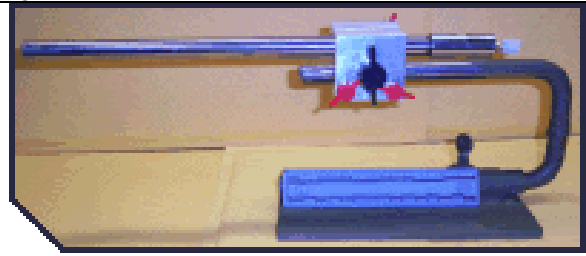
**Current Users:** Not specified**OPERATIONAL PARAMETERS****Explosive Amount Contained/Mitigated:** Not specified**Ballistic Performance:** Not specified**Set-up Time:** Not specified**PHYSICAL PARAMETERS****Size:** Not specified**Weight:** Not specified**Power Requirements:** Not specified**LOGISTICAL PARAMETERS****Portability:** Not specified**Shelf Life:** Not specified**Ease of Use:** Not specified**Maintenance Requirements:** Not specified**Durability:** Not specified**O&M Costs:** Not specified**Environmental Considerations:** Not specified**SPECIAL REQUIREMENTS****Operator Skills:** Not specified**Warranty:** Not specified**Training Available:** Not specified**Independent Testing:** Not specified**Manuals Available:** Not specified**Applicable Regulations:** Not specified**Support Equipment:** Not specified

## GENERAL

***Magnum Microdisrupter*****Model:** .357 Gauge

Ideal Products, Inc.  
P.O. Box 16224  
Arlington, Virginia 22215  
703-405-7249 (Tel)  
ballj@tswg.gov

**Information Source:** www.tswg.gov  
Ideal Products, Inc., Terrell Edwards, President, 700 Loudon Ave., Lexington, KY 40505; 606-255-7738 (Tel); 606-231-9998 (Fax); terrell@idealtool.net

**Unit Cost:** \$1425**Technology:** Disrupters**Availability:** Delivery is 1 wk to 2 wk.

**Description:** 0.357 Magnum Microdisrupter. Background information: Bomb Technicians have had large high power disrupters for many years. At times less power and a smaller tool would allow disruption of a device where using the larger disrupters would not be appropriate. Additionally a smaller disrupter would cause much less collateral damage. Microdisrupters will enhance the capabilities of bomb technicians at all levels. They will allow them to get into smaller/tighter spaces; to do precision shots without impacting other sensitive components; to recover more forensic evidence; and will give them the option of shooting a wide variety of off the shelf and custom rounds. The 0.357 Micro Disrupters/Small Munitions Disrupter (SMD) tool is a miniaturized disrupter sized in 0.357 caliber, which comes with two interchangeable barrels of 12 in length, one rifled and the other smooth bore for different applications. Additional components shown below include: PAN stand adapter, cleaning tools and spare firing system parts. The device is held by either a tripod or a clamped stand. The 0.357 Micro Disrupter tool is meant to disrupt letter bombs, booby traps, suspicious packages, firing devices, etc. The Kit consists of: 1 Pelican case, 1 barrel/breech rifled bore, 1 barrel/breech smooth bore, 1 stand, 2 PAN adapters, 2 laser with mounts, 1 pull thru bore cleaner and other cleaning supplies, and 1 assortment of miscellaneous tools.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified**Ballistic Performance:** Not specified**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified**Weight:** Not specified**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified**Shelf Life:** Not specified**Ease of Use:** Not specified**Maintenance Requirements:** Not specified**Durability:** Not specified**O&M Costs:** Not specified**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified**Warranty:** Not specified**Training Available:** Not specified**Support Equipment:** Not specified**Manuals Available:** Not specified

**Independent Testing:** Characterization information and test reports are available to authorized users via e-mail to [TechTrans@tswg.gov](mailto:TechTrans@tswg.gov). Testing: The prototype was thoroughly tested by the NAVEODTECHDIV. The first production unit was also verified by the NAVEODTECHDIV..

**Applicable Regulations:** SMD devices are considered controlled firearms, intended for bomb technician use only

**GENERAL****Disrupter****Model:** 410 Gauge

Ideal Products, Inc.  
 700 East Loudon Avenue  
 Lexington, Kentucky 40505  
 859-255-7738 (Tel)  
 scott@idealtool.net

**Information Source:** www.idealproductsinc.net**Unit Cost:** Not specified**Technology:** Disrupters**Availability:** 1 wk to 2 wk ARO**Description:** Shock tube initiated 410 gauge disrupter able to fire solid and water rounds**Current Users:** Not specified**OPERATIONAL PARAMETERS****Explosive Amount Contained/Mitigated:** Not specified**Ballistic Performance:** Not specified**Set-up Time:** Not specified**PHYSICAL PARAMETERS****Size:** Not specified**Weight:** Not specified**Power Requirements:** Not specified**LOGISTICAL PARAMETERS****Portability:** Not specified**Shelf Life:** Not specified**Ease of Use:** Not specified**Maintenance Requirements:** Not specified**Durability:** Not specified**O&M Costs:** Not specified**Environmental Considerations:** Not specified**SPECIAL REQUIREMENTS****Operator Skills:** Not specified**Warranty:** Not specified**Training Available:** Not specified**Independent Testing:** Not specified**Manuals Available:** Not specified**Applicable Regulations:** Not specified**Support Equipment:** Not specified

## GENERAL

### BlastSafe—Golans: Fully Confined Containment Systems for Explosives

**Model:** MSI Golan

Mistral Security, Inc.  
7910 Woodmont St.  
Bethesda, Maryland 20814  
301-913-9366 (Tel)  
security@mistralgroup.com

**Information Source:**

[http://www.mistralgroup.com/SEC\\_fully.asp](http://www.mistralgroup.com/SEC_fully.asp)

**Unit Cost:** Call for Pricing or see GSA



**Technology:** Containment

**Availability:** Call for details

**Description:** BlastSafe Golans are fully confined containment systems for explosives, which allow officials to safely remove suspect packages from public areas and allow the safe storage of explosive materials. In transport areas (airports, metros, transit stations, etc.) the Golan 3M protects the traveling public by allowing the safe transport of suspect items or luggage to a secure location. It is easily operated by hand or robot and maneuverable in tight airport spaces. The Golan 4 Gas-Tight is fully confined to protect against potential biological and/or chemical threats up to 2 kg (4.4 lb) of TNT or equivalent. It is easily operated manually or hydraulically. It is cost effective to withstand repeated detonations. The Golan 1, Golan 5, Golan 10, and Golan 15 are used by the government and military to store explosive materials. The Golan 1 is used by the post office and other organizations to safely store and then safely remove suspect envelopes and small packages. The Golan 1, Golan 5, Golan 10, and Golan 15 are rated for reduced distance from inhabited buildings. Benefits Include: Mistral has over a dozen years experience in designing and manufacturing the Golan Fully Confined Containment Systems for Explosives. The Golan Systems are designed to fully confine all explosive effects from internal detonation. Golan Systems designed for 5 kg (11 lb) protective criteria or less can be transportable (trailer, wheels, etc.) allowing for easy and quick removal of suspicious packages. All Golan Systems are manufactured under ISO and ASME certifications. These systems are generally maintenance free, except for periodic painting. The patented design absorbs and fully contains the effects of blasts and fragmentation up to 15 kg (33 lb) of TNT or equivalent (dependent upon which unit is used). Whether standard or optional, Golan can include: An external door for use with an Intrusion Detection System (IDS), preparation for siren, wheels, etc., an internal, no friction sliding door for storage of spark sensitive explosive materials, trailer and an automatic system for door operation., and internal shelving. Golan System Users include: U.S. Federal/State law enforcement; FBI; police (EOD, K9, etc.); Secret Service and U.S. Marshals; airports, and other transit areas; U.S. Army, Navy, Air Force, DoD; French army and police; explosive manufacturing plants; air and sea ports; and any user in need of safely removing suspect packages or storing hazardous/explosive materials.

**Current Users:** 20 yr; law enforcement, commercial, government and military in need of safe storage/removal of explosives

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** The Golan Systems provide explosive storage and protection from 68 g to 15 kg (0.15 lb to 33 lb) of TNT or equivalent. The Golan 1, Golan 5, Golan 10, and Golan 15 provide fully confined protection from 1 kg (2.2 lb) to 15 kg (33 lb) of TNT or equivalent with DDESB approval. Other models are available ranging in protection criteria from 0.15 kg to 15 kg (0.33 lb to 33 lb) of TNT or equivalent.

**Ballistic Performance:** Depends upon model

**Set-up Time:** Depends upon model

## PHYSICAL PARAMETERS

**Size:** Depends upon model

**Weight:** Depends upon model

**Power Requirements:** Depends upon model

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

**SPECIAL REQUIREMENTS**

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Blast Containment Receptacles

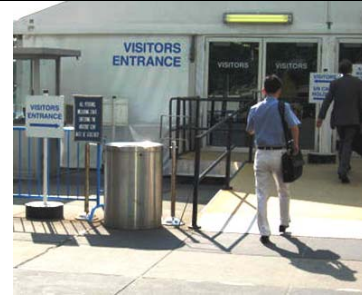
**Model:** MSI BCR

Mistral Security, Inc.  
7910 Woodmont St.  
Bethesda, Maryland 20814  
301-913-9366 (Tel)  
security@mistralgroup.com

**Information Source:**

[http://www.mistralgroup.com/SEC\\_semi.asp](http://www.mistralgroup.com/SEC_semi.asp)

**Unit Cost:** Call for pricing or see GSA



**Technology:** Containment

**Availability:** Call for details

**Description:** Blast Containment Receptacles (BCR) the next generation. Mistral is a pioneer in explosive detection and identification as well as blast mitigation and containment. Mistral designs and manufactures bomb mitigating trash cans. Benefits include: saves lives and serious injury; provides 360° lateral protection against blast pressure and fragments; and is cost effective.

Features include: available with protection levels from 1 kg to 6.8 kg (2 lb to 15 lb) of TNT or equivalent explosions; available with disintegrating lids; available with additional fire suppressant capacity; available in over a hundred colors; and available in 3 trash capacity sizes. May be used as a safe depository to temporarily store suspicious items until authorities arrive.

Applications include: ground transportation (airports/railways/metros/subway stations, etc.); public venues (arenas/stadiums, parade routes, major VIP functions, etc); buildings (Federal/state/local government, court houses, museums, realty co., etc.); industrial sites (construction sites, etc.), and suspicious items until authorities arrive. Headquartered in Bethesda, MD, MSI has an international network in more than 50 countries. For further information go to:

[http://www.mistralgroup.com/SEC\\_explosives.asp](http://www.mistralgroup.com/SEC_explosives.asp).

**Current Users:** 20 yr. Transit facilities (airports, metros, trains, etc.), government buildings, public venues, and industrial sites.

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Options range between 0.9 kg and 6.8 kg (2 lb and 15 lb) of TNT or equivalent explosive

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Options include 79 L (21 gal), 114 L (30 gal), and 151 L (40 gal) of trash capacity

**Weight:** Not specified

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified

## GENERAL

### Total Containment Vessel

**Model:** 42-SCS

NABCO, Inc.  
1001 Corporate Drive  
Suite 205  
Canonsburg, Pennsylvania 15317  
724-746-9617 (Tel)  
jay@nabcoinc.com

**Information Source:** <http://www.nabcoinc.com>

**Unit Cost:** Not specified



**Technology:** Containment

**Availability:** Not specified

**Description:** The explosion containment capability of NABCO vessels range from a few pounds to 22.7 kg (50 lb) of explosives, and in most cases, is repeatable. NABCO also offers an upgrade to its vessels so they can operate in a gas-tight mode, in the event a suspect device is determined to contain a chemical or biological agent. A sample system is provided which allows the user to pull a sample of the vessel's interior atmosphere, and take it to a lab for analysis. In the event the atmosphere is contaminated, provisions are provided to flood the vessel with a reagent to decontaminate it for future use. The gas-tight capability can be retro-fitted onto existing vessels in the field, or supplied with a new vessel. NABCO has upgraded our vessels to a Self-Closing System. The vessels are now equipped with an automatic hydraulic yoke system that allows closure of the vessel in a faster and safer method.

Other NABCO products include explosive storage vessels, approved by the Department of Defense Explosive Safety Board (DDESB). These vessels are rated for reduced quantity distance from inhabited buildings, and are approved for repeated detonations and both fragmenting and nonfragmenting munitions. NABCO also manufactures a totally portable unit for explosive screening operations in high profile public facilities, mail screening operations, and other high risk environments. The vessel can be used for containment or storage of explosives.

NABCO also manufactures a Suspect Luggage Containment Vessel designed to quickly and safely contain luggage, which may be identified as suspect. It provides an affordable way to safely contain the suspect package and distance it from expensive EDS machines until the bomb squad responds. The unit is mobile, and can quickly be towed away resulting in less terminal disruption and evacuations. The compact size of the unit allows it to be easily rolled into standard commercial elevators to reach various levels of the airport.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Few pounds to 22.7 kg (50 lb) of explosives

**Ballistic Performance:** Not specified

**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified

**Weight:** Not specified

**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified

**Shelf Life:** Not specified

**Ease of Use:** Not specified

**Maintenance Requirements:** Not specified

**Durability:** Not specified

**O&M Costs:** Not specified

**Environmental Considerations:** Not specified



**SPECIAL REQUIREMENTS****Operator Skills:** Not specified**Warranty:** Not specified**Training Available:** Not specified**Independent Testing:** Not specified**Manuals Available:** Not specified**Applicable Regulations:** Not specified**Support Equipment:** Not specified

## GENERAL

IED Jammer to Counter RCIED Weapons**Model:** VIP-300 X Series

Security Intelligence Technologies  
 145 Huguenot Street  
 New Rochelle, New York 10801  
 914-654-8700 (Tel)  
 info@secintel.com

**Information Source:** <http://www.bombjammer.com>**Unit Cost:** Available to authorized agencies only**Technology:** Jammer**Availability:** Available to authorized agencies only

**Description:** An IED Jammer saturates the area with electromagnetic energy in order to neutralize an IED that is activated by remote control. The VIP 300 IED Jammer essentially operates by transmitting radio interference signals. This RF jamming interference then helps block the radio receiver attached to the IED from receiving a detonation signal. Because the IED jammer can broadcast RF jamming interference on multiple frequencies simultaneously, all known threats can be addressed. The VIP 300X Bomb Jammer IED jammer was not designed to detonate an IED that is built to trigger by radio control, such as an RCIED. Working as a Defeat Jammer, the sweep rate of the IED jammer and other parameters are optimized for jamming communication bands that would be typically used to detonate an RCIED. The result is a jammer that disrupts the radio control link with less output power as compared to less efficient defeat jamming techniques. Lower output power means less current drain on the vehicle's electrical system, so that in most cases the defeat systems of the bomb jammer operate from the existing alternator/regulator charging system normally supplied with the vehicle. An efficient jammer also generates less heat dissipation, improving reliability, and allowing operation at higher ambient air temperatures.

The purpose of the IED Jammer is to ensure protection from radio controlled bombs. It can protect individual vehicles, vehicle convoys, vehicle parks, and even people operating in the vicinity of the vehicle's jamming system. The VIP 300X Bomb Jammer consists of transmitter jammer modules with separate antennas that work independently of one another. The modules jam frequency bands with differing bandwidths, which are located in different areas of the frequency spectrum. The modules are mounted in one common transmitter unit (rack case), which is mounted on the vehicle roof. The modules can be controlled both from their respective module control panel or from a remote control unit (by cable) situated in the vehicle. The Bomb Jammer IED Jammer is engineered to work in very dusty conditions and rough terrain. It has a filter/ventilation unit that can clean the air and cool the system. The remote control unit indicator system shows the operator that the system is functioning properly. It monitors the power supply, readiness of jamming modules, and transfer of radio frequency energy to the antennas.

**Current Users:** Not specified

## OPERATIONAL PARAMETERS

**Explosive Amount Contained/Mitigated:** Not specified**Ballistic Performance:** Not specified**Set-up Time:** Not specified

## PHYSICAL PARAMETERS

**Size:** Not specified**Weight:** Not specified**Power Requirements:** Not specified

## LOGISTICAL PARAMETERS

**Portability:** Not specified**Shelf Life:** Not specified**Ease of Use:** Not specified**Maintenance Requirements:** Not specified**Durability:** Not specified**O&M Costs:** Not specified**Environmental Considerations:** Not specified

## SPECIAL REQUIREMENTS

**Operator Skills:** Not specified

**Warranty:** Not specified

**Training Available:** Not specified

**Independent Testing:** Not specified

**Manuals Available:** Not specified

**Applicable Regulations:** Not specified

**Support Equipment:** Not specified



**APPENDIX H—LIST OF EXPLOSIVE MATERIALS (2006R-2P)**



## APPENDIX H—LIST OF EXPLOSIVE MATERIALS (2006R–2P)

### DEPARTMENT OF JUSTICE

#### Bureau of Alcohol, Tobacco, Firearms and Explosives

[Docket No. ATF 19N]

#### Commerce in Explosives; List of Explosive Materials (2006R–2P)

**AGENCY:** Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), Justice.

**ACTION:** Notice of List of Explosive Materials.

**SUMMARY:** Pursuant to 18 U.S.C. 841(d) and 27 CFR 555.23, the Department must publish and revise at least annually in the **Federal Register** a list of explosives determined to be within the coverage of 18 U.S.C. 841 *et seq.* The list covers not only explosives, but also blasting agents and detonators, all of which are defined as explosive materials in 18 U.S.C. 841(c). This notice publishes the 2006 List of Explosive Materials.

**DATES:** The list becomes effective upon publication of this notice on September 27, 2006.

**FOR FURTHER INFORMATION CONTACT:** Gary Bangs, Chief; Explosives Industry Programs Branch; Arson and Explosives Programs Division; Bureau of Alcohol, Tobacco, Firearms and Explosives; United States Department of Justice; 650 Massachusetts Avenue, NW., Washington, DC 20226 (202–927–2310).

**SUPPLEMENTARY INFORMATION:** The list is intended to include any and all mixtures containing any of the materials on the list. Materials constituting blasting agents are marked by an asterisk. While the list is comprehensive, it is not all-inclusive. The fact that an explosive material is not on the list does not mean that it is not within the coverage of the law if it otherwise meets the statutory definitions in 18 U.S.C. 841. Explosive materials are listed alphabetically by their common names followed, where applicable, by chemical names and synonyms in brackets. The Department has not added any new terms to the list of explosives or removed or revised any listing since its last publication. This list supersedes the List of Explosive Materials dated December 12, 2005 (Docket No. ATF 18N, 70 FR 73483).

#### Notice of List of Explosive Materials

Pursuant to 18 U.S.C. 841(d) and 27 CFR 555.23, I hereby designate the following as explosive materials covered under 18 U.S.C. 841(c):

#### A

Acetylides of heavy metals.

Aluminum containing polymeric propellant.

Aluminum ophorite explosive.

Amatex.

Amatol.

Ammonal.

Ammonium nitrate explosive mixtures (cap sensitive). \*Ammonium nitrate explosive mixtures (non-cap sensitive).

Ammonium perchlorate having particle size less than 15 microns.

Ammonium perchlorate composite propellant.

Ammonium perchlorate explosive mixtures.

Ammonium picrate [picrate of ammonia, Explosive D].

Ammonium salt lattice with isomorphously substituted inorganic salts.

\*ANFO [ammonium nitrate-fuel oil].

Aromatic nitro-compound explosive mixtures.

Azide explosives.

#### B

Baranol.

Baratol.

BEAF [1,2-bis (2, 2-difluoro-2-

nitroacetoxyethane)].

Black powder.

Black powder based explosive mixtures.

\*Blasting agents, nitro-carbo-nitrates, including non-cap sensitive slurry and water gel explosives.

Blasting caps.

Blasting gelatin.

Blasting powder.

BTNEC [bis (trinitroethyl) carbonate].

BTNEN [bis (trinitroethyl) nitramine].

BTTN [1,2,4 butanetriol trinitrate].

Bulk salutes.

Butyl tetryl.

## **C**

Calcium nitrate explosive mixture.

Cellulose hexanitrate explosive mixture.

Chlorate explosive mixtures.

Composition A and variations.

Composition B and variations.

Composition C and variations.

Copper acetylide.

Cyanuric triazide.

Cyclonite [RDX].

Cyclotetramethylenetetranitramine [HMX].

Cyclotol.

Cyclotrimethylenetrinitramine [RDX].

## **D**

DATB [diaminotrinitrobenzene].

DDNP [diazodinitrophenol].

DEGDN [diethyleneglycol dinitrate].

Detonating cord.

Detonators.

Dimethylol dimethyl methane dinitrate composition.

Dinitroethyleneurea.

Dinitroglycerine [glycerol dinitrate].

Dinitrophenol.

Dinitrophenolates.

Dinitrophenyl hydrazine.

Dinitroresorcinol.

Dinitrotoluene-sodium nitrate explosive mixtures.

DIPAM [dipicramide; diaminohexanitrobiphenyl].

Dipicryl sulfone.

Dipicrylamine.

Display fireworks.

DNPA [2,2-dinitropropyl acrylate].

DNPD [dinitropentano nitrile].

Dynamite.

## **E**

EDDN [ethylene diamine dinitrate].

EDNA [ethylenedinitramine].



Ednatol.  
EDNP [ethyl 4,4-dinitropentanoate].  
EGDN [ethylene glycol dinitrate].  
Erythritol tetranitrate explosives.  
Esters of nitro-substituted alcohols.  
Ethyl-tetryl.  
Explosive conitrates.  
Explosive gelatins.  
Explosive liquids.  
Explosive mixtures containing oxygen releasing inorganic salts and hydrocarbons.  
Explosive mixtures containing oxygen releasing inorganic salts and nitro bodies.  
Explosive mixtures containing oxygenreleasing inorganic salts and water insoluble fuels.  
Explosive mixtures containing oxygen releasing inorganic salts and water soluble fuels.  
Explosive mixtures containing sensitized nitromethane.  
Explosive mixtures containing tetranitromethane (nitroform).  
Explosive nitro compounds of aromatic hydrocarbons.  
Explosive organic nitrate mixtures.  
Explosive powders.

## **F**

Flash powder.  
Fulminate of mercury.  
Fulminate of silver.  
Fulminating gold.  
Fulminating mercury.  
Fulminating platinum.  
Fulminating silver.

## **G**

Gelatinized nitrocellulose.  
Gem-dinitro aliphatic explosive mixtures.  
Guanyl nitrosamino guanyl tetrazene.  
Guanyl nitrosamino guanylidene hydrazine.  
Guncotton.

## **H**

Heavy metal azides.  
Hexanite.  
Hexanitrodiphenylamine.  
Hexanitrostilbene.  
Hexogen [RDX].  
Hexogene or octogene and a nitrated Nmethylaniline.  
Hexolites.  
HMTD [hexamethylenetriperoxidediamine].  
HMX [cyclo-1,3,5,7-tetramethylene  
2,4,6,8-tetranitramine; Octogen].  
Hydrazinium nitrate/hydrazine/aluminum explosive system.  
Hydrazoic acid.

## **I**

Igniter cord.  
Igniters.  
Initiating tube systems.

## **K**

KDNBF [potassium dinitrobenzofuroxane].

## **L**

Lead azide.

Lead mannite.

Lead mononitroresorcinate.

Lead picrate.

Lead salts, explosive.

Lead styphnate [styphnate of lead, lead trinitroresorcinate].

Liquid nitrated polyol and trimethylolethane.

Liquid oxygen explosives.

## **M**

Magnesium ophorite explosives.

Mannitol hexanitrate.

MDNP [methyl 4,4-dinitropentanoate].

MEAN [monoethanolamine nitrate].

Mercuric fulminate.

Mercury oxalate.

Mercury tartrate.

Metriol trinitrate.

Minol-2 [40% TNT, 40% ammonium nitrate, 20% aluminum].

MMAN [monomethylamine nitrate]; methylamine nitrate.

Mononitrotoluene-nitroglycerin mixture.

Monopropellants.

## **N**

NIBTN [nitroisobutametriol trinitrate].

Nitrate explosive mixtures.

Nitrate sensitized with gelled nitroparaffin.

Nitrated carbohydrate explosive.

Nitrated glucoside explosive.

Nitrated polyhydric alcohol explosives.

Nitric acid and a nitro aromatic compound explosive.

Nitric acid and carboxylic fuel explosive.

Nitric acid explosive mixtures.

Nitro aromatic explosive mixtures.

Nitro compounds of furane explosive mixtures.

Nitrocellulose explosive.

Nitroderivative of urea explosive mixture.

Nitrogelatin explosive.

Nitrogen trichloride.

Nitrogen tri-iodide.

Nitroglycerine [NG, RNG, nitro, glyceryl trinitrate, trinitroglycerine].

Nitroglycide.

Nitroglycol [ethylene glycol dinitrate, EGDN].

Nitroguanidine explosives.

Nitronium perchlorate propellant mixtures.

Nitroparaffins Explosive Grade and ammonium nitrate mixtures.

Nitrostarch.

Nitro-substituted carboxylic acids.

Nitrourea.

## **O**

Octogen [HMX].

Octol [75 percent HMX, 25 percent TNT].

Organic amine nitrates.

Organic nitramines.

## **P**

PBX [plastic bonded explosives].

Pellet powder.

Penthrinite composition.

Pentolite.

Perchlorate explosive mixtures.

Peroxide based explosive mixtures.

PETN [nitropentaerythrite, pentaerythrite tetranitrate, pentaerythritol tetranitrate].

Picramic acid and its salts.

Picramide.

Picrate explosives.

Picrate of potassium explosive mixtures.

Picratol.

Picric acid (manufactured as an explosive).

Picryl chloride.

Picryl fluoride.

PLX [95% nitromethane, 5% ethylenediamine].

Polynitro aliphatic compounds.

Polyolpolynitrate-nitrocellulose explosive gels.

Potassium chlorate and lead sulfocyanate explosive.

Potassium nitrate explosive mixtures.

Potassium nitroaminotetrazole.

Pyrotechnic compositions.

PYX [2,6-bis(picrylamino)] 3,5-dinitropyridine.

## **R**

RDX [cyclonite, hexogen, T4, cyclo-1,3,5,-trimethylene-2,4,6,-trinitramine; hexahydro-1,3,5-trinitro-S-triazine].

## **S**

Safety fuse.

Salts of organic amino sulfonic acid explosive mixture.

Salutes (bulk).

Silver acetylide.

Silver azide.

Silver fulminate.

Silver oxalate explosive mixtures.

Silver styphnate.

Silver tartrate explosive mixtures.

Silver tetrazene.

Slurried explosive mixtures of water, inorganic oxidizing salt, gelling agent, fuel, and sensitizer (cap sensitive).

Smokeless powder.

Sodatol.

Sodium amatol.

Sodium azide explosive mixture.

Sodium dinitro-ortho-cresolate.

Sodium nitrate explosive mixtures.

Sodium nitrate-potassium nitrate explosive mixture.

