Countering the threat: New capability to detect hazardous materials and Narcotics

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Setting the scene: recent incidents

Customs and law enforcement officers increasingly face hazardous materials...



18 SWAT officers hospitalized after possible exposure to fentanyl during raid

WCO Programme **Global Shield** Pocket Identification Wizar

International Edition + $\mathcal{P} \equiv$

lo. Melania Trump does not have a

DA approves 2nd gene therapy fo

News & buzz

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Last Updated Aug 9, 2017 11:53 PM EDT

More than a dozen SWAT team officers were hospitalized Wednesday after agents raided a home in Pittsburgh, CBS Pittsburgh reports.

homes. At c Health » Police officer overdoses after brushing fentanyl powder off his uniform

unknown ai Police officer overdoses after brushing fentanyl In addition powder off his uniform

"significant By Artemis Moshtaghian, CNN bags, both I [©] Updated 1649 GMT (0049 HKT) May 16, 2017

Eighteen SV caused then cleared.



This police photo shows powdered fentanyl on the floor of a car seized during the Ohio arrest



Events

CBRNE



VX Nerve agent KL, 2017



2015 - TATP hidden in Motorcycle, Bangkok



Search : Keywo



Hazardous narcotics

Growth in production and use of new psychoactive substances NPSsome <u>active at mcg levels</u>

Increasing availability of synthetic opiates (fentanyl, carfentanil etc.) – <u>fatal dose in mg/mcg</u>







Capability gap

Need to improve:





Resolve™

New capability

Developed with UK and US Govt funding

Identification *through* barriers AND direct line-of-sight

No need to open or disturb containers





Through-Barrier Capability

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Conventional Raman ID Conventional Raman systems require line-of- sight so can work with clear plastic bags / vials and some translucent packaging	



ID Through Non-Transparent Barriers

New capability to detect & identify materials...











Toxic



Explosive

Flammable

Oxidising

Corrosive

Environmentally Damaging

...in wide range of sealed non-metallic containers



Example of Screening a package





Surface Scan Mode

Line-of sight measurements, similar to conventional Raman ID systems Point and shoot Raman







Vial Holder Mode

Custom vial holder Quickly identifies samples within clear glass vials





Simple to operate, clear results



Envelope / Parcel Screening

Opening packages to verify contents requires safety facilities and equipment

Resolve removes the need to open parcels:

- Privacy is not compromised
- Potential hazards remain contained



Examples of Materials

- ✓ Narcotics
- ✓ New psychoactive substances
- ✓ Medicines
- ✓ Benign chemicals



Example: Fentanyl detection



- ~All variants of Fentanyl tested can be detected through-barriers
- High motivation not to open package- severe hazard!







White powder – Clear plastic bag & yellow padded envelope





Cocaine Mixtures



Cocaine mixed with excipients (lowest 9%), for example;

- Lactose
- Mannitol
- Benzocaine



Cocaine aqueous mixture in plastic pouch



17% Cocaine / Lactose mixture



Cocaine "Bullets" and Wraps



Cocaine wrapped in multiple layers of tape, plastic wrapping and paper Identified as Cocaine in through-barrier mode



Cocaine plastic wrap





Cocaine "bullets"



General Chemical Identification

Do not open container and risk unknown material release

Time in protective equipment and breathing gear is used more efficiently

Critical safety decisions can be made sooner

Aids Global Shield programme of intercepting illicit pre-cursor chemicals used in IED's







Palm oil containers from West Africa

Raw unrefined palm oil



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Ammonium Nitrate "IED"



- 25L Palm oil containers from West Africa
- Ammonium Nitrate/Sugar mixture (75/25)







Potassium Permanganate



Dark powder – Amber glass

Oxidizing materials set as a 'Priority'

Result displays in RED







Libraries and Management

Library packages:

- Standard
 - -Narcotics and NPS
 - -Explosives
 - -Household Chemicals
 - -CWA's
- Toxic and Hazardous Chemicals
- Comprehensive
- Can add chemicals to a custom library

Can import an external library

*	START SCAN	
A	Priority Matches	
	Libraries	ন
→+	Import / Export	
• 	Remote Scan	



Summary

Spatially Offset Raman Spectroscopy (SORS) enables detection and ID through typical containers:



No need to open or disturb threat Reduced risk of exposure to operator Reduced risk of detonation Genuinely new capability

- Safe, fast and accurate
- Now deployed worldwide





Thank you for listening

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