TSA/RCA Priorities and Perspectives

Austin Gould

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Requirements and Capabilities Analysis Overview

1 **Perform gap analysis.**

2 **Develop requirements to close identified gaps.**

3 **Develop and enhance capabilities.**

4 **Serve as the lead business authority for the agency.**

5 **Provide decision making support to TSA.**

Priorities

Accessible Property Screening

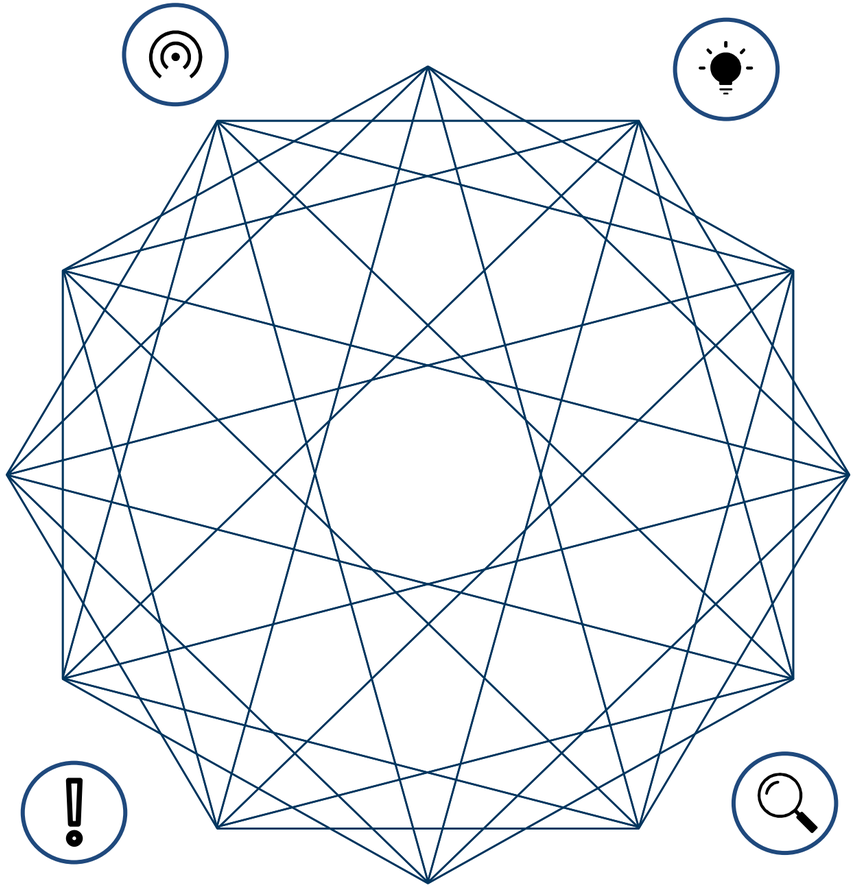
- *15 Computed Tomography (CT) deployed by end of calendar year*
- *Machine Learning development*

Passenger Segmentation

- *Risk-based segmentation of passengers to improve screening efficiency and effectiveness*

Biometrics

- *5 Biometric pilots at 5 airports*
- *Signed joint memo with CBP*



Detection Standards

- *6 created/updated/ managed (APSS, AIT, EDS, ETD, BLS, and EMD)*
- *Aligning international Air Cargo standards*

Emerging Threats

- *Raising the global baseline*
- *Adapting to new threats*

Detection at Range (DaR)

- *Tested with >10 mass transit end-users over past 2 years*
- *Enables law enforcement to identify concealed objects*

Future Lane Experience (FLEx) Screening

Matt Gilkeson

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Sample Lessons Learned

The Innovation Task Force (ITF) has identified key lessons learned from field-based demonstrations that are informing future requirements and helping TSA shape future screening capabilities. Example findings are provided here as excerpts from detailed reports for each solution demonstrated in the field.

- **Computed Tomography**: Integration with an automated belt and diverter enables positive bag control
- **Biometrics:** Identity self-verification systems require more intuitive passenger instructions
- **Explosive Trace Detection (ETD):** Officers preferred technology-enabled kits due to their simplicity when conducting tests.
- **Bottled Liquid Scanner (BLS):** The ability to screen opaque bottles may reduce Liquid Container Screening (LCS)-related pat downs.
- **Advanced Enhanced Imaging Technology (AIT):** Typical passengers had difficulty interpreting the subtlety of the modified stance requirements.

FLEx Overview

To support FLEx demonstrations scheduled for January 2019, TSA is assessing technology and other emerging capabilities to **perform at-speed, on-person screening of known populations**

Long-Term Goal

Through FLEx and other initiatives , TSA seeks to provide screening that…

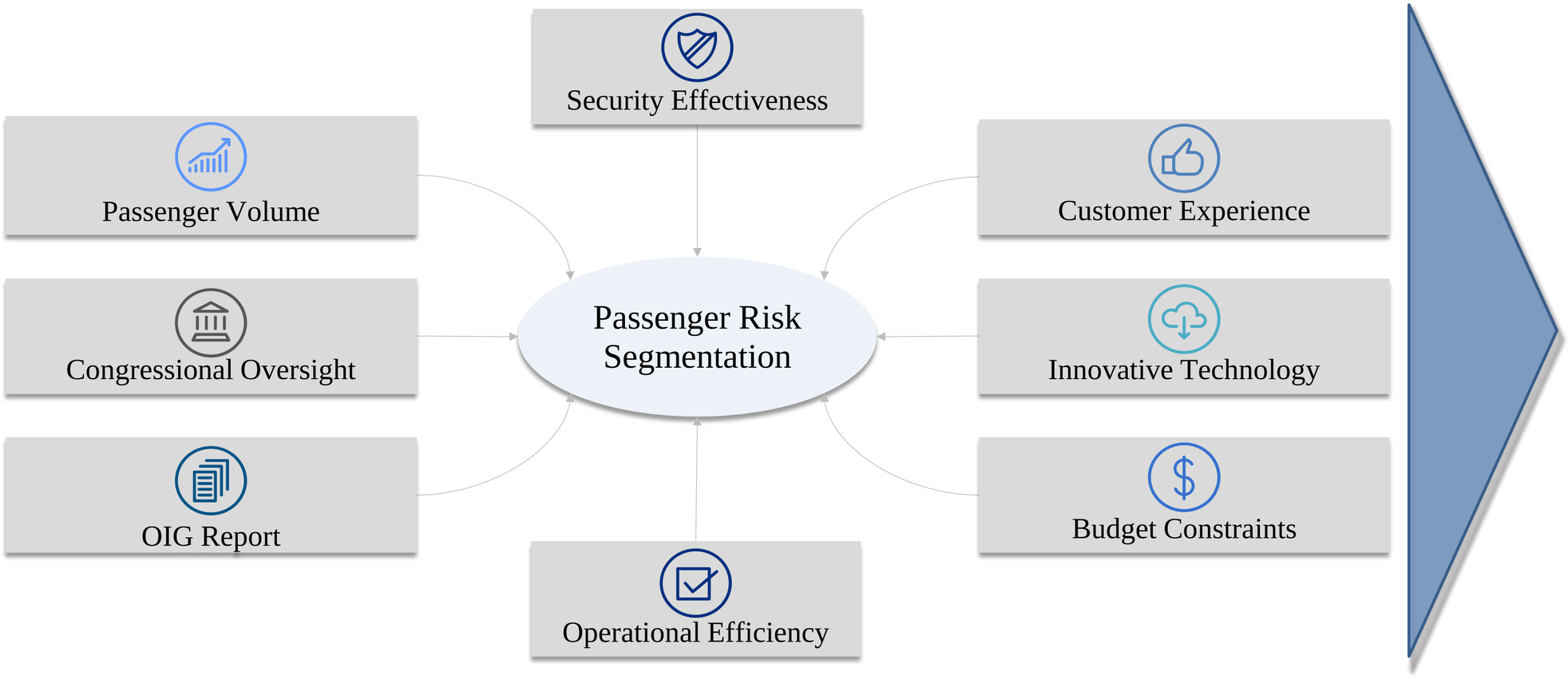
… is based on what is known about the passenger

… requires minimum property divestiture

… is dynamic and seamless

FLEx Strategic Drivers

FLEx will address a range of operational challenges and objectives that are all part of a unified vision for aviation security



Vision

Aviation security is **effective, efficient, and adaptable** to emerging threats and rising passenger volume in a budget-constrained environment.

Accessible Property Screening System

Armen Sahagian

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Checkpoint Computed Tomography Overview

In early 2017, the emergence of improvised explosive threats and their use by terrorists have placed many challenges on aviation security screening. To meet this challenge, TSA is pursuing sustained technology investments. Research and development efforts have shown that CT-based screening technology is the most consequential technology available today for airport checkpoints. **CT systems automates much of the explosives detection function, eliminating the variability introduced by human screeners and allows better detection of threats by providing three-dimensional (3D), high resolution X-ray images for automated threat recognition algorithms, and TSO visual search.**

Current Checkpoint CT Systems

Analogic ConneCT

IDSS Holdings Inc. Detect 1000

L3 Technologies, Inc. ClearScan

Smiths Detection Hi-Scan 6040CTiX

CT Deployment

Track 1: “AT/CT” Deployment

Track 2: “APSS CT” Deployment

CT Algorithm Development

Stream of Commerce (SoC) Data Collection

Accessible Property Screening (APS) Program Stand-Up

Machine Learning & Prohibited Items

Frank Cartwright

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So What? Who Cares?

Problem

- Lack of data available for development and testing purposes
- Limited ability to leverage industry advancement and different approaches to machine learning
- Restricted 3rd party development and integration due to vendor proprietary equipment
- Evolving threat landscape, including explosives and prohibited items (guns, knives, etc.)
- Advanced computational requirements for developing and utilizing machine learning algorithms

Solution

- Collect and maintain threat and Stream of Commerce (SoC) data: **Duke AT and APSS T-BAA**
- Standardize the image format to increase accessibility of data: **DICOS**
- Institute common interfaces to enable 3rd party integration: **OPSL**
- Leverage different approaches to machine learning and rapidly integrate enhancements: **R-CNN, Single Shot, GAN, etc**
- Explore alternate, machine learning focused, architectures: **Local, Airport, or National Computing**

Results

- Collecting 500 – 600 per threat and 10,000 + SoC images on APSS and AT
- Finalized DICOS 2.0A and planning to revise to DICOS 3.0 in early FY19
- OPSL Verson 1.0 released to TSA in March 2018
- Faster R-CNN proven successful at detecting guns in Duke Deep Learning project
- No current results. Planning to initiate analysis in FY19

Machine Learning Impact

Machine Learning has the potential to impact TSA across the Trade Space and as well as enable improved T&E and requirements development processes.

- 1% reduction in Pfa provides about $15 M/year reduction in operating costs

- Promote OEM and 3rd party partnerships to develop enhanced capabilities

Other Factors
- Improved T&E Test and Evaluation (T&E) processes through the use of emulation capabilities
- Enhanced requirements definition

- Detection of Explosives and PI
- Resource Allocations (Countermeasures)
- Resolution of False Alarms
- System Performance Analysis

- Reduction of False Alarms (< 10%)
- Automation
- System Performance Analysis

- Increased passenger throughput (300+ pph)
- Reduced divestiture of personal items

Air Cargo

Allan Collier

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Air Cargo Capability Gaps

IMD is collaborating with the ASAC Research & Development Subcommittee to determine capability gaps. The following Air Cargo capability gaps were identified in FY17.

Capability Gaps

TSA Reference ID	Capability Gap
AS-16-401	Stand-alone cargo screening document
AS-16-402	Domestic and International cargo screening procedure alignment
AS-16-403	Clarify and Standardize cargo screening policy
AS-16-404	Improved screening capability for anomalous air cargo (e.g. human remains, high density cargo)
AS-16-405	Common work station by technology type vice manufacturer unique user interfaces
AS-16-406	Develop and evaluate next generation systems

TSA Reference ID	Capability Gap
AS-16-407	Mid-lifecycle technology assessment
AS-16-408	Develop an International standard
AS-16-409	Develop commodity verse technology analysis
AS-16-410	Prevent unauthorized access to cargo facilities
AS-16-413	Screening of sealed containers
AS-16-414	Screening of heterogeneous and high-density cargo in palletized configurations

Air Cargo Capability Gaps

IMD is also collaborating on additional ASAC initiatives to improve cargo screening security.

Process Improvements

1 - TSA assistance to regulated parties in their selection of the most competent screeners

2 - TSA provision of comprehensive, consistent cargo screener training programs to regulated parties

3 - TSA provision of cargo screener tests to regulated parties

4 - TSA provision of cargo screening test objects to regulated parties

5 - Harmonization and streamlining of TSA regulation related to cargo screeners

6 - Provision of commodity-specific equipment guidance

Emerging Threats

How does TSA adapt to an emerging threat that is not detected by current deployed technology?

- Intel Brief
- Policy Review
- Capability Assessment
- Alternate Measures
- SD/EA Released
- Lab Analysis
- Technology Enhanced