CHIEF ADMINISTRATIVE OFFICE
Procurement and Contracts Division

Date Received

NON-COMPETITIVE BID PURCHASE JUSTIFICATION

Required for all sole source acquisitions in excess of $3,000.00.

This justification document consists of three (3) pages. All information must be provided and all questions must be answered. **Department Head approval is required.**

Requesting Department Information

Department: Sheriff

Index Code: 242114

Contact Name: Jon DeVille

Sub-Object Code:

User Code:

Telephone: 530-621-5691

Fax: 530-642-9473

Required Suppier/Vendor Information

Vendor/Supplier Name: Envision

Vendor/Suppler Address: 6765 Langley Drive, Baton Rouge, LA 70809

Contact Name: Leigh Passman

Estimated Purchase Price: $62,940.17

Vendor/Supplier E-Mail:

Telephone: 225-751-5893

Fax: 225-756-0365

Provide a brief description of the acquisition, including all goods and/or services the vendor/supplier will provide

The Open Vision x-ray unit, robotic extension arm, backpack, and operation cable.

Department Head _____ 3/12/14
Signature Date

Purchasing Agent _____
Signature Date

Board of Supervisors

Date

Item

Buyer Assignment

Assigned To

Date

Non-Competitive Bid - PDF - May 2008

A. THE GOOD/SERVICE REQUESTED IS RESTRICTED TO ONE SUPPLIER FOR THE REASON STATED BELOW:

1. Why is the acquisition restricted to this goods/services supplier?(Explain why the acquisition cannot be competitively bid. Explain if this is an emergency purchase or how the supplier is the only source for the acquisition.)

Envision produces the only portable x-ray system with real time, video-like images available, rather than static photo-like images. Other suppliers simply do not produce a similar product.

2. Provide the background of events leading to this acquisition.

The El Dorado County Sheriff Emergency Ordinance Disposal Team (Bomb Squad) assessed their needs by surveying personnel during staff briefings,attending training seminars, and comparing best practices with other agencies. Through this research, the El Dorado County Sheriff's Office determined that the Open Vision products provided the best solution. Sergeant Auwae, Lieutenant Dreher, Undersheriff Williams and Sheriff D'Agostini agreed with the assessment and approved the purchase request.

3. Describe the uniqueness of the acquisition (why was the goods/services supplier chosen?)

Open Vision is a unique product, it is the only known portable x-ray system with real time, video-like images available, rather than only static photo-like images.

4. What are the consequences of not purchasing the goods/services or contracting with the proposed supplier?

The high risk to personnel safety involved with the unit's purpose of discovering harmful devices is the primary consequence. Another is the risk of harmful devices not discovered in public places or gathering where trash debris and personal carry items are left behind or concealed.

5. What market research was conducted to substantiate no competition, including evaluation of other items consider?
(Provide a narrative of your efforts to identify other similar or appropriate goods/services, including a summary of how the department concluded that such alternatives are either inappropriate or unavailable. The name and addresses of suppliers contacted and the reasons for not considering them must be included OR an explanation of why the survey or effort to identify other goods/services was not performed.)

The El Dorado County Sheriff Emergency Ordinance Disposal Team (Bomb Squad) assessed their needs over several conversations, then, member Jared Melton sought out suppliers and found that only Envision offered the solution needed. Sergeant Auwae, Lieutenant Dreher, Undersheriff Williams and Sheriff D'Agostini agreed with the assessment.

B. PRICE ANALYSIS

1. How was the price offered determined to be fair and reasonable?
(Explain what basis was used for comparison and include cost analysis as applicable.)

The written price quote is itemized in detail, with parts described. It is transparent and fair given the uniqueness of the Open Vision product package.

2. Describe any cost savings or avoidance realized (1 time or on-going) by acquiring the goods/services from this supplier

Lives could be saved and the destruction of community and private property could be avoided. Additionally, this product can quickly and with little intrusion to the public, assess an unattended package, purse or suspicious object. Currently, any item that is suspicious would require a technician to put on protective equipment, set up an x-ray source and film, shoot the x-ray, process the x-ray(minimum of 3 minutes and 30 seconds to process) and finally interpret the image. The new system will allow for a more efficient, less intrusive and safer assessment of a suspicious object.

EL DORADO COUNTY SHERIFF'S OFFICE
SHERIFF JOHN D'AGOSTINI

MEMORANDUM

TO: Lt. Dreher

FROM: Sgt. Auwae

SUBJECT: Open Vision X-Ray

DATE: March 3, 2014

I am submitting a purchase request for an Open Vision live x-ray device. The Open Vision allows the EOD technician to x-ray a package or device and receive a real time image. If, for example, there was an analog timing device in the package, the operator would be able to see the ticking and watch the hands move. Movement in a device can provide valuable information as to how the device functions. It is also possible to provide a three dimensional image of the package by moving the scanner around the package and/or up and down. This provides valuable depth and perspective to the image. Open Vision also records the images it produces allowing retrieval for evidence purposes or additional evaluation.

The benefits of real time x-rays becomes painfully apparent when you are faced with a situation where you have multiple packages you need to evaluate. In Boston, when the smoke cleared at the finish line of the marathon, hundreds if not thousands of bags were left behind by fleeing citizens. Any one could have contained secondary devices. In an example closer to home, EOD was assigned to the Independence Day celebration at Towne Center. Thousands of citizens attended the celebration many with bags, ice chests, backpacks, etc. Any unattended bag represents a potential device. With the open Vision, a technician could quickly and with a minimum intrusion for the citizens, clear the package. Currently, any item left behind and unattended would require the technician to don protective equipment, set up an x-ray source and film, shoot the x-ray, process the x-ray (minimum of three minutes and thirty three seconds to process) and finally interpret the image. With a business like Red Hawk Casino, reducing the amount of time spent disrupting operations could translate in to large sums of revenue maintained.

Beyond EOD operations, the Open Vision can be used to identify hidden compartments in vehicles used for smuggling narcotics or other contraband. The Open Vision can be used to determine if a firearm is loaded even if it is so deteriorated that it will not function.

In doing research in to this technology, I found Envision is the manufacturer and sole source provider of the Open Vision LT x-ray. I also researched competitive products and found that the Open Vision is the only real time x-ray device. Other products will provide a wirelessly transmitted digital image, but that image is static. Open Vision is the equivalent of shooting video whereas the other products available are equivalent to a photo.

El Dorado County Sheriff's Office

300 Fair Lane, Placerville, CA 95667 530-621-5655 Fax:520-621-8091

Purchase Request Form

Date: 2/19/2014

Vendor Information		Requestor/Delivery Information	
Vendor #:	N/A	Requestor:	EOD Unit
Company Name:	Envision Product Group		ATTN: Jared Melton
Address:	6765 Langley Drive	Address:	300 Fair Ln
	Baton Rouge, LA 70809		Placerville Ca 95667
Contact Name:	leigh.passman@qsa-global.com	Phone:	530-621-5655
Phone:	225-751-5893		

Index Code	Sub Object	Part #	Description	Service Cost (For Services)	Qty	Unit Cost	Total Cost
		OVLT-S	Open Vision LT Video X-Ray		1	58860.2	$58,860.17
			Imager Extension Arm Pkg		1	2990	$2,990.00
			Back Pack - Black		1	390	$390.00
			Remote Entry 150' Robot Cable		1	350	$350.00
							$0.00
							$0.00
							$0.00
							$0.00
							$0.00
							$0.00
							$0.00
							$0.00
							$0.00
							$0.00

	Sub Total :	$62,590.17
	Quoted Freight	$350.00
Sales Tax For El Dorado County 7.5 %		
Sales Tax For City of S. Lake Tahoe and Placerville 8 %	Sales Tax	$0.00
	TOTAL	$62,940.17

Requested By

Print Name	Signature	Date	Phone
Sgt. Auwae	M. Auwae	2/19/2014	530-642-4704

Division Commander

Print Name	Signature
Date	

Undersheriff

Rich Williams	3/12/14
Date	

Fiscal Year 2013/2014 VERIFICATION

1. Is the item in Budget ? >> No
2. Is the item on the SO fixed assets list? >> No

Sheriff

John D'Agostini	
Date	

Chief Fiscal Officer

Jon DeVille	
Date	

BUDGET TRACKING (OPTIONAL)

Sub Object	Budget Amount	Encumbered	Balance (FAMIS)	Balance (Less Req)

QSA Global, Inc.
Envision Product Group
6765 Langley Drive
Baton Rouge, LA 70809
Telephone: (225) 751-5893
Toll Free: (800) 225-1383
Facsimile: (225)756-0365
Website: www.openvision.us

Product Quotation

Business Name: El Dorado County Sheriff's Department
Address:

Quotation Number: 02192014-1
Quotation Date: Feb 19, 2014

Attn: Jared Melton
Email: meltonj@edso.org

Expiration Date: April 19, 2014

OpenVision™ LT C-arm Video X-ray System – Model OVLT-S70

- 4"x 6" field of view, continuously movable
- Real-time NTSC video (30 frames/second)
- 250 micron (0.010") pixel resolution
- Constant potential X-ray, 40kV-70kV Minimum, Adjustable Kv & mA
- Head Mounted display system – goggle mount
- Handheld Kit with 6.5" LCD display
- Digital video recorder (DVR) with wireless LCD & 4GB SD card
- Two Lithium-ion battery packs and 1 hour charger
- C-arm-mounted switch and X-ray On light
- Controller with key switch, kV/mA controls, indicator lights, audible alarm
- Pelican field case for X-ray system components
- Robot Attachment Kit – if available and specified at time of order
- One year limited warranty

OVLT C-arm Video Imaging System OVLT-S70 — List Price $74.900.00 ea
Cooperative Purchasing Open Market Price to Law Enforcement Agencies $58,860.17 ea
Discounts for 3-5 Units (3%) and 6+ units (5%) available. FOB Origin

Qty.	Description	Unit Price (USD)	Extended Price
1	OVLT – S Open Vision Video X-Ray System	$58,860.17	$58,860.17
1	Imager Extension Arm Package, "Open Market"	$2,990.00	$2,990.00
1	Back Pack – Black, "Open Market"	$390.00	$390.00
1	Remote Entry 150ft Robot Cable, "Open Market"	$350.00	$350.00
1	Shipping		$350.00
	Total		**$62,940.17**

Envision™

QSA Global, Inc.
Envision Product Group
6765 Langley Drive
Baton Rouge, LA 70809
Telephone: (225) 751-5893
Toll Free: (800) 225-1383
Facsimile: (225)756-0365
Website: www.openvision.us

Comments:
No Export: The OVLT-S cannot be exported. An end user statement is required with a PO confirming buyer understanding of this restriction.
State Registration: Buyer responsible for identifying registration requirements for X-ray systems.
Ionizing Radiation Hazard: System generates ionizing radiation. Buyer responsible for training and safety procedures for authorized system operators. System does not contain radioactive isotopes. See manual for additional important information prior to use.
Shipping Cost 2Day FedEx Estimated $200.00/ea. OVLT-S, $100.00/ea. Imager Extension Arm., $50.00/ea. Back Pack.
AEL/SEL Numbers: 02EX-01-XRAP - X-Ray Unit, Portable or Transportable
15IN-00-XRAY - X-Ray System, Mobile Search & Inspection
Point(s) of Production & FOB Point: LaPorte, TX
Prompt Payment Terms: Net 30
Time of Delivery: Estimated 3-4 weeks after receipt of order.
QSA Global, Inc. Terms and Conditions apply.

Leigh Passman

Leigh Passman
Client Services Manager

QSA GLOBAL

OpenVision™ LT

Flexible, Powerful X-ray Imaging

For bags: Handheld

Remotec Robot Mount

For walls, vehicles

Specifications

X-ray	Single energy selectable: 40/ 55/ 70kV at 0.1, 0.2, 0.3 mA Constant potential 21W tube
Detector	4x6" (10x12cm) active sensor area 15-30" (38-76) aperture, 21" (53cm) high
User Interface	6.5" handle mounted LCD Heads-up display Hand-held and wireless option LCD/ DVR with 4GB SD card storage
Video	NTSC: 640x480 30fps Built-in CCTV or x-ray video
Image Quality	35 AWG wire resolution
Penetration	$^3/_{16}$" (0.5) Fe, 2½"(6.4) Al, 6" (12cm) H_2O
Environmental	Weight: 16.5 - 28lb with options Operates at -30 to 120 F, <95% humidity ¾ hr (x-ray on) – 2.5 hr operations 30 min Battery recharge

The OpenVision™ LT provides real-time video x-ray at low doses for handheld use without evacuation of public areas.

Adaptable

The lightweight OpenVision can be used stationary, handheld or fully robot integrated. It is suitable for a wide range of inspection tasks:

- Unattended bag and parcel inspection
- Secondary inspection of vehicle panels
- Inspection of wall interiors
- Static/ fixed installation
- Facilities protection

Effective

Easy rotation and movement allows rapid scanning and high-resolution views at different angles around a package. The operator uses either a head mounted display, or a 7" LCD monitor. A wireless wrist - or machine mounted digital video recorder can store video images of the exterior and interior of the item under inspection for later review.

Safe

OpenVision uses a new, highly sensitive imager to keep x-ray power low. Tight beam collimation and shielding makes OpenVision safe for operators to handhold and use in public areas without evacuation. A fail-safe x-ray on/off trigger and removable lockout key further enhances safety.

Fast

OpenVision ships in a case or backpack assembled and folded. With no computer to connect and boot up, it takes less than two minutes to unpack, unfold and adjust the 'C' arm and it's ready.

Includes: spare battery, robot adapter kit, 1-year limited warranty.

Manufacturing

QSA Global, Inc.
Envision Products Group
3200 Awesome Lane
La Porte, TX 77571

Sales

QSA Global, Inc.
SENTINEL™
6765 Langley Drive
Baton Rouge, LA 70809

Phone: +1 225 751 5893
Fax: +1 225 751 8082
Email: sales@SENTINELNDT.com
Web: www.openvision.us

OpenVision™ LT Video X-Ray Inspection System - Back Pack

The OpenVision LT X-ray system back pack accessory provides a light weight (5lb) storage and quick deployment option for the OpenVision LT system.

The back pack system includes storage for the system without the charger. A removable controller case with Molle straps is attached to the outside of the pack for immediate use or can be separated and located on the chest straps or a belt for easier access to the kV and mA controls and use without the back pack.

ACU Color shown above. Black shown in picture on left.

Specifications

colors	Black (part number 313290), ACU (part number 313412)
kit contents	Back pack for system with separate cases for the controller, head mounted display and 7" LCD.
weight	5 lbs
ordering	$390.00, In stock.

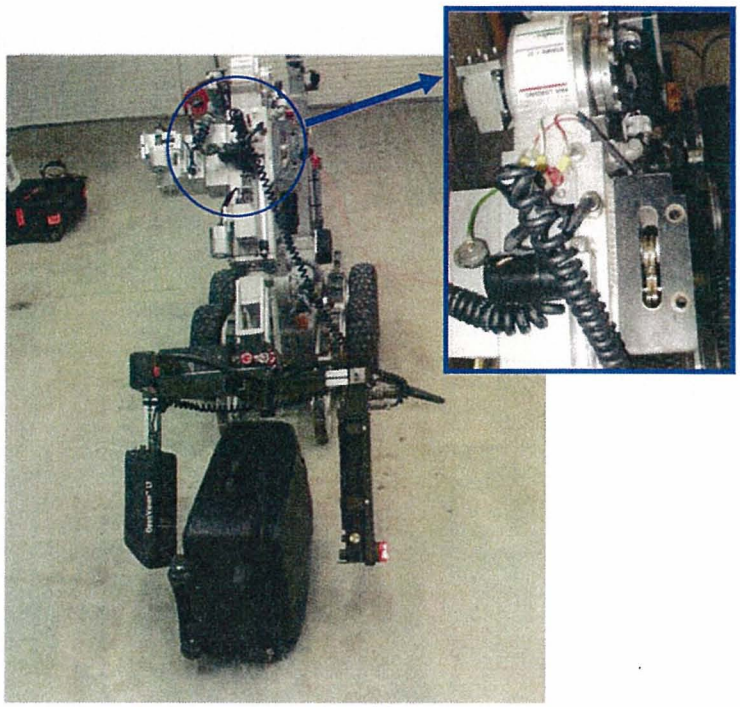
Envision CmosXray LLC 7800 King Street Anchorage, AK 99518 (907)563-1141

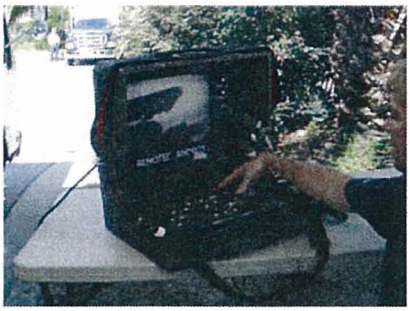
LIVE VIDEO X-RAY
OpenVision™.us

OpenVision™ LT-S

OVLT-Remotec Tech 11/10

"REAL" Real-time X-ray Imaging Remotec Attachment

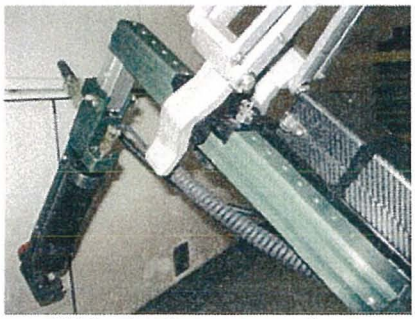




Instructions - Fixed Position Gripper - For use in horizontal and overhead positions.

Controller

Mount the Controller to the C-arm carrier with Velcro and attach the cable from the imager 6 pin connector to the J32 connector on the Remotec arm.



F6A Gripper Attachment

Remove the handle if installed on the C-arm. Slide the Remotec gripper attachment onto the arm with the pan for the controller facing away from the robot as shown above.

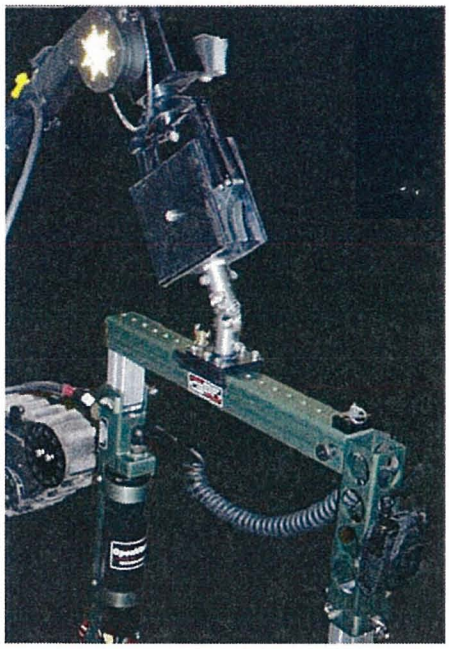
Connection

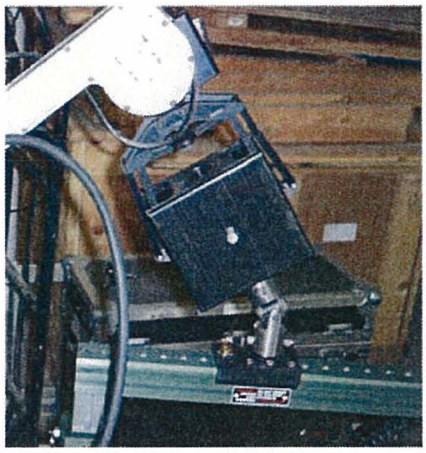
Use the supplied coil cable to connect Remotec J32 jack on the arm to the OpenVision LT controller or the C-arm (green connections)

Envision CmosXray LLC 7800 King Street Anchorage, AK 99518 (907)563-1141

LIVE VIDEO X-RAY
OpenVision™.us

Instructions - U Joint Gripper - For use in vertical positions. Allows rotation of OpenVision system with wrist control





Controller Mount the Controller to the robot arm with the supplied large velcro strap

F6A Gripper Attachment Remove the handle if installed on the C-arm. Slide the Remotec gripper attachment onto the arm as shown above and lock into position with the spring pin.

Connection Use the supplied coil cable to connect Remotec J32 jack on the arm to the OpenVision LT controller or the C-arm (green connections)

Operation:

Video Display Activate the auxiliary video channel to display the C-arm targeting camera and X-ray camera.

X-ray Activation and display Activate the X-ray using the Laser Switch. The video feed from the C-arm will automatically switch to the X-ray display. When the Laser Switch is deactivated, the targeting camera image will return.

Image Capture The DVR recorder can be attached using the wireless adapter or direct connection to the C-arm at one of the BNC connections for recording or to an available video output at the head mounted display (HMD) port of the console. See separate instructions for use of the DV recorder.

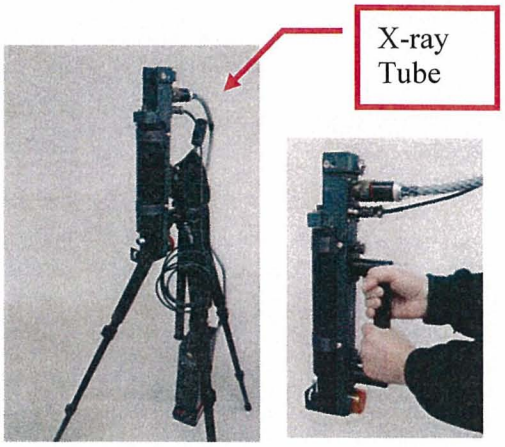
OpenVision™ LT-S

OVLT-S Imager Arm
1003

Imager Extension Arm

Caution: Plan shots carefully to insure the operator is not exposed to the X-ray beam during inspection. The arm can be extended to increase the distance from the imager to operator.

The OpenVision LT Imager Extension Arm converts the OVLT-S C-Arm for use with the tube and imager separated for inspection.



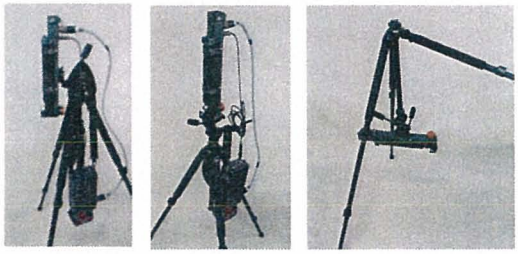
Kit Contents

Imager Extension Arm

Extending aluminum pole attaches to OVLT-S imager and reaches 49-87" with imager swivel of 0, 45, 90 degrees. The imager is powered by a 28v battery attached to the control panel on the end of the pole. The operator's heads up display, LCD or wireless DV recorder is connected to the control panel.

Tube Supports – Hand Held or Tripod Mount from back or bottom.

A handle for hand held positioning of the tube is supplied and a tripod for mounting the tube.



Trigger Extension

7ft trigger extension cable for X-ray tube operator to increase stand off or allow imager operator to activate tube.

Case

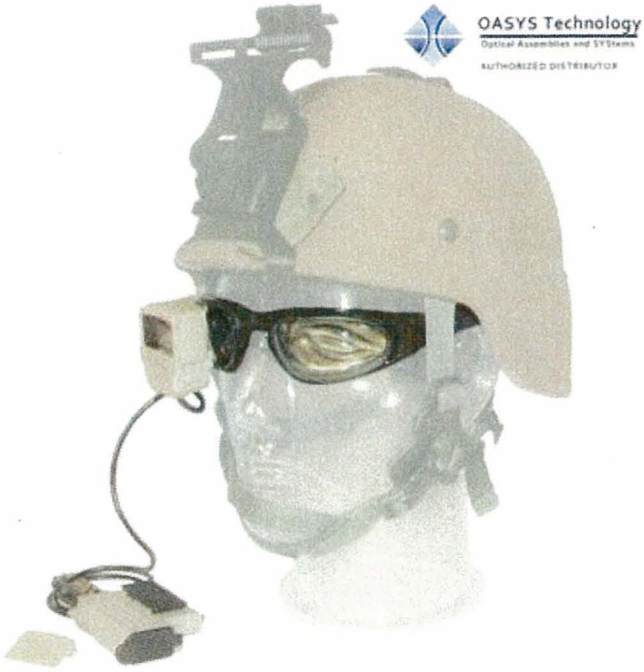
Padded storage and transport case for arm, handle, tripod and cable.

Envision CmosXray LLC 7800 King Street Anchorage, AK 99518 (907)563-1141

LIVE VIDEO X-RAY
OpenVision™.us

OpenVision™ LT Goggle Mounted HMD

03/12



The RED-I Head Mounted Display system from OASYS Technology, LLC. is a remote observation head mounted display device supporting a variety of missions and weapon systems. Currently fielded by the U.S. Army, the RED-I can show full transparency to full opaque within 4 seconds, supports NSN eyewear, and is EOD face shield and DOD helmet compatible.

Warning: Requires U.S. Department of Commerce License for export.

- Helmet or Eyewear Mounting Options
- Adaptable to various sensor devices
- Remote Pendant Control Module

Operational Information: Display connects to the OpenVision C-arm or to the controller. Display can be used as a semi opaque heads up display or, with backing plate installed, a completely opaque head mounted display. Displays OpenVision targeting camera image, then x-ray image when x-ray is triggered. Compatible with many NTCS composite video sources.

Specifications & Options

kit:	Head Mounted Display with goggles, batteries, adapters. PN 313405
power:	two (2) AA Lithium Ion batteries - supplied
weight:	6 Ounces
runtime:	Exceeds 13 hours
warranty:	1 year
manufacturer:	OASYS Technology

QSA Global, Inc.
Envision Products Group
Anchorage, Alaska

Customer Service 1-225-751-5893
Technical Support 1-907-563-1141

LIVE VIDEO X-RAY
OpenVision™.us

"REAL" Real-time X-ray

John A. Pursley
Envision Product Design LLC
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Anchorage, Alaska U.S.A.
johnp@cmosxray.com

William C. Movalson
Envision Product Design LLC
5962 Norway Pine
Gladstone, Michigan U.S.A.
billm@cmosxray.com

Abstract—

A new x-ray system with full video rate imaging is now available for field inspection of suspect packages. These compact, lightweight units can be used in man-portable, robot deployed, or stationary modes.

Unlike previously available x-ray systems, the image is presented continuously allowing rapid in-motion scanning of packages through a range of material densities.

Keywords: *real-time x-ray, digital x-ray*

I. Introduction

X-ray allows the investigation of suspect packages without entering or even touching the package. Most importantly, the x-ray image can now be presented in real-time video. This unique feature allows rapid investigation of packages while moving the imager in three dimensions. This capability is available for hand-held, robot deployed, or stationary remote viewing where the package is presented to the x-ray imager by a robot.

II. History of X-ray

The capability to see-through solid objects with x-ray was discovered by German physics professor Wilhelm Roentgen in 1895. The public became fascinated by Roentgen's discovery once the radiograph (Fig. 1) of his wife's hand showing her bones and ring began to circulate.

Fig. 1. The 1st X-ray

One year later, in 1896, Thomas Edison invented fluoroscopic (moving) x-ray imaging using a phosphor screen. Over the next 50 years x-ray began to be used extensively in medical exams and for industrial applications as well. Up to this point, x-ray film and phosphor screens observed directly, or via a mirror, were the only way to see x-ray images. In the 1950's a vacuum tube technology called an image intensifier allowed the use of video x-ray. Vacuum tube image intensifiers are still used today in both medical operating rooms and some industrial applications, but remain too heavy, bulky, and fragile for field use.

Other x-ray options have come along since 1980's including Polaroid x-ray film, digital flat panels made from amorphous silicon, and so-called real-time imagers that use a CCD camera to capture a still image from a phosphor screen.

Baggage scanners using linear diode arrays (LDA) have been used extensively for the past 20 years. These imagers have relatively low resolution and must have well-controlled motion of the object using a manipulator or conveyor belt.

In 1995, engineers at NASA's Jet Propulsion Lab discovered a way to use CMOS chips as photo detectors. This advanced detector technology is now coming into use for digital cameras, video cameras, document imaging, and has also been recently adapted for high-resolution digital x-ray systems with both linear and field array detectors.

III. The Alaska Connection

The trans-Alaska pipeline and the associated piping and facilities on Alaska's North Slope which were built in the mid 1970's began to have corrosion-related leaks in the late 1980's. All then-available x-ray and other inspection technologies were tried in an attempt to locate areas on pipelines that were weakened by corrosion and subject to leaking. X-ray image intensifiers with vacuum tube technology proved to be useful, but the bulk, weight and fragility of the imagers caused them to be difficult to manage in the field and there were regular equipment breakdowns.

In the early 1990's, Envision Product Design of Anchorage, Alaska (Envision) began development of a solid-state intensified x-ray imager that would overcome the limitations of vacuum tube technology. This development effort led to a system called OpenVision™. In the following years, hundreds of miles of pipelines were inspected with these compact and lightweight portable systems resulting in the prevention of many oil spills and contributing to the protection of the Arctic environment.

The technology has been improved by Envision over the years with added sensitivity and resolution of the imager, and also compactness and efficiency of the x-ray source. These systems are the most advanced tool used for pipeline external corrosion inspection with an excellent field performance and durability history (Fig. 2).

Fig. 2. Pipeline Corrosion Inspection

III. Suspect Package Investigation

In May 2006 the Michigan State Police Forensic Science Division learned of the OpenVision technology and began a series of trials to determine the system's effectiveness for the investigation of suspect packages. Tests were also conducted with the help of the Bomb Squad unit at Elmendorf Air Force Base in Alaska.

The tests in Michigan and Alaska confirmed that the system was very effective for package investigation particularly because of the video capability, allowing dynamic observations inside packages. Typical package densities were shown to be within the penetration capability of the system. The size and weight were found to be less than with previously available x-ray systems allowing better mobility.

Because OpenVision produces video images that move as the imager is moved, inspections can be done much more rapidly than with Polaroid x-ray film or previous "real-time" x-ray systems, which provide only still images. In addition, the operator can get a three-dimensional perspective inside of the inspected package by moving the imager dynamically around the package while viewing the contents. Similarly, the imager can be moved in relation to the package to provide a zoom magnification of package contents.

Once the basic capabilities of the system were confirmed, it was determined by the Michigan group that three modes of operation were desired: man-portable, robot deployed, and stationary where packages are brought to the imager by a robot. With suggestions from the Michigan group, Envision designed and implemented a series of adaptations to the system that would facilitate the three modes of operation.

A color video camera was added to the X-ray system that provides a view from the x-ray tube perspective. This feature allows the operator to know exactly where the x-ray image is located in relation to the outside of the package.

An extended handle with integrated 8" LCD display was added for the man-portable operation mode (Fig. 3).

Fig. 3. Man-Portable Mode

For the robot deployed mode, a gripper bracket and compatible cable connectors were added to allow the x-ray system to utilize the robot wiring for triggering the x-ray system and for transmission of video and x-ray images to the control vehicle (Fig. 4).

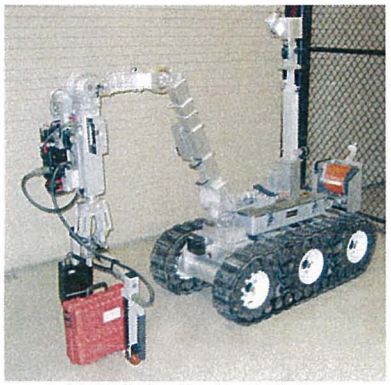

Fig. 4. Robot-Deployed Mode

A quick-attach stand and 50-meter cable was provided to remote the handle and display to a safe distance from the system when operated in the stationary mode (Fig. 5).

Fig. 5. Stationary Mode

IV. Conclusions

An x-ray inspection technology, fully developed and used in the oil and gas pipeline industry, has been found to be ideally suited, with relatively minor adaptations, to the investigation of suspect packages. Man-portable, robot deployed, and stationary modes are easily accommodated in the field. This system provides capability not previously available from portable x-ray systems. The use of this new system will enable an improvement in the way suspect packages are investigated and this will result in the saving of lives.

Acknowledgement

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