DHS SCIENCE AND TECHNOLOGY

Apex Screening at Speed

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Homeland Security
Science and Technology

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So What? Who Cares?

The Apex SaS Program is pursuing transformative R&D activities that support a future vision for increasing security effectiveness while dramatically reducing wait times and improving the passenger experience.

What we're doing: Enlisting traditional and new performers to promote innovation, solve tough problems, and improve security and the passenger experience over the next 5, 10, 20 years.

Why it matters: Resources are limited and threats continue to evolve. Addressing the threat requires agile and innovative solutions as well as creative R&D strategies.

What we need: How do we efficiently integrate many sources of data to reduce overall system risk? With so much more data, how do we certify the overarching architecture and the systems within?

Where we are and where we're heading….

INNOVATIVE

Engage the community and industry to enable R&D in an **innovative** and **creative** way.

- ✓ DHS S&T Silicon Valley Innovation Program (SVIP)
- ✓ SBIR
- ✓ AIT Prize Competition (Kaggle)
- ✓ Hacking for Defense (H4D)

COLLABORATIVE

Collaborate with current and new partners – internally and externally – to determine the future of aviation security.

- ✓ Futures Workshop
- ✓ UK Future Aviation Security Solutions (FASS)
- ✓ ALERT, Advanced Development for Security Applications Workshop (ADSA)

Apex Screening at Speed

Secure, High-Throughput Checkpoint Screening for TSA

Program Vision: Apex Screening at Speed is pursuing transformative R&D activities that support a future vision for increasing security effectiveness from curb to gate while dramatically reducing wait times and improving the passenger experience.

Requirements

- Detect threats at TSA's highest security standards
- Double passenger checkpoint throughput [1]
- Extend security architecture beyond the checkpoint
- Reduce number of personal items separated for scanning
  - ✓ No divestiture of outerwear / clothing
  - ✓ No removal of liquids, aerosols, gels, or electronics from carry-on bags

Results

- Efficiently detect more advanced aviation threats while outpacing the growing population of travelers
- Reduce crowding at checkpoints, lower soft target risk
- Redeploy checkpoint staff to support other critical tasks
- Develop technology applicable to other missions (stadium security, mass transit, etc.)

Artist's concept of future passenger checkpoint

Security, Speed, and Passenger Convenience

[1]: TSA Full Operational Capacity, 2014

Program Overview

Passenger Analysis
- Video Analysis and Passenger Tracking
- Passenger and Bag Correlation

Passenger Screening
- High-Definition Advanced Imaging Technology (HD-AIT)
- AIT Automatic Threat Recognition
- Millimeter Wave (MMW) Shoe Scanner
- Walk-by MMW

Carry-on Screening
- Computed Tomography (CT) Automatic Threat Recognition
- Gratings-based Phase Contrast Imaging
- X-ray Diffraction

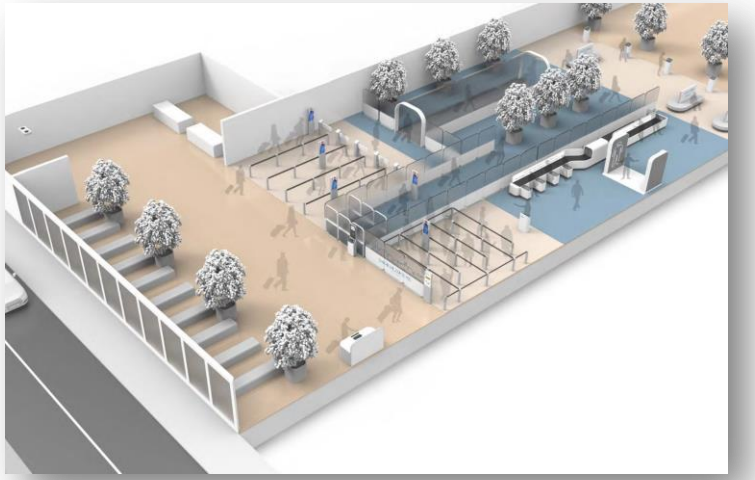
Future Capabilities
- Optical Trace Detection
- Adaptive Threat Detection, Deep Learning
- Augmented Reality Human Systems Integration

Overarching Architecture
- Open Threat Assessment Platform (OTAP)
- Airport Risk Assessment Model

Test & Evaluation
- T&E: Baggage, Passenger, Secondary Screening
- Testbed development

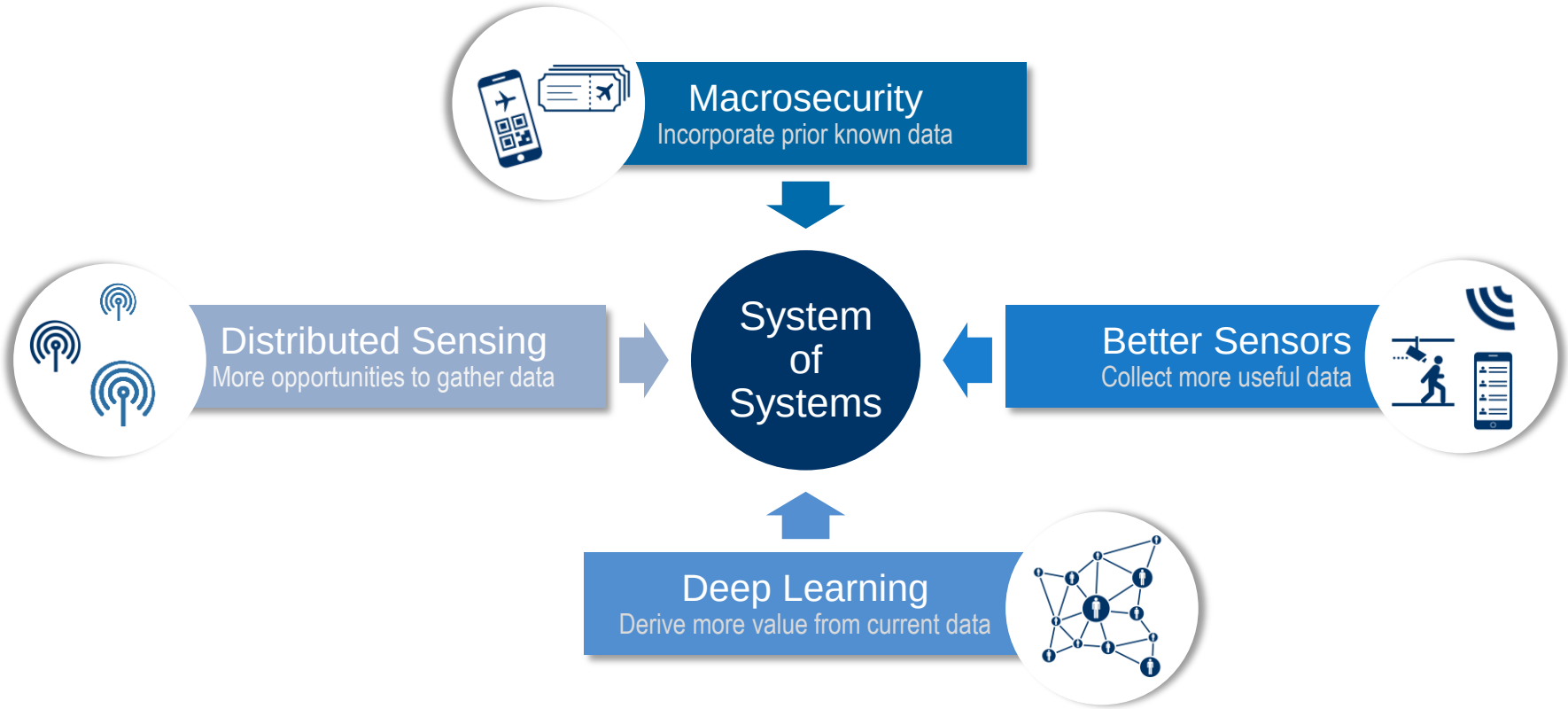
Future State

- Passenger analysis from “curb-to-gate”
- Passengers do not divest outerwear, shoes, liquids, gels, aerosols and electronics
- Flexible CONOPS, algorithms to adapt to passenger risks and threat environments
- Low rate of false alarms enable efficient TSO assignments



Future State Concepts

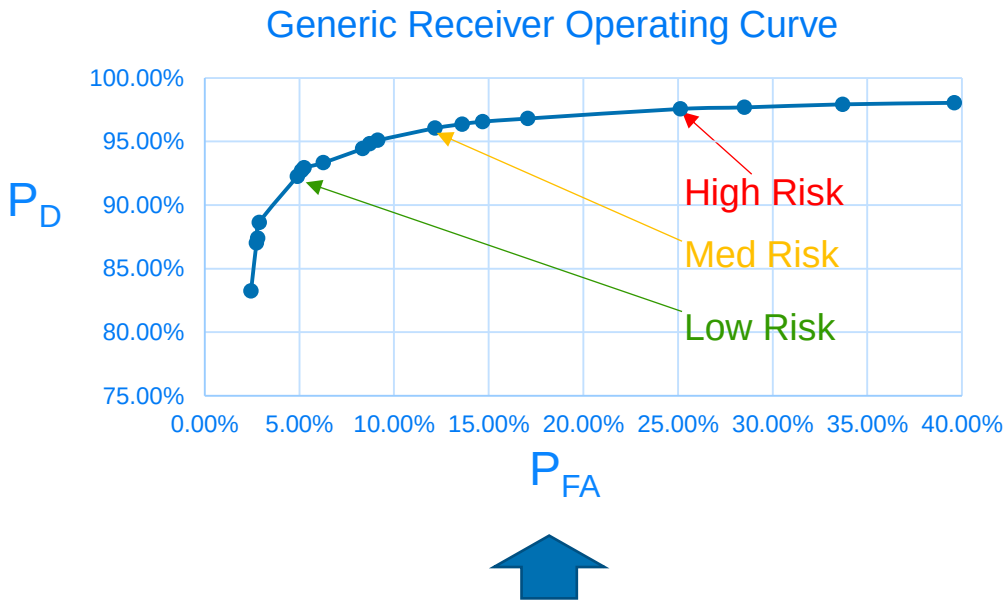
The ultimate goal of the Program's future state concepts is moving people through the airport checkpoint more efficiently. Faster throughput is a data issue that requires a system of systems approach.



Future State Challenges

With more data comes more complexity…

- **System certification**
- **Privacy**
- **Deep Learning**
- **Adaptability**
- **Operator Burden**



Challenge: The performance of individual sensors is no longer sufficient to measure effectiveness in aviation security.

Note, all data is on this slide is fictional and should not imply anything about current security postures or system performance

Updated LRBAA

Questions?

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