

DHS S&T Trace Explosives Detection

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**Laura Parker, PhD, Program Manager - HSARPA
Explosives Division**



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**Richard T. Lareau, PhD, TSL Technical Director (Acting) &
Chief Scientist - Transportation Security Laboratory**

Science and Technology Directorate

Trace Explosives Detection (TED)

General Background

TED for Aviation Security Market

- Deployed Explosives Trace Detectors (ETDs) are primarily Ion Mobility Spectrometry-based
- Potential Next Generation ETDs: Mass spectrometry, colorimetric, standoff optical method, chemiluminescence fluorescence, microsensors, etc

Particle Detection

Most threats present as residue with explosive particles; thus all currently deployed ETDs detect explosive particles

Mode of sensing: “Active” sample collection via swipe sampling

Detection to decision making: Active sampling allows a quick cycle of Detect, Identify, Locate, and Decision Making

Current focus:

- Specific identification of explosive threats
- Expanded and upgradable threat libraries to counter HME threat
- Efficient explosives sampling technologies

Vapor Detection

ETDs with vapor detection or dual particle/vapor detection capability exist, but these ETDs have challenges in sampling explosives with a wide range of vapor pressures

Mode of sensing: “Active” sampling (i.e. puffing at an interrogated surface) and/or “Passive” sampling (i.e. detecting vapor plume)

Detection to decision making: Long cycle due to:

- Long sampling times
- In passive mode, need additional time to locate threats

Current focus:

- Vapor sampling methods capable of sampling explosives with a wide range of vapor pressures
- Reliable air pulsed sampling
- Rapid pre-concentration approaches

Ion Mobility Spectrometry

■ Pros

- Fast
- High detection sensitivity to most explosives
- High detection rate
- Low false alarm rate
- Works at atmospheric pressure
- *Low maintenance (^{63}Ni sources)*
- *Low cost*
- *Easy to operate*

■ Cons

- Limited threat library
- Resolution
- Selectivity
- *Affected by pressure and humidity*



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Needs

- **DHS needs ETDs that have high P_d , low P_{fa} , expanded and upgradable threat library, rugged and portable (for field use), few consumables, and inexpensive (& *low MTBF*)**
 - Selective
 - Sensitive
- **Focus on Sampling**
 - Non-contact sampling
 - Remote or standoff sampling/detection
 - New materials for collection



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Q&A

Discussion



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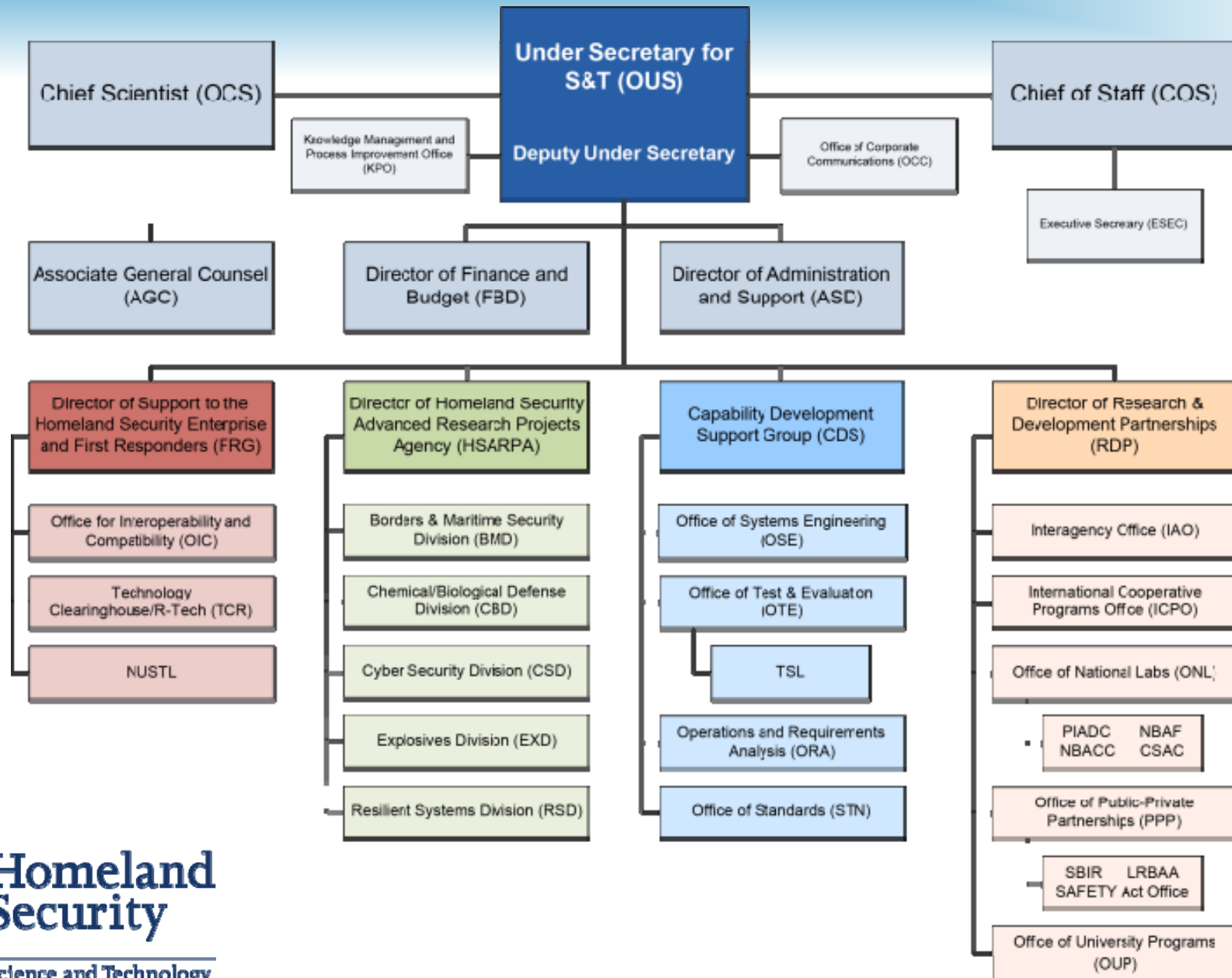
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S&T Organizational Chart

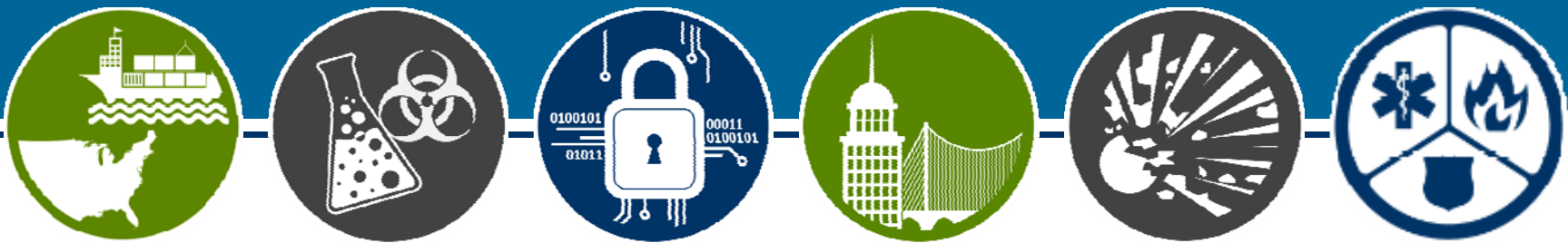


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