Checked Baggage Capability

Advanced Development for Security Applications (ADSA)

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RCA | REQUIREMENTS & CAPABILITIES ANALYSIS

Problem Statement (So What…Who Cares)

Currently, insufficient R&D investments limit improvements for the Checked Baggage capability; as a result, the future technology solution is most certainly put at risk. As the threat to aviation is constantly evolving, it is in TSA's interest to ensure there is a technology development path for future Checked Baggage capabilities.

Challenges

Future State of Checked Baggage: Few technology solutions

Screening Detection and Throughput: Detecting HME and subsequent high false alarms

Connectivity/Cyber: EDS machines are not currently connected and are not cyber compliant

Common GUI/Image: EDS platforms are not currently on a Common Work Station and are not a Common Image Format

Program Expiration: EBSP is slated to sunset in FY2026

Potential Solutions

Future State of Checked Baggage: Work closely with stakeholders within DHS, Industry, and OEMs to accelerate new technology solutions to the field

Screening Detection and Throughput: Implement algorithm upgrades and expand threat list to detect HMEs and decrease high false alarms; use TTPs such as OSARP 2.0

Connectivity/Cyber: Achieve connectivity, cyber compliance and cyber resilience

Common GUI: Generate cross-OEM Common GUI, common workstation requirements and common image

Program Expiration: Accelerate R&D to ensure EBSP 2.0 is funded

As of 09.14.20

Checked Baggage (CB) Capability Maturation Roadmap

Overview

The TSA Checked Baggage Capability Maturation Roadmap describes the current state of the Checked Baggage Screening Capability as it moves toward an end state characterized by increased threat detection and decreased false alarms.

		Current State (Present – FY21)	(FY21 – FY24)	(FY24 – FY26)	EBSP 2.0 (FY26 – FY46+)
DETECT	EDS	▪ Deploy network upgrades for deployment of HME algorithm (7.2) across all EDS platforms	▪ Deploy additional RSEDS platform: CTX-5800	▪ Recap Smiths 9000-9400 with State of the Art EDS (L3 6700, SD 9800)	▪ Full Operational Capability (FOC)
	Detection Standards	▪ Develop increased detection (Pd) algorithm (7.3a) for all EDS platforms ▪ Test increased detection (Pd) algorithm (7.3a)	▪ Continue testing increased detection (Pd) algorithm (7.3a) ▪ Build upon 7.3a to address false alarm (7.3b) ▪ Deploy increased detection algorithm (7.3a/7.3b) ▪ Release the 8.0 standard to OEMs, characterize threats and ROR	▪ Develop DFRDs	▪ Deploy (8.0) algorithm
	False Alarm	▪ Develop OSARP 2.0 process and procedures ▪ Deploy OSARP 2.0 operational assessment	▪ Develop lower false alarm (Pfa) algorithm (7.3b) ▪ Test lower false alarm (Pfa) algorithm (7.3b)	▪ Deploy lower false alarm (Pfa) algorithm (7.3b) ▪ Develop XRD for EDS platforms	▪ Develop DFRDS for lower false alarm (Pfa) algorithm
CONNECT	Data Mining	▪ Develop and standardize FDRS reporting ▪ FDRS capture from CBRA	▪ Test FDRS capture from CBRA ▪ Develop Near Real-Time (NRT) data capture (STIP)	▪ Deploy FDRS Capture from CBRA and Enhance Training Procedures ▪ Deploy NRT data capture (STIP)	▪ Monitor NRT data capture (STIP)
	Cyber Security	▪ Monitor FISMA and STIP activities	▪ Obtain EBSP Authority to Operate (ATO)	▪ Ensure Compliance with Cyber Standards – IT ▪ Connect EDS Network	▪ Monitor IT compliance and remediation efforts
	Remote Screening	▪ Develop Remote Viewing of EDS Image Screening Requirements (From International Locations)	▪ Test Remote Viewing/Screening Capabilities ▪ Demonstrate Remote Viewing/Screening Capabilities	▪ Implement Remote Viewing/Screening Capabilities	▪ Scale Remote Viewing/Screening Capabilities
ENABLE	Enablers	▪ COVID-19 reduced touch of Checked Baggage (OSARP) ▪ Develop Common GUI (CGUI) ▪ Publish DICOS 3.0 standards ▪ Operational Test (OT) site selection ▪ Develop 20-year roadmap for EBSP (RAND Study)	▪ Develop Computational Threat Image (CTI-TIPS for EDS images) ▪ Test CGUI ▪ Mature DICOS 3.0 ▪ Develop Baggage Handling Systems (BHS) requirements for Selectee Screening Automation ▪ Develop new training platform requirements	▪ Deploy CGUI ▪ Deploy Selectee Screening Automation ▪ Develop Open Architecture artifacts and processes to include Common Image Format, Common Tools, and Remote Screening	▪ Implement and scale Open Architecture artifacts and processes to include Common Image Format, Common Tools, and Remote Screening ▪ Advance Material Discrimination: Multi-Energy & Diffraction System

Stakeholder Coordination

TSA seeks to collaborate with internal and external stakeholders throughout the Checked Baggage Capability maturation process. Currently, TSA is working closely with the Department of Homeland Security's (DHS) Science and Technology (S&T) Directorate to identify research and development opportunities which support and align to the Checked Baggage Capability goals. Also, TSA's Innovation Task Force (ITF) is engaging with industry through Broad Agency Announcements (BAAs) to help improve the Agency's understanding of existing market capabilities and identify vendors capable of enhancing the transportation security system.

DHS S&T

S&T supports the development of advanced algorithms and new technologies and methodologies such as XRD and DPC. These approaches provide the potential for enrichment of detection probabilities across the span of current and emerging threats.

Academia

TSA has partnered with academia to improve material identification and threat recognition.

OEMS

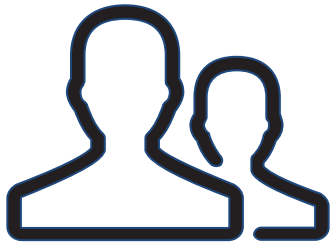
Industry is creating experimental test beds to accelerate testing, development and deployment to the field. By expanding material discrimination, it will increase the ability to detect currently unidentifiable threats, and to differentiate between threat and non-threat materials.

Foreign Partners

TSA is closely working with trusted foreign partners on emerging technology and threats.

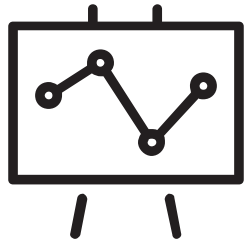
EBSP 2.0 Study

Through the Electronic Baggage Screening Program (EBSP), TSA deploys various types of transportation security screening equipment to ensure that 100% of checked baggage is screened for concealed explosives. The Science and Technology Directorate (S&T) recently awarded the Homeland Security Operational Analysis Center (HSOAC) to put together a technological roadmap for the **next twenty years** for EBSP. This study will also inform the evolution of the Checked Baggage mission space, the Capability Roadmap, the future of EBSP or its successor, investment planning, and industry focus.



Stakeholders

- S&T
- TSA
- HSOAC



Technical Approach

- Analyze Current Documents, Policies, and Operations
- Examine Historical, Current, and Future Technologies
- Gather Input from TSA, Subject Matter Experts, Academia, and S&T to Identify Possible Future Scenarios

Study Objectives

- Data Collection
- Determine Future Scenarios
- Develop Roadmap
- Deliver Final Report and Briefing

Potential Solution: Remote Screening

TSA, the U.S. Customs and Border Protection (CBP), and DHS Science and Technology (S&T) Directorate are exploring a series of proof of concepts that will help determine the feasibility of virtually screening baggage and thus eliminating TSA's need to rescreen baggage. Currently, inbound international travelers who are continuing onto other domestic locations enter at a U.S. International Airport are cleared by CBP. Passengers must collect their checked baggage and proceed through the entry process. Once the traveler completes the Customs inspection process, the traveler must then recheck baggage for onward travel.

Proof of Concepts

Incheon International Airport (ICN) to Hartsfield-Jackson Atlanta International Airport

- This is a joint public-private effort between: TSA, S&T, CBP, Delta Airlines, L3-Harris Communications, ATL, the Government of South Korea, Ministry of Land, Infrastructure and Transport (MOLIT), and ICN.

Sydney Airport (SYD) to Los Angeles International Airport (LAX)

- This is a joint public-private effort between TSA, CBP, S&T, Qantas Airlines, and LAX.
- Proof of Concept is currently on hold due to COVID-19.

Heathrow Airport (LHR) to Dallas Fort Worth International Airport (DFW)

- This is a joint public-private effort between TSA, CBP, S&T, American Airlines, LHR, and DFW.
- Proof of Concept is currently on hold due to COVID-19.

Potential Solution: X-Ray Diffraction

TSA is exploring the use of X-Ray Diffraction (XRD) to discriminate between concealed threats and Stream of Commerce (SOC) clutter. The introduction of XRD to legacy algorithm approaches provides the opportunity for enrichment of detection probabilities across current and emerging threats. To improve material recognition and threat identification, industry and academia have created experimental test beds to accelerate testing, development, and deployment to the field. By expending material discrimination, XRDs will increase the ability to detect currently unidentifiable threats, and to differentiate between threat and non-threat materials.

Potential Benefits of XRDs…

Reduce False Alarms

Increase Efficiency in Correctly Identifying Threat Substances

Optimize Resources (i.e. Staffing)

Rendering of HALO XRD Machine and User