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# **Explosive Trace Detection - Emerging Technologies**

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# So What? Who Cares?

- Trace detection is a critical technology for explosives detection
- Trace detection provides a different and complementary signature from imaging methods
- Trace detection is relatively easy to implement and instrumentation is not very expensive
- Anyone doing explosives screening (including TSA) should and does care as trace detection is a powerful tool (but is not a complete answer).

# Trace Detection Considerations

- Ion mobility spectrometry is the main deployed technology (with shallow development curve)
- CONOPS of current trace implementation is invasive, labor intensive, and subject to variability
- Trace is a secondary signature, an alarm does not mean a threat mass is present (nuisance alarm)
- Environmental backgrounds, false alarms, ion chemistry complications have to be considered
- Particle sampling can be challenging and highly variable.

# Emerging Trace Technologies

- Vapor detection
- Non-contact sampling (particles and vapor)
- Non-contact (standoff) detection
- Enhanced sampling (swipe) materials
- Adaptation to emerging threats (ion chemistry)
- New (and non-radioactive) ion sources
- Potential deployment of mass spectrometry
- Integration with physics based bulk methods