Working Group Report
Baggage Screening Investment Study

Prepared for

Aviation Security Advisory Committee

August 9, 2006

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Synopsis

BAGGAGE SCREENING INVESTMENT STUDY

The Baggage Screening Investment Study (BSIS) defines an investment strategy for the Transportation Security Administration's (TSA's) Electronic Baggage Screening Program (EBSP), which will accelerate the deployment of Explosives Detection System (EDS) equipment and more automated checked baggage screening systems at U.S. airports, thereby improving security and lowering life-cycle costs. Many of the current deployments rely on stand-alone EDS and Explosives Trace Detection (ETD) equipment for primary screening of baggage, perpetuating suboptimal screening systems and resulting in elevated life-cycle costs and increased processing times. Also, many of these systems are not easily scalable to match traffic growth, and without adequate capital investment, screener staffing levels would have to increase significantly to maintain 100% electronic screening compliance. Additionally, without *expedited* capital investment, the life-cycle replacement requirements for the initially deployed screening systems will impede investment in new optimal systems, slowing deployment of EDS equipment to additional airports and increasing costs.

As checked baggage screening is a federal responsibility under the Aviation and Transportation Security Act of 2001 (ATSA) (Public Law 107-71), the airline and airport members of the Aviation Security Advisory Committee (ASAC) BSIS Working Group felt that the federal government should be responsible for 100% of the funding necessary to achieve this mandate, including replacing or upgrading the many current suboptimal initially deployed systems. However, no explicit agreement was reached on a specific cost-sharing formula given differences of view about the degree of federal responsibility under ATSA for funding optimal screening solutions and the realities constraining the federal budget.

Instead, the BSIS Working Group reviewed many potential funding and financing options and agreed to support the following investment strategy and recommend the associated necessary legislative actions:

- Create a voluntary $3 billion tax credit bond (TCB) program under which airports could issue tax credit bonds—on their own behalf or on behalf of airlines that operate terminals—to help fund the necessary infrastructure to accommodate optimal EDS baggage screening systems. With this program, the effective share of facility modification costs borne by airports and airlines would be about 25%.

- Continue federal appropriations of at least $435 million for purchase and installation of EDS, escalating annually. These appropriations are necessary not only for purchase and installation of screening equipment, but also for issuance of facility modification grants to airports and airlines that do not participate in the TCB program.

- Appropriate purchase and installation funds as a combined line item to provide TSA with increased flexibility in light of the voluntary nature of the TCB program.

- Enhance Passenger Facility Charge (PFC) program flexibility to include (a) TCB sinking fund payments and (b) modification or construction of exclusive-use outbound baggage handling systems and infrastructure to accommodate EDS screening systems.

Under this recommended approach, the 20-year present value cost of the EBSP is estimated to be $23.3 billion between 2006 and 2025. Of these costs, the aviation industry is projected to bear $3.6 billion and the federal government is projected to bear $19.7 billion. While the industry is projected to bear new and substantial costs for the installation, operation, and maintenance of more complex baggage handling systems and associated facilities necessary to support optimal EDS baggage screening, the net effect of increased investment in optimal systems would be to reduce overall life-cycle costs by $1.2 billion relative to the current rate of investment, primarily through screener staff cost savings and avoidance of increased screener staff costs in the future.

To achieve these cost savings, it is critical that a more active, collaborative, and formal cost management process be established. Cost management is essential given rapidly evolving technology and design practices, multi-party involvement in design and operation, and the amount of capital investment to be made over the next several years. Key TSA actions required are:

- Publish BSIS Planning and Design Guidelines* for baggage screening systems, with an emphasis on performance standards, embracing new technology, and economic analysis to determine optimal solutions.

- Implement a structured process for ongoing government/industry collaboration.

- Increase program management resources to provide for more substantial TSA involvement throughout the planning, design, and construction process.

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* The Recommended Security Guidelines for Airport Planning, Design and Construction (revised June 15, 2006) issued by TSA and developed with the assistance of a different working group formed under ASAC addressed near-term recommendations for best practices with regard to security planning across a number of different functional components of airports. The section on checked baggage screening describes a number of lessons learned, but focuses on the implementation of systems with currently certified technologies. The BSIS Working Group Technical Team is currently developing new guidelines focusing specifically on checked baggage screening that reflect the results and goals of the BSIS, which include the deployment of new screening technology, the requirement for life-cycle cost estimates to determine the optimal screening solution, and an enhanced planning and design process reflecting a more cost-effective and participatory approach.

- Issue detailed funding guidance to the aviation industry explaining the alternatives available for funding baggage screening systems and communicate the process and business rules to access facility modification grants for airports and airlines not wishing or not able to use the TCB program. Any guidance on the use of PFCs would be developed jointly with the Federal Aviation Administration.

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ACRONYMS AND ABBREVIATIONS

ACSF	Aviation Security Capital Fund
AIF	Airport Improvement Fund
AIP	Airport Improvement Program
AMT	Alternative Minimum Tax
APM	Airport Prioritization Model
ASAC	Aviation Security Advisory Committee
ASIF	Aviation Security Infrastructure Fees
ATO	Airline Ticket Office
ATL	Hartsfield/Jackson Atlanta International Airport
ATR	Automatic Tag Reader
ATSA	Aviation and Transportation Security Act (Public Law 107-71)
BHS	Baggage Handling Systems
BMA	Baggage Measurement Arrays
BOS	Boston/Logan International Airport
BPH	Bags per Hour
BRL	Baggage Reinsertion Line
BSIS	Baggage Screening Investment Study
BSIS Guidelines	BSIS Planning and Design Guidelines
CAT X-III	Threat Category X, I, II, and III
CBRA	Checked Baggage Resolution Area
CBIS	Checked Baggage Inspection System
CFO	Office of Finance and Administration
CTO	Office of Security Technology
CY	Calendar Year
DEN	Denver International Airport
DFW	Dallas/Fort Worth International Airport
DHS	Department of Homeland Security
DOT	Department of Transportation

ACRONYMS AND ABBREVIATIONS *(continued)*

EAC	Equivalent Annual Cost
EBSP	Electronic Baggage Screening Program
EDS	Explosives Detection System
ETD	Explosives Trace Detection
FAA	Federal Aviation Administration
FFY	Federal Fiscal Year
FICA	Federal Insurance Contributions Act
Framework	EBSP Strategy Planning Framework
GAO	Government Accountability Office
GARB	General Airport Revenue Bonds
GO	General Obligation
IATA	International Air Transport Association
IG	Inspector General
ILDT	Integrated Local Design Team
ILS	Integrated Logistics Support
INDT	Integrated National Deployment Team
ISAT	Integrated Site Acceptance Testing
LAS	McCarran International Airport (Las Vegas)
LAX	Los Angeles International Airport
LOI	Letter of Intent
NPV	Net Present Value
OJI	On-the-Job Injury
O&M	Operating and Maintenance
OMB	Office of Management and Budget
OMB A-11	OMB Circular No. A-11
ONT	Ontario International Airport
OOG	Out-of-gauge
OSR	On-screen Resolution
OTA	Other Transaction Agreement

ACRONYMS AND ABBREVIATIONS *(continued)*

PEC	Photoelectric cells
PFC	Passenger Facility Charge
PHX	Phoenix Sky Harbor International Airport
PLC	Programmable Logic Controller
PPI	Producer Price Index
QZAB	Qualified Zone Academy Bonds
R&D	Research and Development
ROI	Return on Investment
ROM	Rough Order of Magnitude
SEA	Seattle-Tacoma International Airport
SFC	Security Facility Charge
SPP	Screening Partnership Program
SSTP	Site Specific Test Plan
STDO	Security Technology Deployment Office
TCB	Tax Credit Bond
TSA	Transportation Security Administration
TSL	Transportation Security Laboratory
TSO	Transportation Screening Officer
VFD	Variable Frequency Drives
Vision 100	Century of Aviation Reauthorization Act (Public Law 108-176)

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Port of Portland
Port of Seattle

Federal Government Agencies and Contractors

Batelle
Department of Homeland Security
Federal Aviation Administration
Federal Highway Administration
Transportation Security Administration
Transportation Security Laboratory

Financial Services Firms

Bear, Sterns, & Co. Inc.
Financial Guaranty Insurance Company
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Chapter 1

EXECUTIVE SUMMARY

This document presents the results of the Baggage Screening Investment Study (BSIS) conducted under the sponsorship of the Aviation Security Advisory Committee (ASAC) during the first 7 months of 2006. Particular emphasis was placed on determining an investment strategy for the Transportation Security Administration's (TSA's) Electronic Baggage Screening Program (EBSP) that will accelerate deployment of Explosives Detection System (EDS) baggage screening and replacement of Explosives Trace Detection (ETD) equipment for primary screening at U.S. airports where practicable. Emphasis was given to minimizing life-cycle costs while maintaining 100% electronic screening of checked baggage, as required by federal law, through leveraging emerging technology and best practice designs to deploy optimal* systems that are more cost effective and more scalable to accommodate growing airline traffic, address potential new threats, and adapt to other industry changes over the next 20 years.

1.1 STUDY OVERVIEW

The BSIS was completed in response to directives contained in the Intelligence Reform and Terrorism Prevention Act of 2004, Public Law 108–458, December 17, 2004 (Sec. 4019a – 4019d). These directives required the Department of Homeland Security (DHS) and TSA to expedite the installation of EDS machines for checked baggage screening and complete a cost-sharing study in collaboration with industry stakeholders to review the benefits and costs of in-line screening systems, innovative financing approaches, formulas for sharing costs among different government entities and the private sector, potential cost savings approaches, and necessary enabling legislation.

The BSIS was conducted in close collaboration between TSA and aviation industry stakeholders through the BSIS Working Group sponsored by ASAC. The Working Group consisted of a Steering Committee supported by a Technical Team and a Finance Team. Each of these subgroups included DHS, TSA, airport, and airline representatives. The Finance Team also included finance industry specialists and relied upon technical advice from the Federal Aviation Administration (FAA) and the Federal Highway Administration's National Resource Center. Many baggage handling system (BHS) designers periodically assisted the Technical Team with development and review of Planning and Design Guidelines.

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* For purposes of this study, an optimal system is defined as the baggage screening system (or set of systems) for an airport that most effectively balances upfront capital costs with long-term operating and maintenance (O&M) costs resulting in the lowest life-cycle cost. A wide range of system types of varying levels of automation, complexity, and cost are becoming available to airports given new and emerging screening technologies and improved design concepts.

1.2 ADOPTION AND REFINEMENT OF THE STRATEGIC PLANNING FRAMEWORK

The BSIS findings presented in this document build on the *EBSP Strategic Planning Framework* (the Framework) submitted to Congress in February 2006. The Working Group agreed to the major elements of the Framework – investing in optimal systems to lower life-cycle costs, leveraging new screening technology, and increasing collaboration between government and industry for planning, design, and operation of screening systems – but many refinements and shifts in emphasis have been made based on additional work by TSA and input from aviation industry stakeholders during the BSIS. Key changes include:

- Incorporation of airport/airline costs into the life-cycle cost model
- Extensive assessment of alternative funding levels and approaches
- Refinements to assumptions about the availability of new screening technology, including timing and types of equipment
- Refinements to assumptions about the future performance of existing screening technology, including throughput and alarm rates
- More conservative assumptions about future-year costs associated with needed upgrades to screening systems to accommodate traffic growth
- Modification of the funding prioritization methodology to ensure that airports and airlines are not penalized for previously implementing and self-funding automated EDS baggage screening systems
- Redefinition of the scope of EDS deployment from the top 250 airports (based on baggage flow) to threat category X, I, II, and III (CAT X – III) airports, which represent 277 airports based on TSA's latest threat category assignments

Other important changes were made related to infrastructure costs and escalation rates, Transportation Screening Officer (TSO) on-the-job-injury (OJI) rates and costs, and staffing efficiency measures.

1.3 BSIS PURPOSE AND GOALS

The primary purpose of the BSIS is to identify a strategy for investing the necessary capital and operating and maintenance (O&M) resources to accomplish the following goals originally identified in the Framework and adopted by the Working Group:

1. *Increase Security*. Maintain 100% electronic baggage screening compliance per federal law and increase security systemwide through deploying EDS equipment to as many airports as practicable.

2. *Minimize Life-Cycle Costs*. Minimize EBSP life-cycle costs by (a) leveraging emerging screening technologies to the maximum extent practicable and (b) deploying the best possible screening solutions to each airport, appropriately balancing capital investment and operating cost tradeoffs through varying levels of automation depending upon traffic levels, space availability, and other local conditions (i.e., optimal solutions).

3. *Minimize Operational Impacts*. Minimize impacts to TSA and airport/airline operations through well-designed and well-placed EDS screening solutions.

4. *Provide Flexibility and Scalability*. Provide security infrastructure that will more readily adapt to growing airline traffic, potential new threats, and other industry changes over the next 20 years.

1.4 CURRENT EBSP STATUS

TSA investment in new in-line baggage screening systems has been limited by insufficient funding, lack of a sustainable funding plan, and higher than expected capital and O&M costs for initial in-line systems. Most existing screening systems are not easily scalable to match forecast airline traffic growth, especially stand-alone systems at space-constrained and fast-growing airports. As a result, substantial increases in screening staff and ETD use would be required to accommodate forecast traffic growth. In addition, current screener staffing levels are already insufficient during peak traffic periods at some airports. Based on forecast traffic growth, some type of investment will be required to maintain 100% screening compliance at most airports – either capital investment to deploy optimal systems or additional staffing and ETD use. Given the security benefits and potential cost savings associated with deploying optimal EDS screening systems (i.e., systems tailored to each airport), the Working Group strongly supported continued capital investment in the EBSP.

1.5 SCOPE OF EDS DEPLOYMENT

To improve security and operational efficiency, TSA recommends that (a) CAT X – III airports, which represent 277 airports in total, should be the focus for EDS solutions, and (b) for other airports, ETD solutions—possibly using improved ETD screening protocols—are most appropriate.

1.6 RATIONALE FOR INCREASED CAPITAL INVESTMENTS

The current rate of capital investment in EDS/ETD screening systems – about $435 million per year, escalating annually, in federal funding plus local contributions – will gradually reduce life-cycle costs by upgrading many currently inefficient systems. This $435 million funding level is necessary for life-cycle refurbishment and replacement, expansion of screening systems to accommodate traffic growth, and implementation of new optimal systems. Without expedited capital investment, the life-cycle replacement and refurbishment obligations for initially deployed screening systems would impede the ability to invest in new optimal systems, further slowing the EBSP and increasing costs.

Increased investment in optimal EDS baggage screening systems would substantially reduce life-cycle costs. However, as discussed in Section 1.7, these cost reductions would accrue to the federal government, while airport/airline industry costs would increase. Based on the recommended funding approach described in Section 1.8 below, increased capital investment in optimal systems would result in the following benefits:

1. *Acceleration of Initial Deployment of Optimal Checked Baggage Screening Systems*. Accelerating the initial deployment of optimal checked baggage screening systems by about 11 years, from 2024 to 2013, based on the assumed level of tax credit bond (TCB) issuance, as discussed in Chapter 4.

2. *Cost Savings*. Reducing life-cycle costs by about $1.2 billion in present value terms compared to the current rate of investment (about $435 million annually in federal funding, escalating over time), primarily through screener staffing cost savings (i.e., reductions in existing staff) and avoidance (i.e., reductions in requirements for future staffing increases), screener OJI rate reductions, and avoidance of throw-away investment in suboptimal systems.

In addition to quantifiable cost savings, other hard-to-quantify benefits of increased investment in optimal systems would result, including:

1. *Operational Improvements*. Improving airport and airline operations by reducing congestion in terminal lobbies and improving the reliability and efficiency of baggage handling; improving passenger levels-of-service through reduced congestion, greater operational reliability, and lower bag opening rates; and improving TSA operations by reducing screener OJI and turnover rates. (Note: Screener OJI reduction is captured in the estimated life-cycle cost savings presented above.)

2. *Increased Security*. Increasing security by increasing the share of bags screened with EDS, reducing congestion in airport terminal lobbies, and

freeing up screener staff for redeployment to passenger checkpoints or other security initiatives.

To fully achieve these benefits, investments must be made in screening systems that appropriately balance upfront capital and ongoing operating costs (i.e., the approach with the lowest life-cycle cost is the optimal solution). In addition, where cost effective, investments should be based on emerging screening technology* given the substantial improvements expected.

1.7 DISTRIBUTIONAL EFFECTS OF CAPITAL INVESTMENTS

As shown in Table 1-1 on the following page, the present value cost of the EBSP over 20 years, based on the recommended funding approach described in Section 1.8 below, is estimated to be $23.3 billion relative to levels of checked baggage screening prior to enactment of the Aviation and Transportation Security Act (ATSA) (Public Law 107-71). Of this amount, the aviation industry is estimated to bear $3.6 billion in costs and the federal government is estimated to bear $19.7 billion in costs. While the industry would bear substantial costs due to the installation of more complex baggage handling systems and associated facilities necessary to support optimal EDS baggage screening, the net effect of increased investment in optimal systems would be to reduce overall life-cycle costs by $1.2 billion relative to the current rate of investment.

* Significantly advanced screening equipment is under development and is expected to be deployable beginning no later than 2008.

Table 1-1

20-YEAR PRESENT VALUE PROGRAM COSTS
Optimal System Deployment with Tax Credit Bond Program Scenario
2006 - 2025

	TSA/Federal Government		Airport/Airline		Total
Cost Category	Present Value Cost ($ billion) *(a)*	Share	Present Value Cost ($ billion) *(a)*	Share	Present Value Cost ($ billion) (a)
Capital *(b)*	$ 4.83	88%	$0.68	12%	$ 5.51
Staffing *(c)*	11.49	>99	0.02	<1	11.51
O&M	2.52	47	2.90	53	5.41
Other	0.87	100	--	--	0.87
Total	$19.70	85%	$3.60	15%	$23.31
Savings relative to current rate of investment	$ 1.47		($0.27)		$ 1.21

Note: Columns and rows may not add to totals shown because of rounding.

(a) Amounts shown are based on a nominal discount rate of 9.35%. This rate is based on the 7.00% real discount rate prescribed in OMB Circular No. A-94 for capital projects that accrue benefits to the government and other non-governmental parties (in this case, passengers, airlines, and airports) plus an adjustment for the spread between real and nominal 20-year Treasury rates interpolated from OMB Circular No. A-94, Appendix C, revised January, 2006.

(b) Amounts shown are based on the present value of: (1) TSA grants and local matching contributions, and (2) net cost of the tax credits allowed by the federal government and estimated sinking fund payments contributed by airports over 20 years (not the full term of the tax credit bonds).

(c) For economic modeling purposes, it was assumed for this scenario that checked baggage screener staffing would be sufficient to maintain 100% checked baggage screening as traffic grows (to provide an equivalent screening performance baseline).

While the directly quantifiable cost savings associated with these investments would accrue to the federal government, the national economy and the commercial air transportation system would benefit from operational improvements and security enhancements.

1.8 FUNDING APPROACH

The Working Group considered numerous alternative funding approaches, including various levels of funding, cost-sharing ratios, and funding mechanisms. Many of the approaches identified were likely to be constrained by federal budget scoring practices. The Working Group therefore agreed upon an innovative funding strategy that would increase total investment while avoiding the requirement for significantly increased appropriations levels. This recommendation was deemed

the most viable way to implement and accelerate the EBSP and realize the significant economic and security benefits.

Specifically, the funding strategy agreed upon by the Working Group includes the following elements:

- Create a voluntary $3 billion TCB program under which airports could issue tax credit bonds to fund the necessary infrastructure to accommodate optimal EDS baggage screening systems. With this TCB program, the effective share of facility modification costs borne by the airports and airlines would be about 25%.

- Continue federal appropriations of at least $435 million per year, escalating annually, for purchase and installation of EDS equipment and for issuance of facility modification grants to airports and airlines that do not participate in the TCB program.

- Appropriate purchase and installation funds as a combined line item to provide TSA with increased flexibility in light of the voluntary nature of the TCB program.

- Enhance Passenger Facility Charge (PFC) program flexibility to include TCB sinking fund payments and exclusive-use outbound baggage handling systems and infrastructure.

This funding strategy represents a package of recommendations that, when taken together, would provide a sustainable funding approach for the EBSP. The strategy is critically dependent on the provision of at least the current baseline annual appropriations of $435 million, escalating annually, for purchase and installation of EDS equipment. As shown on Figure 1-1 below, the voluntary TCB program only addresses the cost of infrastructure modifications; continued federal appropriations would be necessary to fund a number of capital costs associated with the purchase and installation of EDS/ETD systems.

Figure 1-1

RECOMMENDED FEDERAL FUNDING SOURCES FOR CAPITAL COSTS
TSA Electronic Baggage Screening Program

Funding Source	Screening Equipment Purchase and Installation			BHS/ Infrastructure
	New Optimal Systems	Life-Cycle Refurbishment and Replacement	Accommodating Growth	
Appropriations—EDS/ETD Systems (Purchase and Installation)*	■	■	■	■
Tax Credit Bond Program				■

*At least the $435 million in capital funding, escalating annually, as discussed in this report.

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Should elements of the recommended funding strategy fail to be provided, additional direct appropriations would be required to ensure that sufficient capital is available to achieve the deployment timeline and overall cost savings described in this report. To the maximum extent possible, future funding levels should be predictable so key industry manufacturers, suppliers, and contractors can move forward with appropriate measures to support the EBSP through timely provision of research and development (R&D), manufacturing, and labor resources.

1.9 COST SHARING

The rationale for increased capital investment is straightforward even without consideration of hard-to-quantify benefits—life-cycle costs are reduced as program completion is accelerated and screener staff cost savings and avoidance are achieved sooner. The earlier these savings are achieved, the more significant the life-cycle cost savings.

The rationale for cost sharing is much more challenging. While the federal government's costs are reduced over time by increased investments in optimal systems, airport/airline costs increase significantly due to system maintenance obligations. Airport and airline operations, passenger levels-of-service, and security levels are improved by these investments, although the improvements are impossible to quantify in economic terms reliable enough to factor into a cost-sharing formula.

Furthermore, airport and airline members of the Working Group felt that the installation of optimal EDS screening systems could only be considered a benefit to the industry when compared to the initial checked baggage screening installations. In meeting the tight deadlines imposed by ATSA for 100% electronic checked baggage screening, a collaborative and more cost-effective approach to deploying

systems was not feasible. Therefore, industry stakeholders felt that these benefits should not be used to derive a cost-sharing formula.

Most industry participants advocated that the needed capital investment be paid by the federal government, given that baggage screening is a federal responsibility, as defined in ATSA, and that the quantifiable benefits accrue to the federal government. However, the reality of competing federal budget priorities, and concerns about the degree of federal responsibility for providing screening that has little or no negative operational impact, resulted in no consensus on the level of federal responsibility for the infrastructure and O&M costs associated with optimal EDS baggage screening systems.

Federal government participants offered that increased capital investments could be paid through increased user fees given the security, operational, and passenger level-of-service benefits from improved screening systems. However, user fees already account for about 50% of TSA's annual aviation budget through a combination of airline passenger user fees and direct airline payments to TSA. Aviation industry stakeholders argued that additional user fees were inappropriate, given the degree to which the national economy benefits from operational improvements and security enhancements to the commercial air transportation system.

Given the complexity of establishing an agreeable and consistent baseline for measuring benefits, competing demands on the federal budget, and persistent fundamental differences of view over the degree of federal responsibility for funding the capital investments associated with deploying EDS to all CAT X – III airports, no specific cost-sharing formula was explicitly agreed to by the Working Group. Instead, the Working Group agreed on a funding strategy that increases total investment through the use of a TCB program. Adoption of such a program would maintain the current cost-sharing arrangements as provided over the past several years through the TSA Letter of Intent (LOI) program. In addition, the Working Group acknowledged that the reality of the size and complexity of the EBSP would require the federal government and industry entities to work together to accelerate deployment of optimal screening solutions.

1.10 COST MANAGEMENT

To achieve the cost savings described above, it is critical that a more active, collaborative, and formal cost management process be established. Cost management is essential, given rapidly evolving technology and design practices, multi-party involvement in checked baggage screening system design and operation, and the amount of capital investment to be made over the next several years. Many cost risks are associated with the EBSP that must be actively managed, including:

- Availability and performance of assumed new screening technology
- Quality of in-line system designs
- Consistent selection of optimal systems by airports/airlines
- New security threats
- Screening protocol changes
- Price escalation for critical materials and labor due to program acceleration or external economic factors

To help manage these cost risks, the following actions are recommended:

1. *New BSIS Planning and Design Guidelines*. Publish and maintain new BSIS Planning and Design Guidelines (BSIS Guidelines)* that convey the necessary design principles and performance metrics to ensure that, to the maximum extent possible, designed screening systems are compatible with the cost and funding assumptions made in the BSIS. In particular, the BSIS Guidelines should provide specific guidance on how to design baggage screening systems that are (a) less costly from both a capital and life-cycle perspective, and (b) higher performance than the first generation of in-line systems.

2. *Enhanced Design and Funding Approval Process*. Given the size and complexity of the EBSP, an upgraded, collaborative, and transparent design and funding approval process will be necessary to manage costs and quality. To receive federal funding assistance of any type (i.e., infrastructure and/or equipment), airports and airlines must produce designs that meet standards for cost-effectiveness and performance established in the BSIS Guidelines.

3. *Increased TSA Program Management Resources*. As a result of the upgraded design and funding approval process, it is recommended that TSA provide ample dedicated full-time program management personnel for accelerated EDS deployment. In addition to reviewing

* The Recommended Security Guidelines for Airport Planning, Design and Construction (revised June 15, 2006) issued by TSA and developed with the assistance of a different working group formed under ASAC addressed near-term recommendations for best practices with regard to security planning across a number of different functional components of airports. The section on checked baggage screening describes a number of lessons learned, but focuses on the implementation of systems with currently certified technologies. The BSIS Working Group Technical Team is currently developing new guidelines focusing specifically on checked baggage screening that reflect the results and goals of the BSIS, which include the deployment of new screening technology, the requirement for life-cycle cost estimates to determine the optimal screening solution, and an enhanced planning and design process reflecting a more cost-effective and participatory approach.

designs, these personnel would actively collaborate with airports and airlines during the entire planning and design process to minimize risk of costly and time-consuming redesign efforts.

4. *Integrated National Deployment Team*. Establish an Integrated National Development Team (INDT) as a mechanism for continuing collaborative industry-TSA communications and relieving some pressure on TSA being sole administrator of cost control on implementation projects. The INDT would (a) serve as a regular forum for exchanging lessons learned as implementation moves forward, (b) assist TSA with ongoing refinement of the BSIS Guidelines, (c) assist TSA with technical review of designs, and (d) assist TSA with reviewing the impact of potential screening protocol changes. If possible, the INDT should include ongoing representation from airports and airlines that work directly with TSA program management staff at TSA headquarters, as well as representation from industry trade associations.

5. *Integrated Local Design Teams*. At the airport level, integrated local design teams (ILDTs) will be required to ensure that all necessary local physical, financial, and operational conditions are considered. Design teams should include at least the following representation: the airport, relevant airlines, local TSA, local law enforcement, relevant EDS vendor(s), a TSA headquarters representative of the INDT, and an INDT industry representative. If PFC funding is contemplated, regular communication with the local FAA Airports office servicing the airport should be included in the ILDT process.

Even with diligent application of these cost management measures, there are still significant cost risks from external factors outside the control of TSA, the INDT, and the industry. As such, the funding requirements and/or completion timeframes specified in this report should be reviewed and updated as necessary in close collaboration with the aviation industry.

1.11 LEGISLATIVE RECOMMENDATIONS

As directed in the legislation requiring completion of this study (the Intelligence Reform and Terrorism Prevention Act of 2004), legislative recommendations to support ongoing funding of EDS deployment were identified.

The key recommendation is authorization of a voluntary $3 billion TCB program to help airports fund the necessary infrastructure to accommodate optimal EDS baggage screening systems. The Internal Revenue Code would be modified by adding a new section authorizing the issuance by airports of up to $3 billion in tax credit bonds. This issuance authority would be allocated among interested CAT X – III airports by DHS and TSA, based on the prioritization approach described in Chapter 5 of this report. A bond authorization profile of $1 billion in the first year,

stepping down to $800 million in the second year, and then to $600 million in the third and fourth years is recommended. Higher authorization levels are requested in the early years to (a) assist with the refunding of electronic screening systems for airports and airlines that have already self-funded in-line systems and (b) address the backlog of infrastructure needs at many large, complex airports. It is estimated that the TCB program would reduce U.S. Treasury net revenue by about $130 million annually once the total amount of authorized tax credit bonds is issued.

Since the TCB program would be voluntary and only fund infrastructure (i.e., not screening equipment), it is essential that TSA maintain annual capital funding for purchase and installation of screening equipment at no less than $435 million, escalating annually. Funding at this level or higher is imperative to provide:

- Screening and other ancillary equipment to airports using the TCB program for the installation of new optimal systems and/or for redesign and expansion of existing optimal systems to accommodate growth in traffic over time.

- Screening equipment, other ancillary equipment, and direct grant funding for infrastructure modifications to airports and airlines that do not use the TCB program for the installation of new optimal systems and/or for redesign and expansion of existing optimal systems to accommodate growth in traffic over time.

- Life-cycle replacement and refurbishment of previously installed screening equipment.

In addition, the voluntary nature of the TCB program will result in less predictability of funding needs. TSA will, therefore, need more flexibility to use purchase and installation funds interchangeably to fund then-current needs, through the appropriation of a combined purchase and installation budget line item. This flexibility will allow TSA to respond to the needs of airports and airlines in the context of a more transparent long-term investment strategy.

A final recommendation is to modify Title 49 to allow PFC revenues to be used for (1) modification or construction of exclusive-use baggage handling systems and infrastructure to accommodate EDS screening systems and (2) TCB sinking fund deposits.

1.12 SUMMARY OF CRITICAL ACTIONS

The following summarizes critical actions required by Congress, TSA, and the aviation industry to achieve the economic and security benefits outlined in this report.

Key Congressional actions:

1. Authorize a voluntary TCB program of $3 billion for Federal Fiscal Year (FFY) 2008 through FFY 2011, which airports could access—on their own behalf or on behalf of airlines that operate terminals—to fund infrastructure necessary for optimal EDS baggage screening systems.

2. Permit use of the TCB program for refunding investments made by airports and airlines that have already self-funded or will self-fund their own in-line screening systems without federal government assistance.

3. Continue at least the existing rate of annual appropriations for purchase and installation of EDS equipment ($435 million, escalating annually). TSA would be responsible for prioritizing the use of the these funds, which could include provision of: (a) equipment at airports that use the voluntary TCB program, (b) grants and screening equipment to airports and airlines that do not use the voluntary TCB program, (c) grants to airports and airlines requiring reimbursement for self-funded optimal screening systems that do not use the TCB program, (d) ongoing support for expansion of optimal screening systems to accommodate future traffic growth, and (e) life-cycle replacement and refurbishment of previously installed equipment.

4. Appropriate purchase and installation funds as a combined line item to provide TSA with increased flexibility in light of the voluntary nature of the TCB program.

5. Enhance PFC program flexibility to include (a) TCB sinking fund payments and (b) modification or construction of exclusive-use outbound baggage systems to accommodate EDS screening systems.

Key TSA actions:

1. Finalize and publish the draft BSIS Guidelines developed by the BSIS Technical Team. Include a detailed explanation of the upgraded design review and approval process in the BSIS Guidelines. Update the BSIS Guidelines at least yearly to reflect ongoing lessons learned.

2. Establish an INDT comprised of representatives from TSA, airports, airline, and key industry trade associations to actively and collaboratively manage the cost and quality of new EDS baggage screening systems.

3. Work with DHS and equipment manufacturers to actively manage the timely development and deployment of new screening technologies critical to the cost and performance assumptions in the BSIS.

4. Issue detailed funding guidance to the aviation industry explaining the alternatives available for funding baggage screening systems and communicate the process and business rules to access facility modification grants for airports and airlines not wishing or not able to use the TCB program. Any guidance on the use of PFCs would be developed jointly with FAA.

5. Provide Congress with requested information regarding an estimated deployment timeline on an airport-by-airport basis.

Key industry actions:

1. Actively participate in the INDT, including providing a dedicated group of representatives to work with TSA during the initial deployment of optimal screening systems to all CAT X – III airports.

2. For those airports and airlines that have already developed designs for in-line systems, but have not yet initiated construction, refine the designs to be consistent with the BSIS Guidelines.

3. Develop contracts with BHS designers, suppliers, and other associated contractors that require compliance with the BSIS Guidelines and the performance standards specified therein.

4. Use upcoming industry conferences to communicate the key findings and recommendations of the BSIS.

5. Create ILDTs for individual design efforts to facilitate stakeholder coordination at the local level.

Chapter 2

INTRODUCTION AND BACKGROUND

2.1 STUDY OVERVIEW

This document presents the results of the BSIS, a study mandated by Congress in the Intelligence Reform and Terrorism Prevention Act of 2004. The BSIS was completed in close collaboration with aviation industry stakeholders during the first 7 months of 2006, building on the *EBSP Strategic Planning Framework* submitted to Congress by TSA in February 2006; the major elements are the same, but many refinements have been made based on additional analytical work by TSA and input from aviation industry stakeholders during preparation of the BSIS.

2.1.1 Purpose and Goals

The primary purpose of the BSIS is to identify a sustainable investment strategy for making the necessary capital and O&M resources available to accomplish the following goals originally identified in the Framework, and adopted by the Working Group:

1. *Increase Security*. Maintain 100% electronic baggage screening compliance per federal law and increase security systemwide through maximizing the deployment of EDS equipment to as many airports as practicable.

2. *Minimize Life-Cycle Costs*. Minimize EBSP life-cycle costs by (a) leveraging emerging screening technologies to the maximum extent practicable and (b) deploying the best possible screening solutions to each airport, appropriately balancing capital investment and operating cost tradeoffs through varying levels of automation depending upon traffic levels, space availability, and other local conditions (i.e., optimal solutions).

3. *Minimize Operational Impacts*. Minimize impacts to TSA and airport/airline operations through well-designed and well-placed EDS screening solutions.

4. *Provide Flexibility and Scalability*. Provide security infrastructure that will more readily adapt to growing airline traffic, potential new threats, and other industry changes over the next 20 years.

2.1.2 Participants

The BSIS was conducted under the sponsorship of ASAC during the first 7 months of 2006. The BSIS Working Group consisted of the Steering Committee, supported by

the Technical Team and the Finance Team. Each of these subgroups included DHS, TSA, airport, and airline representatives. The Finance Team also included finance industry specialists and relied upon technical advice from FAA and the Federal Highway Administration's National Resource Center. Many baggage handling system (BHS) designers periodically assisted the Technical Team with development and review of the BSIS Planning and Design Guidelines. The following table lists the members of each subgroup.

Table 2-1

WORKING GROUP MEMBERS

Subgroup	Affiliation	Name	Title
Airport Representatives			
Steering	Metropolitan Washington Airports Authority (IAD/DCA)	James Bennett	President & CEO
Steering	Port Authority of New York and New Jersey (JFK/EWR/LGA)	William R. DeCota	Director, Aviation Department
Steering	Port of Oakland (OAK)	Steve Grossman	Director of Aviation
Steering	Kent County Aeronautics Board (GRR)	James A. Koslosky	Aeronautics Director
Steering	Hillsborough County Aviation Authority (TPA)	Louis E. Miller	Executive Director
Steering	City of Chicago, Department of Aviation (ORD/MDW)	Erin O'Donnell	Deputy Commissioner, City of Chicago
Airline Representatives			
Steering	American Airlines	Laura Einspanier	Vice President, Corporate Real Estate
Steering	Southwest Airlines	Mike Golden	Senior Director, Airport Technology Strategies
Steering	Northwest Airlines	Jim Greenwald	VP, Properties and Facilities
Steering	Continental Airlines	Hershel Kamen	VP, Security and Regulatory Affairs
Steering	JetBlue Airways	Rob Maruster	VP, Operational Planning
Steering	United Airlines	Ajay Singh	Vice President, Corporate Real Estate
Federal Government Representatives			
Steering	Transportation Security Administration	Chuck Burke	Deputy Assistant Administrator, Security Technologies
Steering	Transportation Security Administration	Ross Dembling	TSA Assistant Chief Counsel
Steering	Transportation Security Administration	Richard Hayes	Director of Operations
Steering	Transportation Security Administration	Mark Kerski	TSA CFO Chief of Staff
Steering	Transportation Security Administration	Randy Null	Assistant Director, Operational Process & Technology/CIO

Table 2-1 *(continued)*
WORKING GROUP MEMBERS

Subgroup	Affiliation	Name	Title
Airport Representatives			
Technical	Dallas/Fort Worth International Airport Board (DFW)	James M. Crites	Executive Vice President, Operations
Technical	City of Manchester, Aviation Department (MHT)	Kevin Dillion	Executive Director
Technical	Port of Seattle (SEA)	Jeff Fitch	Director of Public Safety and Security
Technical	Department of Aviation, City of Atlanta (ATL)	Daniel Molloy	Aviation Assistant General Manager
Airline Representatives			
Technical	Northwest Airlines	Fred Clements	Managing Director, Construction and Design
Technical	Southwest Airlines	John Conlon	Senior Manager, Federal Airport Security Technology
Technical	JetBlue Airways	Rick Garde	Director Security Services
Technical	Northwest Airlines	Steve Mayberry	Corporate Engineer
Technical	United Airlines	John McDonald	Manager, Intelligence Gov't Liaison; Facilities Security
Technical	American Airlines	Nick Meador	Manager, Airport Security Processes
Technical	Delta Air Lines	Terry Spradlin	Manager, GSE Support and Asset Management
Federal Government Representatives			
Technical	Transportation Security Administration	Keith Goll	CTO Deployment Manager
Technical	Transportation Security Administration	Brian Koski	Industrial Engineer Supervisor
Technical	Battelle	Don Lamonaca	Manager, Atlantic City Operations
Technical	Transportation Security Administration	Andy Lee	Acting Checked Baggage Program Lead
Technical	Transportation Security Administration	Micheal Salmen	TPA Stakeholder Manager
Technical	Transportation Security Administration	Robert Sheftel	Technology Manager
Technical	Battelle	David Smith	Lead Engineer
Technical	Transportation Security Administration	Scot Thaxton	Screening Operations Specialist
Baggage Handling System Designers			
Technical	Siemens A.G.	Gary Cline	Vice President - Sales Marketing
Technical	Vanderlande Industries B.V.	Gaylloyd Dadyala	Business Development Manager
Technical	Logplan	Matthias Frenz	President
Technical	URS Corporation	Archie Lind	Vice President
Technical	Swanson Rink, Inc.	James Lusche	Vice President, Project Management
Technical	Raytheon Technical Services Company LLC	Mike Moser	Subject Matter Expert - Inline EDS Systems
Technical	G&T Conveyor Company	Dan Stricklin	Director of Airlines Baggage System Sales
Technical	Cage Inc.	Larry Studdiford	Regional Director
Technical	Vic Thompson Company	Victor H. Thompson	President

Table 2-1 *(continued)*
WORKING GROUP MEMBERS

Subgroup	Affiliation	Name	Title
Airport Representatives			
Financial	City of Boise, Aviation & Public Transportation (BOI)	John Andersen	Director, Aviation and Public Transportation
Financial	Department of Aviation, City of Atlanta (ATL)	Mario Diaz	Deputy General Manager
Financial	Port of Portland (PDX)	Vincent Granato	General Manager of Financial Services
Financial	Greater Orlando Aviation Authority (MCO)	Maureen S. Riley	Deputy Executive Director, Finance and Administration
Financial	Columbus Regional Airport Authority (CMH)	Elaine Roberts	President and CEO
Financial	Maryland Aviation Administration (BWI)	Jim Walsh	Deputy Executive Director, Business Management and Administration
Airline Representatives			
Financial	Southwest Airlines	Leslie Carr	Attorney
Financial	US Airways	Dion Flannery	VP, Financial Analysis
Financial	United Airlines	Steve Mayer	Director, Corporate Real Estate
Financial	American Airlines	Tim Skipworth	Managing Director, Properties
Financial	Alaska Airlines	Kathy Smith	Manager of Airport Affairs
Financial	JetBlue Airways	Lisa Studness	Director, Airport Affairs
Federal Government Representatives			
Financial	Transportation Security Administration	Randy Fiertz	TSA Director of Revenue
Financial	Transportation Security Administration	Kim Hutchinson	Finance and Administration
Financial	Federal Aviation Administration	Catherine M. Lang	Acting Associate Administrator for Airports
Financial	Federal Highway Administration National Resource Center	Jennifer Mayer	Innovative Finance Specialist
Financial	Department of Homeland Security	Bonita McClenny	DHS CFO Program Analyst
Financial	Federal Aviation Administration	Barry Molar	Division Manager, Financial Assistance, Airports Division
Financial	Transportation Security Administration	Kimberly Rhodes	Financial Program Manager
Finance Industry Representatives			
Financial	Financial Guaranty Insurance Company (FGIC)	Mary Francoeur	Director
Financial	Bear, Sterns, & Co. Inc.	Wendy Franklin	Managing Director
Financial	J.P. Morgan Chase & Co.	Crystal J. Mullins	Vice President

2.1.3 Scope

The results of this study focus solely on the EBSP and checked baggage screening for passenger aviation. The EBSP is one component of TSA's security mission to minimize the risk of injury or death of people or damage or loss of property due to hostile acts of terrorism. The deployment of screening technologies and personnel at passenger security checkpoints and cargo facilities at airports as well as the provision of security for other modes of transport are not considered as part of this study. However, the Working Group strongly recommends that TSA adopt a broad and systemwide approach to strategic planning for commercial aviation security – including checked baggage, passenger checkpoints, and cargo – to ensure that the plans for each component reflect a full understanding of the challenges and potential solutions for the other components.

2.2 CONGRESSIONAL DIRECTIVES

The BSIS was completed in response to directives contained in the Intelligence Reform and Terrorism Prevention Act of 2004 (Sec. 4019a – 4019d). These directives required the DHS and TSA to (a) expedite the installation of EDS machines for checked baggage screening and (b) complete a cost-sharing study in collaboration with industry stakeholders to review the benefits and costs of in-line screening systems, innovative financing approaches, formulas for sharing costs among different government entities and the private sector, potential cost savings approaches, and necessary enabling legislation.

2.2.1 Intelligence Reform and Terrorism Prevention Act of 2004

This legislation includes the following directives:

> SEC. 4019. IN-LINE CHECKED BAGGAGE SCREENING.
>
> (a) IN-LINE BAGGAGE SCREENING EQUIPMENT.—The Assistant Secretary of Homeland Security (Transportation Security Administration) shall take such action as may be necessary to expedite the installation and use of in-line baggage screening equipment at airports at which screening is required by section 44901 of title 49, United States Code.
>
> (b) SCHEDULE.—Not later than 180 days after the date of enactment of this Act, the Assistant Secretary shall submit to the appropriate congressional committees a schedule to expedite the installation and use of in-line baggage screening equipment at such airports, with an estimate of the impact that such equipment, facility modification, and baggage conveyor placement will have on staffing needs and levels related to aviation security.
>
> (c) REPLACEMENT OF TRACE-DETECTION EQUIPMENT.—Not later than 180 days after the date of enactment of this Act, the Assistant Secretary shall

establish and submit to the appropriate congressional committees a schedule for replacing trace-detection equipment, as soon as practicable and where appropriate, with explosive detection system equipment.

(d) COST-SHARING STUDY.—The Secretary of Homeland Security, in consultation with representatives of air carriers, airport operators, and other interested parties, shall submit to the appropriate congressional committees, in conjunction with the submission of the budget for fiscal year 2006 to Congress under section 1105(a) of title 31, United States Code—

(1) a proposed formula for cost-sharing among the Federal Government, State and local governments, and the private sector for projects to install in-line baggage screening equipment that reflects the benefits that each of such entities derive from such projects, including national security benefits and labor and other cost savings;

(2) recommendations, including recommended legislation, for an equitable, feasible, and expeditious system for defraying the costs of the in-line baggage screening equipment authorized by this title; and

(3) the results of a review of innovative financing approaches and possible cost savings associated with the installation of in-line baggage screening equipment at airports.

2.2.2 Other Congressional Directives

This report also directly responds to several other Congressional directives included in appropriations and authorization language as well as recommendations from the Government Accountability Office (GAO), as discussed below.

Appropriations Language. The House of Representatives' Committee on Appropriations Report on the Department of Homeland Security Appropriations Act, 2004 and the Conference Report for the DHS Appropriations Act, 2005 direct the TSA to report to the appropriate Congressional committees on the installation of EDS.

Specifically, the House of Representatives Committee on Appropriations Report on the Department of Homeland Security Appropriations Act, 2004 (H.Rpt. 108-169) states:

The Committee directs TSA to report to the Committee on their plan for installing EDS machines in-line, the timetable, and the cost estimates for each airport beginning on September 1, 2003, and every quarter thereafter.

And the Conference Report to the DHS Appropriations Act, 2005 (H.Rpt. 108-774) states:

> TSA should submit quarterly reports on its plans for such in-line installations that include: (1) the universe of airports that may benefit from an in-line EDS system or other physical modifications; (2) a list of all airports where TSA has begun working on plans to move EDS machines in-line either through the Boeing contract design phases or directly with the airports; and (3) a list of airports that will be doing EDS enhancements, including moving systems in-line that are not funded via Letters of Intent. Costs associated with each airport's project and a tentative timeline for award and completion should be included. Additionally, the plan should include information reflecting the anticipated cost savings--particularly personnel savings--that will be achieved from the use of in-line checked baggage systems contrasted with reliance on ETD and stand-alone systems. The conferees expect that TSA's planning will be conducted in consultation with aviation stakeholders (including airports, airlines, and EDS manufacturers).

Government Accountability Office Recommendations. The GAO report issued on March 15, 2005, entitled *Systematic Planning Needed to Optimize the Deployment of Checked Baggage Screening Systems,* recommends that TSA conduct a systematic, prospective analysis to determine at which airports it could achieve long-term savings and enhance efficiencies and security by installing in-line systems or, where in-line systems may not be economically justified, by making greater use of stand-alone EDS systems rather than relying on the labor-intensive and less efficient ETD screening process.

Specifically, the GAO report includes the following specific recommendation, among others:

> We are recommending that the Secretary of the Department of Homeland Security (DHS) direct the TSA Administrator to systematically evaluate baggage screening systems at the nation’s airports to include the costs and benefits associated with installing in-line EDS baggage screening systems and deploying stand-alone EDS machines—in lieu of ETD machines—to conduct the primary screening of checked baggage at airports where an in-line system would not be cost-effective or for justified other reasons.

2.3 EBSP PROGRAM OBJECTIVES

The EBSP fulfills the requirement for 100% screening of aviation checked baggage by electronic or other approved means (Section 110 of ATSA). It seeks to prevent catastrophic loss and air piracy through screening passenger-checked baggage while ensuring freedom of movement for people and commerce. It is an essential program, which minimizes the risk of injury or death of people or damage or loss of property due to hostile acts of terrorism that may be directed at the National Airspace System.

2.4 CURRENT STATUS OF THE EBSP

The current state of the EBSP is summarized in the following sections:

2.4.1 Current Deployment

About 71 of the top 100 busiest airports do not have optimal EDS baggage screening systems installed or under construction in all areas. Additionally, many proposed in-line systems do not reflect design best practices and next generation technology that will soon be available; emerging screening technologies combined with improved in-line designs will significantly improve the economic case for automation investments.

Currently, approximately 75% of originating checked bags nationwide are screened with EDS—the remaining bags are screened with ETD. During peak traffic periods, the share of bags screened with EDS is much lower, as screener staffing levels are insufficient at some airports.

2.4.2 Accommodating Future Traffic Growth

Most existing screening systems are not easily scalable to match forecast airline traffic growth, especially stand-alone systems at space-constrained and fast growing airports; substantial increases in screening staff and ETD use will be required to accommodate expected traffic growth. Given expected traffic growth, some type of investment will be required to achieve and maintain 100% screening compliance at most airports – either capital investment to automate the system or deployment of additional staffing and ETD equipment. In addition, traffic growth and the need for operational and security improvements at passenger screening checkpoints is increasing the pressure to shift staff and capital resources away from checked baggage screening.

2.4.3 Life-Cycle Replacement Responsibilities

Within about 7 to 8 years, a substantial funding requirement for life-cycle replacement of EDS equipment will compete with funding requirements for new optimal systems (EDS machines are estimated to have a useful life of 7 years, extended to 11 years with refurbishment). To the extent that optimal systems are not installed when these replacements are required, "throw-away" investment will be required to maintain 100% screening compliance (i.e., capital investment that does not facilitate development of the optimal screening system). If deployment of optimal systems is not completed before these replacements are required, the deployment timeline for new optimal systems will be extended by several years.

2.5 NEED FOR A COMPREHENSIVE EBSP STRATEGIC PLAN

The need to upgrade the current lobby-based and staff-intensive baggage screening systems is well understood. However, factors including the evolving threat environment, higher-than-expected costs and poorer-than-expected economic benefits of many initial in-line systems, rapidly changing security technology, limited and uncertain funding availability, and staffing constraints have all added to the challenge of defining a path forward.

The intent of the strategic planning process that TSA initiated with the Framework, and further refined through the BSIS, is to incorporate the major lessons learned over the past few years into a comprehensive new strategy for deploying checked baggage screening systems nationwide, including identification of an investment strategy.

2.5.1 Initially Deployed Screening Systems

An understanding of the history behind EDS deployment at U.S. airports and developments related to EDS technology is critical to establishing the context for the BSIS and the rationale for its recommendations.

To meet the requirement for 100% checked baggage screening established in ATSA, TSA used a variety of screening solutions, many of which were intended to be temporary, since permanent in-line solutions require 2 to 3 years to complete from design initiation to system opening. Many, if not most, of the implementations were suboptimal with regard to both operating cost and airport/airline impact metrics. However, implementation was necessary given ATSA's December 31, 2002, deadline (later extended by one full year in the Homeland Security Act, [Public Law 107-296]) for 100% electronic checked baggage screening.

Due to program schedule constraints and space constraints at many airports, only approximately 1,200 EDS machines were installed, primarily at CAT X and CAT I airports. Where EDS equipment was deployed, the machines were usually installed in airport lobbies, increasing congestion in already-crowded terminal lobbies. Furthermore, the initial systems were generally not integrated with the baggage handing systems (i.e., they were stand-alone installations). Where economically justified, airports and airlines prefer replacing these lobby-based systems to relieve the negative effects of increased congestion and passenger processing times. There are also security benefits to reducing the level of congestion and the handling of bags in airport terminal lobbies.

Airports without EDS equipment—as well as many with an insufficient number of EDS machines—rely on ETD for primary screening of bags, which is not only labor intensive, but also less efficient and more susceptible to human factors issues. It is TSA's major priority to replace ETD with EDS for primary screening as soon as practicable and where appropriate, consistent with the requirements of the Intelligence Reform and Terrorism Prevention Act of 2004 (SEC. 4019c), the 9/11

Commission report, and various GAO and DHS Inspector General (IG) reports on screener performance.

2.5.2 First Generation In-Line Screening Systems

Many of the first generation in-line screening systems currently installed do not produce sufficient economic savings to offset their initial capital costs. While early assessments predicted major economic benefits, as documented in the media and in GAO reports, recent TSA studies indicate that when all of the life-cycle costs and benefits of these first generation in-line systems are considered, they are not delivering a positive economic return on investment. Although some of the most recent designs are producing significant staff savings (e.g., a 57% reduction in checked baggage screeners was achieved at Tampa International Airport upon operation of the new in-line system), many of the earliest designs produced much lower levels of staff savings, which have not been sufficient to offset the upfront capital costs. In addition, the facilities and baggage handling system modification costs have been higher than expected. For example, the nine airports with TSA LOI-funded in-line systems (including those under design) have incurred or are projecting up to $6 million or more in infrastructure costs for every EDS machine required.

This suboptimal outcome is not altogether surprising given the first generation nature of the screening system designs and the limitations imposed by available EDS technology. Another contributing factor is that many of the first nine airports receiving TSA LOIs were among the most difficult for which to develop 100% electronic screening solutions given space, operational, and/or other constraints. In-line solutions, in some cases, were the only feasible solutions given the major negative operational impacts or unacceptably low level of security associated with other alternatives.

2.5.3 EDS Technology

Most of the currently deployed EDS technology was developed prior to ATSA, based on standards set forth by Congress in the Aviation Security Improvement Act of 1990 (Public Law 101-604). Since large-scale deployment of EDS systems in 2002 and 2003, equipment manufacturers have incrementally improved performance in terms of false alarm rates, and the industry has begun to incorporate the lessons learned from initial in-line installations to marginally improve throughput capabilities. In addition, new EDS equipment has been certified in the past year, including the Reveal CT-80 and Analogic AN 6400. Much of the currently deployed stand-alone EDS equipment now operates at throughputs between 80 and 180 bags per hour (bph), while currently deployed in-line EDS equipment operates at throughputs between 300 and 550 bph. False alarm rates for currently deployed EDS equipment generally range between 15% and 25%.

Next generation EDS machines currently under development and scheduled for commissioning in early 2008 can operate at up to approximately 1,000 bph. In addition, many of these systems will likely have lower false alarm rates, perhaps as low as 10%, resulting from enhancements in detector technology and software algorithms.

2.6 STRATEGIC PLANNING FRAMEWORK OVERVIEW

The *EBSP Strategic Planning Framework* was developed during 2005 and submitted to Congress in February 2006. Its intent was to provide the basic principles and analytical tools necessary to support the BSIS and ongoing strategic planning work.

The following are the key recommendations from the Framework:

1. Install EDS screening systems at the top 250 airports to increase the percentage of bags screened with EDS to 95%.

2. Reduce life-cycle costs associated with checked baggage screening by ensuring that optimal EDS screening systems are deployed at each airport.

3. Accelerate and leverage next generation screening technology matched to best practice designs to establish a wide-range of higher-performance and lower-cost screening systems that can be used immediately (i.e., provide an improved and larger "toolkit" of screening solutions).

4. Publish Planning and Design Guidelines for in-line systems that fully reflect lessons learned from initial in-line system implementations, new screening concepts developed in this strategic planning effort, and emerging new technology that will soon be available.

5. Adopt a more "hands-on" approach to actively and collaboratively managing and overseeing the design and deployment of optimally scaled screening systems to each airport, reflecting industry best-practices; new technology; local needs, conditions, and constraints; and an appropriate balance between capital investment and operational costs.

6. Consider increased funding levels to accelerate completion of optimal screening solutions and to further reduce life-cycle costs. If implemented, accelerated funding should be structured so as to mitigate the substantial EDS life-cycle replacement costs that are expected to occur in the 2013 to 2015 timeframe.

7. Use the Congressionally mandated cost-sharing study (i.e., the Baggage Screening Investment Study) to (a) explore alternative cost-sharing

formulas, (b) explore innovative financing concepts that would accelerate deployment, and (c) identify optimal funding levels.

The results and recommendations presented in this document build on the Framework with refinements as discussed in Chapter 3.

2.6.1 "Top-Down" Planning Tools

To provide a solid analytical foundation for the systematic planning needed to develop the Framework and to conduct the BSIS, TSA developed data-driven top-down planning tools. These tools include: (1) an Airport Prioritization Model that identifies an initial optimal screening solution for each terminal and screening zone at all CAT X – III airports in the United States and prioritizes projects by balancing security risk, performance, economic, and stakeholder supportability factors, and (2) a Deployment Model that identifies the optimal schedule for deploying EDS equipment to airports given funding, equipment availability, and other key assumptions. These tools will allow the results presented in this study to be quickly updated over the coming years as design practices and EDS technology continue to rapidly improve and threats change.

While useful for strategic planning, these tools are not designed to determine the specific screening solution or allowable project cost for a given airport. The optimal system types identified by these tools for specific airport zones are useful for providing planners and designers with a "starting point" for developing and evaluating alternatives. Specific airport solutions should be developed with full consideration of local conditions following the principles set forth in the BSIS Guidelines.

2.6.2 Optimally Scaled Solutions

To minimize overall EBSP costs and maximize benefits, optimally scaled airport-specific solutions are essential. A wide range of screening systems exist with different tradeoffs between up-front capital costs, staffing efficiencies, and spatial requirements.

For instance, high-throughput, centralized in-line systems are the most efficient from a machine and staff utilization perspective. However, airportwide or terminalwide centralized in-line systems would likely require additional baggage sortation systems, more complex conveyor arrangements and modifications to physical infrastructure, higher up-front capital investment, and higher O&M costs. At many airports, the potential staff savings may not offset the very large capital and maintenance costs that these high-speed in-line systems require. Smaller, less capital-intensive systems may, therefore, be more advantageous at these airports.

In addition, the best approach for a given airport may include several different types of screening systems. Some terminals may be well suited for high-speed, centralized

in-line systems, while others may only need partially integrated in-line systems. At very small airports, an in-line system – whether fully integrated or partially integrated – may not be appropriate, given the low baggage volumes. In these cases, stand-alone EDS or ETD equipment may indeed be the most cost-effective option.

Chapter 3

RECOMMENDED REFINEMENTS TO THE STRATEGIC PLANNING FRAMEWORK

The Working Group adopted the Framework as the foundation for its work on the BSIS after reviewing the Framework Report, including extensive review of the underlying analytical approach.

The recommended refinements to the Framework suggested by the Working Group are summarized in this chapter. The major elements of the recommended strategy are the same – investment in optimal systems to lower life-cycle costs, leveraging of new screening technology, and increased collaboration between government and industry for planning, design, and operation of screening systems – but some key elements have been refined and emphasis has shifted based on additional work by TSA and input from aviation industry stakeholders during the BSIS. Key changes include:

- Incorporation of airport/airline costs into the life-cycle cost model, so that investment decisions balance costs and benefits for both government and industry
- Extensive assessment of alternative funding levels and approaches to help determine a sustainable investment strategy
- Refinements to assumptions about the availability of new screening technology, including timing and types of equipment
- Refinements to assumptions about the future performance of existing screening technology, including throughput and alarm rates
- More conservative assumptions about future-year costs associated with needed upgrades to screening systems to accommodate traffic growth
- Modification of the funding prioritization methodology to ensure that airports and airlines are not effectively penalized for previously implementing and self-funding automated EDS baggage screening systems
- Redefinition of the scope of EDS deployments from the top 250 airports (based on baggage flow) to CAT X - III airports, which represent 277 airports based on TSA's latest threat category assignments

Other important changes relate to infrastructure costs and escalation rates, Transportation Screening Officer on-the-job-injury rates and costs, and staffing efficiency measures.

The key changes are summarized in the following sections.

3.1 AIRPORT AND AIRLINE COSTS

The Framework focused exclusively on the federal government's costs for the EBSP. At the outset of the BSIS, TSA proposed to include in the life-cycle cost model all costs associated with checked baggage screening to be borne by airports and airlines, and the Working Group concurred. Data collection efforts were undertaken to assess the cost implications of automated EDS screening systems for airports and airlines as well as the current industry costs related to existing lobby-based screening systems. The key costs borne by airports and airlines are those associated with operation and maintenance of more complex baggage screening systems for additional automated screening systems. The results of the data collection are included in the Technical Team report (see Appendix B).

3.2 SCOPE OF EDS DEPLOYMENT

As stated in the Framework, one of the primary goals of the EBSP is to increase security through deploying EDS equipment to as many airports as practicable. The Framework defined the scope of airports to receive EDS equipment as the top 250 airports based on baggage volume. Baggage at airports not in the top 250 was anticipated to be screened using a more intensive ETD primary screening protocol, as baggage flows at these airports are relatively low.

Initially, airport and airline members of the Working Group expressed concern that such a large-scale deployment of EDS equipment could be extremely costly to the federal government and to airports and airlines. To assess the cost impact of large-scale EDS deployment, the top-down planning models developed as part of the Framework were used to estimate the 20-year present value cost difference between EDS deployment to the top 100 airports and deployment to the top 250 airports.

Compared to deployment to the top 100 airports, a larger program scope of deployment to 250 airports added roughly $120 million to the cost of the program in present value dollars over 20 years – an increase of less than 1% of total present value program costs over the same period. As such, the Working Group felt that, given the potential security benefits of replacing ETD primary screening with EDS at these smaller airports, a large-scale deployment of EDS equipment was reasonable.

Working Group members also expressed some concern that (a) the cut-off of 250 airports was difficult to accurately assess and might be perceived as somewhat arbitrary, and (b) the scope did not directly take into account TSA threat assessments. To address these concerns, the scope of EDS deployment was modified to include all CAT X – III airports, which represent 277 airports based on TSA's latest threat category assignments.

3.3 APPROACH TO ACCOMMODATING TRAFFIC GROWTH

The Framework was based on the assumption that the installation of optimally scaled EDS screening systems would provide an easily updatable platform for accommodating traffic growth and other operational changes (such as changes in airline scheduling or new entrant carriers) at no significant additional infrastructure cost, apart from the purchase of upgrades to the screening equipment or new models of equipment. Specifically, it was assumed that the benefits of technology improvements over time would effectively offset the need for additional infrastructure investment to accommodate traffic growth beyond the design year (system opening date plus 5 years). The Technical Team expressed concerns about this assumption and proposed several recommendations, as discussed below.

3.3.1 Costs for Expansion of Initial Optimal Systems

The Technical Team recommended including some allowance for cost impacts resulting from traffic growth, which resulted in increased estimates of total national program costs. Specifically, the Technical Team felt that improvements in equipment (resulting in higher throughput rates) would frequently result in significant costs to modify the BHS. For example, higher throughput machines would require substantial improvements to the BHS infrastructure. In addition, the Technical Team felt that it was overly optimistic, in the context of estimating future funding needs, to assume that technology improvements would produce throughputs in excess of about 1,000 bags per hour.

Given the economic importance of deploying next generation technologies with throughputs reaching this limit, the Technical Team asserted that the costs of either expanding these systems or providing additional space up front for future machines to be installed should be included in the overall program cost estimates. Without such provision, the Technical Team was concerned that the "size of the problem" may be understated.

Accordingly, to capture the potential cost of accommodating growth, the methodology was modified so that the model predicts when additional machines would be required to accommodate growth. In practice, the best approach – expansion at a later date or additional capacity up front – would need to be determined on a case-by-case basis during the planning and design of the initial system. The approach that minimizes 20-year life-cycle costs should be selected. In some cases, the lowest life-cycle cost approach would be to opt for higher up-front investment. For example, at an airport with strong traffic growth where expansion at a later date would be significantly more expensive due to construction conditions, it may be most cost effective to provide all of the necessary infrastructure up front to accommodate 20 years of traffic growth. Rather than try to predict this choice for each airport, all airports in the model were assumed to expand incrementally over time. The Technical Team felt that this approach would appropriately capture, at a macro-level, the effective cost impact of traffic growth.

For systems that are already in place, traffic growth could be accommodated in several ways, including:

1. Increasing use of the installed equipment
2. Upgrading software and/or hardware to improve throughputs of installed equipment
3. Reducing bag spacing to improve throughput of continuous-feed EDS equipment
4. Replacing installed equipment with higher-throughput machines and incurring the cost of necessary modifications to the BHS to support these machines
5. Installing additional equipment and associated BHS infrastructure

A combination of one or more of the above approaches would likely be used. The choice of how additional capacity is provided will depend on the constraints of the facility, the degree of certainty about future traffic growth, the overall capacity of the terminal, and the type of system initially deployed.

Use of the BSIS Guidelines and the cost management measures discussed in Chapter 6 will be essential to ensuring that the lowest life-cycle cost approach is applied at each airport.

3.3.2 Costs for Automated EDS Screening Systems in Future New Terminals

In the Framework, known new terminal construction projects were assumed in the analysis, but no costs were assumed for yet-to-be-announced new terminals. Given that some new terminals will replace old terminals (i.e., they will replace rather than supplement existing terminal capacity), the Technical Team requested that some additional costs be assumed for providing in-line screening systems at future new terminals.

To include these costs, an estimated annual rate of terminal construction was developed for 2010 and beyond based on surveys conducted by industry associations, as discussed in Appendix B. The included costs only represent the portion of the construction cost for a new terminal associated with an in-line EDS screening system.

3.4 COST ASSUMPTIONS

Assumptions regarding unit cost multipliers (e.g., the cost of facility modifications per EDS machine or fully loaded salaries) used to estimate program costs were reviewed with the Working Group. Minor refinements to unit costs were

recommended based on updated data from TSA and data collection completed as part of the BSIS process.

Additionally, the Working Group expressed concern regarding inflation assumptions in the Framework. Specifically, it was assumed in the Framework that economies of scale, learning effects, and new Planning and Design Guidelines would prevent significant escalation in the cost of facility modifications. The Working Group felt that these costs would be driven primarily by the costs of labor and raw materials, which are likely to escalate over time. Therefore, escalation of infrastructure costs was incorporated based on the Producers Price Index, as discussed in Appendix B. As discussed in Chapter 6, active cost management for implementation of the BSIS recommendations will be required to minimize the risk of actual costs differing significantly from the cost assumptions detailed in Appendix B.

3.5 TECHNOLOGY ASSUMPTIONS

The Technical Team reviewed the assumptions regarding throughputs, alarm rates, and the availability of screening equipment. Minor refinements were recommended based on updated data from TSA and the Transportation Security Laboratory (TSL).

In addition, TSL indicated that a new, low-cost mini in-line EDS machine was likely to be deployable in the next 2 to 3 years. This machine is expected to achieve throughputs of 300 to 350 bags per hour and purchase costs lower than $400,000 per unit. This machine was incorporated for deployment beginning in 2008 as part of the baseline economic model. More information on this technology and other technology assumptions is provided in Appendix B.

Chapter 4

RATIONALE FOR AUTOMATION INVESTMENTS

One of the primary goals of the BSIS was to identify the lowest life-cycle cost approach to achieving the Congressionally mandated baggage screening requirements, appropriately balancing capital investment and long-term operating costs. As such, varying levels and types of automation investments were analyzed as part of the BSIS.

In addition, hard-to-quantify benefits of automation investments, such as improved airport/airline operations, improved TSA operations, and improved passenger levels-of-service, were also considered.

The results of this analysis are summarized in the following sections.

4.1 TOP-DOWN PLANNING MODELS

As described in Section 2.6.1, TSA has developed data-driven top-down planning models to allow extensive testing of alternative screening technologies, screening system types, equipment deployment and redeployment approaches, funding levels, innovative financing concepts, and cost-sharing formulas. The Working Group reviewed these models, including a detailed review of assumptions by the Technical and Finance Teams.

The top-down models were used to capture and compare systemwide costs. At many individual airports, the cost estimates and screening systems selected in the models could vary significantly from reality as the result of local factors that could not be assessed in detail given the time constraints of this study. Therefore, the system types selected for specific airport zones should not be considered as the ultimate screening solution for an airport. Instead, the models provide a starting point for the assessment of approaches that would be tailored to the specific airport environment, following the principles set forth in the Framework and in the BSIS Guidelines.

The modeling results were used to assess the present value 20-year life-cycle cost for the EBSP and the completion date of initial optimal system deployment, which was defined as the federal fiscal year in which initial optimal EDS screening systems would be operational at all CAT X – III airports. Checked baggage screening at threat category IV airports is expected to be accomplished through primary ETD screening, potentially using more intensive ETD screening protocols, or through a combined operation with future checkpoint EDS equipment currently being developed under the TSA CAMBRIA program. The current approach to cost sharing was assumed in all scenarios, as discussed in more detail in Chapter 5.

The results presented in this chapter support continued federal funding of automation investments and provide an assessment of the costs associated with the recommended increased funding approach (i.e., voluntary TCB program). In addition to the modeling results presented below, Working Group members reviewed results from over 10 different model scenarios throughout the BSIS process. These results included assessments of the sensitivity of results to different technology assumptions, financing approaches, and program scopes (i.e., number of airports included for EDS deployment).

The Technical Team report (Appendix B) provides a summary of the key assumptions reviewed and agreed to by the Working Group. In addition, Appendix B provides an overview of the screening system types considered and critical design principles that underpin the modeling efforts.

4.2 COMPLIANCE-ONLY SCENARIO

To provide a baseline for comparing life-cycle costs, a compliance-only scenario was developed. In this scenario, capital expenditures are minimized and no additional investment in new in-line EDS baggage screening systems was assumed. Instead, this scenario was designed to meet 100% screening compliance requirements by increasing staffing and ETD use to keep pace with traffic growth. All additional investments would be targeted at life-cycle replacement of EDS and ETD, as well as provision of additional ETD and screener staff. No additional automated EDS baggage screening systems would be installed under this scenario.

4.2.1 Initial Deployment Completion Year

The compliance-only scenario would not achieve the goal of deploying EDS equipment to all CAT X – III airports.

4.2.2 20-Year Present Value Cost

To assess the economic implications of this scenario, 20-year present value life-cycle costs were used. Table 4-1 shows these costs, broken out into capital, staffing, O&M, and other cost categories. In addition, costs are divided between TSA/federal government and airport/airline costs based on the current cost-sharing approach.

Table 4-1

20-YEAR PRESENT VALUE PROGRAM COSTS
Compliance-Only Scenario
2006 - 2025

	TSA/Federal Government		Airport/Airline		Total
Cost Category	**Present Value Cost ($ billions) *(a)***	**Share**	**Present Value Cost ($ billions) *(a)***	**Share**	**Present Value Cost ($ billions) *(a)***
Capital	$ 2.55	96%	$0.12	4%	$ 2.66
Staffing *(b)*	16.91	99	0.09	1	17.00
O&M	2.64	58	1.92	42	4.56
Other	0.43	100	--	--	0.43
Total	$22.53	91%	$2.13	9%	$24.66

Note: Columns and rows may not add to totals shown because of rounding.

(a) Amounts shown are based on a nominal discount rate of 9.35%. This rate is based on the 7.00% real discount rate prescribed in OMB Circular No. A-94 for capital projects that accrue benefits to the government and other non-governmental parties (in this case, passengers, airlines, and airports) plus an adjustment for the spread between real and nominal 20-year Treasury rates interpolated from OMB Circular No. A-94, Appendix C, revised January, 2006.

(b) For economic modeling purposes, it was assumed in the compliance-only scenario that checked baggage screener staffing would be increased sufficiently to maintain 100% checked baggage screening as traffic grows (to provide an equivalent screening performance baseline). In practice, it is unlikely that TSA would be able to increase staffing as much as necessary to accommodate traffic growth, resulting in increased operational disruption and/or degraded security levels.

As shown above, in the compliance-only scenario, most (91%) of the program costs would be the responsibility of the federal government. The O&M costs shown for airports and airlines are the result of increased O&M for baggage handling systems at airports that have existing in-line systems. More complicated baggage handling systems are required at those airports to support automated EDS screening equipment.

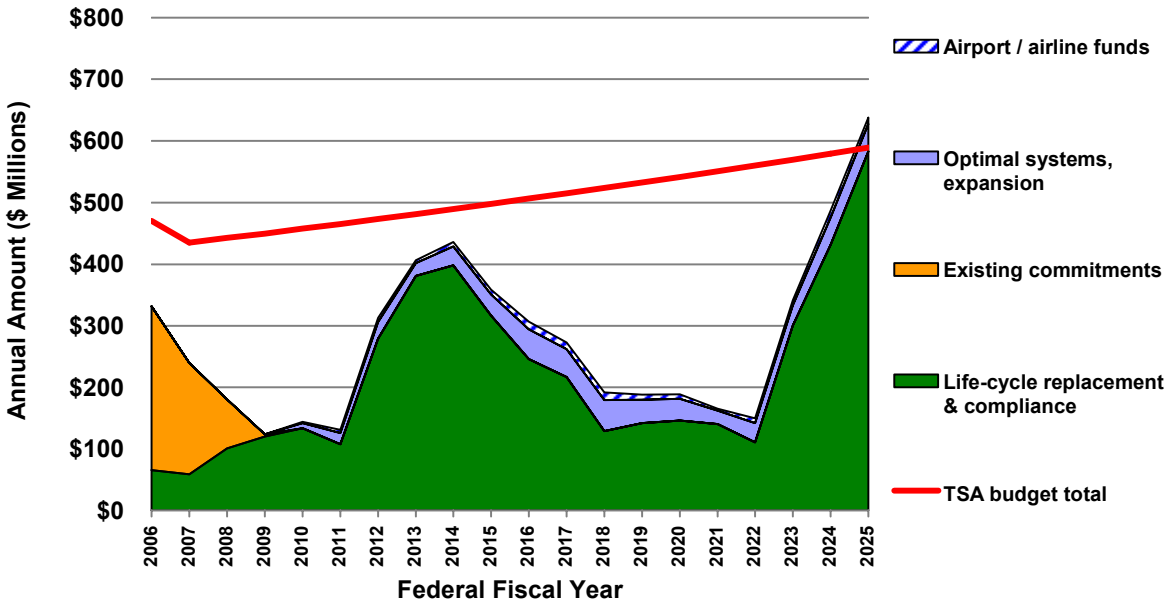
4.2.3 Funding Requirements

While the economic evaluation of this scenario is based on present value costs, the funding requirements necessary to implement the EBSP must be defined in undiscounted, nominal dollar values. This section summarizes the funding requirements for capital, staffing, O&M, and other costs associated with the compliance-only scenario.

Capital Costs. The capital funding profile for this scenario is shown on the figure below.

Figure 4-1

CAPITAL FUNDING PROFILE
Compliance-Only Scenario



The orange area in the above figure (referred to as existing commitments) represents remaining federal funding required for projects that have received funding commitments (i.e., LOIs, Other Transaction Agreements [OTAs], or Airport Improvement Program (AIP)-funded projects). Funding for life-cycle refurbishment/replacement and compliance requirements is shown in green, and provisions for expansion of current in-line systems to accommodate growth past the systems' design years is shown in light blue. The hatched area represents airport and airline matching contributions for current in-line system expansion, assuming the current cost-sharing approach.

The total funding requirement for capital projects under the compliance-only scenario, broken out by type of project, is shown in Table 4-2. The cost of existing commitments is not shown, as funding has already been provided and/or requested for these projects.

Table 4-2

CAPITAL FUNDING REQUIREMENTS
Compliance-Only Scenario
2006 - 2025

Capital Cost Category	Nominal Cost ($ billions) TSA / Federal Government	Airport / Airline	Total
Initial new optimal systems			
Facilities modifications	$ --	$ --	$ --
Equipment purchase and installation	--	--	--
Expansion of initial optimal systems			
Facilities modifications	0.72	0.24	0.95
Equipment purchase and installation	0.14	--	0.14
Future new terminal systems			
Facilities modifications	--	--	--
Equipment purchase and installation	0.10	--	0.10
Life-cycle refurbishment and replacement			
Facilities modifications	0.14	--	0.14
Equipment purchase and installation	4.25	--	4.25
Total – capital costs	$5.35	$0.24	$5.59

Note: Columns and rows may not add to totals shown because of rounding.

Staffing Costs. The compliance-only scenario incorporates staff-intensive screening systems to maintain 100% electronic checked baggage screening. As such, the staffing costs for TSA screeners are significant. In addition, airports and airlines would be required to hire baggage porters at many checked baggage screening installations to transport bags from TSA screening areas to airline take-away belts. Funding requirements for staffing under this scenario are shown in the following table.

Table 4-3

STAFFING FUNDING REQUIREMENTS
Compliance-Only Scenario
2006 - 2025

Staffing Cost Category	Nominal Cost ($ billions) TSA / Federal Government	Airport / Airline	Total
TSA screening personnel – salaries (a)	$40.84	$ --	$40.84
TSA screening personnel – training	2.25	--	2.25
TSA screening personnel – on-the-job injuries	1.02	--	1.02
TSA headquarters personnel	0.22	--	0.22
Baggage porters	--	0.23	0.23
Total – staffing costs	$44.33	$0.23	$44.55

Note: Columns and rows may not add to totals shown because of rounding.

(a) Includes screeners, lead screeners, and supervisors. It was assumed in the compliance-only scenario that checked baggage screener staffing would be increased sufficiently to maintain 100% checked baggage screening as traffic grows (to provide an equivalent screening performance baseline).

O&M Costs. Funding requirements associated with operating and maintaining (a) screening equipment for all screening system types and (b) baggage handling systems for in-line EDS screening are shown in the following table.

Table 4-4

O&M FUNDING REQUIREMENTS
Compliance-Only Scenario
2006 - 2025

O&M Cost Category	Nominal Cost ($ billions) TSA / Federal Government	Airport / Airline	Total
Screening equipment	$5.17	$ --	$ 5.17
BHS and facilities	--	5.12	5.12
Other (a)	1.51	--	1.51
Total – O&M costs	$6.67	$5.12	$11.79

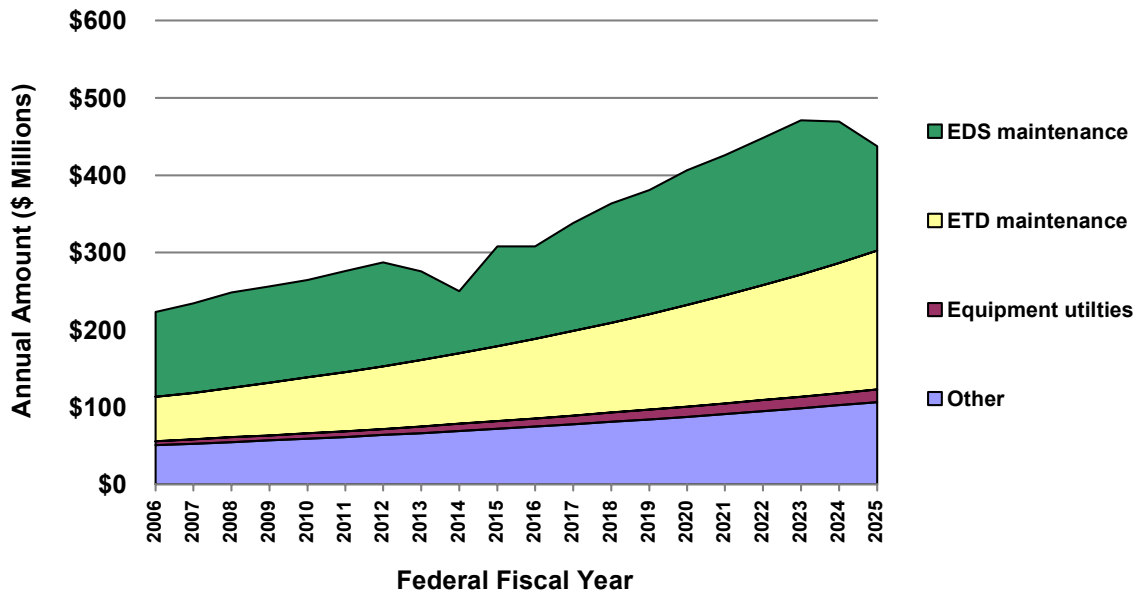
(a) Includes costs of integrated logistics support functions, warehousing, consumables, and ancillary equipment maintenance.

The O&M costs shown for airports and airlines are based on increased O&M for baggage handling systems at airports with existing in-line baggage screening systems. More complicated baggage handling systems are required at these airports to support automated EDS screening equipment.

Annual maintenance cost projections for TSA are shown on Figure 4-2.

Figure 4-2

O&M FUNDING PROFILE
Compliance-Only Scenario



Other Costs. In addition to the direct costs shown above, funding for research and development supporting the EBSP is estimated at $1.09 billion, attributable entirely to the federal government.

4.2.4 Working Group Comments

Several airport and airline representatives expressed concern regarding the operational level of service inherent in this scenario. The degraded passenger service and operational unreliability would be most acute at operationally critical airports (e.g., hubs and large origin-destination markets). Concern was specifically expressed about the unintended consequences from rapid deployment of equipment in airport lobbies as a result of the tight deadlines imposed by ATSA. Working Group members noted that the increased congestion in airport lobbies, from checked baggage screening equipment, flight delays and passenger inconvenience resulting from delays in the screening process, and the security implications of crowded

airport lobbies should be remedied as soon as possible because traffic growth will only exacerbate the problems. As discussed later in this report, while airport and airline members of the Working Group disagreed with the premise that they should be willing to be responsible for a larger share of the capital investments necessary to solve these problems, there was general agreement that the compliance-only scenario is not optimal.

4.3 OPTIMAL SYSTEM DEPLOYMENT WITH CURRENT FUNDING APPROACH

To assess the life-cycle cost implications of continued automation investments, a scenario was developed in which the current federal funding levels and approach (e.g., the use of grants), along with deployment of EDS screening systems optimally-scaled to the needs of each CAT X – III airport, were assumed. Optimal system deployment refers to the concept that the lowest-cost EDS screening system may not necessarily be the same at every airport. Instead, an optimally scaled system is tailored to the needs of a specific airport, terminal, and screening zone. For instance, fully automated in-line EDS screening systems, such as those planned at the TSA LOI airports, may not be appropriate for smaller airports or lower baggage volume areas of larger airports.

An important element of this scenario is the reliance on next-generation EDS screening technologies. As discussed in Appendix B, these technologies promise higher throughputs, lower false alarm rates, and more options for different degrees of automation. Technologies that are likely to be available within the next 2 to 3 years were assumed to be part of this scenario.

In addition, it was assumed in this scenario that TSA will actively participate in and manage the planning and design process nationwide. To this end, the BSIS Guidelines would be published that incorporate performance-based standards for screening systems and provide best practices for the design of screening systems and lessons learned from installing current generation screening systems. A preliminary version of the BSIS Guidelines was developed as part of the BSIS and reviewed by the Technical Team.

Finally, it was assumed in this scenario that TSA will maintain its current EDS purchase and installation funding levels for the EBSP ($470 million in FFY 2006, $435 million in FFY 2007, and budget growth at 1.7% per year thereafter).

4.3.1 Initial Deployment Completion Year

In this scenario, initial deployment of optimal EDS screening systems to all CAT X – III airports is estimated to be complete in FFY 2024.

4.3.2 20-Year Present Value Cost

To assess the economic justification for investment in optimal EDS baggage screening systems, 20-year present value life-cycle costs were used. Table 4-5 shows

these costs, broken out into capital, staffing, O&M, and other cost categories. In addition, costs are divided between TSA/federal government and airport/airline costs based on the current cost-sharing approach.

Table 4-5

20-YEAR PRESENT VALUE PROGRAM COSTS
Optimal System Deployment with Current Funding Approach Scenario
2006 - 2025

	TSA/Federal Government		Airport/Airline		Total
Cost Category	**Present Value Cost ($ billions) *(a)***	**Share**	**Present Value Cost ($ billions) *(a)***	**Share**	**Present Value Cost ($ billions) *(a)***
Capital	$ 4.80	87%	$0.70	13%	$ 5.50
Staffing *(b)*	13.02	>99	0.04	<1	13.06
O&M	2.49	49	2.59	51	5.08
Other	0.87	100	--	--	0.87
Total	$21.18	86%	$3.33	14%	$24.51
Savings relative to compliance-only	$ 1.35		($1.20)		$ 0.15

Note: Columns and rows may not add to totals shown because of rounding.

(a) Amounts shown are based on a nominal discount rate of 9.35%. This rate is based on the 7.00% real discount rate prescribed in OMB Circular No. A-94 for capital projects that accrue benefits to the government and other non-governmental parties (in this case, passengers, airlines, and airports) plus an adjustment for the spread between real and nominal 20-year Treasury rates interpolated from OMB Circular No. A-94, Appendix C, revised January, 2006.

(b) For economic modeling purposes, it was assumed in this scenario that checked baggage screener staffing would be sufficient to maintain 100% checked baggage screening as traffic grows (to provide an equivalent screening performance baseline).

As shown in the above table, the current rate of investment in automation would yield present value savings of approximately $150 million over 20 years. Given the positive economic case for investment in automated EDS baggage screening systems, as well as the security benefits inherent in the replacement of ETD with EDS screening and the hard-to-quantify benefits (see discussion later in this report) associated with in-line EDS, the Working Group recommends continued investment in automated EDS checked baggage screening systems.

While the Working Group supported automation investments, the quantifiable benefits of automation (in terms of total cost savings) under the current cost-sharing responsibilities would accrue solely to the federal government as the result of screener staffing cost savings and avoidance over time. Although airports and airlines would benefit from reductions in baggage porter costs, these benefits would

be more than offset by significantly higher O&M costs resulting from the installation of complex baggage handling systems necessary to support in-line EDS. Nonquantifiable benefits would accrue to the federal government, airports, airlines, and passengers, as discussed at the end of this chapter.

4.3.3 Funding Requirements

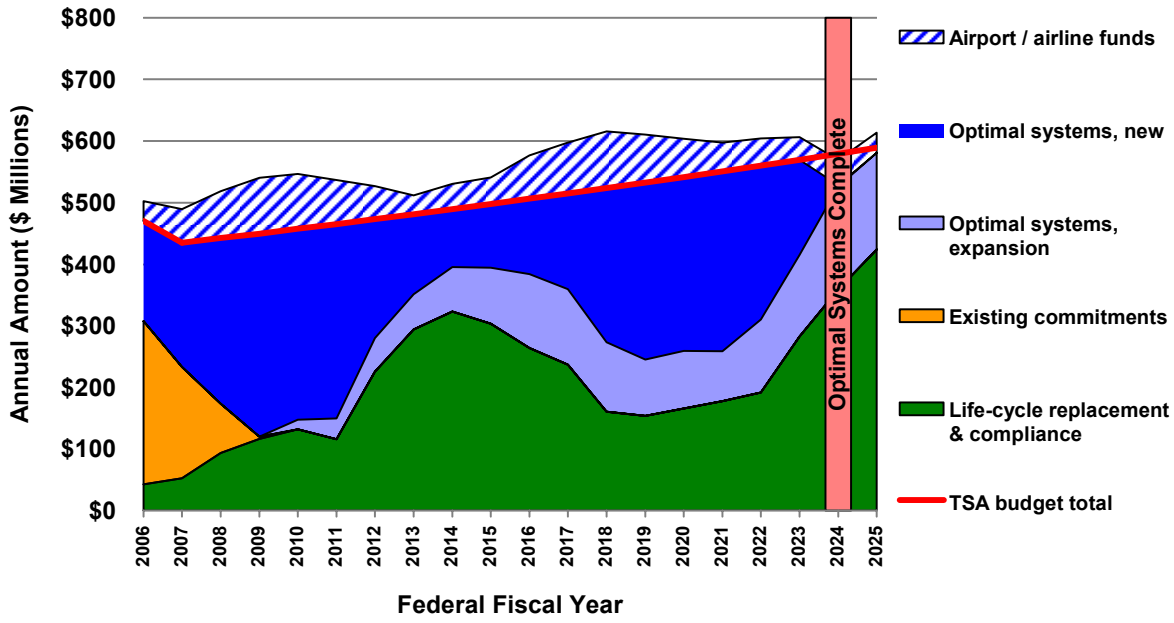
While the economic evaluation of this scenario is based on present value costs, the funding requirements necessary to implement the EBSP must be defined in undiscounted, nominal dollar values. This section summarizes the funding requirements for capital, staffing, O&M, and other costs for the optimal system deployment with current funding approach scenario.

Capital Costs. The capital funding profile for this scenario is shown on the figure below.

Figure 4-3

CAPITAL FUNDING PROFILE

Optimal System Deployment with Current Funding Approach Scenario



In addition to the capital funding discussed for the compliance-only scenario, the figure above also shows a dark blue area representing the federal government's contribution to the purchase and installation of EDS screening systems at all CAT X – III airports. Also shown is a vertical bar representing the estimated completion of the initial deployment of optimal systems in FFY 2024.

The total funding requirement for capital projects in this scenario, broken out by the type of project, is shown in Table 4-6. The cost of existing commitments is not shown because funding has already been provided and/or requested for these projects.

Table 4-6

CAPITAL FUNDING REQUIREMENTS
Optimal System Deployment with Current Funding Approach Scenario
2006 - 2025

	Nominal Cost ($ billions)		
Capital Cost Category	**TSA / Federal Government**	**Airport / Airline**	**Total**
Initial new optimal systems			
Facilities modifications	$ 2.76	$0.80	$ 3.56
Equipment purchase and installation	0.93	--	0.93
Expansion of initial optimal systems			
Facilities modifications	1.48	0.48	1.95
Equipment purchase and installation	0.38	--	0.38
Future new terminal systems			
Facilities modifications	0.80	0.27	1.06
Equipment purchase and installation	0.20	--	0.20
Life-cycle refurbishment and replacement			
Facilities modifications	0.14	--	0.14
Equipment purchase and installation	3.98	--	3.98
Total – capital costs	$10.66	$1.54	$12.20

Note: Columns and rows may not add to totals shown because of rounding.

Staffing Costs. Investment in automated EDS screening systems would yield staff cost savings and avoidance for TSA as well as airports and airlines. Funding requirements for staffing under this scenario are shown in the following table.

Table 4-7

STAFFING FUNDING REQUIREMENTS
Optimal System Deployment with Current Funding Approach Scenario
2006 - 2025

Staffing Cost Category	Nominal Cost ($ billions) TSA / Federal Government	Airport / Airline	Total
TSA screening personnel – salaries *(a)*	$27.53	$ --	$27.53
TSA screening personnel – training	2.25	--	2.25
TSA screening personnel – on-the-job injuries	0.61	--	0.61
TSA headquarters personnel	0.22	--	0.22
Baggage porters	--	0.07	0.07
Total – staffing costs	$30.60	$0.07	$30.67

(a) Includes screeners, lead screeners, and supervisors. It was assumed in this scenario that checked baggage screener staffing would be sufficient to maintain 100% checked baggage screening as traffic grows (to provide an equivalent screening performance baseline).

An economic analysis should be based on the underlying assumption that similar levels of security and operational service would be provided. Therefore, for purposes of appropriate economic modeling in this study, an equivalent screening performance baseline was assumed across all airports in the staff savings analysis, even if this situation does not currently exist at all airports.

To quantify the staffing required to achieve an equivalent screening performance baseline, the compliance-only scenario was used. As discussed in Section 4.3.2, in the compliance-only scenario, it was assumed that checked baggage screener staffing would be increased sufficiently to maintain 100% checked baggage screening as traffic grows and to maintain equivalent operational performance (i.e., to ensure that maximum additional delay is less than 10 minutes*). The calculated staffing levels in the compliance-only scenario may exceed actual staff counts in some cases.

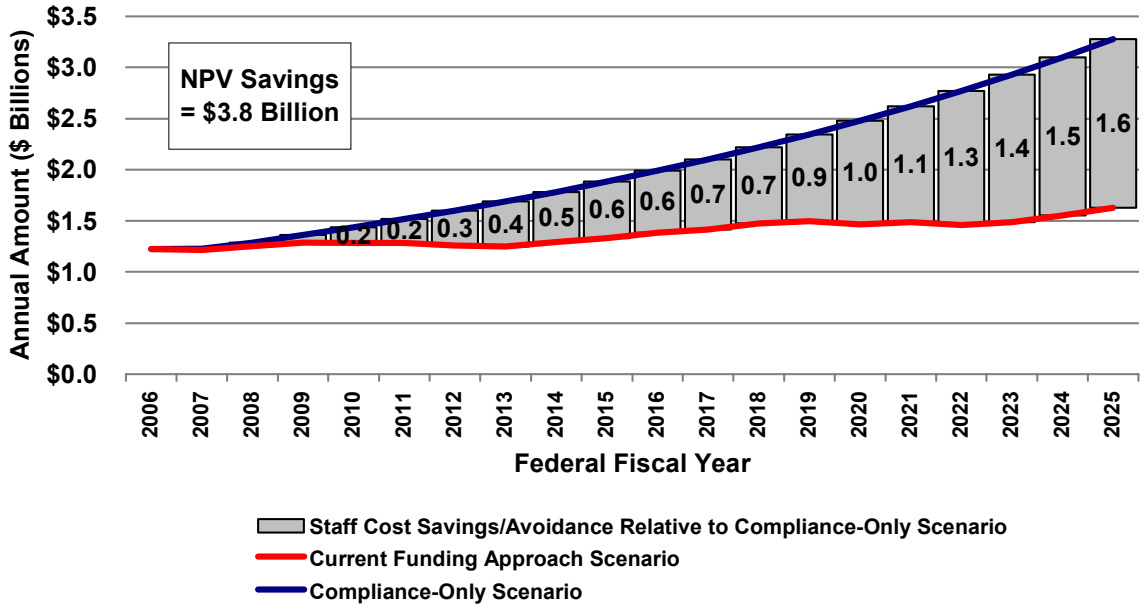
Figure 4-4 shows the economic benefit of the annual TSA staff cost savings and avoidance for the optimal system deployment with the current funding approach scenario compared to the compliance-only scenario.

* Measured at the 95th percentile. This is the expected performance of an in-line screening system.

Figure 4-4

ANNUAL STAFFING COST SAVINGS AND AVOIDANCE

Optimal System Deployment with Current Funding Approach Scenario



Note: For economic modeling purposes, it was assumed in the compliance-only scenario that checked baggage screener staffing would be increased sufficiently to maintain 100% checked baggage screening as traffic grows (to provide an equivalent screening performance baseline). Therefore, the staff savings shown in the figure above are not compared to current staffing levels, but to a theoretical staffing level necessary to maintain compliance in the absence of capital investments to automate these screening systems. The net present value (NPV) savings shown refer only to fully loaded salaries for screeners, lead screeners, and supervisors. They do not include TSA headquarters staff, workers compensation, training, or other program-level costs shown in Tables 4-5 and 4-7.

The staffing cost savings analysis is for the EBSP only and should not be used in isolation for TSA staff planning purposes. For example, the projected reduction in the number of checked baggage screeners resulting from an in-line EDS installation is unlikely to result in an equivalent airportwide reduction in screeners, as some excess checked baggage screeners may be redeployed to the security checkpoints and for other security initiatives.

O&M Costs. Funding requirements associated with operating and maintaining screening equipment for all screening system types and baggage handling systems for in-line EDS screening under this scenario are shown in the following table.

Table 4-8

O&M FUNDING REQUIREMENTS
Optimal System Deployment with Current Funding Approach Scenario
2006 - 2025

O&M Cost Category	Nominal Cost ($ billions) TSA / Federal Government	Airport / Airline	Total
Screening equipment	$4.77	$ --	$ 4.77
BHS and facilities	--	7.71	7.71
Other (a)	1.51	--	1.51
Total – O&M costs	$6.28	$7.71	$13.98

(a) Includes costs of integrated logistics support functions, warehousing, consumables, and ancillary equipment maintenance.

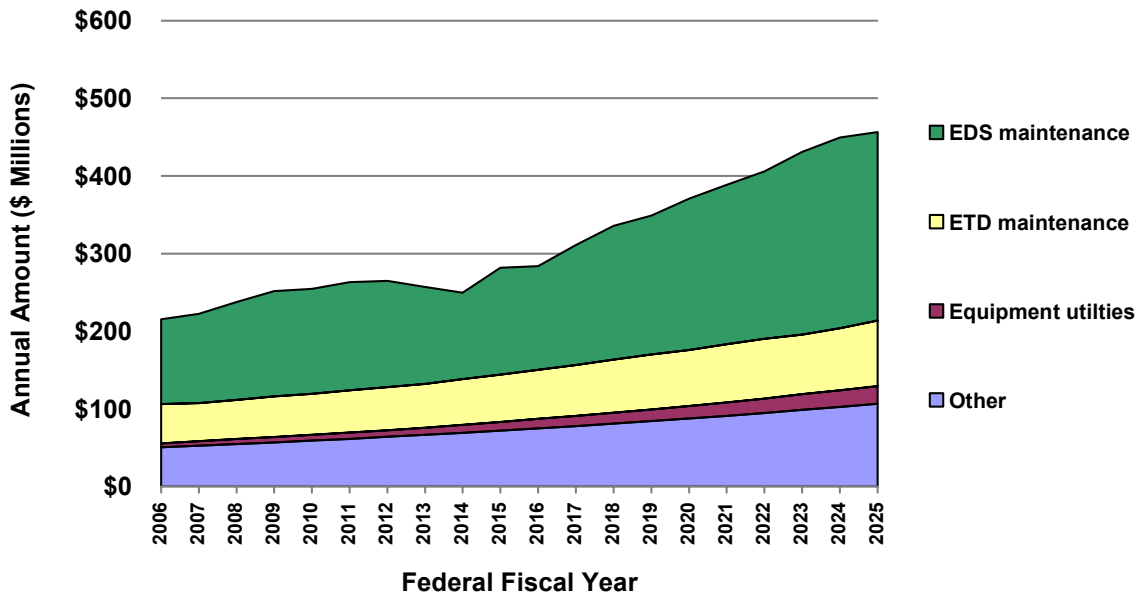
The O&M costs incurred by airports and airlines are due to the need for increased O&M of complicated baggage handling systems that accompany in-line EDS screening equipment.

Annual maintenance cost projections for TSA are shown on Figure 4-5.

Figure 4-5

O&M FUNDING PROFILE

Optimal System Deployment with Current Funding Approach Scenario



Other Costs. In addition to the direct costs shown above, funding for research and development supporting the EBSP is estimated to cost $2.19 billion, attributable entirely to the federal government. The increase in R&D funding relative to the compliance-only scenario reflects the importance of accelerating the use of next-generation technology.

4.4 OPTIMAL SYSTEM DEPLOYMENT WITH TAX CREDIT BOND PROGRAM

The results of the optimal system deployment scenario relying on current funding levels indicate that there are quantifiable net benefits to investing in automated EDS baggage screening systems. The most significant benefit from automation is the avoidance of future staffing increases; therefore, the Working Group investigated several possibilities for accelerating the deployment of automated EDS baggage screening systems. As discussed later in this report, the recommended funding and financing approach resulting from this study is authorization of a voluntary TCB program to provide additional funding above the current TSA baseline purchase and installation funding level ($435 million per year, escalated annually at 1.7%).

The modeling results for this scenario were based on similar assumptions to those used in the optimal system deployment with current funding approach scenario: next-generation screening technology and a robust planning and design review and approval process. These assumed elements are imperative to contain costs.

In addition, as discussed below, different levels of TCB issuance were assessed. OTAs were also assumed as part of this scenario, and would be used with any funding available after equipment is provided for compliance, life-cycle replacement, and TCB projects.

4.4.1 Initial Deployment Completion Year

The TCB program would produce a significant acceleration in the completion of initial optimal system deployment. Compared to the current funding levels and approach, the addition of this program would accelerate completion by 11 years, from FFY 2024 to FFY 2013. As participation in the TCB program would be voluntary, the exact completion date will depend on the level of participation. The results reflect the assumption that, of the airports that have yet to receive funding for optimal systems, approximately 50% of large-hub airport terminals and 75% of medium-hub airport terminals would be funded with TCBs,* although all CAT X – III airports would be eligible to participate in the TCB program and/or receive direct TSA grants through OTAs.

4.4.2 20-Year Present Value Cost

To assess the economic justification for the TCB program, 20-year present value life-cycle costs were used. Table 4-9 shows these costs, broken out into capital, staffing, O&M, and other cost categories. In addition, costs are divided between TSA/federal government and airport/airline costs based on the current cost-sharing approach.

* The percentage of large-hub airport terminals assumed to be funded with TCBs is lower because many large-hub airport terminals have already been funded with LOI, OTA, AIP, or airport/airline funds or are expected to be funded in FFY 2006 or FFY 2007 through OTAs issued by TSA.

Table 4-9

20-YEAR PRESENT VALUE PROGRAM COSTS
Optimal System Deployment with Tax Credit Bond Program Scenario
2006 - 2025

	TSA/Federal Government		Airport/Airline		Total
Cost Category	Present Value Cost ($ billions) *(a)*	Share	Present Value Cost ($ billions) *(a)*	Share	Present Value Cost ($ billions) *(a)*
Capital *(b)*	$ 4.83	88%	$0.68	12%	$ 5.51
Staffing *(c)*	11.49	>99	0.02	<1	11.51
O&M	2.52	47	2.90	53	5.41
Other	0.87	100	--	--	0.87
Total	$19.70	85%	$3.60	15%	$23.31
Savings relative to compliance-only	$ 2.83		($1.47)		$ 1.35

(a) Amounts shown are based on a nominal discount rate of 9.35%. This rate is based on the 7.00% real discount rate prescribed in OMB Circular No. A-94 for capital projects that accrue benefits to the government and other non-governmental parties (in this case, passengers, airlines, and airports) plus an adjustment for the spread between real and nominal 20-year Treasury rates interpolated from OMB Circular No. A-94, Appendix C, revised January, 2006.

(b) Amounts shown are based on the present value of (1) TSA grants and local matching contributions and (2) net cost of the tax credits allowed by the federal government and estimated sinking fund payments contributed by airports over 20 years (not the full term of the tax credit bonds).

(c) For economic modeling purposes, it was assumed in this scenario that checked baggage screener staffing would be sufficient to maintain 100% checked baggage screening as traffic grows (to provide an equivalent screening performance baseline).

The TCB scenario would yield an overall present value cost savings of $1.35 billion relative to the compliance-only scenario as a result of the acceleration of automation investments. However, airports and airlines would incur increased costs relative to both the compliance-only and optimal system deployment with current funding levels scenarios. These added costs would result from increased O&M associated with accelerated installation of more complex conveyor systems necessary to support automated screening.

As discussed previously, because the TCB program would be voluntary, the economic cost-savings shown above are based on an assumed level of airport participation and may vary if the level of airport participation varies.

4.4.3 Funding Requirements

While the economic evaluation of this scenario was based on present value costs, the funding requirements necessary to implement the program must be defined in

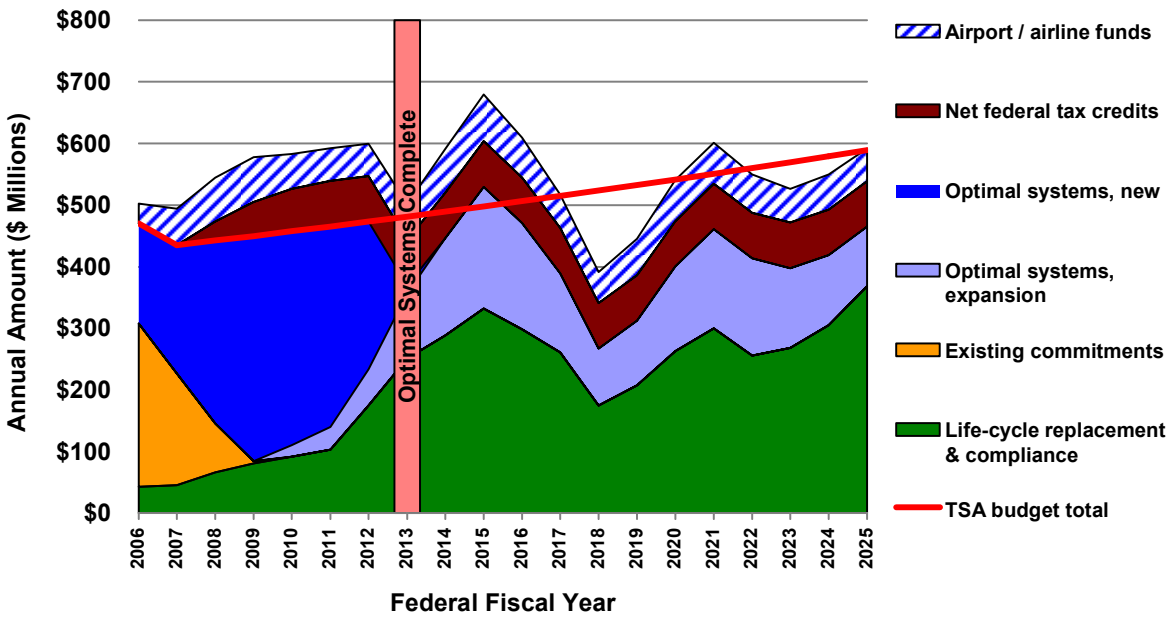
undiscounted, nominal dollar values. This section summarizes the funding requirements for capital, staffing, O&M, and other costs for this scenario.

Capital Costs. The capital funding profile for this scenario is shown on the figure below.

Figure 4-6

CAPITAL FUNDING REQUIREMENTS

Optimal System Deployment with Tax Credit Bond Program Scenario



In addition to the capital funding types discussed under the previous scenario, the figure above also shows a maroon area representing the annual value of the net tax credits allowed by the federal government associated with the tax credit bond issuance for airport facility modifications. The annual sinking fund contributions necessary to repay the tax credit bond principal are included within the "airport / airline funds" category.

The total funding requirement for capital projects under this scenario, broken out by the type of project, is shown in Table 4-10. The cost of existing commitments is not shown because funding has already been provided and/or requested for these projects.

Table 4-10

CAPITAL FUNDING REQUIREMENTS
Optimal System Deployment with Tax Credit Bond Program Scenario
2006 - 2025

Capital Cost Category	Nominal Cost ($ billions) TSA / Federal Government	Airport / Airline	Total
Initial new optimal systems			
Facilities modifications (a)	$2.20	$0.79	$2.98
Equipment purchase and installation (b)	0.82	--	0.82
Expansion of initial optimal systems			
Facilities modifications	1.67	0.51	2.18
Equipment purchase and installation	0.54	--	0.54
Future new terminal systems			
Facilities modifications	0.80	0.27	1.06
Equipment purchase and installation	0.20	--	0.20
Life-cycle refurbishment and replacement			
Facilities modifications	0.13	--	0.13
Equipment purchase and installation	4.06	--	4.06
Total – capital costs	$10.41	$1.56	$11.98

Note: Columns and rows may not add to totals shown because of rounding.

(a) Amounts shown include direct federal grants and airport/airline matching contributions as well as the net cost of tax credits allowed by the federal government and the estimated sinking fund contributions by airports over 20 years (not the full term of the tax credit bonds).
(b) Equipment for TCB projects was assumed to be purchased and installed through TSA appropriations, not with bond proceeds.

TCB issuance and the net cost of the associated tax credits and sinking fund contributions were estimated for new optimal baggage screening systems and the refunding of self-funded systems. However, because it is difficult to accurately estimate future costs associated with the redesign of existing systems, expansion to accommodate growth, and implementation of optimal systems in new terminals, an allowance in the total TCB program is recommended to account for these costs. Therefore, the recommended size of the TCB program was developed as follows:

- *Estimated TCB Issuance for New Optimal Systems and Refunding*—The funding requirements shown in Table 4-10 are based on the assumed issuance of approximately $1.76 billion in tax credit bonds for new optimal baggage screening systems and the refunding of self-funded systems. Several scenarios were modeled to compare different levels of participation in the TCB program for the installation of new optimal systems and refunding of self-funded systems. Total TCB proceeds for initial new optimal systems and refunding of existing self-funded systems ranged from about $1.67 billion to $2.20 billion. To ensure authorization at a sufficient level, the

Working Group recommends that the high end of this range be used to size the portion of the TCB program expected to be used for new optimal systems and refunding of existing self-funded systems.

- *Allowance for Other Eligible TCB Uses*—In addition, as defined in Chapter 7, the TCB program would also be used to provide funding to airports that, during the authorization period of the TCB program, wish to (a) redesign existing systems to improve their efficiency, (b) expand systems to accommodate traffic growth, or (c) implement systems for future new terminals. To provide sufficient TCB financing capacity for these types of projects, it is estimated that an additional $800 million in TCB issuance authority would be needed. As a result, the recommended size of the TCB program is $3 billion.

Staffing Costs. Investment in automated EDS baggage screening systems would yield staff cost savings and avoidance for TSA as well as airports and airlines. Funding requirements for staffing are shown in the following table.

Table 4-11

STAFFING FUNDING REQUIREMENTS
Optimal System Deployment with Tax Credit Bond Program Scenario
2006 - 2025

	Nominal Cost ($ billions)		
Staffing Cost Category	**TSA / Federal Government**	**Airport / Airline**	**Total**
TSA screening personnel – salaries *(a)*	$23.99	$ --	$23.99
TSA screening personnel – training	2.25	--	2.25
TSA screening personnel – on-the-job injuries	0.49	--	0.49
TSA headquarters personnel	0.22	--	0.22
Baggage porters	--	0.03	0.03
Total – staffing costs	$26.95	$0.03	$26.98

Note: Columns and rows may not add to totals shown because of rounding.

(a) Includes screeners, lead screeners, and supervisors. It was assumed in this scenario that checked baggage screener staffing would be sufficient to maintain 100% checked baggage screening as traffic grows (to provide an equivalent screening performance baseline).

As mentioned in the discussion of the optimal system deployment with current funding approach scenario, an equivalent screening performance baseline across all airports was assumed in the staff savings analysis, even if this situation does not currently exist at all airports. To quantify the staffing required to achieve an equivalent screening performance baseline, the compliance-only scenario was used.

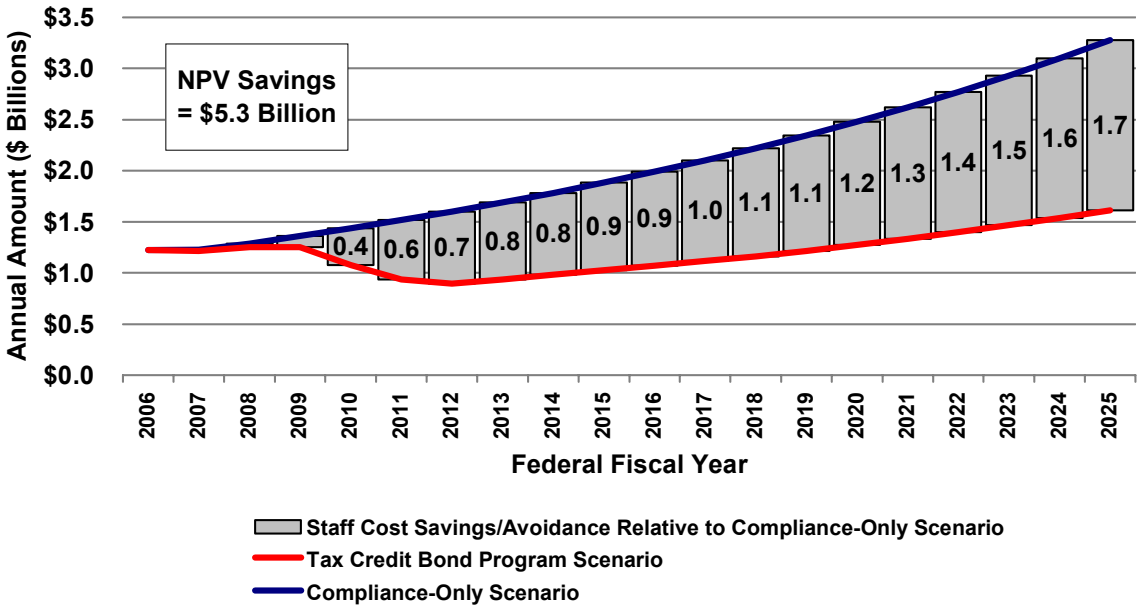
The calculated staffing level associated with the compliance-only scenario may exceed actual current staff counts in some cases.

Figure 4-7 shows the economic benefit of the annual TSA staff cost savings and avoidance for the optimal system deployment with the TCB program scenario compared to the compliance-only scenario.

Figure 4-7

ANNUAL STAFFING COST SAVINGS AND AVOIDANCE

Optimal System Deployment with Tax Credit Bond Program Scenario



Note: For economic modeling purposes, it was assumed in the compliance-only scenario that checked baggage screener staffing would be increased sufficiently to maintain 100% checked baggage screening as traffic grows (to provide an equivalent screening performance baseline). Therefore, the staff savings shown in the above figure are not compared to current staffing levels, but to a theoretical staffing level necessary to maintain compliance in the absence of capital investments to automate these screening systems. The NPV savings shown refer only to fully loaded salaries for screeners, lead screeners, and supervisors. They do not include TSA headquarters staff, workers compensation, training, or other program-level costs shown in Tables 4-9 and 4-11.

The staff savings analysis is for the EBSP only and should not be used in isolation for TSA staff planning purposes. For example, the projected reduction in the number of checked baggage screeners resulting from an in-line EDS installation is unlikely to result in an equivalent airportwide reduction in screeners, as some excess checked baggage screeners may be redeployed to the security checkpoints and for other security initiatives.

O&M Costs. Funding requirements associated with operating and maintaining screening equipment for all system types and baggage handling systems for in-line EDS screening are shown in the following table.

Table 4-12

O&M FUNDING REQUIREMENTS
Optimal System Deployment with Tax Credit Bond Program Scenario
2006 - 2025

	Nominal Cost ($ billions)		
O&M Cost Category	**TSA / Federal Government**	**Airport / Airline**	**Total**
Screening equipment	$4.93	$ --	$4.93
BHS and facilities	--	8.43	8.43
Other *(a)*	1.51	--	1.51
Total – O&M costs	$6.43	$8.43	$14.86

Note: Columns and rows may not add to totals shown because of rounding.

(a) Includes costs of integrated logistics support functions, warehousing, consumables, and ancillary equipment maintenance.

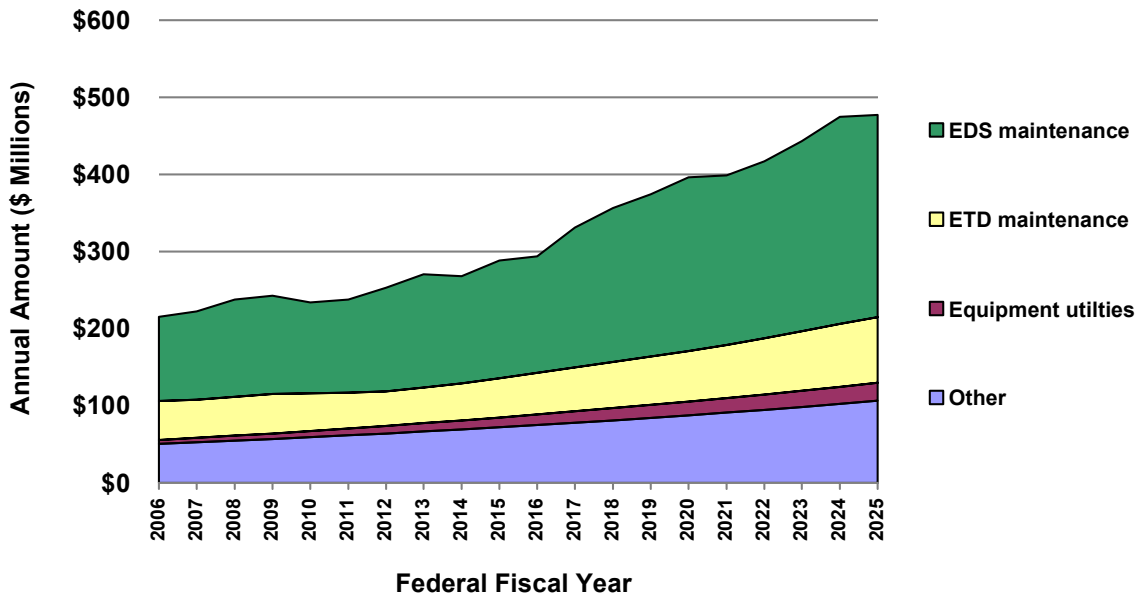
The O&M costs incurred by airports and airlines are due to the need for increased O&M of complicated baggage handling systems that accompany in-line EDS screening equipment.

Annual maintenance cost projections for TSA are shown on Figure 4-8.

Figure 4-8

O&M FUNDING PROFILE

Optimal System Deployment with Tax Credit Bond Program Scenario



Other Costs. In addition to the direct costs shown above, funding for research and development supporting the EBSP is estimated to cost $2.19 billion, attributable entirely to the federal government. The increase in R&D funding relative to the compliance-only scenario reflects the importance of accelerating the use of next-generation technology.

4.5 HARD-TO-QUANTIFY BENEFITS

In addition to the quantifiable costs assessed as part of the modeling effort, the Working Group discussed several hard-to-quantify benefits. These benefits include operational improvements, direct security benefits, and indirect security benefits, such as reduced lobby congestion and the potential for reallocation of screeners to understaffed passenger checkpoints.

4.5.1 Operational Improvements

Integration of EDS equipment with baggage handling systems will allow TSA to remove screening equipment from terminal lobbies. As a result, lobby congestion will decrease and passenger convenience will increase. In addition, in-line EDS screening systems designed according to the performance standards specified in the

BSIS Guidelines will provide more reliable baggage delivery, greater efficiency, and increased flexibility to accommodate traffic growth.

TSA will also benefit from operational improvements associated with automation. For instance, working conditions for screeners will improve with in-line systems. Alarms can be resolved in quieter, dedicated spaces properly designed for the alarm resolution function. On-the-job injuries are likely to be significantly reduced as a result of better-designed alarm resolution areas.

While the Working Group agreed that operational improvements should be considered as part of the rationale for automation investments, airport and airline members of the Working Group felt that this benefit should not be used to establish a cost-sharing formula. Specifically, the airport and airline members of the Working Group felt that, because screening is a federal responsibility and many of the current lobby-based systems were installed as temporary measures to meet the December 31, 2002, deadline for 100% checked baggage screening mandated by ATSA, the operational improvements to be gained by replacing the lobby-based systems with more automated EDS baggage screening systems should not be used as the basis for justifying increased local funding.

4.5.2 Direct Security Benefits

Investment in EDS baggage screening systems (both automated and stand-alone) will reduce the number of bags screened primarily by ETD. Airports without EDS equipment, as well as many with an insufficient number of EDS machines, rely on ETD for primary screening of bags. This approach is not only labor intensive, but also less efficient and more susceptible to human factors issues. It is TSA's major priority to replace ETD with EDS for primary screening as soon as practicable and where appropriate, which is consistent with the requirements of the Intelligence Reform and Terrorism Prevention Act of 2004 (SEC. 4019c), the 9/11 Commission Report, and various GAO and IG reports on screener performance.

4.5.3 Indirect Security Benefits

In addition to the direct security benefits resulting from the replacement of ETD with EDS for primary screening of checked baggage, automated EDS baggage screening systems will generate indirect security benefits associated with reducing congestion and the handling of bags in airport lobbies.

Deployment of automated EDS baggage screening systems will also allow for screeners currently used for checked baggage screening to be transferred to passenger checkpoint installations. As next generation technologies and operational procedures for passenger checkpoints may not lend themselves as readily to increased automation, actions to further improve security and level-of-service at passenger checkpoints will likely require additional screeners to be successful.

Chapter 5

FUNDING / FINANCING ALTERNATIVES AND RECOMMENDED APPROACH

Chapter 4 presented the scope of EDS deployment and funding needs, setting out the array of different costs and cost responsibilities that exist today and into the future. This chapter presents:

- The historical approach to funding the various costs associated with baggage screening
- Alternatives that were considered for funding and financing baggage screening costs into the future
- The recommended funding and financing approach, consisting of a suite of tools
- An approach to prioritizing airport and airline access to those funding and financing tools
- A discussion of the current cost-sharing approach and the challenges of allocating benefits to individual stakeholders

5.1 HISTORICAL FUNDING APPROACH

Historically, the costs of providing security services to protect aircraft and passengers were considered a normal and necessary part of doing business for airlines. In 1997, the White House Commission on Aviation Safety and Security determined that aviation security was a national security issue and that substantial federal funding should be allocated for related capital improvements.*

Prior to the September 11, 2001, terrorist attacks, regulated airlines were responsible for aviation security screening, and FAA performed compliance and enforcement oversight inspections. Airline use of EDS equipment to screen baggage was voluntary. Any investment by airports in infrastructure to facilitate checkpoint screening and checked baggage screening was funded with FAA grants, PFC revenues, and airport funds generated, in part, from airline rates and charges.

Although checked baggage screening has been the federal government's responsibility since enactment of ATSA in 2001, the reality is that TSA is directly responsible for certain functions and costs, while other functions and facilities are the responsibility of airports and airlines, sometimes with financial support from

* White House Commission on Aviation Safety and Security, *Final Report to President Clinton*, February 12, 1997, Recommendation 3.1, p. 27.

FAA (prior to FFY 2004) and/or TSA. Costs to airports and airlines net of any federal assistance are typically paid from PFC revenues (capital and financing costs only) and/or general airport revenues, including revenues generated from airline rates and charges.

5.1.1 Overview of Checked Baggage Screening Components and Funding

Program Costs. Specific cost responsibilities for funding baggage screeners, baggage screening equipment, baggage handling systems, and related infrastructure are as follows:

- *Baggage Screeners.* TSA has been directly responsible for paying 100% of the costs of checked baggage screeners at all commercial service airports since 2002, as previously discussed. Even at the six airports that have private security screeners,* TSA is directly responsible for procuring, contracting with, and paying the private screening companies.

- *Baggage Screening Equipment***.** TSA is also responsible for procuring baggage screening equipment, which to date has been by direct purchase, periodically refurbishing and replacing such equipment, contracting with equipment maintenance providers, and reimbursing airports (or airlines where they operate a terminal) for equipment utility costs.

- *Baggage Handling Systems***.** Historically, baggage handling systems were primarily owned and operated by the airlines, either individually (particularly outbound baggage systems) or collectively (more common for inbound baggage systems). The airlines were responsible for purchasing and operating those systems. Occasionally, an airport would own and operate certain BHS, particularly where common systems served international traffic; the airport could use PFC revenues to pay for the systems in lieu of or to augment other local funds.

  In the post-September 2001 environment, TSA is responsible for the immediate inbound and outbound BHS serving baggage screening equipment (i.e., only the inbound and outbound belts for the EDS machine)**, and the airport owns and operates the rest of the system (or, if an airline operates the terminal, the airline is directly responsible for the BHS, including those parts of the system added or modified to accommodate baggage screening equipment. Where centralized bag screening is instituted, the additional conveyors and other elements of the

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* All five airports that were part of the private security Screening Partnership Program (SPP, which was a pilot program) opted not to have federal screeners when the pilot program ended (i.e., these airports continued to have private screeners), and Sioux Falls Regional Airport subsequently opted not to have federal screeners, for a current total of six airports that have private security screeners.

** Including responsibility for maintenance, replacement, and utility costs for the belts.

BHS can be substantial). Where airports are responsible, the costs are typically passed on to the airlines through airport rates and charges.

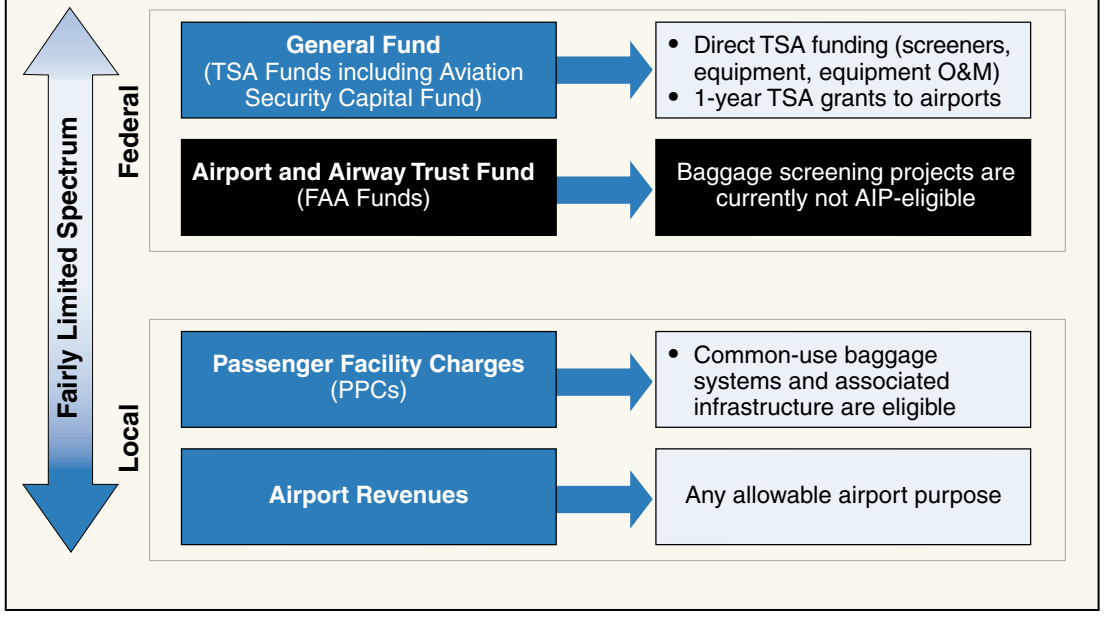
- *Infrastructure.* The infrastructure to house baggage screening equipment and associated BHS has historically been, and continues to be, built and maintained by airports, generally as part of building and maintaining terminals. In some cases, however, terminals are built and maintained by airlines. To a limited extent, FAA (prior to FFY 2004) and TSA have provided partial financial support.

The current spectrum of available sources of funding for baggage screening purchase and installation is a fairly limited one, as shown on Figure 5-1.

Figure 5-1

CURRENT BAGGAGE SCREENING FUNDING SOURCES

Transportation Security Administration



Funding Sources. For non-infrastructure EDS investments, such as equipment purchase, installation, maintenance, and utilities, TSA uses direct funding to contract with third-party vendors. Since September 2001, multiple sources of funding have been available for baggage screening infrastructure investment, including:

- *TSA Grants* – TSA grants have been available on a limited basis since FFY 2003, funded, in part, by federal user fees. Grants have been issued as multi-year LOIs as well as 1-year grants called Other Transaction Agreements to fund baggage screening infrastructure. Through FFY 2004, TSA executed eight LOIs to provide grant funding to each of nine airports over a 3- or 4-year period. The last payment related to these LOIs is scheduled to be issued in FFY 2007, subject to annual Congressional appropriations. In FFY 2003 and FFY 2004, TSA issued LOIs to the following airports, in the order in which they were granted:

  – Massachusetts Port Authority (BOS)
  – Dallas/Fort Worth International Airport Board (DFW)
  – Port of Seattle (SEA)
  – City and County of Denver, Department of Aviation (DEN)
  – Clark County Department of Aviation (LAS)
  – Los Angeles World Airports (LAX and ONT)
  – City of Phoenix, Aviation Department (PHX)
  – City of Atlanta, Department of Aviation (ATL)

  Six of the nine airports issued debt to be repaid with annual TSA LOI grant funds, and used the bond proceeds to build infrastructure for in-line systems. The airports in Los Angeles and Phoenix used the grant funds and did not issue debt.

  Due to concerns about making multi-year commitments without the safeguards of a trust fund or other form of guaranteed future year funding, and because the funding stream has not supported additional long term grant agreements, TSA has provided only 1-year grants since FFY 2004 through OTAs. To date, approximately 33 OTAs have been issued by TSA

- *FAA AIP Grants* – AIP grants were used to fund EDS infrastructure at airports through FFY 2003, but since FFY 2004, Congress has prohibited such use. A small number of airports invested in infrastructure to accommodate in-line systems using AIP grants in FFY 2002 and FFY 2003, with AIP grants covering approximately 75% of the estimated project costs. Although ATSA made baggage screening infrastructure costs eligible for AIP funding, Congress has incrementally reduced the categories of AIP funding that can be used for baggage screening infrastructure through subsequent authorization and appropriation legislation. Beginning in FFY 2004 through FFY 2006, the U.S. Department of Transportation's (DOT's) annual appropriation acts have prohibited spending AIP funds for baggage screening infrastructure. This prohibition is expected to continue through FFY 2007 and possibly beyond.

- *State Grants* – State grants for security, including baggage screening infrastructure, are very unusual, but are issued in rare instances (e.g., by the State of Florida).

- *Passenger Facility Charges* – Common-use baggage handling systems and related infrastructure are eligible for PFC funding. Since September 11, 2001, pursuant to consultation with airlines and approval by FAA, airports have used PFC revenues as (1) the local match to FAA and TSA grants, and (2) in rare cases, to entirely fund BHS and infrastructure. Baggage handling systems used exclusively by a single airline are not PFC-eligible because of historical FAA concerns that such systems do not foster airline competition.

- *Airport Revenues* – Airport revenues from airline rates and charges and/or nonairline sources can be used for any airport purpose, and have been used by certain airports as (1) the local match to FAA and TSA grants, and (2) in rare cases, to entirely fund BHS and infrastructure. Depending on the terms of an airport's use and lease agreement with airlines, if one exists, the airlines may have the right to approve capital investments and/or the issuance of bonds to accommodate EDS screening systems.

5.1.2 TSA EBSP Funding

The EBSP is funded from multiple line items within TSA's budget. Table 5-1 shows appropriated funding levels by relevant category for FFY 2002 through FFY 2006, and potential funding levels for FFY 2007.

The following categories are related to the EBSP:

- *Screener Workforce* – Includes the federal screener workforce and privatized screening.
- *Other Screener-Related Costs* -- Screener training and human resource services are separate line items that are partly allocable to baggage screening. Also, a significant portion of on-the-job injuries can be directly attributed to suboptimal deployments of EDS and ETD. TSA's OJI costs were funded through the human resources services line item of the budget in FFY 2006, but will be funded from the personnel, compensation and benefits line item in FFY 2007.
- *EDS/ETD Systems* -- Appropriations for EDS/ETD systems are on multiple line items. As Table 5-1 shows, purchase, installation, maintenance, and operational integration are separate line items. Another separate line item for refurbishment was added in FFY 2007 for FFY 2007 in the appropriations bill passed by the House of Representatives for DHS, but not in the Administration's budget or the Senate appropriations bill. From a management implementation perspective, these separate budgets make it more difficult for TSA to manage interrelated costs for multi-faceted projects, especially when those costs may vary significantly and not necessarily in tandem. In addition, the use of multiple line items affects the prioritization of projects (i.e., necessitates selecting projects that fit within the constraints of the budget categories).

The table also shows the $250 million in mandatory appropriations from the ASCF each year for EDS/ETD facility modifications (not equipment).

Table 5-1

TSA ANNUAL BUDGET
(in millions)

		FFY 2004	FFY 2005	FFY 2006	FFY 2007 Administration Budget	FFY 2007 House Bill	FFY 2007 Senate Bill
Discretionary appropriation							
Screener Workforce							
Privatized screening		$ 130.0	$ 130.0	$ 146.0	$ 148.6	$ 148.6	$ 148.6
Passenger and baggage screeners, personnel, compensation and benefits		2,200.0	2,299.0	2,522.0	2,470.2	2,470.2	2,470.2
Subtotal, screener workforce		$2,330.0	$2,429.0	$2,668.0	$2,618.8	$2,618.8	$2,618.8
Screening training and other		198.0	344.0	261.0	244.5	244.5	244.5
Human resource services		211.0	150.0	207.0	207.2	207.2	200.0
Checkpoint support		37.0	124.0	157.0	173.4	173.4	180.7
EDS/ETD Systems							
EDS purchase (a)	[a]	157.0	180.0	175.0	91.0	136.0	141.4
EDS installation (a)	[b]	515.0	45.0	45.0	94.0	94.0	171.5
EDS/ETD maintenance		166.0	175.0	200.0	234.0	234.0	210.0
EDS/ETD refurbishment	[c]	--	--	--	--	10.0	--
Operation integration		--	--	23.0	23.0	23.0	23.0
Subtotal, EDS/ETD systems		$ 838.0	$ 400.0	$ 443.0	$ 442.0	$ 497.0	$ 545.9
Total, screening operations		$3,614.0	$3,447.0	$3,736.0	$3,685.9	$3,740.9	$3,789.9
Mandatory appropriation							
Aviation Security Capital Fund (a)	[d]	0.0	250.0	$ 250.0	$ 250.0	$ 250.0	$ 250.0
Total available for purchase and installation	[a+b+c+d]	**$ 672.0**	**$ 475.0**	**$ 470.0**	**$ 435.0**	**$ 490.0**	**$ 562.9**

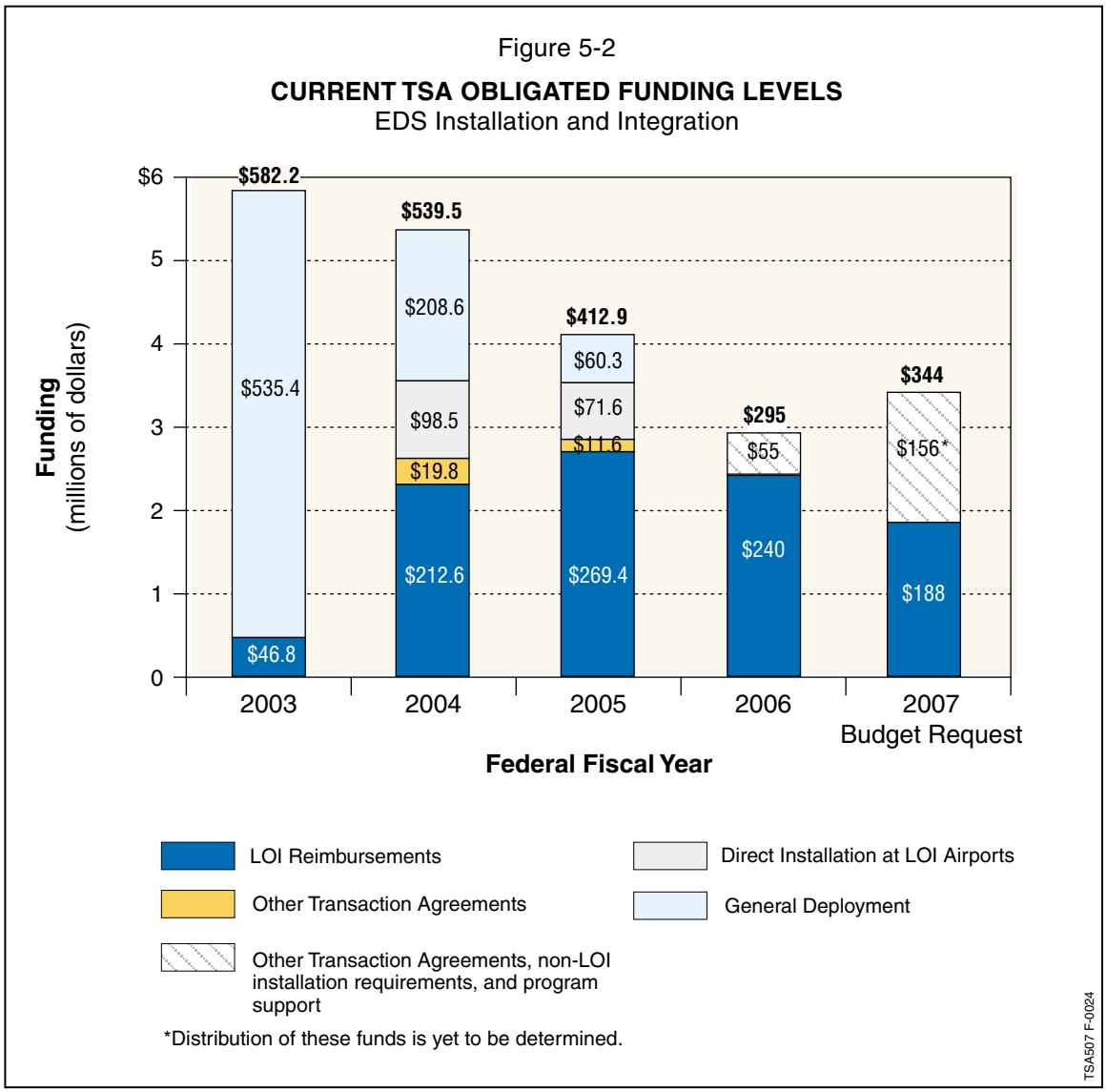
(a) Included in total available for purchase and installation.

Source:
2005 - http://www.tsa.gov/public/display?theme=39
2006 - TSA staff
2007 - Appropriations Bill for FFY 2007, Department of Homeland Security

Note: FFY 2002 and FFY 2003 were unique years in terms of TSA appropriations, so they are not shown. TSA's funding for FFY 2002 came in the form of two lump sum appropriations, rather than line items that are characteristic of TSA appropriations beginning in FFY 2004. In FFY 2002, $206 million was budgeted for EDS purchase and $738 million was budgeted for EDS installation. In FFY 2003, TSA's funding was provided in the FFY 2003 Omnibus Appropriations Act of 2003. A total of $175 million was budgeted for EDS purchase, and $500 million was budgeted for EDS installation in FFY 2003.

TSA grants to airports to fund investment in BHS and infrastructure are made from the EDS installation line item. The figure below reflects the various components of the obligated installation budget since FFY 2003.

Figure 5-2



TSA Funding from Federal User Fees and Federal Taxes. TSA is funded from General Fund appropriations offset by the collection of two federal aviation security user fees:

- *Passenger Security Fees* –The Passenger Security Fee is currently $2.50 per flight segment with a maximum of $5.00 per one-way trip, and is collected by airlines from the passenger when the ticket is purchased. The fees generate approximately $1.9 billion per year, which will increase as passenger traffic increases over time.

- *Aviation Security Infrastructure Fees* – These fixed annual fees are charged directly by the federal government to airlines in an amount intended to equal the amount paid by airlines in calendar year 2000 for screening passengers and property. The fees have been generating approximately $300 million annually. GAO has since estimated that the industry-wide calendar year 2000 passenger and property screening cost was approximately $448 million, and TSA has taken action to collect that amount. However, airlines have challenged the GAO estimate, and the exact amount therefore has yet to be resolved.

Deployment of EDS Systems. Deployment of in-line and other EDS systems has slowed considerably due to uncertainty about future funding sources and costs resulting from (1) evolving policies regarding federal grants to airports to build infrastructure for in-line systems, (2) concerns about the federal budget, and (3) the fact that first generation in-line systems have been more resource-intensive than anticipated.

- *Uncertainty regarding Federal Grants to Airports* – It is not likely that U.S. DOT's annual appropriation will allow FAA to approve AIP funding of baggage screening infrastructure, and the current funding environment does not support the issuance of multi-year LOI commitments without the safeguards of a multi-year trust fund or other source of "guaranteed" future-year funding. Therefore, TSA may only be able to provide 1-year OTAs under the current funding approach. As a result, airports are less certain each year as to whether they will receive a grant and have generally not issued debt in anticipation of receiving those 1-year grants. The result has been that only a small number of airports have invested in infrastructure to accommodate in-line EDS screening systems.

- *Federal Budget Challenges* – The federal budget has been in deficit since FFY 2002. The ongoing wars in Afghanistan and Iraq, 2005 hurricane devastation, and increasing fuel prices and their potential effect on the economy have raised concerns, particularly in the Administration, about controlling annual federal expenditures for aviation security programs and various other programs. In FFY 2005 and 2006, Congress appropriated amounts greater than the Administration's requests for airport security screening. To reduce the use of General Fund monies (from federal taxes) for aviation security, the Administration has also proposed increases in Passenger Security Fees and Aviation Security Infrastructure Fees in FFY 2006 and FFY 2007. In part because of industry opposition to the proposed increases in federal aviation fees, Congress did not adopt those proposed fee increases.

5.2 ALTERNATIVE FUNDING AND FINANCING CONCEPTS CONSIDERED

While there is no shortage of creative ideas on how to *finance* future baggage equipment and investment in infrastructure—for example, using leases and various forms of debt financing—the significant challenge has been to find the sources of *funding* to pay for those various debt instruments. The Working Group, therefore, focused first on the more difficult issue of funding streams, taking into consideration a wide range of potential funding sources and determining which were viable. The Working Group then considered different financing mechanisms that could be used to leverage the viable funding sources. Specifically, the Working Group focused on the following options to fund and finance infrastructure and BHS:

- Increased TSA funding from the General Fund
- New Tax Credit Bond program (providing federal tax subsidies)
- TSA EBSP funding protection and increased flexibility
- New Aviation Security Trust Fund (using federal aviation security user fees)
- Reinstatement of Airport Improvement Program eligibility
- Continued use of available state funding
- New Security Facility Charge Program
- Changes to Passenger Facility Charge program
- Increased use of airport/airline revenue

Figure 5-3 summarizes the funding/financing concepts that were considered in depth, and shows the types of costs each concept might cover (screeners, equipment maintenance, BHS O&M, and other O&M expenses, [primarily consisting of equipment utility costs, baggage screening equipment], and BHS/infrastructure). Most concepts would, at a minimum, facilitate investment in BHS and infrastructure. Some would cover equipment, and others would extend to screeners and other O&M costs.

Figure 5-3

FUNDING/FINANCING CONCEPTS CONSIDERED IN DEPTH

Transportation Security Administration

Key Concept	Operating and Maintenance Costs			Capital Cost	
	Screeners	Equipment Maintenance	Other O&M	Screening Equipment	BHS/ Infrastructure*
1 Equipment Lease		■		■	
2 Service or Usage Contract	□	■	■	■	□
3 Share-in-Savings					■
4 Reinstated AIP Eligibility					■
5 Enhanced PFC Eligibility					■
6 Trust Fund/LOI					■
7 Tax Credit Bonds					■
8 New User Fees	■	■	■	■	■

□ Potential use
■ Intended use

*BHS O&M is currently paid by airports and airlines. Reimbursement from TSA could be included under the service or usage contract concepts.

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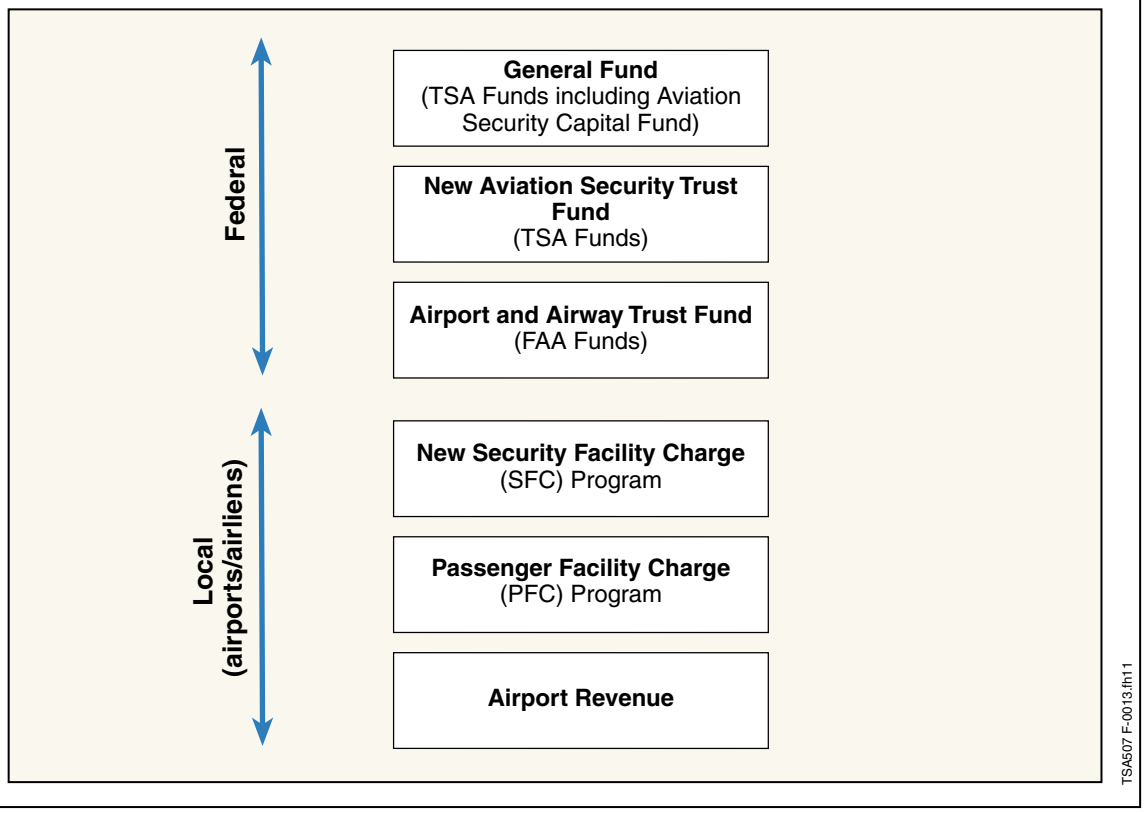
Figure 5-4 shows the expanded set of funding sources considered as part of the BSIS. These sources are presented so that federal funding sources are shown at the top of the figure, followed by local sources (i.e., funding from airports and airlines).

Figure 5-4

RANGE OF FUNDING SOURCES CONSIDERED

Transportation Security Administration



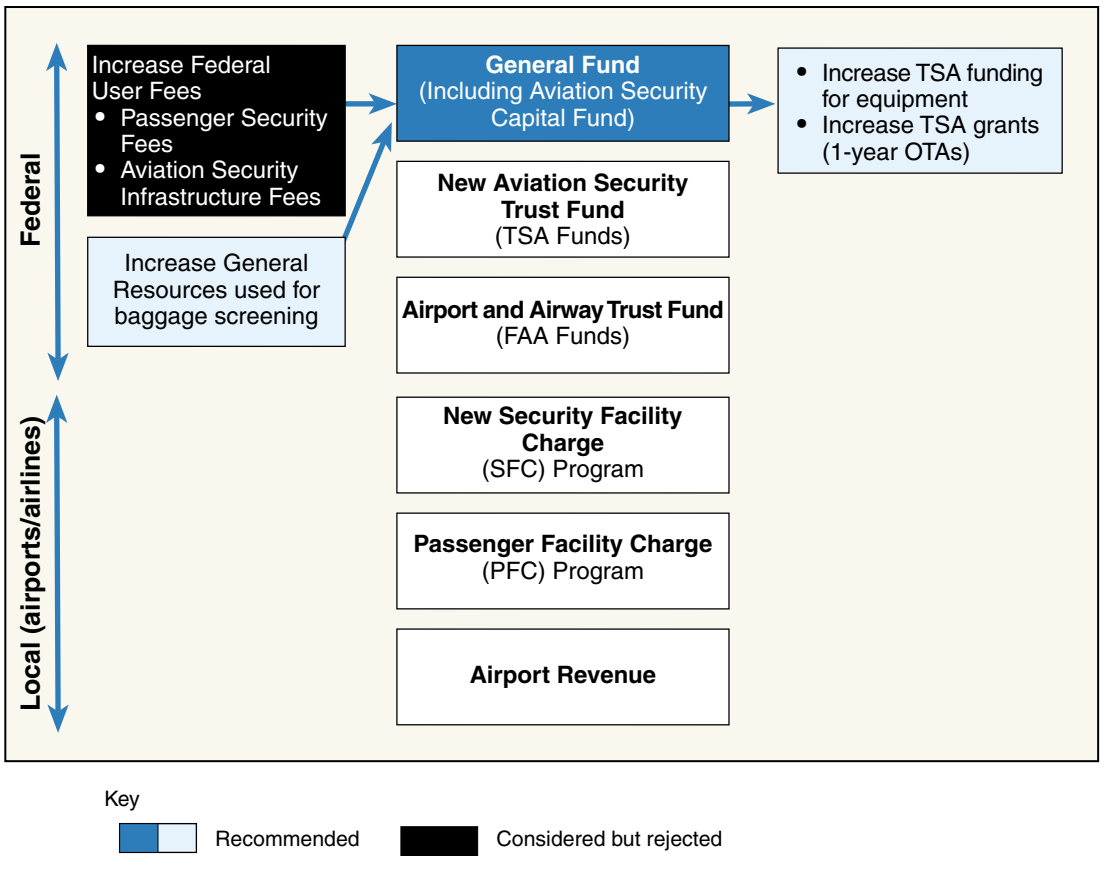
5.2.1 Increased TSA Funding from the General Fund

As shown on Figure 5-5 and discussed below, two alternatives were considered for increasing annual appropriations for TSA's purchase and installation of EDS baggage screening systems from the current $435 million level (escalating annually): (1) increasing federal user fees, and (2) increasing the amount of general resources of the federal government from tax revenues used to support investment in baggage screening.

Figure 5-5

CONSIDERATION OF INCREASED FEDERAL USER FEES AND GENERAL FEDERAL RESOURCES

Transportation Security Administration



- *Increase Federal Aviation Security User Fees*. The Working Group considered the concept of increasing either the Passenger Security Fees ($2.50 per flight segment with a maximum of $5.00 per one-way trip) or the Aviation Security Infrastructure Fees that are currently collected directly from the airlines ($300 million to $448 million annually). The Working Group strongly agreed that checked baggage screening, as defined in ATSA, is a federal responsibility. While airline and airport members of the Working Group felt that the federal government should, therefore, be 100% responsible for the funding necessary to achieve this mandate, TSA felt that this was unrealistic without increasing federal aviation user fees, given current constraints on the federal budget. Airline members of the Working Group stressed that airlines absorb passenger fees as well as direct fees, since they cannot add the passenger fees onto their fares due to fare competition. Representatives of passenger interest groups and airline representatives argued strongly against increasing the federal user fees they collect and pay, so the concept was not endorsed.

- *Increase Support from Federal Taxes*. The Working Group also considered recommending larger annual appropriations for TSA from the General Fund. On the basis of the quantifiable and nonquantifiable benefits that would accrue to the federal government/general public (as discussed in Section 5.5), the consensus was to recommend that TSA seek to maintain, if not increase, appropriations for investment in baggage screening. However, the Finance Team also recognized that this approach does not allow for substantial inclusion of large numbers of airports or terminals in a given fiscal year. Alternative approaches that would support the recommended investment policy and also be more feasible from a fiscal perspective were, therefore, explored.

5.2.2 New Tax Credit Bond Program

The BSIS process has resulted in the recommendation that Congress adopt new legislation authorizing the use of a federal tax credit bond program for the capital costs of BHS and related infrastructure. Under this proposal, Congress would authorize airports to issue up to $3 billion in TCBs over a 4-year period. The issuance amount would be allocated to interested airports by DHS and TSA, based on the prioritization process described in Section 5.4.

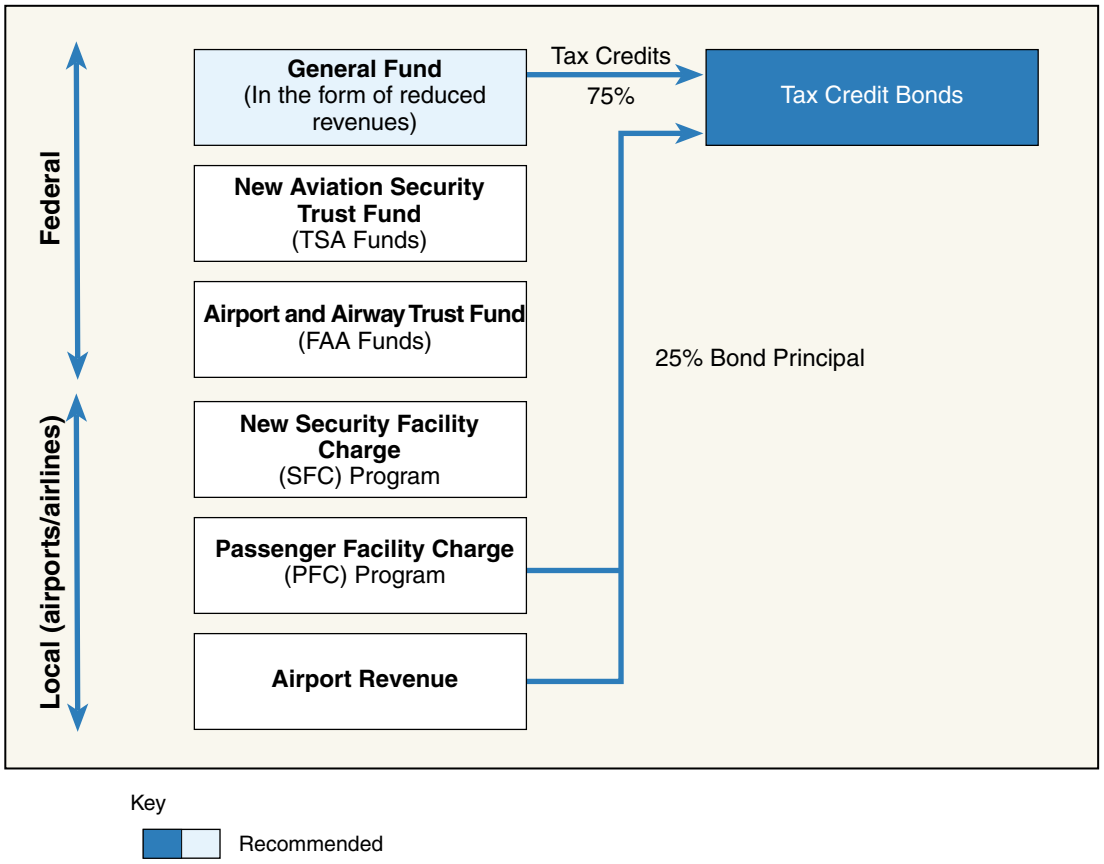
Background. TCBs are a relatively new form of financial instrument. They were first introduced in 1997 through the establishment of Qualified Zone Academy Bonds (QZABs), a $400 million per year, 2-year program targeted to public school modernization projects in lower income neighborhoods. Congress has renewed the QZAB program several times since then; presently, $3.2 billion of such bonds have been authorized for issuance. The Administration, in its FFY 2007 Budget, has proposed extending the QZAB program by another $800 million through FFY 2007. Last year, Congress enacted a similar $800 million TCB program for clean, renewable energy projects called Clean Renewable Energy Bonds (CREBs), and a $350 million TCB program for Alabama, Louisiana, and Mississippi to provide short-term financial relief for Hurricane Katrina recovery.

TCBs involve the issuance of taxable debt by state and local governments or other non-federal entities for designated capital purposes. In lieu of cash interest, bondholders receive annual tax credits that can be applied against their federal income tax liability. The tax credit itself represents taxable income to the bondholder. Principal is repayable by the issuer from non-federal sources. The bonds are generally structured as "bullet" term bonds where the principal is repaid in a lump sum at bond maturity. TCBs are generally structured as bullet term bonds to maximize the value of the tax credit, and the issuer makes periodic deposits to a sinking fund to provide for principal retirement at maturity. Unlike other federal tax credit programs oriented to equity capital (such as tax credits for investments in low-income housing), TCBs do not require the project sponsor to be the "consumer" of the tax credit. Instead, this form of tax subsidy encourages private investment in desired infrastructure through lower-cost debt capital for the issuer.

TCBs provide a substantial subsidy to the issuer, as the interest expense can represent 50% to 80% of the effective cost of long-term borrowing. The extent of the subsidy depends on the term (maturity) of the bonds and the interest (credit) rates. The longer the term and the higher the interest rates, the greater the subsidy level. In today's interest rate environment, airports and airlines would effectively pay 25% of project costs in present value terms if all project costs were financed with TCBs having a maturity of 25 years.

Figure 5-6

CONSIDERATION OF TAX CREDIT BONDS
Transportation Security Administration



Proposed TCB Program Features. A $3 billion program is recommended for the EBSP, to be allocated among interested CAT X—III airports by DHS and TSA based on the prioritization approach described in Section 5.4. The program would be structured to provide $1 billion in proceeds in FFY 2008, stepping down to $800 million in FFY 2009, and $600 million in each of FFY 2010 and FFY 2011. Any TCB proceed amounts not issued in the year initially authorized would carry forward to future years. Each airport would be responsible for identifying pledged non-federal sources of revenue to repay the principal at maturity, consistent with its legal authority, and any financial covenants backing its other debt. The tax credit bonds

could be on parity with an airport's traditional revenue bond indebtedness, or issued on a subordinate or stand-alone basis. Possible pledged revenue streams include one or more of the following:

- *General Airport Revenues*, from airline rents and fees and nonairline sources, as is the case for traditional general airport revenue bonds (GARBs)
- *Passenger Facility Charge Revenues*, as is the case for stand-alone PFC-backed bonds and double-barrel bonds backed by PFC revenues and general airport revenues
- *General Local Governmental Resources*, such as sales and property taxes, as is the case for general obligation municipal bonds issued to fund airport projects (more common for small- and nonhub airports than large- and medium-hub airports)

Airport participation in the TCB program would be entirely voluntary. It is anticipated that large- and medium-hub airports, which frequently access the capital markets to raise capital, would be the most likely issuers of TCBs. While smaller airports would not be excluded, the resource demands on smaller airports for this type of issuance would be relatively high compared with their smaller borrowing needs. In addition, the federal subsidy provided through the recommended TCB program (about 75%) would be less than the 90% federal contribution currently received by small- and non-hub airports for baggage screening infrastructure costs as part of the LOI program. One of the primary reasons for maintaining or increasing the $435 million baseline for TSA purchase and installation funding is to provide assistance to airports that choose not to participate in the TCB program.*

Airport demand for funding of their baggage security projects far exceeds the available $435 million annual baseline (escalating annually). Airports wishing to rely on this traditional funding approach could face delays in receiving sufficient grants. The TCB program would enable participating airports to significantly accelerate the initial deployment (or needed expansion) of optimal baggage screening systems. In addition, the program would permit those airports or airlines that have or will self-fund new baggage screening infrastructure to use their tax credit bond allocation to refinance previously issued airport revenue bonds or reimburse internal funds used for such purpose. These airports, however, could not use the proceeds from TCBs to cover their share of a previously issued LOI agreement or a project for which an OTA has been issued. For airlines that have self-funded new baggage screening infrastructure at terminals they own and operate, reimbursement with TCB proceeds could be facilitated by the airport acting as a conduit (as is currently the case for terminals, maintenance facilities, etc. funded with special facility bonds). Any new baggage screening systems, whether entirely

* Airports wishing to rely on direct grants could face delays in receiving grants depending on the prioritization process and business rules established by TSA (see Section 5.4.3).

self-funded or funded with federal assistance, must be approved by TSA as described in the BSIS Planning and Design Guidelines.

Market for Tax Credit Bonds. As taxable fixed-income investments, tax credit bonds would be sold in the corporate bond market. The return to a bondholder—the tax credit rate—would have to provide a competitive risk-adjusted rate of return compared to other investments. The program terms should provide that the tax credit rate would be the yield that would enable bonds sold on a given date to be marketed without discount and without additional interest cost to the issuer.

The demand for tax credit bonds by entities with federal tax liability will determine the program's market potential. Potential bondholders include banks, insurance companies, and other taxable bondholders. A bondholder would be allowed to decouple, or strip, the tax credits from the principal, similar to U.S. Treasury bonds. This attribute would substantially broaden the market, and allow the tax credit strips to be sold to corporate bondholders with ongoing tax liability (such as insurance companies) and the stripped taxable principal to be sold to other classes of bondholders that have no demand for tax-advantaged returns (such as pension funds).

Budgetary Implications. Traditional federal spending (such as grant and lease payments) is recognized through obligations of funds on the discretionary side of the federal budget, subject to annual appropriations. Such spending and borrowing by federal agencies typically is scored (i.e., expensed) up-front, regardless of the nature of the assets being financed. Thus, unlike state and local governments, which can reflect the budgetary cost of long-term capital investments over a multi-year period through debt financing, the federal government's budgetary accounting does not distinguish between capital and operating items.

Tax code measures are handled differently. Under federal budgetary scoring procedures, the fiscal impact of a tax code incentive, such as tax credit bonds, is calculated annually through "tax expenditures." These are the estimated foregone Treasury receipts, projected over a 10-year scoring window following enactment of the measure.

Based on conventions used in the existing tax credit bond programs for school modernization and energy projects (the QZABs and CREBS), it appears that the 10-year scored cost of a $3 billion tax credit bond program with the contemplated 4-year issuance profile would be approximately $1.1 billion (or 38% of the face value of the bonds). In contrast to grants, this budgetary cost would be charged against the *mandatory* (receipts) side of the federal budget, and would not compete for funding with conventional spending programs that are subject to *discretionary* budget controls. In this manner, the tax credits can augment the direct appropriations received by TSA to support further investment in baggage screening systems.

TCB Program Justification. The Working Group believes that a TCB program is the most viable way to accelerate the EBSP and realize significant economic and security benefits of doing so. This recommendation takes into account (1) current budget realities, (2) the nature of the long-lived infrastructure improvements, and (3) the widespread security benefits accruing to the general public, as well as the direct benefits to be realized by system users. The TCB program is recommended for the following reasons:

- It is supportable by both airlines and airports and would minimize the budgetary impact of the required federal contribution. These attributes make it the most feasible way to expedite implementation of optimal EDS baggage screening systems. Expedited implementation would enable a present value life-cycle cost savings to the federal government of approximately $1.5 billion compared to the current funding baseline.

- It effectively draws on general taxpayer support through a tax subsidy, thereby inducing airport investment to augment the current TSA EDS purchase and installation budget. This investment is appropriate because (1) baggage screening at airports is a critical element in maintaining national security; (2) a safe and dependable commercial aviation system provides nationwide economic benefits; and (3) the primary beneficiary in terms of quantifiable economic benefits from automation investments is the federal government (through TSA staffing cost savings and avoidance).

- The use of tax credits would allow the budgetary cost of the federal assistance to be spread over a multi-year period, more in line with the useful economic life of the financed infrastructure improvements than conventional government investments, which are "expensed" up front.

- The TCB program results in a 25% local cost share. This ratio is consistent with other baggage screening investments by TSA in recent years (through LOIs) and federal infrastructure assistance programs.

- Providing federal assistance through a tax subsidy compared to outright grants minimizes the need for federal bureaucracy, and ensures that project-related borrowings by airports are subject to a market test for financial feasibility.

5.2.3 TSA EBSP Funding Protection and Flexibility

A continuation of at least $435 million, escalating annually, is needed in annual capital appropriations to TSA for purchase and installation of EDS equipment, and for issuance of facility modification grants to airports that do not participate in the TCB program. The voluntary nature of the TCB program will result in less predictability of funding needs. TSA will therefore need more flexibility to use purchase and installation funds interchangeably to fund then-current needs, through the appropriation of a combined purchase and installation budget line item.

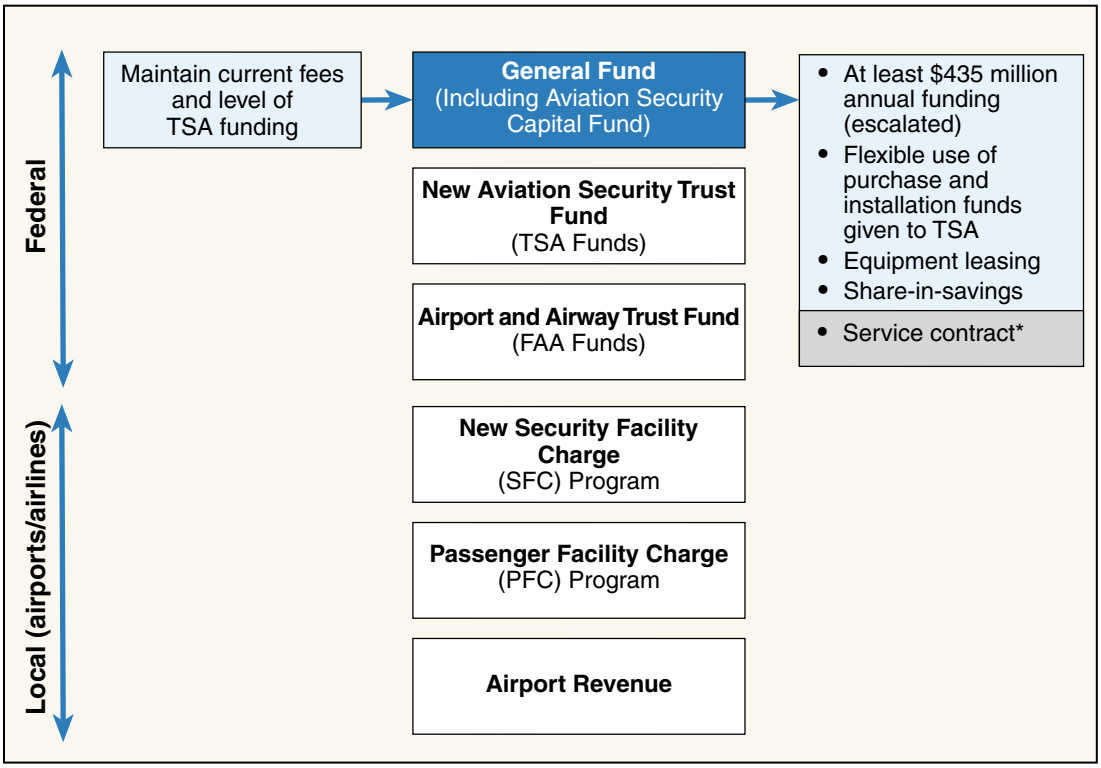
This flexibility will allow TSA to respond to the needs of airports and airlines in the context of a more transparent long-term investment strategy. Any restrictions associated with preventing the combination of purchase and installation funds should therefore be minimized or eliminated to provide TSA with increased flexibility in light of the voluntary nature of the TCB program.

Figure 5-7 reflects several ways in which additional flexibility might be afforded TSA.

Figure 5-7

CONSIDERATION OF CURRENT TSA FUNDING PROTECTION/INCREASED FLEXIBILITY

Transportation Security Administration



Potential mechanisms considered by the Working Group to give TSA additional flexibility include:

Equipment Leasing. DHS and TSA decision-makers are interested in exploring the option to lease EDS equipment, with a goal of deploying new equipment more quickly than would otherwise be possible. A key question is

whether, in the long run, it might be more cost-effective to lease rather than purchase such equipment, given the high maintenance and rapid demands for new technology. Even so, the acceleration benefits of leasing EDS equipment would be minimal because equipment purchase costs represent only a small portion of the initial capital costs associated with EDS deployment (typically 15% to 30%). The installation and associated infrastructure costs—which do not lend themselves to leasing—represent the largest share of the program funding needs.

EDS equipment leasing would involve a contract between the federal government and either the equipment manufacturer or a third party. To facilitate accelerated acquisition of equipment without a significant increase in TSA appropriations, the lease would need to be treated as an operating lease for federal budget purposes. Under an operating lease, the budget authority necessary to fund annual lease payments would be scored against the budget *each year* as the payments come due. This scoring contrasts with capital leases and other borrowing arrangements, where sufficient budget authority to cover the full cost of the asset being acquired must be provided *up front*—even if the payments (outlays) are spread over a multi-year period. Annual scoring through an operating lease would allow TSA's equipment budget to support more equipment each year.

OMB Circular No. A-11 (A-11), Appendix B, sets forth the terms that a lease must meet to be classified as an operating lease:

- Ownership of the asset remains with the lessor during the term of the leases and is not transferred to the federal government at or shortly after the end of the lease period.

- The lease does not contain a bargain-price purchase option (e.g., the lease does not have a buyout clause at less than the fair market value of the asset at the end of the lease).

- The lease term does not exceed 75% of the estimated economic life of the asset.

- The present value of the minimum lease payments over the life of the lease does not exceed 90% of the fair market value of the asset at the inception of the lease.

- The asset is a general-purpose asset rather than being for a special purpose of the federal government, and is not built to unique specification for the federal government as lessee.

- There is a private-sector market for the asset.

The first four conditions depend on the specific structure of the lease, while the last two depend on the assets being leased. Essentially, meeting these conditions requires shifting risk (contingent financial liability) from the government to the lessor.

TSA would likely face several challenges in structuring favorable EDS equipment lease terms, given the specialized nature of the assets and potential market conditions: EDS equipment has a fairly short life (approximately 7 years) before it must be significantly overhauled ("refreshed"); there are few manufacturers of approved equipment; market demand (by the federal government, thus far) is uncertain; and the technology/performance risks are high.

It may be especially difficult to satisfy the regulatory requirement that there be a private-sector market for EDS equipment, especially if a market for *used* EDS equipment is required. As a practical matter, without a secondary market to resell or re-lease equipment, vendors and/or third-party leasing companies would likely add to the lease cost for the risk of not finding alternative buyers/lessees of the equipment, which could greatly increase the cost of the lease.

TSA has held initial discussions within the Administration regarding the leasing of EDS equipment. Significant concerns have been expressed about whether a leasing program for EDS equipment could satisfy the operating lease tests in A-11. In addition to analyzing the budgetary treatment, an assessment of the economics of the transaction is required – the terms of the lease and the lease payments must be structured so that the lease has a lower present-value cost than the purchase of the equipment, discounted at the government's low cost of capital. This lower cost may be difficult to achieve in the relatively high-risk manufacturing environment for EDS equipment.

Because of concerns about both economic feasibility and budgetary impact, and because EDS equipment costs are only a modest part of the overall system implementation challenge, the Working Group did not specifically recommend equipment leasing. But the Working Group did conclude that TSA should be able to continue exploring potential lease arrangements and issues with private vendors/lease providers.

Service Contracts. A service contract between TSA and an airport, airline, or third party would provide a package of services and facilities to screen checked baggage. Under a service contract, TSA would enter into a contract and make annual payments to an airport, airline, or third party. In return, the airport, airline, or third party would provide baggage screening services subject to TSA oversight. To provide those services, the airport, airline, or third party would need to:

- *Hire Screeners* – Hiring screeners would entail participating in the Screening Partnership Program by opting not to have federal screeners at the airport. Rather than the standard form of opting out used to date, where TSA selects, contracts with, and pays a private screening company at the airport, the airport would either provide screening services using its own staff or contract out and pay a private screening company. This change may require a legislative change to the existing SPP. Another significant concern relates to liability risks; many airports have expressed concerns that the current

contracting provisions and indemnifications are not sufficient to address their liability concerns.

- *Provide and Maintain Equipment* – The airport, airline, or third party would either purchase or lease equipment from vendors, most likely with a maintenance program included in the contract.

- *Pay O&M and Other Costs* – The airport, airline, or third party would be responsible for other O&M costs, primarily utilities to run the equipment and BHS.

TSA would have a greater probability of achieving annual scoring if screener costs were included in a service contract, as they are clearly operating costs and are quite large, potentially overwhelming the costs of equipment and maintenance.

In addition, a comprehensive service contract could include:

- *Infrastructure* – The airport, airline, or third party would fund the infrastructure necessary to support optimal automated EDS baggage screening systems, the cost of which would be included as part of the service contract bundle.

It is contemplated that TSA and the airport, airline, or third party would negotiate an annual payment, perhaps fixed within certain bounds, whereby the airport would assume "business risk." If the airport airline, or third party could arrange the service at a lower cost than the TSA funding level, it could retain the savings, but it would also take downside risk if actual costs exceeded the contractual level of TSA payments. A fairly predictable annual amount, perhaps with appropriate escalation, might be simplest to accommodate in TSA's budgeting process. Alternatively, TSA could pay on a per-bag basis, but that would introduce another element of risk for both TSA and the airport, airline, or third party (i.e., the risk of not accurately forecasting activity), and it would make TSA's budgeting process more challenging.

The service contract option does not have full airport or airline support. However, if an airport expresses the desire to follow through and appropriate legislative authority exists, the Working Group agreed that TSA currently has the authority to pursue this mechanism, and is permitted to do so, but the Working Group did not specifically recommend implementing service contracts.

Share-in-Savings. Under this general concept, TSA would share with the airport some of the significant screener staff savings anticipated to result from the installation of an optimal system at that airport. The concept is intended to "incentivize" airports to accelerate investment in optimal baggage screening systems using their own resources, including TCBs, rather than waiting for TSA grants to become available. The screeners could be either TSA staff or outsourced personnel operating under a service contract. A participating airport could use its share of the savings to reimburse itself for pay-as-you-go costs or debt service associated with the capital investment**.** Conference Report language accompanying TSA's FFY 2006

Appropriations Act encourages TSA to enter into share-in-savings agreements with airports, but the program has not been used to date.

While the concept has merit, several practical challenges exist to implementation:

- *Calculating Savings* – It is very difficult to establish the "baseline" cost to use in calculating expected savings, especially if TSA does not have its required complement of screeners at the airport initially. Additionally, at many airports, screener resources are shared extensively between checked baggage and passenger checkpoint functions, making a precise count for each component quite difficult. Another complication is how to account for traffic growth in establishing the baseline.

- *TSA Checkpoint Screener Needs* – To improve security and levels-of-service at passenger screening checkpoints, especially as traffic increases, TSA may need to redeploy baggage screeners (made available due to EDS optimal system automation) to the checkpoints at an airport, or from one airport to another.

- *Potential for Reduced TSA Budget* – If TSA were successful in realizing screener savings, Congress could, at some point, reduce TSA's funding and reduce or eliminate TSA's ability to pay the airport, since it is likely that TSA payments as part of the share-in-savings program would be subject to annual appropriations – i.e., appropriations for these payments would not be "locked in" without a guaranteed source of funding, such as a trust fund. This uncertainty would make it difficult for an airport or airline to issue debt secured by share-in-savings payments and would necessitate securitizing the bonds with more reliable sources of revenue.

Recognizing these significant challenges, the Working Group did not seek to rely on the share-in-savings mechanism as a key element of one or more specific baggage screening funding sources or financing tools. However, the Working Group recognized that the general concept could conceivably be used in the future in tandem with an existing mechanism or any new mechanisms.

5.2.4 New Aviation Security Trust Fund

The Working Group explored the possibility of seeking legislation to establish a dedicated trust (or similar type of special) fund for TSA such as the Airport and Airway Trust Fund that supports most of the federal aviation programs including AIP or the Highway Trust Fund for surface transportation programs. Under this concept, some or all of the existing $2.50 Passenger Security Fee (that generates about $1.9 billion per year), and the Aviation Security Infrastructure Fees (which are paid directly by the airlines and generate $300 million to $448 million per year), would be credited to a newly-established Aviation Security Trust Fund. Those resources would be intended to provide more reliable funding for deployment of optimal screening systems.

As shown on Figure 5-8, potential benefits of an Aviation Security Trust Fund that is considered "self insured" would include:

- Re-enabling TSA to issue multi-year LOIs for airports
- Facilitating other types of reimbursement agreements where an airport could construct BHS/infrastructure with its own internally generated funds or debt and preserve its eligibility for later grant reimbursement by TSA
- Giving TSA multi-year contract authority with "guaranteed" annual spending (similar to the Highway Trust Fund)

Despite the nominal appeal of trust-funded budget resources, the Finance Team identified significant challenges with this approach.

- A key issue is the nature of federal trust funds, which generally are considered to be accounting mechanisms rather than fiduciary trusts. Unlike other trusts, where beneficiaries own the assets managed by trustees, the federal government owns and manages the assets of federal trust funds. The federal government can and frequently does change the collections, payments, and purposes of its trust funds by changing the laws governing them.
- A second challenge would be the potential opposition to creating yet another special fund of the federal government. Notwithstanding their legislative origins and political support, trust funds exist within the larger framework of federal budget policies and spending decisions. Attempts to create special / trust funds frequently are resisted as they reduce appropriations oversight and budget flexibility
- Another concern is that this approach would not – in and of itself – result in new resources. Directing existing Passenger Security Fees and/or Aviation Security Infrastructure Fees to a new special / trust fund would not increase overall resources to facilitate deployment of optimal screening systems or address the budget tension between operating costs and capital improvements. New fees or general revenues would be required to replace those fees credited to the new fund to enhance investment in baggage screening.
- Finally, and perhaps most fundamentally, the source of revenue for any new trust fund is a concern. By definition, federal trust funds are supported by "user fees" – receipts or offsetting collections earmarked for specific purposes. As indicated previously, the airport and airline members of the Finance Team believe that baggage screening is a federal responsibility that generates national benefits, and therefore should be supported principally from the General Fund. Airport and airline members feel strongly that direct users of the aviation system (passengers and airlines) already bear a significant share of screening and airport security costs through the existing

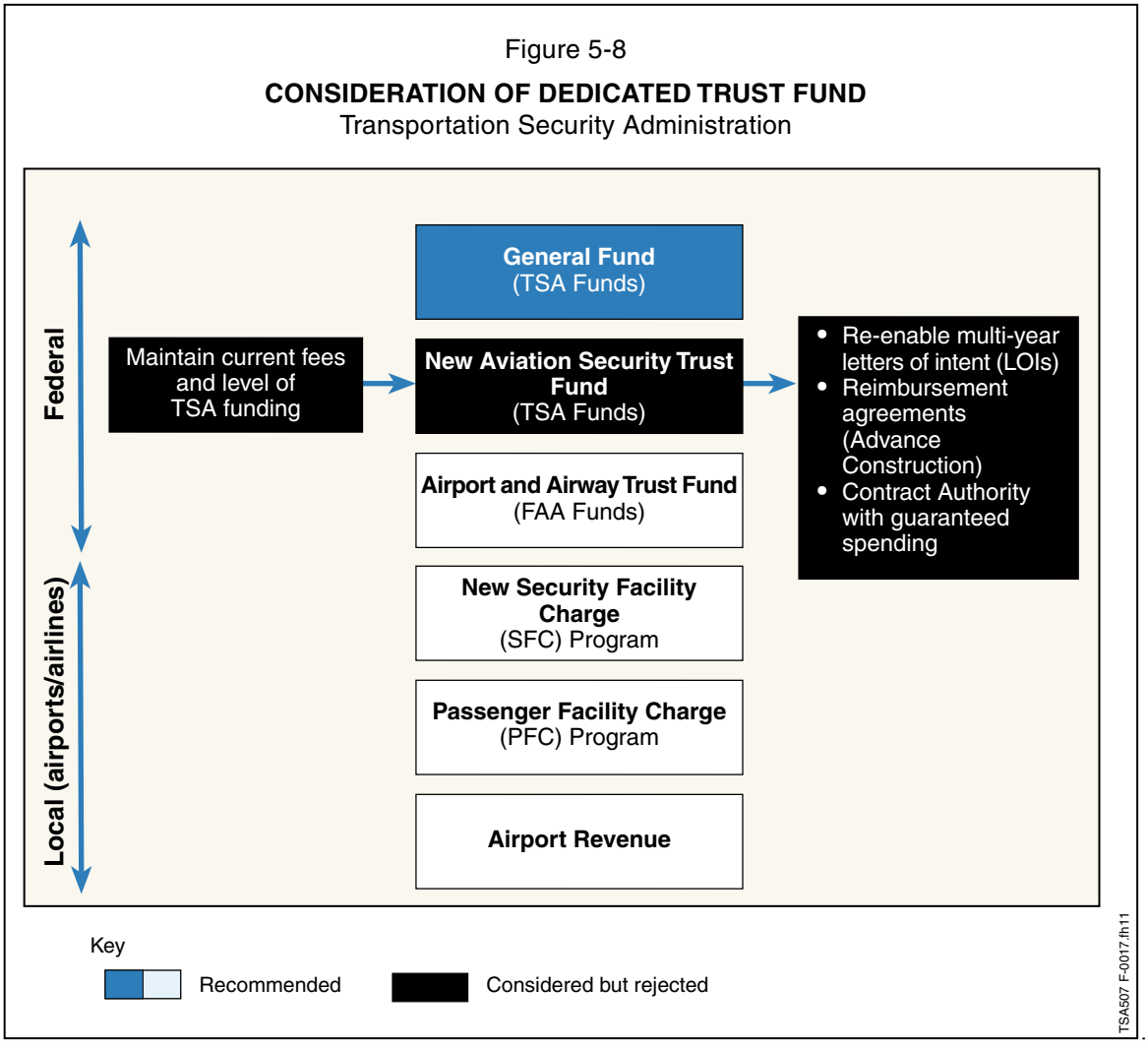
federal user fees. Establishing a new federal trust fund might imply that any further resources required for airport security should come exclusively from federal user fees. The industry strongly opposes any further increases in costs paid by users of the system through new or increased fees.

The Working Group consensus was not to pursue the Aviation Security Trust Fund concept, because the TCB program is viewed as a more effective and feasible approach for supplementing current resources and accelerating deployment of optimal screening systems. Also, it was agreed that concurrently pursuing two major initiatives—the TCB program and the Aviation Security Trust Fund—would be difficult and might undermine the prospects for enactment of either proposal.

Figure 5-8

CONSIDERATION OF DEDICATED TRUST FUND

Transportation Security Administration



5.2.5 Reinstatement of Airport Improvement Program Eligibility

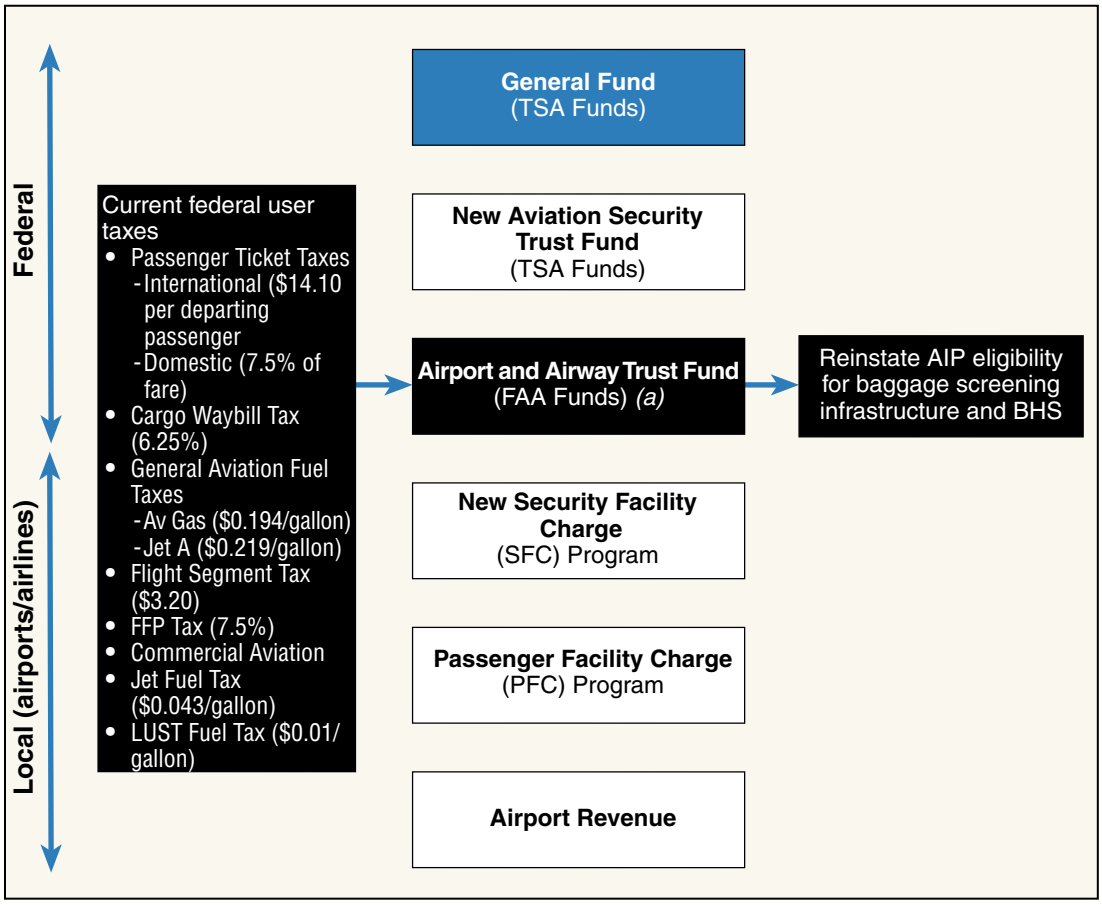
The Working Group explored the concept of seeking reinstatement of FAA AIP eligibility for baggage screening. This concept is shown on Figure 5-9. As previously indicated, ATSA made baggage screening infrastructure eligible for AIP discretionary and passenger entitlement funds (but not cargo entitlement funds). Effective in FFY 2004, the Century of Aviation Reauthorization Act (Public Law 108-176), referred to as Vision 100, limited baggage screening infrastructure eligibility to passenger entitlement funds. Since FFY 2004, U.S. DOT's appropriation acts have prohibited use of any AIP funds for baggage screening infrastructure.

Airport representatives and FAA's technical advisors to the Working Group expressed significant concern that providing substantial AIP support for EDS installation at current AIP funding levels could require FAA to defer funding for other important projects to enhance or preserve capacity, leading the Working Group to abandon the concept.

Figure 5-9

CONSIDERATION OF REINSTATING AIP ELIGIBILITY

Transportation Security Administration



Key

Recommended

Considered but rejected

(a) The Aviation and Transportation Security Act (ATSA) made baggage security infrastructure eligible for AIP discretionary and passenger entitlement funds. Effective in FFY 2004, the Vision 100 reauthorization of AIP limited baggage security infrastructure eligibility to passenger entitlement funds. However, beginning in FFY 2004 and continuing through FFY 2006, the Department of Transportation's appropriation act has prohibited spending any AIP funds for baggage security infrastructure.

FFP = Frequent Flyer Program Mileage Tax
LUST = Leaking Underground Storage Tanks

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5.2.6 Continued Use of Available State Funding

State funding for aviation security purposes is very rare, but Florida is one state that provides grants for such purposes. Specifically, the State of Florida Trust Fund Program provides grant funding through the Florida DOT. The Working Group view was that any such funding could play a role in an airport's funding strategy, but such funding is generally likely to be *de minimis*.

5.2.7 New Security Facility Charge Program

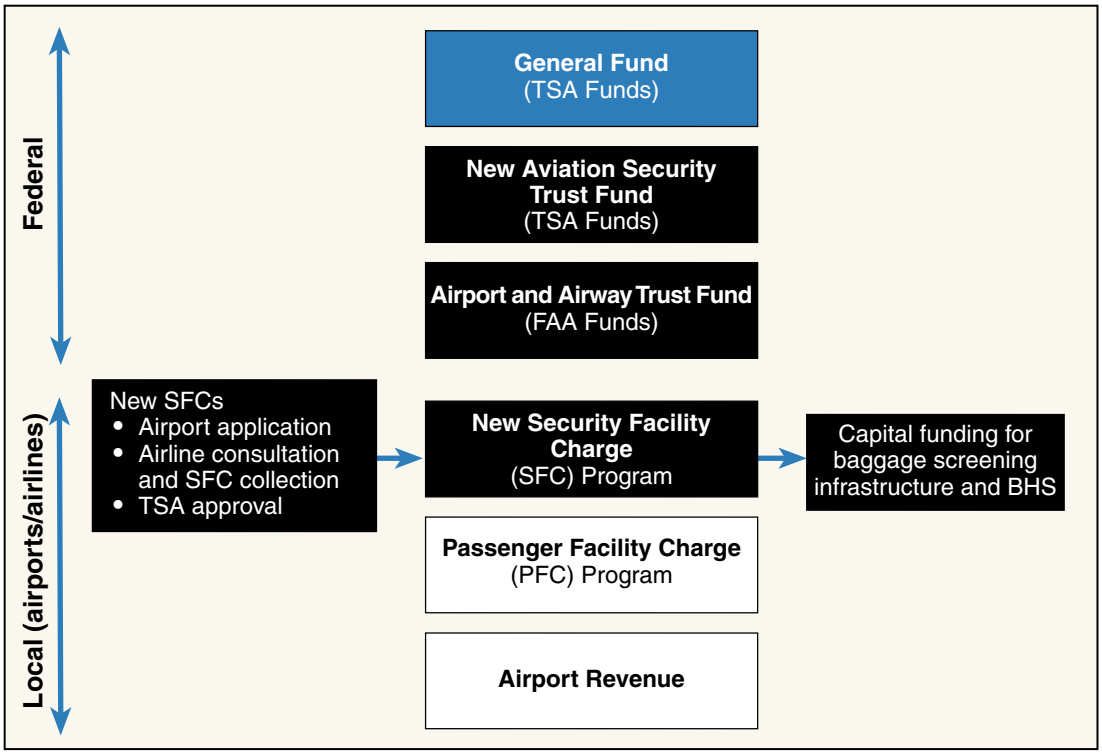
The Working Group assessed the possibility of a Security Facility Charge (SFC) administered by TSA and modeled after FAA's PFC program. Similar to PFCs, SFCs would be federally authorized local funds that could be used as the local match to TSA grants or to fund projects in their entirety. SFC revenue could be used on a pay-as-you-go basis, to make TCB sinking fund payments, or to pay debt service on traditional interest-bearing bonds.

As shown on Figure 5-10, an airport would develop its proposed project(s) and funding plan, consult with the airlines, and submit an application to TSA for approval to collect an SFC and use the revenue for the project(s). The airlines would include the SFC in the ticket price, and remit the SFC revenues to the airport, minus a collection fee that the airlines would retain.

Airport members of the Working Group expressed concern that implementation of an SFC might obviate the chances of making desired changes to the PFC program. Airline members also argued against the concept, stating that it would be another fee they may not be able to pass on to passengers and would need to absorb themselves. "Direct collect" approaches such as Airport Improvement Fund collections in Canada, where passengers pay an airport directly, have not worked well, and would add yet another line for passengers to navigate as they depart an airport. The Working Group members also expressed concern about TSA's ability to find the resources necessary to administer such a program. Due to these various concerns, the Working Group did not recommend this concept.

Figure 5-10

CONSIDERATION OF SECURITY FACILITY CHARGE (SFC)
Transportation Security Administration



5.2.8 Changes to Passenger Facility Charge Program

PFC revenues are the primary source to date of local matching funds to federal grants used to fund BHS and infrastructure at airports. Certain airports, such as Tampa International Airport, have used PFC revenues to fund all or nearly all of their baggage screening investments. PFC revenues can currently be used to fund common-use baggage handling systems, related infrastructure, and, possibly, equipment (although to date, no equipment has been funded with PFC revenues).

Airport members of the Working Group expressed concern about increasing the PFC level for the specific purpose of funding infrastructure to accommodate EDS baggage screening systems and BHS, given their view that checked baggage screening is the federal government's responsibility, and the need to increase PFCs to fund capacity, noise, and safety projects. Airline members shared those concerns, but also expressed concern about increasing the PFC for any reason, because they may not be able to pass the increase on to passengers, and would need to absorb it themselves.

While the Working Group rejected PFC revenues as a primary source for increased EDS baggage screening system funding, it did recommend eligibility changes to permit PFC revenues to be used for limited purposes. As shown on Figure 5-11, the Working Group recommends modifications to Title 49 to:

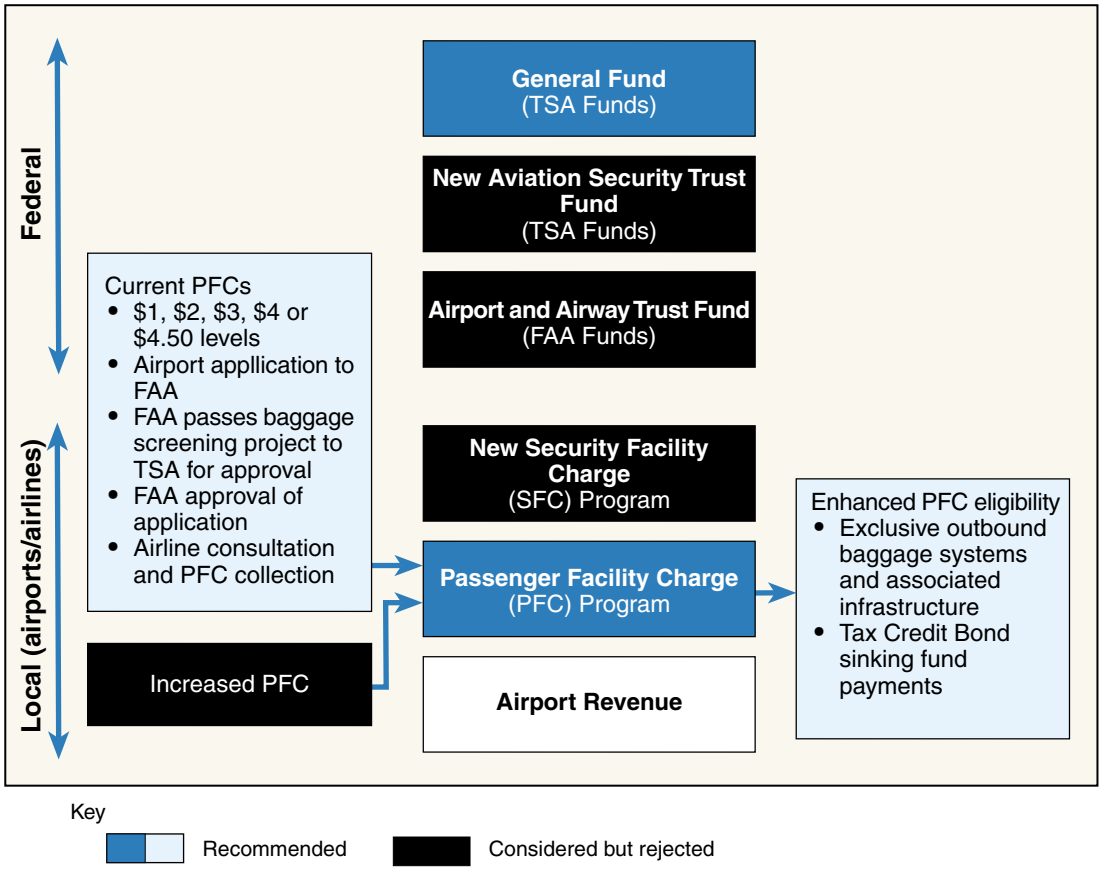
- *Allow Modification or Construction of Exclusive-Use Baggage Handling Systems and Infrastructure to Accommodate EDS Screening Systems* – security concerns are viewed by Working Group members and FAA technical advisors as outweighing potential competitive concerns, since airline competition at airports is driven to a much greater degree by access to gates than by outbound baggage systems.

- *Allow TCB Sinking Fund Deposits* -- PFC revenues can currently be used to pay debt service on bonds issued to fund eligible projects, so sinking fund deposits to repay principal are likely eligible. The Working Group would like to make that eligibility explicit.

Since ATSA was adopted, EDS equipment has been purchased and installed by TSA. The Working Group also recommends that the responsibility for equipment funding remain with TSA and expressly rejected any consideration of expanding PFC use to include equipment purchase.

Figure 5-11

CONSIDERATION OF PASSENGER FACILITY CHARGE (PFC) USE
Transportation Security Administration



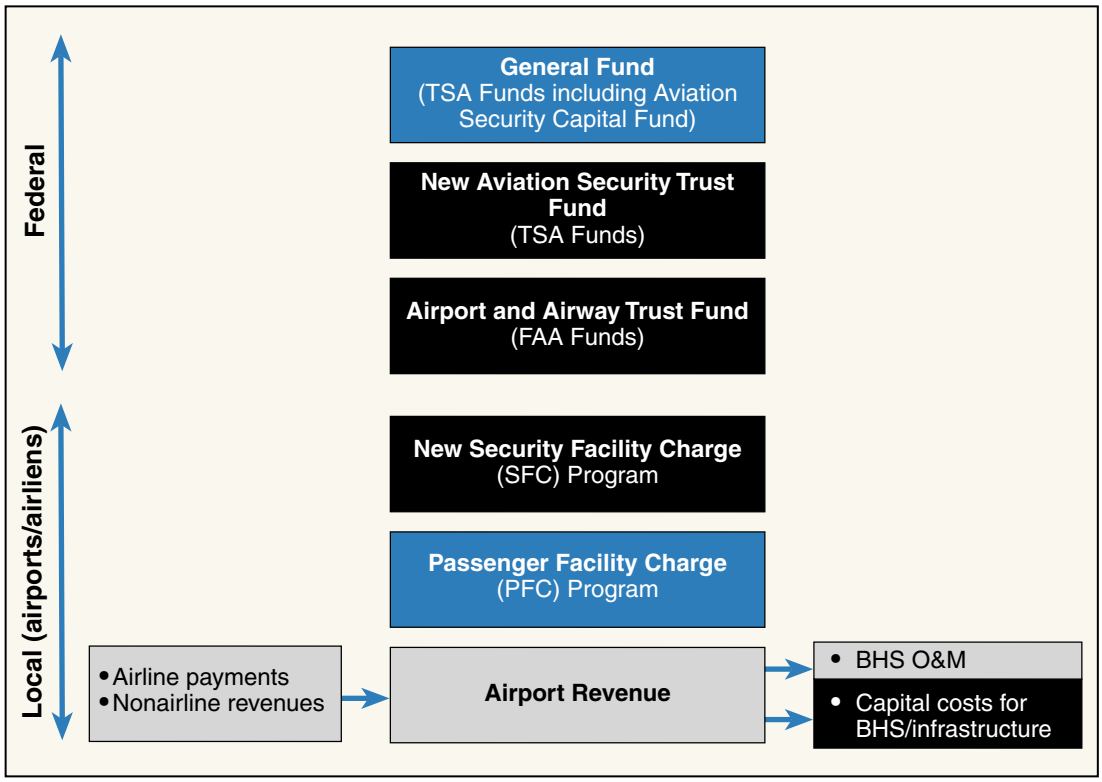
5.2.9 Increased Use of Airport/Airline Revenue

Several airports (and airlines operating unit terminals) have used internally generated funds to pay for infrastructure and BHS. Several others that received TSA LOIs, OTAs, and/or FAA AIP funding used internally generated airport funds, and/or proceeds of bonds supported by airport revenues, including airline rates and charges, as all or part of their local contribution. Airport revenues may be used for any allowable airport purpose under federal law. However, depending on the terms of an airport's use and lease agreement with the airlines, if one exists, the airlines may have the right to approve capital investments or the issuance of bonds to accommodate in-line EDS screening systems. Airlines may be reluctant to approve or support proposed airport investments to accommodate in-line EDS screening systems at airports, because they view checked baggage screening to be the federal government's responsibility and the increased burden on airline finances, except at key hub airports or other locations with severe operational problems resulting from stand-alone baggage screening systems. The Working Group recognized that

airport revenues from airline payments and nonairline sources are currently used to pay BHS O&M costs and are expected to continue to be used for BHS O&M, and perhaps, to pay TCB sinking fund deposits, but rejected using airport revenues as a primary source for increased EDS baggage screening system capital funding.

Figure 5-12

CONSIDERATION OF USE OF AIRPORT/AIRLINE REVENUES
Transportation Security Administration



5.3 RECOMMENDED FUNDING AND FINANCING APPROACH

The BSIS resulted in the following two critical elements of the recommended funding/financing strategy that are mutually dependent:

- *Create a Voluntary $3 Billion Tax Credit Bond Program* that airports can access to fund infrastructure and BHS necessary to support the screening system.
- *Maintain at Least the Current Level of Annual EDS Purchase and Installation Appropriations to TSA* from the General Fund (escalating annually) for EDS purchase and installation.

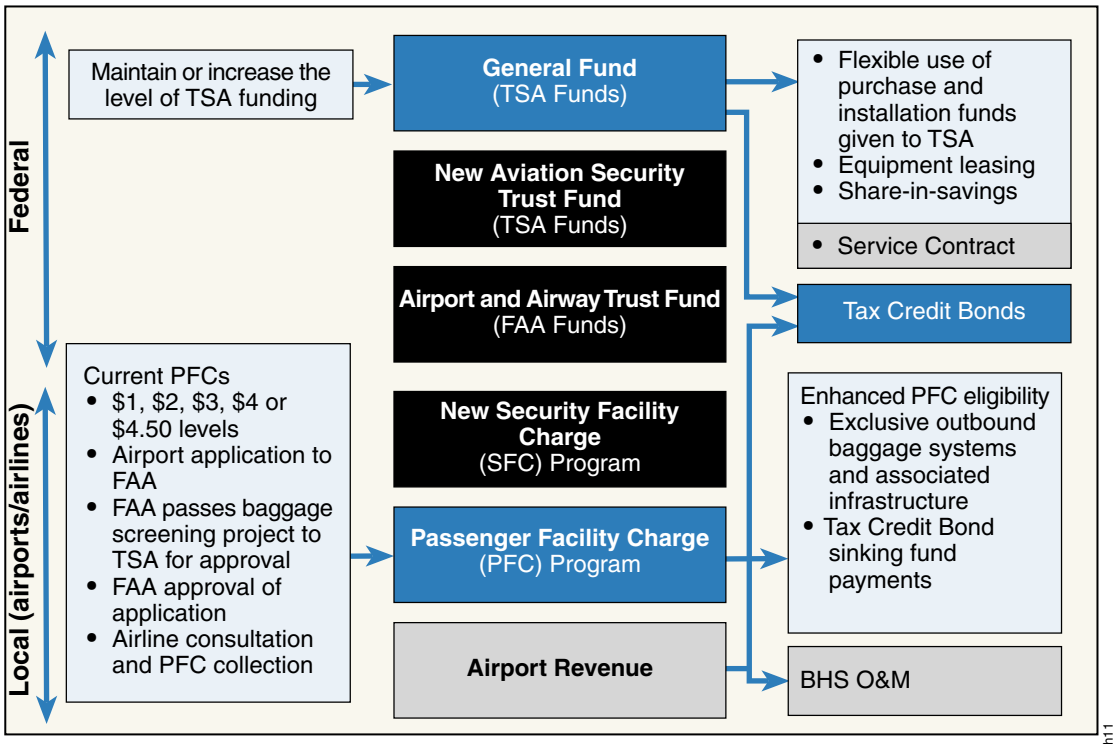
In addition to these primary funding strategies, the Working Group identified an additional initiative to enhance the tools available for baggage screening:

- *Enhance PFC Eligibility* for (a) modification or construction of exclusive-use outbound baggage handling systems and infrastructure to accommodate EDS screening systems and (b) TCB sinking fund payments.

Figure 5-13 shows the suite of recommended funding tools that represent the consensus of the Working Group.

Figure 5-13

SUMMARY OF FUNDING CONCEPTS
Transportation Security Administration



5.4 GENERAL APPROACH TO PRIORITIZATION

Prioritization of checked baggage screening projects is the responsibility of TSA. The Framework described a general approach to prioritization based on the use of the Airport Prioritization Model (APM). TSA has established a set of weights for each evaluation criterion and sub-criterion, based on its view of the relative importance of each criterion.

5.4.1 Prioritization Criteria for Initial Optimal System Deployment

Working Group members were given the opportunity to comment on the criteria used for prioritization of initial optimal system deployment projects presented in the *EBSP Strategic Planning Framework*. There was general agreement on the prioritization approach and criteria used. However, several members expressed concern about two aspects of the criteria:

1. As applied in the Framework, some criteria penalize airports and airlines that seek reimbursement from the federal government for existing in-line systems paid for entirely by local monies. Since the current deployment of equipment is used as the baseline for establishing economic benefits, these airports and airlines are likely to be lower on the prioritization list than those that chose not to move forward with automated EDS screening system investments.

2. The criteria do not include quantifiable measures of the operational challenges caused by lobby-based screening systems at many airports. Suggestions were made to incorporate several quantitative measures.

TSA will assess the feasibility of addressing these concerns and incorporate improved data and measures into the prioritization process.

5.4.2 Prioritization Criteria Weights for Initial Optimal System Deployment

To prevent any potential conflicts of interest, Working Group members were not provided an opportunity to comment on the weights used. The criteria weights were shown to the Working Group as part of its review of the Framework.

5.4.3 Prioritization Process

The prioritization process described in the Framework Report was based on the use of TSA grants to fund optimal EDS baggage screening systems at airports. TSA could, therefore, prioritize all projects and program funding for those highest on the list in a given year.

The recommended funding approach, as discussed earlier in this chapter, is authorization of a voluntary TCB program to accelerate investment in automated EDS screening systems. Since participation in this program would be voluntary, it is anticipated that applications to issue TCBs would be reviewed and prioritized by TSA on an annual basis. Therefore, the prioritization process needs to account for TCB applications and the provision of equipment for TCB projects.

The prioritization process must also account for the uses of TSA's purchase and installation budget, which includes funding for the following:

- Grants to airports and airlines for the federal government's share of facilities modification costs:
  - New optimal systems at existing terminal facilities
  - New optimal systems at future new terminal facilities
  - Redesign of existing systems to improve efficiency
- Purchase and direct installation of screening equipment for:
  - New optimal systems at existing terminal facilities
  - New optimal systems at future new terminal facilities
- Purchase and direct installation of new screening equipment for life-cycle replacement of existing equipment or to accommodate growth in traffic
- Procurement of life extension (refurbishment) and upgrade packages for screening equipment

Finally, the prioritization process must account for the status of the proposed projects – airports and airlines that have developed plans or do not have an immediate interest in pursuing an optimal screening system should not receive federal grants at the expense of airports and airlines that are prepared to implement approved systems immediately.

To accommodate the TCB program, prioritization of different uses of the purchase and installation budget, and the need to prioritize only airports and airlines that have developed plans for an optimal screening system, the prioritization approach would likely consist of the following elements:

1. Applications for TCB issuance authority would be reviewed on an annual basis to ensure that the projects comply with the Planning and Design Guidelines and other requirements for funding.

2. Eligible TCB projects would be prioritized based on the prioritization criteria and weights shown in Table 5-2 and Figure 5-13. Issuance authority would be granted for projects based on the amount of money available from the TCB program.

3. Requirements for purchase and installation of equipment necessary to maintain compliance with ATSA requirements would be assessed, including:
   - Equipment for future new terminal facilities
   - Equipment for accommodating growth in traffic

- Life-cycle replacement of existing equipment
- Life extension and upgrade packages

4. Remaining funds would be available for purchase and installation of equipment for:
   - TCB projects
   - Projects funded by federal grants
   - Locally funded projects
5. Grants for facilities modification costs at airports with approved designs would then be provided based on the prioritization criteria and weights discussed above.

This prioritization approach is based on the assumption that current purchase and installation funding levels ($435 million in FFY 2007 escalated annually) are maintained or increased, such that progress can be made in providing grants to airports and airlines that choose not to participate in the TCB program.

The Working Group agreed that prioritization of TCB issuance authority to airports as well as the prioritization of projects funded with TSA's purchase and installation appropriations would be the prerogative of TSA. As such, TSA plans to issue detailed funding guidance to the aviation industry explaining the alternatives available for funding baggage screening systems and communicating the process and business rules to access facility modification grants for airports and airlines that do not use the TCB program.

Since the purchase and installation budget is the only source of funding for the procurement and direct installation of equipment and will most likely be the primary source of federal assistance for the installation of optimal systems at many small airports, projects at airports where TCBs are viable but not used may receive a lower priority than other types of projects (e.g., procurement and direct installation of equipment, grants to airports and airlines that cannot effectively access the TCB program). TSA will clarify how this situation and other business rules will be defined as part of the detailed funding guidance.

5.5 RATIONALE FOR COST-SHARING APPROACH

The Working Group strongly agreed that checked baggage screening, as defined in ATSA, is a federal responsibility. While airline and airport members of the Working Group felt that the federal government should, therefore, be 100% responsible for the funding necessary to achieve this mandate, TSA felt that this was unrealistic without increasing user fees, given current constraints on the federal budget.

In addition, members of the Working Group agreed that the benefits of checked baggage screening should accrue to all elements of the aviation industry and that local funds have, in the past, been used to fund automated EDS baggage screening systems or provide a local match to federally funded systems.

5.5.1 Allocation of Benefits from Checked Baggage Screening

Effective and efficient screening of checked baggage helps ensure the safety of passengers and the unconstrained flow of commercial activity. The benefits of optimal checked baggage screening accrue to all elements of the aviation industry and the nation as a whole. Based on an analysis prepared for the Air Transport Association of America, it was determined that the commercial aviation industry was responsible for approximately $1.25 trillion of national output in 2004.*

Since the benefits of checked baggage screening include improved safety and passenger confidence, they are difficult to accurately quantify. In addition, these benefits accrue to airports, airlines, passengers, and the nation as a whole, making allocation among the parties extremely challenging.

5.5.2 Allocation of Benefits from Optimal EDS Screening

As discussed in Chapter 4, the benefits of investment in optimal screening systems, including automated EDS baggage screening systems, accrue primarily to the federal government in the form of staffing cost savings and avoidance. Airports and airlines are likely to incur additional O&M costs associated with more complex baggage handling systems required to support automated EDS screening. While all parties benefit from the improved level of security resulting from large-scale deployment of EDS equipment and the replacement of primary ETD equipment, these security benefits are difficult to quantify.

Furthermore, operational improvements resulting from optimal EDS screening will also benefit the federal government, airports, and airlines, as discussed in Chapter 4. Airport and airline members of the Working Group felt that the installation of optimal EDS baggage screening systems could only be considered a benefit to the industry when compared to today's lobby-based screening systems. In meeting the tight deadlines of ATSA, a collaborative and more cost-effective approach to deploying systems was not feasible. Therefore, industry stakeholders felt that these benefits should not be used to impose a cost-sharing formula.

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* The Campbell-Hill Aviation Group, Inc., *Commercial Aviation and the American Economy*. Prepared for the Air Transport Association of America, March 2006.

5.5.3 Cost-Sharing Approach

Given the difficulties in (a) quantifying many of the benefits of deploying optimal screening systems and (b) establishing an agreeable and consistent baseline for measuring benefits, defining an analytical cost-sharing formula is unrealistic.

As discussed in Chapter 4, airports and airlines receive minimal quantifiable benefits and bear significantly increased costs associated with optimal EDS baggage screening system deployment. In addition, ATSA mandates that screening be a federal responsibility. The airline and airport stakeholders, therefore, felt that there was neither a defensible policy nor economic justification for anything less than a 100% cost share by the federal government. However, they understood the realities constraining the federal budget and the challenges associated with deployment of optimal EDS baggage screening systems to all CAT X – III airports

Therefore, the Working Group accepted the recommendations that the TCB program be authorized and TSA's baseline EDS purchase and installation budget ($435 million, escalating annually) be maintained or increased. Table 5-2 summarizes the current cost-sharing approach.

Table 5-2

CURRENT COST-SHARING APPROACH

Cost	Current Cost-Sharing Approach (Federal Government / Airport and Airline)
Capital costs	
Facilities modification	75% / 25% for in-line EDS baggage screening systems at large- and medium-hub airports
	90% / 10% for in-line EDS baggage screening systems at small- and non-hub airports
	100% / 0% for stand-alone EDS baggage screening systems at all airports (regardless of hub size)
Screening equipment purchase and direct installation	100% federal government funding
Operating and maintenance costs	
BHS and associated facilities	100% airport and airline funding
Screening equipment utilities and maintenance	100% federal government funding
Staffing costs	
TSA checked baggage screeners	100% federal government funding
Baggage porters	100% airport and airline funding

Chapter 6

COST MANAGEMENT

Given the size and complexity of the EBSP, active cost management is essential to achieving the benefits envisioned in this study. As screening technology evolves, the corresponding design best practices must also evolve. Given the relative newness of 100% electronic baggage screening in the United States and the rapid changes in technology, there are many different philosophies regarding in-line system design, which vary significantly in cost and performance. Left unmanaged or under-managed, nationwide costs for implementing EDS screening systems could be much higher than necessary, which would delay program completion and reduce economic benefits.

Critical to the success of the EBSP is the active engagement of and coordination among multiple parties. Frequent and open communication at both the national and local levels among airports, airlines, equipment manufacturers, BHS designers and manufacturers, local TSA, and TSA headquarters will be essential to the success of the program. Strong and sophisticated program management will be necessary to achieve program cost, schedule, and performance goals.

6.1 COST RISKS

There are many cost risks associated with the EBSP that must be actively managed, including:

- Availability and performance of assumed new screening technology
- Quality of in-line system designs
- Consistent selection of optimally scaled screening systems at the local level (i.e., consistently and appropriately balancing up-front capital costs with ongoing operating costs)
- New security threats and screening protocol changes
- Price escalation for critical materials and labor due to program acceleration or external economic factors

These risks are discussed further in the following sections.

6.1.1 Availability and Performance of Assumed New Screening Technology

It is anticipated that new screening technologies with significant performance improvements will be deployable by 2008. In the event that delays occur in the availability of these technologies, or the performance of these technologies is lower

than expected when they do become available, the cost assumptions in the BSIS and the economic case for investment could be very different than previously assumed and have a material effect on the recommended strategy.

Several types of next generation EDS equipment with improved image quality and lower false alarm rates are currently being developed by EDS manufacturers and are expected to become available by 2008. Some of the next generation screening equipment is expected to have much higher throughput rates (in the range of 1,000 bph) as well as improved resolution capability. The TSL, key EDS manufacturers, and the BSIS Technical Team extensively reviewed the performance and availability assumptions during the course of the BSIS. Appendix B, the Technical Team report, provides a summary of the key performance assumptions for current and anticipated new screening equipment.

Some of the performance and availability risk is mitigated by the fact that several manufacturers are currently developing new technologies. However, the risk can be further mitigated through increased R&D investment by DHS/TSA and more active coordination among TSA, DHS, and equipment manufacturers. Given that TSA no longer manages the TSL, additional effort will be required to ensure that TSL efforts are consistently applied to projects and initiatives that will produce the most benefit for the EBSP.

6.1.2 Quality of In-Line System Designs

With increasing pressure to automate EDS baggage screening functions, program costs could be significantly higher than estimated and the resulting checked baggage screening systems could perform below expectations without explicit and detailed planning and design guidelines and strong program management oversight nationwide. Suboptimal performance may lead to significant additional recurring costs to improve designs and improve performance to desired levels. Typically, sub-optimal designs are very costly to operate and manage because they require significantly higher staffing levels to remedy problems such as higher mistracking rates, bag jams, and higher rates of unknown bags. Also, improving screening system designs after implementation is generally very costly, as structural changes and significant operational disruptions may be involved.

6.1.3 Consistent Selection of Optimally Scaled Screening Systems

Optimally scaled EDS screening systems are screening systems that are sized and automated to minimize life-cycle costs. Often, only two options are considered during the planning and design process – fully automated in-line systems or stand-alone systems. However, many other options with varying degrees of cost and automation should also be considered, many of which rely on new screening technology anticipated to be deployable no later than 2008.

Unless clear guidance is provided on the types of technology that will be available, best practice designs, and how TSA will determine funding levels and priorities, many airports and airlines will likely continue designing systems that are sub-optimal from a cost and performance perspective.

6.1.4 New Security Threats and Screening Protocol Changes

As security threats to civil aviation constantly evolve, the appropriate security response requires changes and improvements in technology performance, security procedures, and screening protocols. As additional security threats are identified, new security standards are implemented to address these additional threats. As new security standards are met by emerging technologies (as well as existing technologies to the extent possible), expected performance levels of screening technologies are likely to change.

For example, if the new standards require more types of threats to be detected using a given technology, throughput could decrease or the false alarm rate could increase. As a result, various screening systems could become more labor intensive, thereby increasing staffing costs related to security operations (and potentially reducing screening system effectiveness).

Screening protocol changes could also have a significant operational and economic impact. To accommodate protocol changes without affecting other screening system performance parameters (such as baggage time in system), system modifications would likely result in an increase in staffing and EBSP costs.

6.1.5 Price Escalation Due to Program Acceleration

Accelerating EDS deployment may have a significant impact on prices charged by manufacturers and vendors of various equipment types related to in-line checked baggage screening systems (e.g., EDS manufacturers, BHS manufacturers). In addition, external economic events may lead to increased prices for raw materials used in conveyor components, EDS equipment, and building construction.

Many Working Group members indicated that accelerating investments and the required ramp-up of the aviation industry to support implementation of the BSIS recommendations may result in price escalation for equipment, components and services required (similar to price trends after September 11, 2001, for BHS components, as well as other related services). A spike in very large orders for products and services in a short period of time is likely to result in a "price premium" from vendors compared to a stable request for products and services over an extended period of time. This risk can be mitigated by free market competition among the various vendors, as well as by actively managing implementation costs (for example, the BSIS Guidelines require planners to identify and pursue the lowest life-cycle cost screening alternative), and by staggering TCB funding over 4 years, as presented in Chapter 5.

Certain escalation risks, such as those caused by increases in world demand for raw materials, are likely to be outside the control of the cost management actions recommended in the following section. As such, the Working Group recommended that the funding requirements and/or completion timeframes described in Chapter 4 be updated as necessary to reflect economic realities.

6.2 COST MANAGEMENT STRATEGY

Several actions were recommended by the BSIS Technical Team to help manage program costs, as summarized below.

6.2.1 BSIS Planning and Design Guidelines

To mitigate some of the above-mentioned risks, BSIS Guidelines are being prepared to consolidate and promulgate best practices and identify opportunities to significantly reduce costs through improved designs and new technology.*

The BSIS Guidelines not only emphasize best practices associated with screening system layouts, they also address other factors necessary to actively manage cost and performance. Key themes emphasized in the BSIS Guidelines include:

- Achieving lowest-cost solutions by leveraging new technology and conducting life-cycle cost analysis of alternatives
- Defining operational performance standards that must be met during implementation as well as during the planning and design stages
- Understanding the complexity of in-line screening systems and how to avoid the common pitfalls of first-generation designs
- Developing principles for appropriate sizing of systems, including methods for estimating demand and equipment requirements
- Developing principles for providing equipment redundancy and establishing contingency operations

* The Recommended Security Guidelines for Airport Planning, Design and Construction (revised June 15, 2006) issued by TSA and developed with the assistance of a different working group formed under ASAC addressed near-term recommendations for best practices with regard to security planning across a number of different functional components of airports. The section on checked baggage screening describes a number of lessons learned, but focuses on the implementation of systems with currently certified technologies. The BSIS Working Group Technical Team is currently developing new guidelines focusing specifically on checked baggage screening that reflect the results and goals of the BSIS, which include the deployment of new screening technology, the requirement for life-cycle cost estimates to determine the optimal screening solution, and an enhanced planning and design process reflecting a more cost-effective and participatory approach.

- Developing principles for accommodating growth beyond initial system sizing

- Upgrading the design review and approval process

The BSIS Guidelines address some key design improvements critical for improving the economic performance of in-line systems, such as:

- Reducing baggage jams at EDS machines by improving staging of bags prior to EDS screening (e.g., additional queuing belts and elimination of power turns immediately before the EDS machine) and using alignment devices for equipment with less than a 1-meter gantry (the standard conveyor belt width)

- Reducing mis-tracked bags (thereby reducing the number of bags going to ETD) by improving BHS design, improving tracking technology, and adding recirculation and bypass loops

- Providing design flexibility to accommodate a future upgrade path and meet future threats and security requirements (e.g., accommodate bag tracking of selectee passengers)

- Reducing ETD resolution times by providing baggage viewing stations for each ETD machine (i.e., rather than a single station for the entire resolution room and/or relying on color printouts)

6.2.2 Enhanced Design and Funding Approval Process

The process by which new and upgraded system designs are approved must be enhanced to ensure that planners identify a wide range of screening solutions and select the most cost effective alternative. To ensure consistent selection of the optimal system, the key change associated with the design review and approval process relates to additional information that must be included in the required design package submittals. In particular, there would be an increasing emphasis on economic analysis, providing for contingency operations plans, and ensuring conformance with operational performance standards.

The BSIS Guidelines provide a detailed description of a more effective process for submittal, review, and approval of screening system design by TSA. Three major phases were identified for the overall design process:

- **Pre-design Phase.** During this phase, a recommended conceptual alternative would be developed, which involves identifying existing baseline conditions, estimating the design-year baggage screening demand, and selecting a preferred alternative through an iterative process of developing and analyzing a range of candidate alternatives.

- **Schematic Design Phase.** During this phase, the work product of the Pre-design Phase would be used to further develop and refine the preferred alternative(s), including initial development of design drawings, more detailed rough-order-of-magnitude construction cost estimates, and program schedule, resulting in an approved Basis of Design Report.

- **Detailed Design Phase(s).** During this phase, the Basis of Design Report would be used to refine and finalize detailed design drawings (throughout the three sub-phases: 30%, 70% and 100% design), rough order-of-magnitude construction cost estimates, and program schedule.

The BSIS Technical Team also recommends that a local design committee, including representatives of relevant stakeholders, be formed as needed to assess and quantify the impact of specific local conditions that affect the design.

6.2.3 Increased TSA Program Management Resources

The Working Group believes that TSA does not currently have sufficient program management resources to adequately oversee the EBSP, especially as the program is accelerated through additional capital funding. To achieve the cost savings estimated in this report, active participation from TSA headquarters is required throughout the planning, design, and construction process. Accordingly, it is recommended that TSA provide ample dedicated full-time program management personnel for accelerated EDS deployment. In addition to reviewing designs, these personnel would actively collaborate with airports and airlines during the entire planning and design process to minimize the risk of costly and time-consuming redesign efforts.

6.2.4 Integrated National Deployment Team

An INDT is recommended as a mechanism for continuing collaborative industry-TSA communication at the program-wide level and to relieve some pressure on TSA being the sole administrator of cost control. Specifically, it is recommended that the INDT have the following roles:

1. Serve as a regular forum for exchanging lessons learned as implementation moves forward and advising on regular refinement to the BSIS Guidelines.

2. Assist TSA with technical review of designs.

3. Assist TSA with reviewing the impact of potential screening protocol changes (such as reviewing the cost implications of Canadian and international recheck screening).

4. Assist TSA with improving communications with the aviation industry, including communicating design best practices.

5. Assist TSA with overall EBSP management, including periodic updates to the Strategic Plan as warranted by technology or other critical changes.

6. Serve as a stakeholder forum for TSA to brainstorm operation and policy issues as needed.

If possible, the INDT should include ongoing representation from airports and airlines to work directly with TSA program management staff at TSA headquarters, as well as representation from industry trade associations.

6.2.5 Integrated Local Design Teams

At the airport level, ILDTs are recommended to ensure that all necessary local physical, financial, and operational conditions are considered. ILDTs should include the following representation: airport, airline, local TSA, local law enforcement, relevant EDS vendor(s), a TSA headquarters representative of the INDT, and an industry representative of the INDT. If PFC funding is contemplated, regular communication with the local FAA Airports office servicing the airport should be included in the ILDT process.

Training materials, secure websites, and other forms of information exchange would be required to ensure that the ILDTs are up-to-date on evolving design best practices and so that dissemination of the information required to implement recommendations specified in the BSIS Guidelines can be expedited.

Chapter 7

RECOMMENDED LEGISLATIVE ACTIONS

Congress directed DHS and TSA in the Intelligence Reform and Terrorism Prevention Act of 2004 (Sec. 4019d) to include recommended legislative action if such action is necessary to implement the recommendations from the BSIS. Many of the funding recommendations made by the Working Group would require legislative actions, and these actions are summarized in this chapter.

The Working Group's recommendations for legislative changes to support a new funding and financing mechanism to facilitate timely implementation of optimal EDS baggage screening systems are provided below, along with a few minor adjustments to existing funding mechanisms that will facilitate EBSP completion. The recommendations in this chapter consist of a suite of tools that, when combined, can enable timely EDS implementation at all CAT X – III airports.

Sections 7.1 and 7.2 describe the two primary elements of the funding/financing recommendations. They are mutually dependent and essential to implementation of the recommended strategy. Other actions that would also be beneficial to expediting implementation of optimal EDS baggage screening systems are identified in Section 7.3.

7.1 TAX CREDIT BOND PROGRAM

The Working Group identified a limited duration, federal tax credit bond program as the best option to provide the additional funding necessary for expedited implementation of optimal baggage screening systems. In fact, a voluntary TCB program is the only funding option (other than significantly higher federal General Fund appropriations over the next 5 years) supported by all parties: airlines, airports, and TSA.

The Working Group recommendation is to request Congressional authorization for $3 billion of TCB authority over a period of 4 years (FFY 2008 through FFY 2011), that would be made available to airports willing to use their credit and capital debt capacity to invest in designing and constructing a baggage screening system (including all requisite infrastructure modifications) in accordance with the BSIS Guidelines. TSA could be vested with the responsibility of awarding TCB issuance authority to applicant airports annually in accordance with the prioritization methodology in the EBSP Strategic Planning Framework as subsequently refined in the BSIS (see Section 5.4.3).

The proposed TCB program appears to be supportable by the industry, and would effectively amortize the federal contribution to baggage screening over 25 to 30 years, thereby minimizing the immediate impact on the federal budget. The TCB program would:

- Enable long-term financing of the most expensive elements of baggage screening systems (infrastructure modifications and baggage handling systems) since the resulting improvements have a long useful life.

- Provide a substantial federal contribution to a federally mandated program by subsidizing the borrowing costs of airports at a share comparable to TSA LOIs (approximately 25% local share on a 25-year term).

- Augment current levels of General Fund appropriations for the current TSA EDS purchase and installation budget.

- Expedite implementation of optimal EDS baggage screening systems by 11 years, enabling significant national security and economic benefits to be realized sooner.

It is estimated that net federal revenues would be reduced by $130 million annually once the full amount of authorized TCBs is issued. However, this investment would produce an estimated overall cost savings relative to the current investment level of over $1.2 billion in present value terms and would accelerate significant hard-to-quantify benefits such as improved security.

The life-cycle cost savings from expedited investment in optimal systems, as well as critical needs at some airports for improved baggage screening systems, led the Steering Committee to recommend a front-loaded program of TCB authorization divided by year as follows:

2008	$1 billion
2009	$800 million
2010	$600 million
2011	$600 million

This additional infrastructure funding would jump start optimal EDS baggage screening system implementation by allowing many airports and airlines with the most urgent need and most expensive solutions to get started sooner than if the program were evenly divided over the 4-year period. However, given the voluntary nature of the TCB program and potential startup time for issuance of bonds, it is important for any TCB proceed amounts not issued in the year initially authorized to carry forward to future years. This funding would also facilitate relatively quick payback to airports and airlines that self-fund their optimal EDS baggage screening systems with the expectation of federal support.

Although the cost-sharing inherent in the TCB proposal was widely debated within the Steering Committee (see Section 5.5), the Working Group ultimately agreed that significantly increased appropriations from the General Fund are unlikely. Therefore, despite continuing industry belief that the EBSP should be funded entirely by the federal government, the Working Group agreed to recommend a

funding and financing mechanism (i.e., TCBs) that would continue the current cost-sharing arrangements established in TSA LOIs issued in 2003 and 2004.

7.1.1 Eligible Projects

Eligible projects must be based on designs that are completed and approved by TSA within the authorization period of the TCB program for the following:

- New optimal baggage screening systems at existing terminals.
- Refunding of eligible project costs for airports or airlines with self-funded systems not yet supported by federal investment.
- Modification of existing systems necessary to accommodate traffic growth, changes in airline operations, and changes in TSA protocols.
- Redesign of first-generation baggage screening systems.
- Optimal EDS baggage screening systems for new terminals.

Any new baggage handling system and infrastructure modification design and construction costs necessary to accommodate EDS implementation in accordance with the BSIS Guidelines would be eligible for TCB financing.

As a matter of practicality, since smaller airports may have difficulty issuing bonds, TCBs are anticipated to be most useful for large- and medium-hub airports, which are the airports facing the most costly baggage screening solutions. Small and non-hub airports are likely to continue to rely on TSA grant funding, as are some larger airports that do not participate in the voluntary TCB program.

7.1.2 Ineligible Projects

The following projects would not be eligible for TCB funding:

- Refunding of the local match for federally funded baggage screening systems.
- Augmented funding for baggage screening systems funded by TSA LOIs.
- Baggage screening systems for which final design is not completed and approved before the beginning (October 1) of the last federal fiscal year in which TCBs are authorized, unless the authorization period is extended or funds are carried over past the authorization period.

7.2 TSA EBSP FUNDING PROTECTION AND FLEXIBILITY

TSA's annual budget includes EDS purchase and installation funds, which have been the source of TSA's ability to:

- Acquire and install new screening equipment, including EDS and ETD equipment.
- Refurbish and replace existing screening equipment.
- Authorize and pay the outstanding obligations on TSA LOIs.
- Issue direct grants to airports and airlines through OTAs for new optimal screening systems and redesign and expansion of existing screening systems.
- Reimburse airports and airlines that have self-funded optimal screening systems

The President's budget request for FFY 2007 includes $435 million for this account for EDS purchase and installation. The Working Group made several recommendations regarding continuation of this funding that are essential to implementation of optimal checked baggage screening systems nationwide.

7.2.1 Protection of Baseline Capital Funding

The additional funding source provided by the TCB program would expedite implementation of optimal screening systems; however, the program will fail if TSA is unable to supply the necessary equipment to keep pace with system construction. If airports and airlines move ahead to implement optimal screening systems—through the TCB program, direct grants from TSA, or the use of local funds—TSA must have the funds to acquire and install the equipment or the systems will be unused. The anticipated rate of system implementation resulting from increased funding will require TSA to procure and install more equipment annually than it has deployed since 2002. In many cases, these systems will require next generation EDS screening technology.

In addition, life-cycle replacement demands for existing EDS equipment will begin increasing significantly in approximately 2013. This funding need will compete with funding needs for new system implementation.

The baseline capital funding will also be required to support the infrastructure modifications necessary to redesign some existing in-line EDS screening systems that are based on first generation designs and to provide for expansion of optimal screening systems to accommodate growth.

Also, many small- and non-hub airports are unlikely to use the TCB program to fund optimal system implementation, and some larger airports may choose not to access TCBs or may have insufficient debt capacity to do so. These airports will rely on a continuing TSA grant program, both for funding of new optimal systems and reimbursement of self-funded optimal systems. As such, TSA must have a predictable, consistent funding stream available to support those airports not accessing TCBs. This availability could be difficult considering that the purchase and installation budget is dependent on annual General Fund appropriations; however, the Working Group strongly urges the Administration and Congress to make the required funding a high priority in the annual appropriations process.

7.2.2 TSA Funding Flexibility

Since 2001, TSA EDS purchase and installation funds have been appropriated with significant restrictions. For example, TSA has not been able to combine purchase funds with installation funds, there have been many equipment and technology set-asides, and funding has sometimes been allocated based on airport hub size.

While the BSIS recommends a logical methodology for TSA to follow in implementing optimal baggage screening, the implementation schedule would not solely be under TSA's control. Given that the TCB program would be voluntary, TSA would have limited ability to manage the timing for airports and airlines to move forward. The recommended investment strategy is dependent on TSA's purchase and installation funding being flexible to allow TSA's timely response to airports accessing TCBs, airports and airlines relying on grant monies, and life-cycle replacement demands. Therefore, the Working Group recommends the following:

- Appropriate purchase and installation funding as a combined line item to provide TSA the greatest flexibility to respond to equipment purchase, life-cycle replacement, installation demands, or grants for airports and airlines not accessing TCBs.

- Ensure that all EDS purchase and installation funding is unrestricted as to specific technology equipment.

- Ensure that all EDS purchase and installation funding is unrestricted as to specific hub size categories or other airport categories, as was the case in FFY 2006 and FFY 2007, but was not in prior years.

7.3 EXPANSION OF PFC ELIGIBILITY

Title 49 currently allows FAA to permit airports to apply PFC revenues to support the costs of common-use or preferential-use baggage systems. The Working Group recommends that Title 49 be modified to allow PFC revenues to be used for:

- Costs of modifying or constructing exclusive-use outbound baggage handling systems and infrastructure to accommodate EDS screening.
- Annual sinking fund payments for TCBs.

7.3.1 Exclusive-Use Outbound Baggage Systems

PFCs were originally intended to support capital costs incurred by airports for projects and systems applicable to the broad spectrum of users at that airport. Because one of the goals of the PFC legislation was to provide a new source of capital funding for projects that enhance competition, use of PFCs for any terminal work under a long-term exclusive-use lease was prohibited. This prohibition included out-bound baggage systems.

The current challenge of incorporating EDS into outbound baggage systems is an across-the-board federal requirement for all outbound baggage systems at airports, regardless of ownership. In addition, as discussed, acceleration of optimal EDS deployment provides important national security benefits. The Working Group believes that, in the case of optimal EDS deployment, the security benefits outweigh the potential negative competitive implication of using PFC revenue on exclusive-use systems. Therefore the Working Group recommends that modifications to exclusive-use baggage systems to accommodate automated EDS screening be eligible for PFC funding. Several airports have used PFCs to self-fund EDS implementation in common-use systems and to pay the local share of TSA LOI and OTA obligations. In addition, the Working Group recommends that PFCs be considered an authorized source of funding for incorporating EDS into airline-owned outbound baggage systems if the airport and airline communities at that airport agree and submit an application to FAA.

7.3.2 Sinking Fund Deposits

Once TCBs are issued for baggage system and infrastructure improvements, airports (or airlines) would be required to make annual deposits into a sinking fund for ultimate repayment of principle to bond holders. PFCs, as one of several sources of airport revenues, are explicitly intended to support capital costs and have been used as a stand-alone revenue source for self-funded baggage system costs. The Working Group recommends that annual sinking fund payments for TCBs be clearly defined as eligible for PFC funding.

This expanded eligibility can be accomplished with an FAA rule-making change to 14 CFR Part 158 and the Working Group encourages FAA to adopt this change.

7.3.3 Equipment

EDS equipment has, since ATSA was enacted, been purchased and installed by TSA. The Working Group recommends that the responsibility for equipment funding and installation remain with TSA and expressly rejected any consideration of expanding the use of PFC revenues for equipment purchase.

Chapter 8

SUMMARY OF CRITICAL ACTIONS

Significant action will be required over the coming months to achieve the economic and security benefits outlined in this report. This chapter summarizes the most critical actions by Congress, TSA, and the aviation industry, as recommended by the BSIS Working Group.

8.1 KEY CONGRESSIONAL ACTIONS

Key Congressional actions include:

1. Authorize a voluntary Tax Credit Bond program of $3 billion for FFY 2008 through FFY 2011, which airports could access to fund the infrastructure necessary for automated EDS baggage screening systems.

2. Permit use of TCBs for refunding by airports or airlines that have or will self-fund their in-line screening systems through the TCB authorization period (with the airport facilitating conduit financing on behalf of airlines as needed, as TCBs require the issuer to be a public entity).

3. Continue or increase the existing rate of annual appropriations for purchase and installation of EDS equipment ($435 million per year, escalating annually). TSA would be responsible for prioritizing the use of the these funds, which could include provision of: (a) equipment to airports that use the voluntary TCB program, (b) grants and equipment to airports and airlines that do not use the voluntary TCB program, (c) grants to airports and airlines requiring reimbursement for self-funded optimal screening systems that do not to use the TCB program, (d) ongoing support for expansion of optimal screening systems to accommodate future traffic growth and (e) life-cycle replacement and refurbishment of previously installed equipment.

4. Eliminate any restrictions associated with combining purchase and installation funds to provide TSA with increased flexibility to manage the impact of the voluntary TCB program.

5. Enhance PFC program flexibility to include (a) TCB sinking fund payments and (b) modification or construction of exclusive-use outbound baggage systems to accommodate EDS screening systems.

8.2 KEY TSA ACTIONS

Key TSA actions include:

1. Finalize and publish the draft BSIS Guidelines developed by the BSIS Technical Team. Include a detailed explanation of the upgraded design review and approval process in the BSIS Guidelines. Update the BSIS Guidelines at least yearly to reflect ongoing lessons learned.

2. Establish an INDT comprised of representatives from TSA, airport, airline, and key industry trade associations to actively and collaboratively manage the cost and quality of automated EDS baggage screening systems at a national level.

3. Work with DHS and equipment manufacturers to actively manage the timely development and deployment of new screening technologies critical to the costs and performance assumptions in the BSIS.

4. Issue detailed funding guidance to the aviation industry explaining the alternatives available for funding baggage screening systems and communicate the process and business rules to access facility modification grants for airports and airlines not wishing or not able to use the TCB program. Any guidance on the use of PFCs would be developed jointly with FAA.

5. Provide Congress with requested information regarding an estimated deployment timeline on an airport-by-airport basis.

8.3 KEY INDUSTRY ACTIONS

Key industry actions include:

1. Actively participate in the INDT, including providing dedicated representatives to work with TSA during the initial deployment of optimal screening systems to all CAT X – III airports.

2. For those airports and airlines that have already developed designs for in-line systems but not yet initiated construction, prepare refined designs consistent with the BSIS Guidelines.

3. Develop contracts with BHS designers, suppliers, and other associated contractors that require compliance with the BSIS Guidelines and the performance standards specified therein.

4. Use upcoming industry conferences to communicate the key findings and recommendations of the BSIS.

5. Create ILDTs for individual design efforts to facilitate stakeholder coordination at the local level.

Appendix A

FINANCE TEAM REPORT

This appendix, the Finance Team report, supplements the information provided in the Baggage Screening Investment Study (BSIS) report. It summarizes the approaches used to date to fund and finance baggage screening system costs, the alternatives considered for funding and financing baggage screening systems into the future, and the recommended funding and financing approach, consisting of a suite of tools.

These issues have been reviewed and approved by the BSIS Finance Team, a group composed of airline business and finance executives, airport financial managers and directors, financial managers from the Department of Homeland Security (DHS) and the Transportation Security Administration (TSA), finance industry specialists, and technical advisors from the Federal Aviation Administration (FAA) and the Federal Highway Administration's National Resource Center.

A.1 EXECUTIVE SUMMARY

A.1.1 Funding Approach

After considering numerous alternative approaches to funding the Electronic Baggage Screening Program (EBSP) —including alternative levels, cost-sharing ratios, and mechanisms—the BSIS Finance Team recommends a funding strategy that increases total investment. The funding strategy recommended by the Finance Team includes the following elements:

- **Tax Credit Bond Program** – This would entail creation of a $3 billion Tax Credit Bond (TCB) program, a voluntary but highly attractive debt issuance program that airports and airlines could access for help in funding the necessary infrastructure to accommodate automated Explosives Detection System (EDS) baggage screening systems, including baggage handling systems (BHS) and associated infrastructure. A funding profile of $1 billion in the first year, stepping down to $800 million in the second year, and then to $600 million in the third and fourth years is recommended. Higher authorization levels are requested in the early years to (1) assist with reimbursing airports and airlines that have already self-funded in-line systems, and (2) address the backlog of infrastructure needs at many large, complex airports. However, given the voluntary nature of the TCB program and the potential startup time for issuing bonds, it is important that any authorized TCB amounts not issued in the year initially authorized carry forward to future years. It is estimated that this program would reduce U.S. Treasury net revenue by about $130 million annually, once the total amount of authorized tax credit bonds is issued. With this program, the effective share of facility modification costs for assets funded with TCBs borne by

airports and airlines would be about 25%.

A $3 billion TCB program would serve as a transparent, identifiable, and stable source of funding for airports implementing the optimal baggage screening systems. As such, it will aid and encourage airport planning, and further promote industry research and development based on a greater likelihood of an accelerated market for screening system implementation. TCBs would also take advantage of the sophistication of airports with respect to debt issuance.

- **TSA Purchase and Installation Funding Protection and Flexibility –** Maintaining at least the $435 million escalating annual federal appropriations baseline for EDS purchase and installation is critical to the success of the program. These funds will be necessary to provide EDS equipment to airports that move forward using the TCB program, and to provide equipment and direct grants for facility modifications to airports that choose not to use the program.* If airport equipment costs significantly increase due to the TCB program, then the flexibility to realign purchase and installation funds throughout the year will become increasingly important. For this reason, Congress should appropriate purchase and installation funds as a combined line item to provide TSA with increased flexibility, in light of the voluntary nature of the TCB program.

  In addition, future funding levels should be guaranteed to the maximum extent possible, so that key industry manufacturers, suppliers, and contractors can move forward with appropriate measures to support the EBSP through timely provision of research and development (R&D), manufacturing, and labor resources.

- **Expanded Passenger Facility Charge Eligibility** -- Another key recommendation is to modify Title 49 to allow Passenger Facility Charges (PFCs) to be used for (1) modification or construction of exclusive-use baggage handling systems and infrastructure to accommodate EDS systems, and (2) TCB sinking fund deposits.

*Airports wishing to rely on the traditional approach could face delays in receiving grants.

A.1.2 Overview

The remainder of this appendix presents:

- **Section A.2**—The historical approach to funding the various costs associated with EDS baggage screening
- **Section A.3**—Future EBSP capital funding requirements
- **Section A.4**—Alternatives that were considered for funding and financing future EDS baggage screening costs
- **Section A.5**—A summary of the recommended funding and financing approach**,** consisting of a suite of tools

A.2 HISTORICAL FUNDING APPROACH

Historically, the costs of providing security services to protect aircraft and passengers were considered a normal and necessary part of doing business for airlines. In 1997, the White House Commission on Aviation Safety and Security determined that aviation security was a national security issue and that substantial federal funding should be allocated for related capital improvements.*

Prior to the September 11, 2001 terrorist attacks, regulated airlines were responsible for aviation security screening, and the FAA performed compliance and enforcement oversight inspections. Airline use of EDS equipment to screen baggage was voluntary. Any investment by airports in infrastructure to facilitate checkpoint screening and any checked baggage screening was funded with FAA grants, the airport's PFC revenues, and airport funds generated, in part, from airline rates and charges.

Although checked baggage screening has been the federal government's responsibility since enactment of the Aviation Transportation Security Act (ATSA) in 2001, the reality is that TSA is directly responsible for certain functions and costs, while other functions and facilities are the responsibility of airports and airlines, sometimes with financial support from FAA (prior to Federal Fiscal Year [FFY] 2004) and/or TSA. Costs to airports and airlines net of any federal assistance are typically paid from PFC revenues (capital and financing costs only) and/or general airport revenues, including revenues generated from airline rates and charges.

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* White House Commission on Aviation Safety and Security, *Final Report to President Clinton*, February 12, 1997, Recommendation 3.1, p. 27.

A.2.1 Overview of TSA Funding

Figures A-1 and A-2 show the amount of funding appropriated for TSA in FFY 2006, and the Administration's FFY 2007 budget request, respectively. As shown on the two figures, TSA is funded from General Fund appropriations offset by the collection of two federal aviation security fees. These two fees were established under ATSA, and will remain in effect unless otherwise amended by Congress.

- **Passenger Security Fees** – The Passenger Security Fees (PSF) are currently $2.50 per flight segment, with a maximum of $5.00 per one-way trip, and are collected by airlines from the passenger when the ticket is purchased. The fees generate an estimated $1.9 billion per year. In 2003, Congress mandated in the Century of Aviation Reauthorization Act (Vision 100) that the first $250 million of that amount is to be deposited into an Aviation Security Capital Fund (ASCF) within the General Fund to fund facility modifications to accommodate baggage screening systems. Vision 100 (and the ASCF) are scheduled to expire at the end of FFY 2007.

- **Aviation Security Infrastructure Fees** – Aviation Security Infrastructure Fees (ASIF) are fixed annual fees charged by the federal government directly to the airlines in an amount intended to equal the amount paid by the airlines in calendar year 2000 for screening passengers and property. The fees have been generating approximately $300 million annually. The Government Accountability Office (GAO) has since estimated that the industrywide calendar year 2000 passenger and property screening cost was approximately $448 million, and TSA has taken action to collect that amount. However, airlines have challenged the GAO estimate and the exact amount therefore has yet to be resolved.

Figure A-1

TSA FUNDING—FFY 2006 APPROPRIATION
Transportation Security Administration

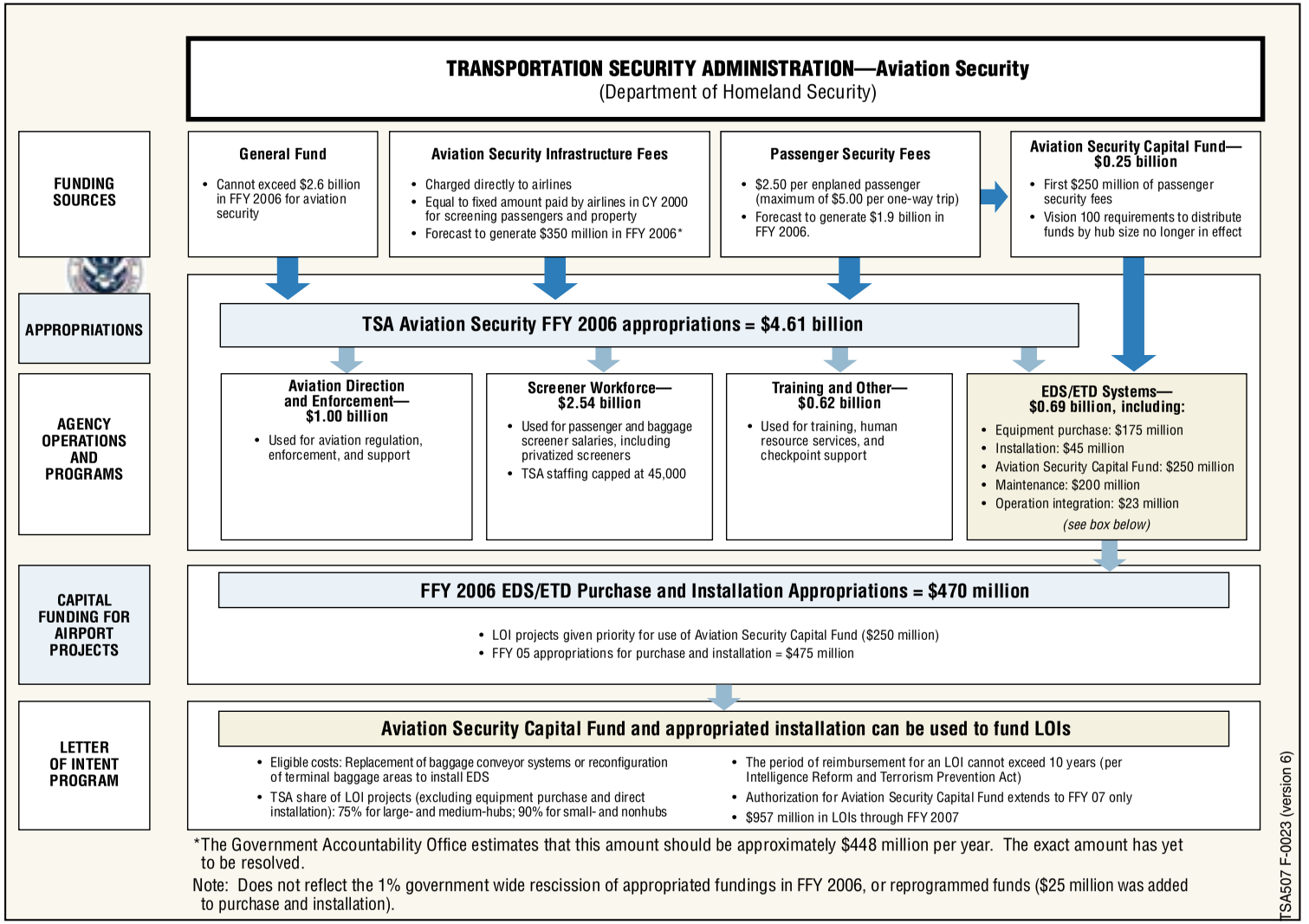
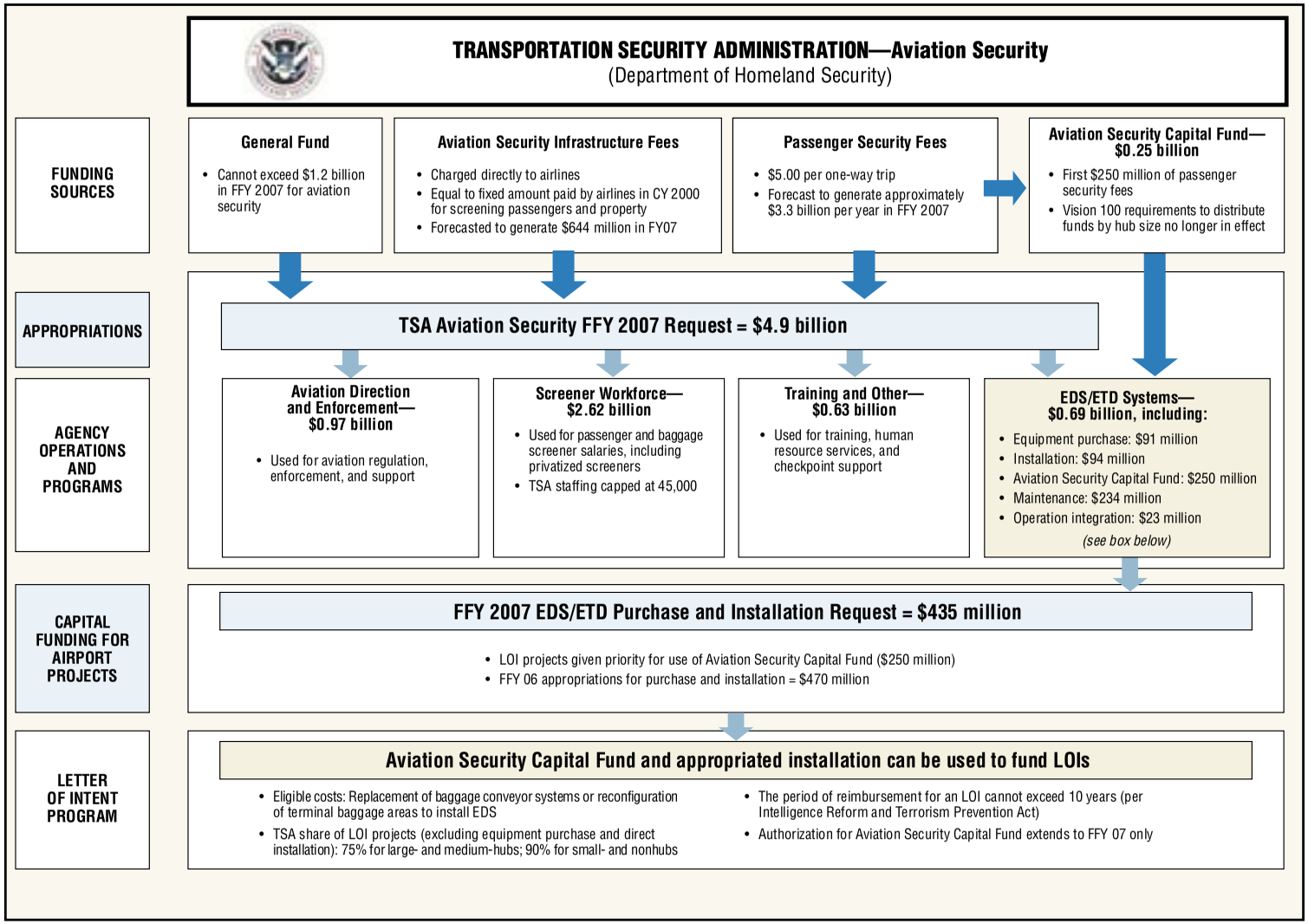


Figure A-2

TSA FUNDING—FFY 2007 BUDGET REQUEST
Transportation Security Administration



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The EBSP is funded from multiple line items within TSA's budget. Table A-1 shows appropriated funding levels by relevant category for FFY 2002 through FFY 2006, and potential funding levels for FFY 2007. The following categories are related to the EBSP:

- **Screener Workforce** – Includes the federal screener workforce and privatized screening.

- **Other Screener-Related Costs** – Screener training and human resource services are separate line items that are partly allocable to baggage screening. Also, a significant portion of on-the-job injuries can be directly attributed to suboptimal deployments of EDS and Explosives Trace Detection (ETD). TSA's on-the-job injury (OJI) costs were funded through the human resources services line item of the budget in FFY 2006, but will be funded from the personnel, compensation and benefits line item in FFY 2007.

- **EDS/ETD Systems** – Appropriations for EDS/ETD systems are on multiple line items. As Table A-1 shows, purchase, installation, maintenance, and operational integration are each separate line items. Another separate line item for refurbishment was added for FFY 2007 in the appropriations bill passed by the House of Representatives for DHS, but not in the Administration's budget or the Senate appropriations bill. From a management implementation perspective, these separate budgets make it more difficult for TSA to manage interrelated costs for multi-faceted projects, especially when those costs may vary significantly and not necessarily in tandem. In addition, the use of multiple line items affects the prioritization of projects (i.e., necessitates selecting projects that fit within the constraints of the budget categories).

The table also shows the $250 million in mandatory appropriations from the ASCF each year for EDS/ETD facility modifications (not equipment).

Table A-1

TSA ANNUAL BUDGET
(in millions)

		FFY 2004	FFY 2005	FFY 2006	FFY 2007 Administration Budget	FFY 2007 House Bill	FFY 2007 Senate Bill
Discretionary appropriation							
Screener Workforce							
Privatized screening		$ 130.0	$ 130.0	$ 146.0	$ 148.6	$ 148.6	$ 148.6
Passenger and baggage screeners, personnel, compensation and benefits		2,200.0	2,299.0	2,522.0	2,470.2	2,470.2	2,470.2
Subtotal, screener workforce		$2,330.0	$2,429.0	$2,668.0	$2,618.8	$2,618.8	$2,618.8
Screening training and other		198.0	344.0	261.0	244.5	244.5	244.5
Human resource services		211.0	150.0	207.0	207.2	207.2	200.0
Checkpoint support		37.0	124.0	157.0	173.4	173.4	180.7
EDS/ETD Systems							
EDS purchase (a)	[a]	157.0	180.0	175.0	91.0	136.0	141.4
EDS installation (a)	[b]	515.0	45.0	45.0	94.0	94.0	171.5
EDS/ETD maintenance		166.0	175.0	200.0	234.0	234.0	210.0
EDS/ETD refurbishment	[c]	--	--	--	--	10.0	--
Operation integration		--	--	23.0	23.0	23.0	23.0
Subtotal, EDS/ETD systems		$ 838.0	$ 400.0	$ 443.0	$ 442.0	$ 497.0	$ 545.9
Total, screening operations		$3,614.0	$3,447.0	$3,736.0	$3,685.9	$3,740.9	$3,789.9
Mandatory appropriation							
Aviation Security Capital Fund (a)	[d]	0.0	250.0	$ 250.0	$ 250.0	$ 250.0	$ 250.0
Total available for purchase and installation	[a+b+c+d]	**$ 672.0**	**$ 475.0**	**$ 470.0**	**$ 435.0**	**$ 490.0**	**$ 562.9**

(a) Included in total available for purchase and installation.

Source:
2005 - http://www.tsa.gov/public/display?theme=39
2006 - TSA staff
2007 - Appropriations Bill for FFY 2007, Department of Homeland Security

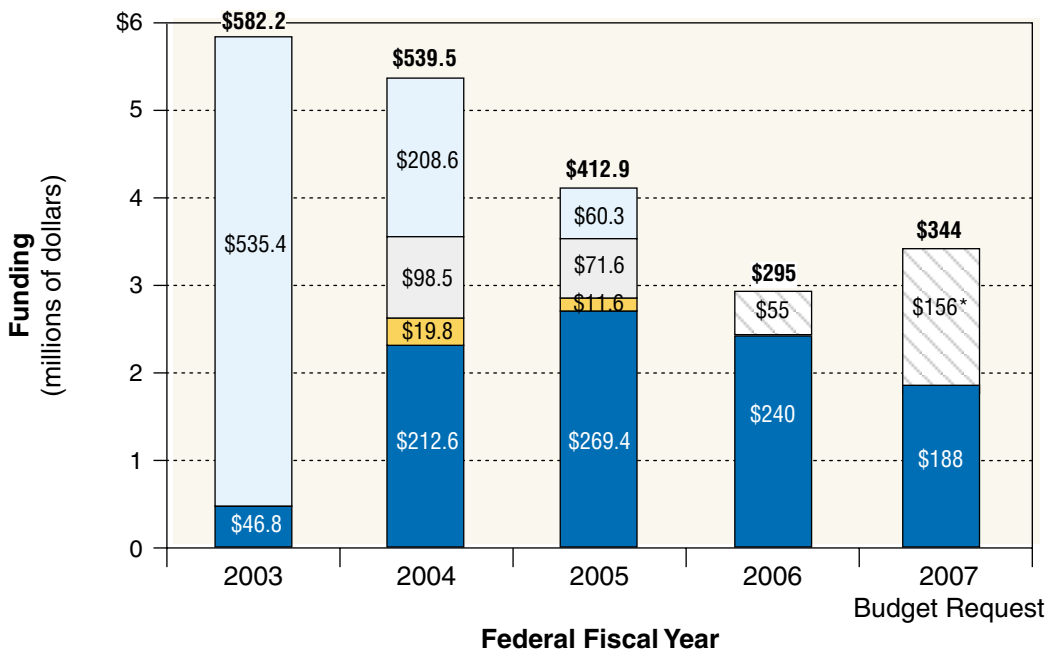
Note: FFY 2002 and FFY 2003 were unique years in terms of TSA appropriations, so they are not shown. TSA's funding for FFY 2002 came in the form of two lump sum appropriations, rather than line items that are characteristic of TSA appropriations beginning in FFY 2004. In FFY 2002, $206 million was budgeted for EDS purchase and $738 million was budgeted for EDS installation. In FFY 2003, TSA's funding was provided in the FFY 2003 Omnibus Appropriations Act of 2003. A total of $175 million was budgeted for EDS purchase, and $500 million was budgeted for EDS installation in FFY 2003.

TSA grants to airports to fund investment in BHS and infrastructure are made from the EDS installation line item and the ASCF. Figure A-3 reflects the various components of the installation budget since FFY 2003.

Figure A-3

CURRENT TSA OBLIGATED FUNDING LEVELS

EDS Installation and Integration



LOI Reimbursements

Other Transaction Agreements

Other Transaction Agreements, non-LOI installation requirements, and program support

Direct Installation at LOI Airports

General Deployment

*Distribution of these funds is yet to be determined.

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A.2.2 Overview of Checked Baggage Screening Components and Funding

Program Costs. Specific cost responsibilities for funding baggage screeners, baggage screening equipment, baggage handling systems, and related infrastructure are as follows:

- **Baggage Screeners** – TSA has been directly responsible for paying 100% of the costs of checked baggage screeners at all commercial service airports since FFY 2002, as previously discussed. Even at the six airports that have

private security screeners,* TSA is directly responsible for procuring, contracting with, and paying the private screening companies.

- **Baggage Screening Equipment** – TSA is also responsible for procuring baggage screening equipment (which to date has been by direct purchase), periodically refurbishing and replacing such equipment, contracting with equipment maintenance providers, and reimbursing airports (or airlines where they operate a terminal) for equipment utility costs.

- **Baggage Handling Systems** – Historically, baggage handling systems were primarily owned and operated by the airlines, either individually (particularly outbound baggage systems) or collectively (more common for inbound baggage systems). The airlines were responsible for purchasing and operating those systems. Occasionally, an airport operator would own and operate certain BHS, particularly where common systems served international traffic; the airport could use PFC revenues to pay for the systems in lieu of or to augment other local funds.

  In the post-September 2001 environment, TSA is responsible for the immediate inbound and outbound BHS serving baggage screening equipment (i.e., only the inbound and outbound belts for the EDS machines), and the airport owns and operates the rest of the system (or, if an airline operates the terminal, the airline is directly responsible for the BHS, including those parts of the system added or modified to accommodate baggage screening equipment). Where centralized baggage screening is instituted, the additional conveyors and other elements of the BHS can be substantial. Where airports are responsible, the costs are typically passed on to the airlines through airport rates and charges.

- **Infrastructure** – The infrastructure to house baggage screening equipment and associated BHS has historically been, and continues to be, built and maintained by airports, generally as part of building and maintaining terminals. In some cases, however, terminals are built and maintained by airlines. To a limited extent, FAA (prior to FFY 2004) and TSA have provided partial financial support.

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* All five airports that were part of the private security Screening Partnership Program (SPP, which was a pilot program) opted not to have federal screeners when the pilot program ended (i.e., these airports continued to have private screeners), and Sioux Falls Regional Airport subsequently opted not to have federal screeners, for a current total of six airports that have private security screeners.

Funding Sources. The current spectrum of available sources of funding and financing for baggage screening infrastructure by airports is fairly limited:

- **TSA Grants** – TSA grants have been available on a limited basis since FFY 2003, funded, in part, by federal user fees. Grants have been issued as multi-year LOIs as well as 1-year grants called Other Transaction Agreements to fund baggage screening infrastructure. Through FFY 2004, TSA executed eight LOIs to provide grant funding to each of nine airports over a 3- or 4-year period. The last payment related to these LOIs is scheduled to be issued in FFY 2007, subject to annual Congressional appropriations. In FFY 2003 and FFY 2004, TSA issued LOIs to the following airports, in the order in which they were granted:

  – Massachusetts Port Authority (BOS)
  – Dallas/Fort Worth International Airport Board (DFW)
  – Port of Seattle (SEA)
  – City and County of Denver, Department of Aviation (DEN)
  – Clark County Department of Aviation (LAS)
  – Los Angeles World Airports (LAX and ONT)
  – City of Phoenix, Aviation Department (PHX)
  – City of Atlanta, Department of Aviation (ATL)

  Six of the nine airports issued debt to be repaid with annual TSA LOI grant funds, and used the bond proceeds to build infrastructure for in-line systems. The operators of the airports in Los Angeles and Phoenix used the grant funds and did not issue debt.

  Due to concerns about making multi-year commitments without the safeguards of a trust fund or other form of guaranteed future year funding, and because the funding stream has not supported additional longterm grant agreements, TSA has provided only 1-year grants since FFY 2004 through OTAs. To date, approximately 33 OTAs have been issued by TSA.

- **FAA Airport Improvement Program (AIP) Grants** – Table A-2 shows AIP grant amounts used to fund EDS infrastructure at airports in FFY 2002 through FFY 2007. A small number of airports invested in infrastructure to accommodate in-line systems using AIP grants in FFY 2002 and FFY 2003, with AIP grants covering approximately 75% of the estimated project costs. Although ATSA made baggage screening infrastructure costs eligible for AIP funding, Congress has incrementally narrowed the categories of AIP funding that can be used for baggage screening infrastructure through subsequent reauthorization and appropriation legislation. Beginning in FFY 2004 through FFY 2006, U.S. Department of Transportation's (DOT's) annual appropriation acts have prohibited spending AIP funds for baggage screening infrastructure. This prohibition is expected to continue through FFY 2007 and possibly beyond.

- **State Grants** -- State grants for security, including baggage screening infrastructure, are very unusual, but are issued in rare instances (e.g., by the State of Florida).

- **Passenger Facility Charges** – Common-use baggage handling systems and related infrastructure are eligible for PFC funding.* Since September 11, 2001, pursuant to consultation with the airlines and approval by the FAA, airports have used PFC revenues (1) to fund the local match to FAA and TSA grants, and (2) in rare cases, to entirely fund BHS and infrastructure. Baggage handling systems used exclusively by a single airline are not PFC-eligible because of historical concerns by FAA that such systems do not foster airline competition.

* Because TSA has been responsible for funding EDS equipment to date, an explicit eligibility determination has not been made by FAA to date. Other airport equipment, such as aircraft rescue and firefighting equipment, is PFC-eligible, so it is possible FAA would consider EDS equipment that is not funded by TSA to be PFC-eligible if an airport owns and operates that equipment.

Table A-2

FAA FUNDING OF EDS PROJECTS
(in millions)

	FFY 2002	FFY 2003	FFY 2004 *(a)*	FFY 2005 *(a)*	FFY 2006 *(a)*
AIP Grants					
Discretionary	$77.3	$300.3	$ -	$ -	$ -
Entitlement	35.3	1.5	-	-	-
Total	$112.6	$301.8	$ -	$ -	$ -

(a) ATSA made baggage security infrastructure eligible for AIP discretionary and passenger entitlement funds. Effective in FFY 2004, the Vision 100 reauthorization of the AIP program limited baggage security infrastructure eligibility to passenger entitlement funds. However, beginning in FFY 2004 and continuing through FFY 2006, the USDOT appropriation act has prohibited spending any AIP funds for baggage security infrastructure.

(b) The appropriation for FFY 2007 has not yet been enacted by Congress, but the prohibition against using AIP for baggage security infrastructure is expected to continue.

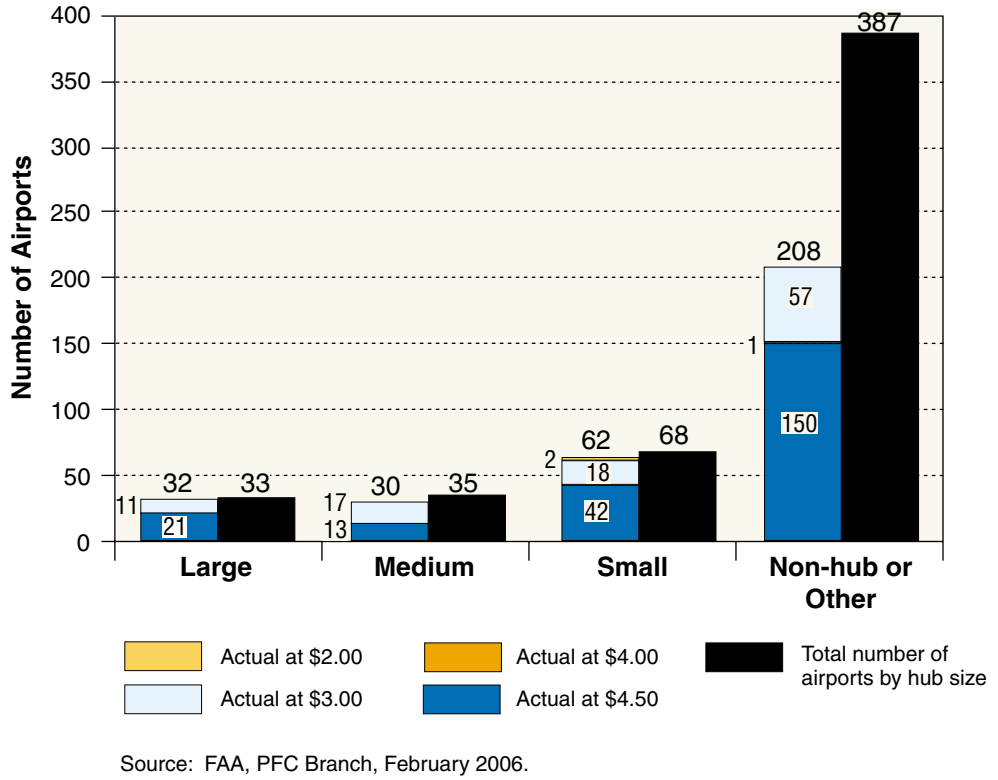
Source: Federal Aviation Administration records.

Figure A-4 shows the number of large-, medium-, small-, non-hub and other airports that charged a $2.00 PFC (shown in gold), $3.00 PFC (light blue), $4.00 PFC (orange), and $4.50 PFC (blue) as of February 2006, the most recent month for which the data are available**.** Black bars on the right for each hub size show the total number of airports of that size. The large-, medium- and small-hub airports shown on Figure A-4 constitute 92% of all airports in those hub sizes. Overall, 67% of all airports charge a PFC.

Figure A-4

PASSENGER FACILITY FEES BY HUB SIZE

Transportation Security Administration



Source: FAA, PFC Branch, February 2006.

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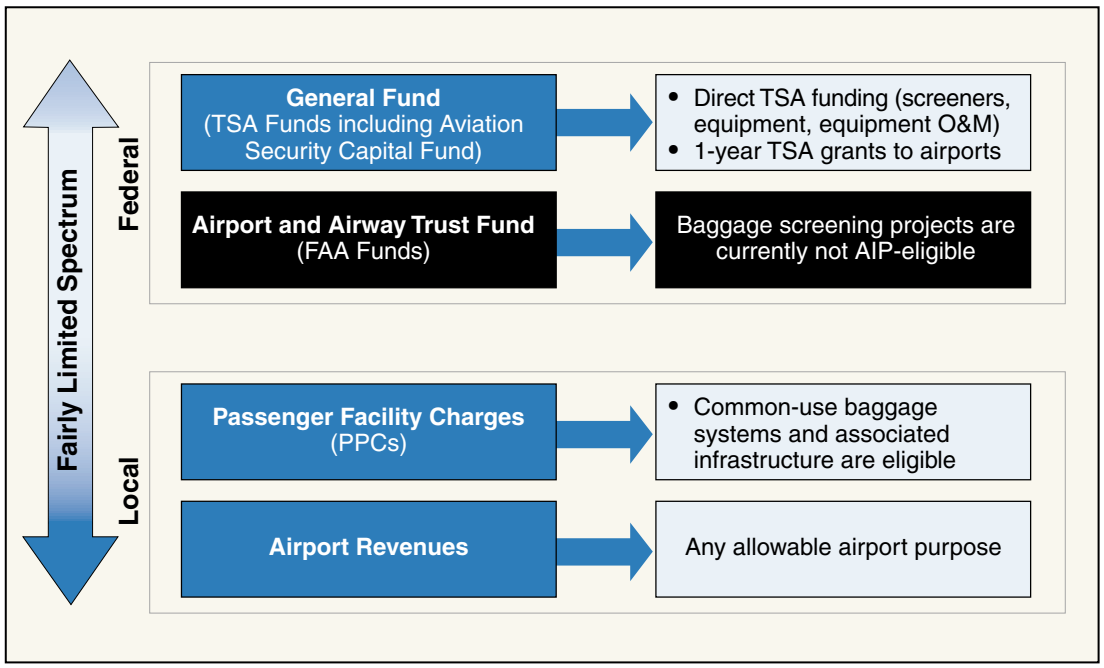
- **Airport Revenues** -- Airport revenues from airline rates and charges and/or nonairline sources can be used for any airport purpose, and have been used by certain airports (1) to fund the local match to FAA and TSA, and (2) in rare cases, to entirely fund BHS and infrastructure. Depending on the terms of an airport operator's use and lease agreement with the airlines, if one exists, the airlines may have the right to approve capital investments and/or issuance of bonds to accommodate EDS systems.

Figure A-5 summarizes the sources of funding and financing for baggage screening infrastructure investment that are currently available to airports. As the figure shows, only three sources of funding are currently used—TSA funds from the General Fund (including PSF and ASIF collections), PFCs, and airport revenues.

Figure A-5

CURRENT BAGGAGE SCREENING FUNDING SOURCES

Transportation Security Administration



Deployment of EDS Systems. Deployment of in-line and other EDS systems has slowed considerably due to uncertainty about future funding sources and costs resulting from (1) evolving policies regarding federal grants to airports to build infrastructure for in-line systems, (2) the airport/airline view that checked baggage screening is a federal responsibility, (3) concerns about the federal budget, and (4) the fact that first generation in-line systems have been more resource-intensive than anticipated.

- **Uncertainty regarding Federal Grants to Airports** – It is not likely that U.S. DOT's annual appropriation will allow FAA to approve AIP funding of baggage screening infrastructure, and the current funding environment does not support the issuance of multi-year LOI commitments without the safeguards of a multi-year trust fund or other source of "guaranteed"

future-year funding. Therefore, TSA may only be able to provide 1-year OTAs. As a result, airports are less certain each year as to whether they will receive a grant, and have generally not issued debt in anticipation of receiving those 1-year grants. The result has been that only a small number of airports have invested in infrastructure to accommodate in-line EDS systems.

- **Checked Baggage Screening Seen as Federal Responsibility** –A common view among airlines and airports is that checked baggage screening, as defined in ATSA, is a federal responsibility. This view has resulted in (1) airline opposition to increases in Passenger Security Fees and Aviation Security Infrastructure Fees collected from the airlines, and (2) airport reluctance to request and airline reluctance to approve (where applicable) or support proposed airport investments to accommodate in-line EDS systems, except at key hub airports or other locations with severe operational problems resulting from stand-alone baggage screening systems.

- **Federal Budget Challenges** – The federal budget has been in deficit since FFY 2002. The ongoing wars in Afghanistan and Iraq, 2005 hurricane devastation, and increasing fuel prices and their potential effect on the economy have raised concerns, particularly in the Administration, about controlling annual federal expenditures for aviation security programs and various other programs. In FFY 2005 and FFY 2006, Congress appropriated amounts greater than the Administration's requests for airport security screening. To reduce the use of General Fund monies (from federal taxes) for aviation security, the Administration proposed increases in Passenger Security Fees and Aviation Security Infrastructure Fees in FFY 2006 and FFY 2007. In part because of industry opposition, Congress did not approve those proposed federal aviation fee increases.

A.3 FUTURE EBSP CAPITAL FUNDING REQUIREMENTS

A.3.1 Optimal System Deployment with Current Funding Approach

To assess the life-cycle cost implications of continued automation investments, a scenario was developed in which the current federal funding levels and approach (e.g., the use of grants) were assumed, along with the deployment of EDS screening systems that are optimally scaled to the needs of each threat category X, I, II, and III (CAT X – III) airport. Optimal system deployment refers to the concept that the lowest-cost EDS screening system may not necessarily be the same at every airport. Instead, an optimally scaled system is tailored to the needs of a specific airport, terminal, and screening zone. For instance, fully automated in-line EDS screening systems, such as those planned at the TSA LOI airports, may not be appropriate for smaller airports or lower baggage volume areas of larger airports. The BSIS report summarizes the findings of the life-cycle cost analysis. The Finance Team focused on funding for EDS purchase and installation, which is discussed further here.

It was assumed in this scenario that TSA will maintain its current EDS purchase and installation funding levels for the EBSP ($470 million in FFY 2006, $435 million requested for FFY 2007, and budget growth of 1.7% per year thereafter). The total capital funding requirement for the optimal system deployment with current funding scenario in nominal values, broken out by the type of project, is shown in Table A-3. The cost of existing commitments is not shown, since funding has already been provided and/or requested for these projects.

Table A-3

CAPITAL FUNDING REQUIREMENTS
Optimal System Deployment with Current Funding Approach Scenario
2006 - 2025

Capital Cost Category	Nominal Cost ($ billion) TSA / Federal Government	Airport / Airline	Total
Initial new optimal systems			
Facilities modifications	$2.76	$0.80	$3.56
Equipment purchase and installation	0.93	--	0.93
Expansion of initial optimal systems			
Facilities modifications	1.48	0.48	1.95
Equipment purchase and installation	0.38	--	0.38
Future new terminal systems			
Facilities modifications	0.80	0.27	1.06
Equipment purchase and installation	0.20	--	0.20
Life-cycle refurbishment and replacement			
Facilities modifications	0.14	--	0.14
Equipment purchase and installation	3.98	--	3.98
Total – capital costs	$10.66	$1.54	$12.20

Note: Columns and rows may not add to totals shown because of to rounding.

A.3.2 Optimal System Deployment with Tax Credit Bond Program

The results of the optimal system deployment scenario relying on current funding levels indicate that there are quantifiable benefits to investment in automated EDS baggage screening systems, as discussed in the BSIS report. The most significant benefit from automation is the reduction in requirements for future staffing increases (referred to as "avoidance"); therefore, the Working Group investigated several possibilities for accelerating the deployment of automated EDS baggage screening systems. As discussed in the report and later in this appendix, the recommended funding and financing approach resulting from this study is authorization of a voluntary TCB program to provide additional funding above the

current TSA baseline purchase and installation funding level ($435 million per year, escalated annually at 1.7%).

The modeling results for this scenario were based on similar assumptions to those used in the optimal system deployment with current funding approach scenario: next generation screening technology and a robust planning and design review and approval process. These assumed elements are imperative to contain costs. OTAs were also assumed as part of this scenario, and would be used with any funding available after equipment is provided for compliance, life-cycle replacement, and TCB projects.

In addition, as discussed below, different levels of TCB issuance were assessed. The total funding requirement for capital projects under the TCB scenario, broken out by the type of project, is shown in Table A-4. The cost of existing commitments is not shown because funding has already been provided and/or requested for these projects.

TCB issuance and the net cost of the associated tax credits and sinking fund contributions were estimated for new optimal baggage screening systems and the refunding of self-funded systems. However, because it is difficult to accurately estimate future costs associated with the redesign of existing systems, expansion to accommodate growth, or implementation of optimal systems in new terminals, an allowance in the total TCB program is recommended to account for these costs. Therefore, the recommended size of the TCB program was developed as follows:

- **Estimated TCB Issuance for New Optimal Systems and Refunding**—The funding requirements shown in Table A-4 are based on the assumed issuance of approximately $1.76 billion in tax credit bonds for new optimal baggage screening systems and the refunding of self funded systems. Several scenarios were modeled to compare different levels of participation in the TCB program for the installation of new optimal systems and refunding of self-funded systems. Total TCB proceeds for initial new optimal systems and refunding of existing self-funded systems ranged from about $1.67 billion to $2.20 billion. To ensure authorization at a sufficient level, the Working Group recommends that the high end of this range be used to size the portion of the TCB program expected to be used for new optimal systems and refunding of existing self-funded systems.

Table A-4

CAPITAL FUNDING REQUIREMENTS
Optimal System Deployment with Tax Credit Bond Program Scenario
2006 - 2025

Capital Cost Category	Nominal Cost ($ billion) TSA / Federal Government	Airport / Airline	Total
Initial new optimal systems			
Facilities modifications (a)	$2.20	$0.79	$2.98
Equipment purchase and installation (b)	0.82	--	0.82
Expansion of initial optimal systems			
Facilities modifications	1.67	0.51	2.18
Equipment purchase and installation	0.54	--	0.54
Future new terminal systems			
Facilities modifications	0.80	0.27	1.06
Equipment purchase and installation	0.20	--	0.20
Life-cycle refurbishment and replacement			
Facilities modifications	0.13	--	0.13
Equipment purchase and installation	4.06	--	4.06
Total – capital costs	$10.41	$1.56	$11.98

Note: Columns and rows may not add to totals shown because of rounding.

(a) Amounts shown include direct federal grants and airport/airline matching contributions as well as the net cost of the tax credits allowed by the federal government and the estimated sinking fund contributions by airports over 20 years (not the full term of the tax credit bonds).
(b) Equipment for TCB projects was assumed to be purchased and installed through TSA appropriations, not with bond proceeds.

- **Allowance for Other Eligible TCB Uses—**In addition, as defined in Chapter 7 of the BSIS report, the TCB program would be used to provide funding to airports that, during the authorization period of the TCB program, wish to (1) redesign existing systems to improve their efficiency, (2) expand systems to accommodate traffic growth, or (3) implement systems for future new terminals. To provide sufficient TCB financing capacity for these types of projects, an additional $800 million in TCB issuance authority would be needed. As a result, the recommended size of the TCB program is $3 billion.

A.4 ALTERNATIVE FUNDING AND FINANCING CONCEPTS CONSIDERED

While there is no shortage of creative ideas on how to *finance* future baggage screening equipment and investment in related infrastructure – for example, using leases and various forms of debt financing – the significant challenge has been to find the sources of *funding* to pay for those various debt instruments. The Finance Team therefore focused first on the more difficult issue of funding, taking into consideration a wide range of potential *funding sources* and determining which were viable. The Finance Team then considered different *financing mechanisms* that could be used to leverage the viable funding sources. Specifically, the Finance Team focused on the following options to fund and finance infrastructure and BHS:

- Increased TSA funding from the General Fund
- New Tax Credit Bond program (providing federal tax subsidies)
- TSA EBSP funding protection and increased flexibility
- New Aviation Security Trust Fund (using federal aviation security user fees)
- Reinstatement of Airport Improvement Program eligibility
- Continued use of available state funding
- New Security Facility Charge program (an additional type of user fee)
- Changes to Passenger Facility Charge program
- Increased use of airport/airline revenue

Figure A-6 summarizes the funding/financing concepts that were considered in depth, and shows the types of costs each concept might cover (screeners, equipment maintenance, other BHS operation and maintenance (O&M), and other O&M expenses [primarily consisting of equipment utility costs], baggage screening equipment, and BHS/infrastructure). Most concepts would, at a minimum, facilitate investment in BHS and infrastructure. Some would cover equipment, and others would extend to screeners and other O&M costs.

Figure A-6

FUNDING/FINANCING CONCEPTS CONSIDERED IN DEPTH
Transportation Security Administration

Key Concept	Operating and Maintenance Costs			Capital Cost	
	Screeners	Equipment Maintenance	Other O&M	Screening Equipment	BHS/ Infrastructure*
1 Equipment Lease		■		■	
2 Service or Usage Contract	□	■	■	■	□
3 Share-in-Savings					■
4 Reinstated AIP Eligibility					■
5 Enhanced PFC Eligibility					■
6 Trust Fund/LOI					■
7 Tax Credit Bonds					■
8 New User Fees	■	■	■	■	■

□ Potential use
■ Intended use

*BHS O&M is currently paid by airports and airlines. Reimbursement from TSA could be included under the service or usage contract concepts.

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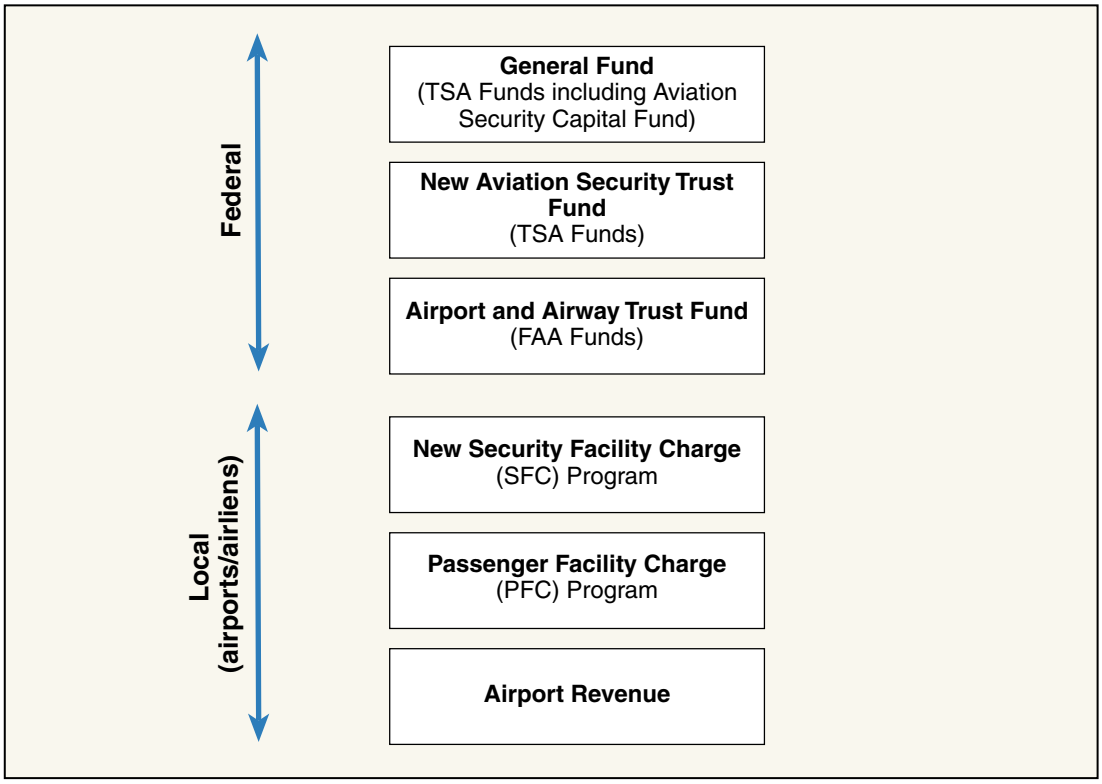
Figure A-7 shows the expanded set of funding sources considered as part of the BSIS. These sources are presented so that federal funding sources are shown at the top of the figure, followed by local sources (i.e., funding from airports and airlines).

Figure A-7

RANGE OF FUNDING SOURCES CONSIDERED
Transportation Security Administration

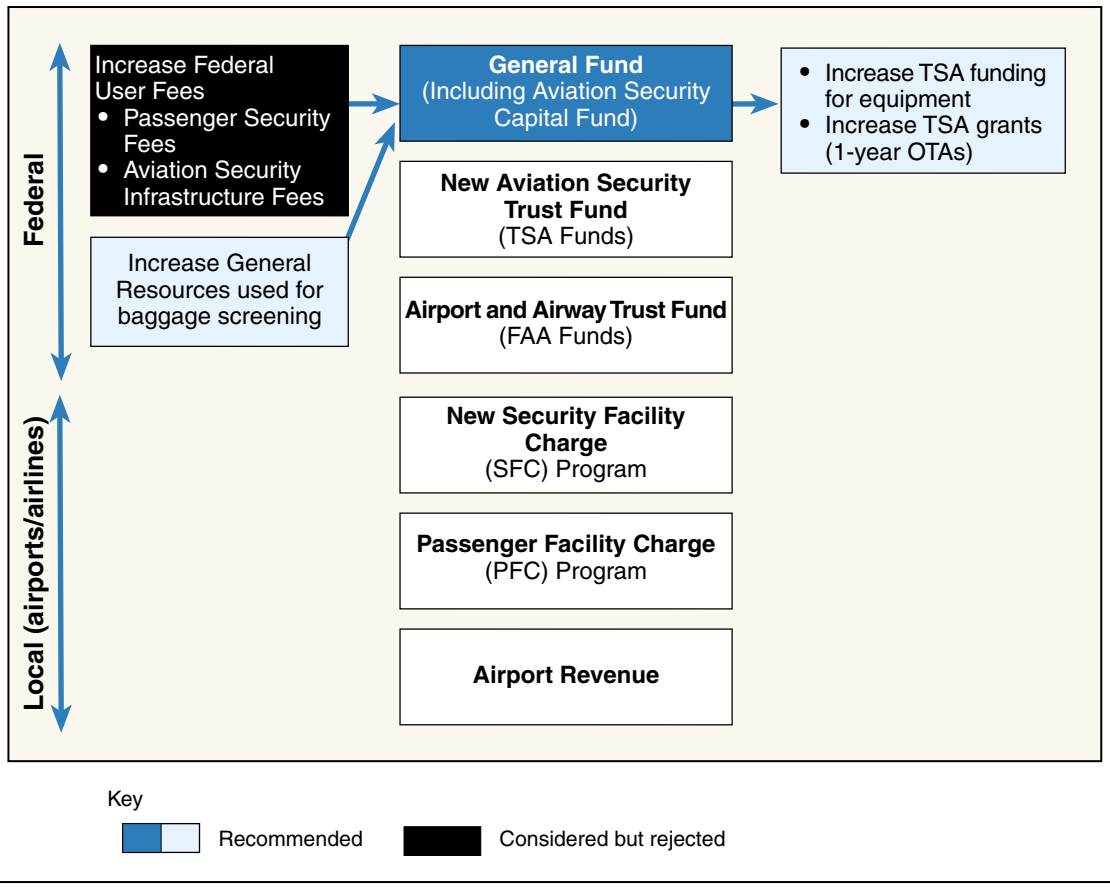


A.4.1 Increased TSA Funding from the General Fund

As shown on Figure A-8, and discussed below, two alternatives were considered for increasing annual appropriations for TSA's purchase and installation of EDS baggage screening systems from the current $435 million level (escalating at 1.7% annually): (1) increasing federal user fees and (2) increasing the amount of general resources of the federal government from tax revenues used to support investment in baggage screening.

Figure A-8

CONSIDERATION OF INCREASED FEDERAL USER FEES AND GENERAL FEDERAL RESOURCES
Transportation Security Administration



- **Increase in Federal Aviation Security User Fees** – The Finance Team considered the concept of increasing either the Passenger Security Fee ($2.50 per flight segment with a maximum of $5.00 per one-way trip) or the Aviation Security Infrastructure Fees that are currently collected directly from the airlines ($300 million to $448 million annually). The Working Group strongly agreed that checked baggage screening, as defined in ATSA, is a federal responsibility. While airline and airport members of the Working Group felt that the federal government should, therefore, be 100% responsible for the funding necessary to achieve this mandate, TSA felt that this was unrealistic without increasing federal aviation user fees, given current constraints on the federal budget. Airline members of the Finance Team stressed that airlines absorb passenger fees as well as direct fees, since they cannot add the passenger fees to their fares due to fare competition. Representatives of passenger interest groups and airline representatives argued strongly against increasing federal user fees they collect and pay, so the concept was not endorsed.

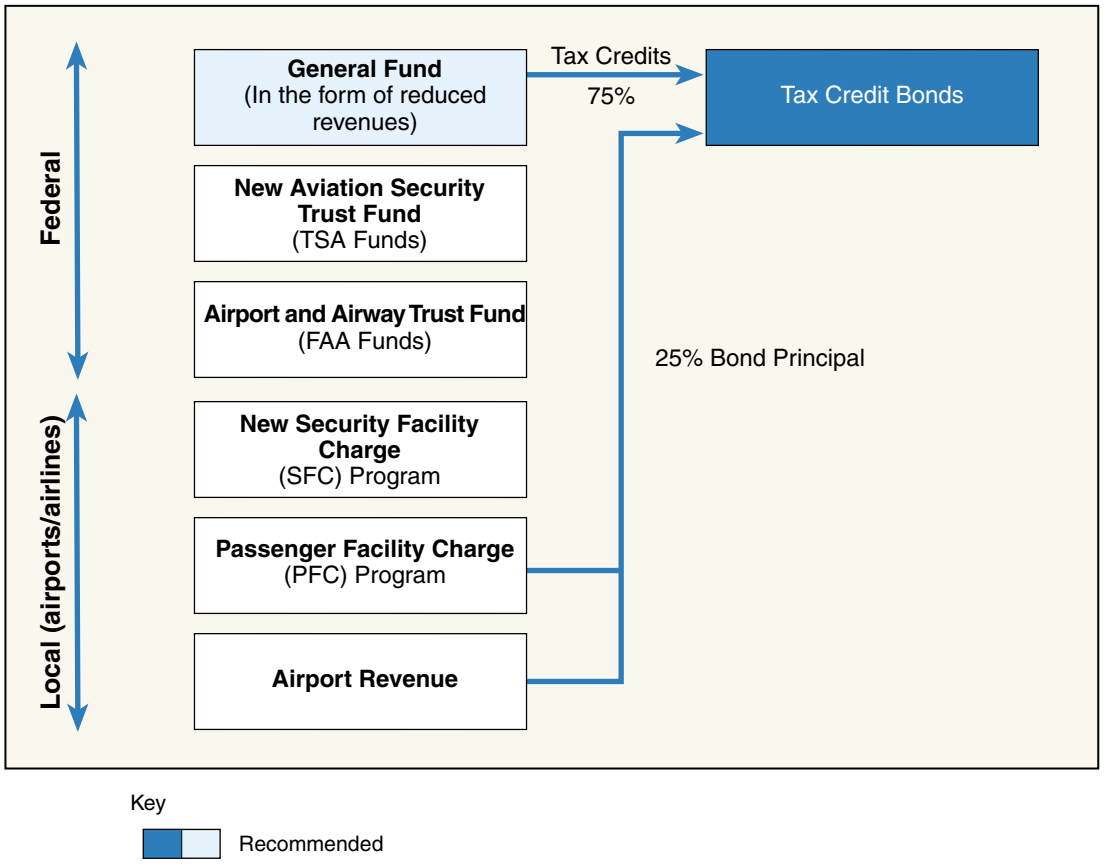
- **Increase Support from Federal Taxes** – The Finance Team also considered recommending larger annual appropriations for TSA from the General Fund. On the basis of the quantifiable and nonquantifiable benefits that would accrue to the federal government / general public (as discussed in Section 5.5 of the BSIS report), the consensus was to recommend that TSA seek to at least maintain, if not increase, appropriations for investment in baggage screening. However, the Finance Team also recognized that this approach does not allow for substantial inclusion of large numbers of airports or terminals in a given fiscal year. Alternative approaches that would support the recommended investment policy and also be more feasible from a fiscal perspective were, therefore, explored.

A.4.2 New Tax Credit Bond Program

The BSIS process has resulted in the recommendation that Congress adopt new legislation authorizing the use of a federal TCB program, as shown on Figure A-9, for the capital costs of BHS and related infrastructure. Under this proposal, Congress would authorize airports to issue up to $3 billion in TCBs over a 4-year period. The issuance amount would be allocated to interested airports by DHS and TSA based on the prioritization process described in Section 5.4 of the BSIS report.

Figure A-9

CONSIDERATION OF TAX CREDIT BONDS
Transportation Security Administration



Background. TCBs are a relatively new form of financial instrument. They were first introduced in 1997 through the establishment of Qualified Zone Academy Bonds (QZABs), a $400 million per year, 2-year program targeted to public school modernization projects in lower income neighborhoods. Congress has renewed the QZAB program several times since then; presently, $3.2 billion of such bonds have been authorized for issuance. The Administration, in its FFY 2007 Budget, has proposed extending the QZAB program by another $800 million through FFY 2007. Last year, Congress enacted a similar $800 million TCB program for clean renewable energy projects called Clean Renewable Energy Bonds (CREBs), and a $350 million TCB program for Alabama, Louisiana, and Mississippi to provide short-term financial relief for Hurricane Katrina recovery.*

As shown on Figure A-10, TCBs involve the issuance of taxable debt by state and local governments or other non-federal entities for designated capital purposes. In lieu of

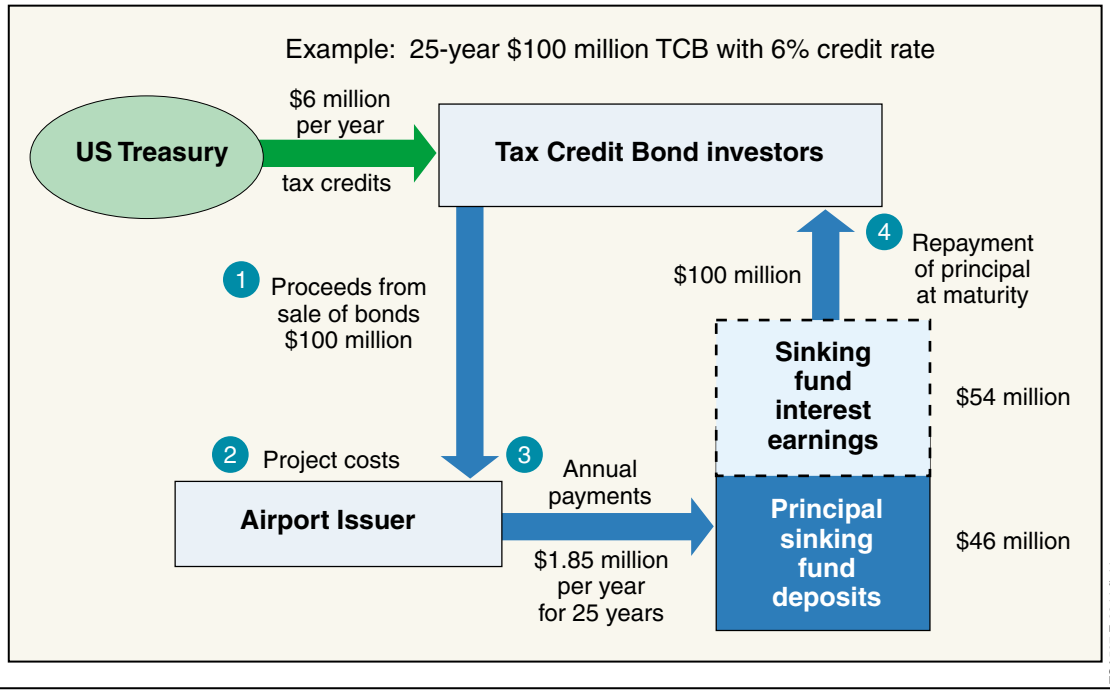
* The Clean Renewable Energy Bond (CREB) program was authorized in Section 1303 of the Energy Tax Incentives Act of 2005 (Public Law109-58); the Gulf Tax Credit Bond program was authorized in Section 101 of the Gulf Opportunity Zone Act of 2005 (Public Law 109-135).

cash interest, bondholders receive annual tax credits that can be applied against their federal income tax liability. The tax credit itself represents taxable income to the bondholder (please see Section A.4.2 for a more detailed explanation). Principal is repayable by the issuer from non-federal sources. The bonds are generally structured as "bullet" term bonds, where the principal is repaid in a lump sum at bond maturity. TCBs are generally structured as bullet term bonds to maximize the value of the tax credit, and the issuer makes periodic deposits to a sinking fund to provide for principal retirement at maturity. Unlike other federal tax credit programs oriented to equity capital (such as tax credits for investments in low-income housing), TCBs do not require the project sponsor to be the "consumer" of the tax credits. Instead, this form of tax subsidy encourages private investment in desired infrastructure through lower-cost debt capital for the issuer.

Figure A-10

TAX CREDIT BOND ILLUSTRATION—AIRPORT ISSUERS

Transportation Security Administration



TCBs provide a substantial subsidy to the issuer, as the interest expense can represent 50% to 80% of the effective cost of long-term borrowing. The extent of the subsidy depends on the term (maturity) of the bonds and the interest (credit) rates. The longer the term and the higher the interest rates, the greater the subsidy level. In today's interest rate environment, airports would effectively pay 25% of project costs in present value terms if all project costs were financed with TCBs having a maturity of 25 years.

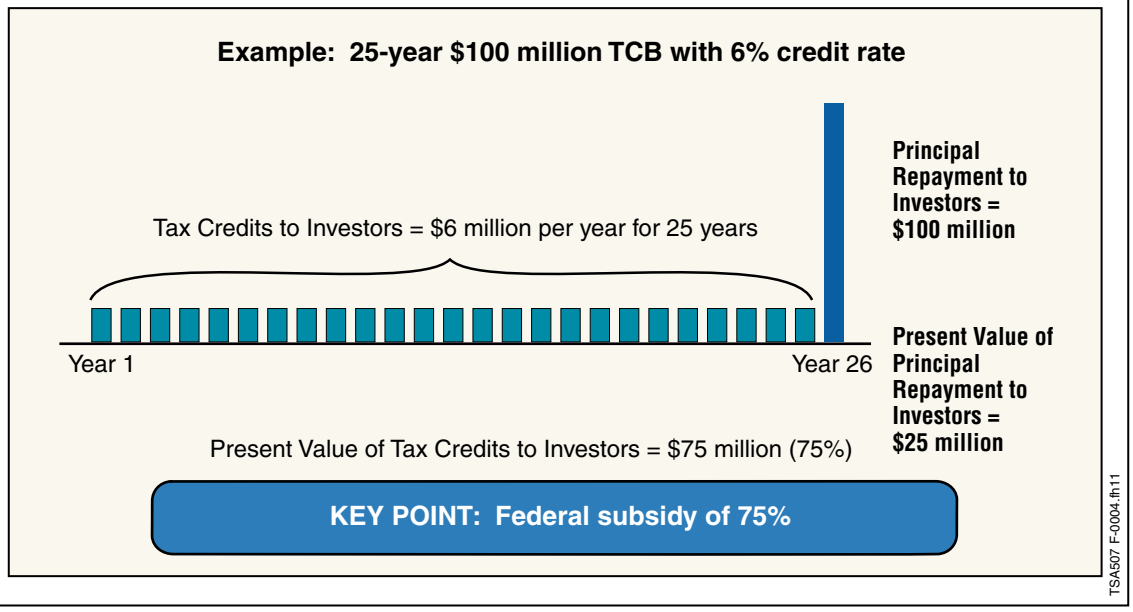
Program Mechanics. The basic mechanics of the TCB program from an investor's perspective and the airport issuer's perspective are discussed below.

- **Investor Perspective** – The return on any fixed income investment consists of two components: periodic interest payments and return of capital (i.e., principal payments). For tax credit bonds, the investor receives non-cash tax credits in lieu of interest payments. Principal is repaid by the issuer at maturity using non-federal revenue sources. The tax credits can be viewed as "in-kind" interest payments because they reduce, dollar-for-dollar, other federal income tax liability of the bondholder. So long as an investor has federal tax liability, the tax credit has economic value – the same value regardless of the investor's tax bracket. Figure A-11 shows the mechanics for a hypothetical example where 25-year TCBs in the amount of $100 million are issued with a 6% credit rate, which is within the range of recent credit rates on QZABs. It is assumed in the example that sinking fund payments would be made at the beginning of the first year and thereafter for 25 years, and that principal would be repaid in Year 26.

Figure A-11

TAX CREDIT BOND MECHANICS—INVESTOR PERSPECTIVE

Transportation Security Administration



The value of the tax credit stream increases the longer the principal is outstanding. For a 25-year term bond with a 6% tax credit stream, its discounted present value approximates 75% of the economic value of the bond (the same result as for a conventional 6% cash-interest bond). This equates to a federal subsidy of 75%, the same federal share achieved under TSA's LOI program.

Table A-5 demonstrates the net benefit of holding TCBs from the perspective of a hypothetical investor with annual taxable income of $100,000 and subject to a 30% marginal tax rate. Under the "null case," the investor would pay $30,000 in federal taxes. If the investor held $100,000 in TCBs and the federal tax credit rate on the bonds was 6%, then (1) the $6,000 tax credit would be added to the investor's taxable income, increasing it to $106,000, and (2) the investor's federal tax liability of $31,800 would be offset by the $6,000 tax credit for an adjusted tax liability of $25,800, a reduction of $4,200 or 4.2% compared to the null case. Because the tax credit is added to taxable income at the outset, TCBs are considered taxable bonds.

Table A-5

EXAMPLE—CLAIMING TAX CREDITS
Transportation Security Administration

	Null Case (No TCB held)	$100,000 TCB held
Assumptions		
Outstanding principal amount of TCB held	$ --	$100,000
Federal marginal tax bracket	30%	30%
Federal tax credit rate	6%	6%
Amount of tax credit allowed	$ --	$ 6,000
Federal Income Tax Calculation		
Taxable income before credit	$100,000	$100,000
Add: tax credit applied to federal taxable income	--	6,000
Adjusted federal taxable income	$100,000	$106,000
Federal tax liability	$ 30,000	$ 31,800
Minus: Amount of tax credit	--	(6,000)
Adjusted tax liability	$ 30,000	$ 25,800
Net after-tax income	$ 70,000	$ 74,200
Net benefit of holding TCB	$4,200	
Annual after-tax return on TCB	4.2%	

- **Airport Issuer Perspective** – Figure A-12 shows the same hypothetical $100 million TCB issue from the issuer's perspective. To reassure bondholders that sufficient resources will be on hand to retire the TCB at maturity, it is anticipated that most issuers would establish escrow accounts, known as sinking funds, to accumulate revenues over time. The sinking funds would be held by a bond trustee, and the balances would be invested for the benefit of the bondholders. Issuers could lock in a guaranteed reinvestment rate for annual deposits to the sinking fund by entering into a forward supply agreement with securities dealers. Under these agreements, a dealer agrees to sell the issuer U.S. Treasury bonds or other high-quality investment obligations annually at predetermined prices and yields over a 25-year period. In this way, the issuer is assured of its reinvestment rate, and avoids any interest rate risk. The issuer is therefore able to lock in a yearly annuity-type contribution that would be sufficient to retire the bonds at maturity.

Figure A-12

TAX CREDIT BOND MECHANICS—AIRPORT ISSUER PERSPECTIVE

Transportation Security Administration

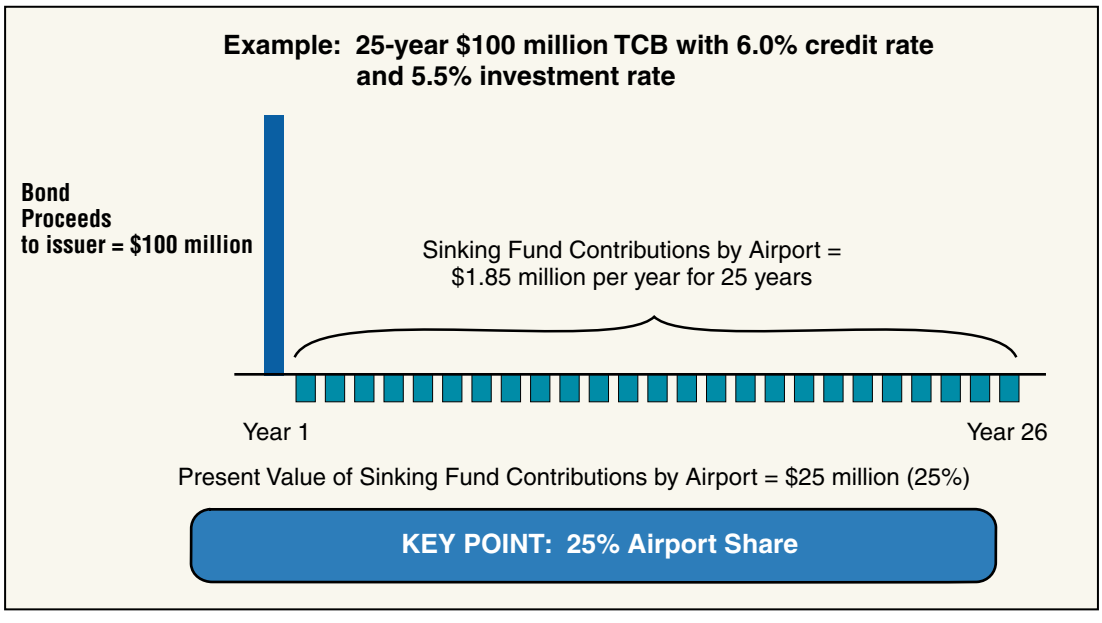
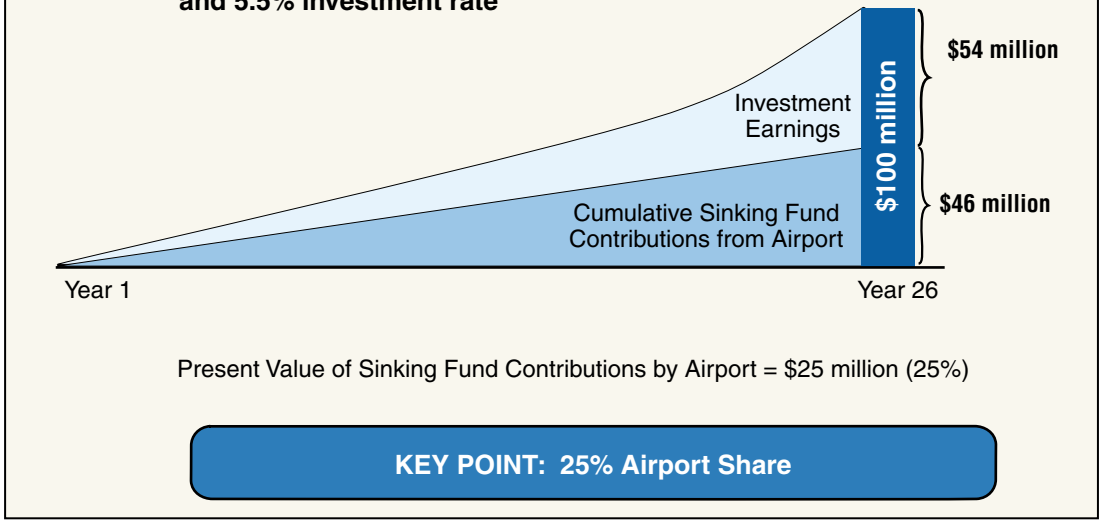


Figure A-13 shows the effect of compound reinvestment of interest earnings over the term of the TCB.

Figure A-13

TAX CREDIT BOND MECHANICS—AIRPORT SINKING FUND

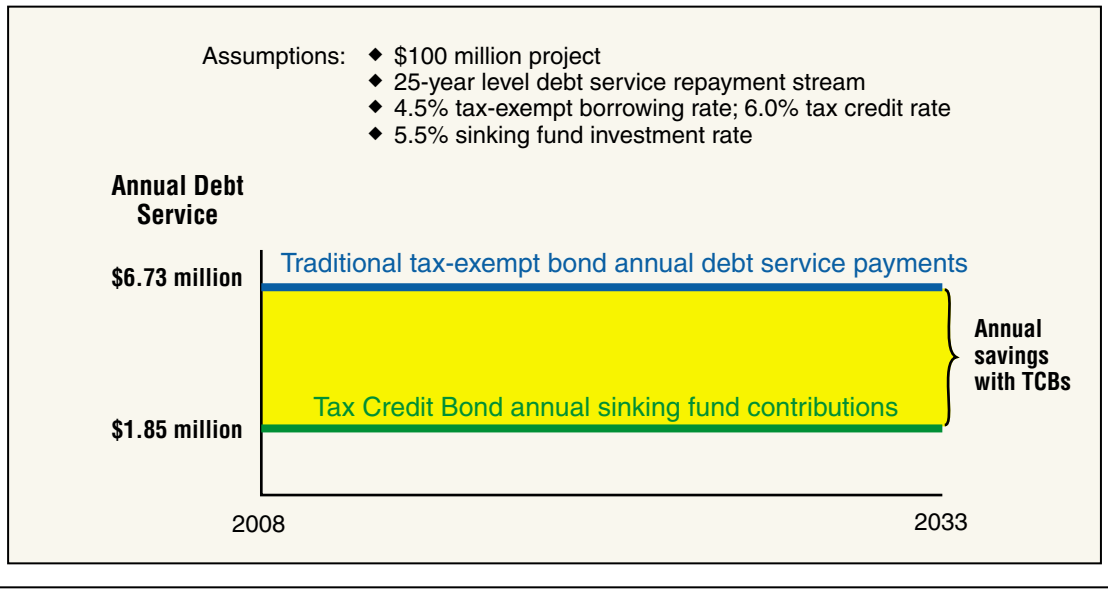
Transportation Security Administration



For an issuer, the use of tax credit bonds can dramatically increase the amount of debt that can be supported by a given level of pledged revenues. Conversely, as illustrated on Figure A-14, an issuer can substantially reduce its annual cost of borrowing a fixed amount through tax credit bonds compared to traditional tax-exempt debt financing.

Figure A-14

COMPARISON OF TAX CREDIT BONDS WITH CONVENTIONAL BOND FINANCING
Transportation Security Administration



Each airport issuer would be responsible for identifying a pledged non-federal revenue source to repay the principal at maturity, consistent with its legal authority and any financial covenants backing its other debt. The tax credit bonds could be on parity with an airport's traditional revenue bond indebtedness, or issued on a subordinate or stand-alone basis. Possible pledged revenue streams include one or more of the following:

- **General Airport Revenues** from airline rents and fees and nonairline sources, as is the case for traditional general airport revenue bonds (GARBs)
- **Passenger Facility Charge Revenues,** as is the case for stand-alone PFC-backed bonds and certain double-barreled bonds backed by PFC revenues and general airport revenues
- **General Local Governmental Resources,** such as sales and property taxes, as is the case for general obligation (GO) municipal bonds issued to fund airport projects (more common for small- and nonhub airports than large- and medium-hub airports)

Airport participation in the TCB program would be entirely voluntary. It is anticipated that large- and medium-hub airports, which frequently access the capital markets to raise capital, would be the most likely issuers of TCBs. While smaller airports would not be excluded, the resource demands on smaller airports for this type of issuance would be relatively high compared with their smaller borrowing needs. In addition, the federal subsidy provided through the recommended TCB

program (about 75%) would be less than the 90% federal contribution currently received by small- and non-hub airports for baggage screening infrastructure costs as part of the LOI program. One of the primary reasons for maintaining or increasing the $435 million baseline for TSA purchase and installation funding is to provide assistance to airports that choose not to participate in the TCB program.

Airport demand for funding of baggage security projects far exceeds the available $435 million annual baseline (escalating annually at 1.7%). Airports wishing to rely on this traditional funding approach could face delays in receiving sufficient grants. The TCB program would enable participating airports to significantly accelerate the initial deployment (or needed expansion) of optimal baggage screening systems. In addition, the program would permit those airports or airlines that have or will have self-funded new baggage screening infrastructure since September 11, 2001, to use their tax credit bond allocation to refinance previously issued airport revenue bonds or reimburse internal funds used for such purpose. These airports, however, could not use the proceeds from TCBs to cover their share of a previously issued LOI agreement or a project for which an OTA has been issued. For airlines that have self-funded new baggage screening infrastructure at terminals they own and operate, reimbursement with TCB proceeds could be facilitated by the airport acting as a conduit (as is currently the case for terminals, maintenance facilities, etc., funded with special facility bonds). Any new baggage screening systems, whether entirely self-funded or funded with federal assistance, must be approved by TSA as described in the BSIS Planning and Design Guidelines.

Market for Tax Credit Bonds. As taxable fixed income investments, tax credit bonds would be sold in the corporate bond market. The return to a bondholder—the tax credit rate—would have to provide a competitive risk-adjusted rate of return compared to other investments. The program terms should provide that the tax credit rate would be the yield that would enable bonds sold on a given date to be marketed without discount, and without interest cost to the issuer.

The demand for tax credit bonds by entities with federal tax liability will determine the program's market potential. Potential bondholders include banks, insurance companies, and other taxable investors. A bondholder would be allowed to decouple, or strip, the tax credits from the principal, similar to U.S. Treasury bonds. This attribute would substantially broaden the market, and allow the tax credit strips to be sold to corporate investors with ongoing tax liability (such as insurance companies) and the stripped taxable principal to be sold to other classes of bondholders that have no demand for tax-advantaged returns (such as pension funds).

Budgetary Implications. Traditional federal spending (such as grant and lease payments) is recognized through obligations of funds on the discretionary side of the federal budget, subject to annual appropriations. Such spending and borrowing by federal agencies typically is scored (i.e., expensed) up-front, regardless of the nature of the assets being financed. Thus, unlike state and local governments, which can reflect the budgetary cost of long-term capital investments over a multi-year

period through debt financing, the federal government's budgetary accounting does not distinguish between capital and operating items.

Tax code measures are handled differently. Under federal budgetary scoring procedures, the fiscal impact of a tax code incentive, such as tax credit bonds, is calculated annually through "tax expenditures." These are the estimated foregone Treasury receipts, projected over a 10-year scoring window following enactment of the measure.

Based on conventions used in the existing tax credit bond programs for school modernization and energy projects (the QZABs and CREBS), it appears that the 10-year scored cost of a $3 billion tax credit bond program with the contemplated 4-year issuance profile would be approximately $1.1 billion (or 38% of the face value of the bonds). In contrast to grants, this budgetary cost would be charged against the *mandatory* (receipts) side of the federal budget, and would not compete for funding with conventional spending programs that are subject to *discretionary* budget controls. In this manner, the tax credits can augment the appropriations received by TSA to support further investment in baggage screening systems.

Net federal revenues are estimated to be reduced by $130 million annually once the full amount of authorized TCBs is issued. However, this investment would significantly accelerate the deployment of optimal systems and result in an estimated program cost savings relative to the current investment level of over $1.2 billion in present value terms.

Proposed TCB Program Legislative Features. It would be necessary to add a new section to the Internal Revenue Code authorizing the issuance of up to $3 billion in tax credit bonds to help fund the EBSP. Authority to issue TCBs would be allocated among interested CAT X—III airports by the DHS and TSA based on the prioritization approach described in Section 5.4 of the BSIS report. The Finance Team recommends a TCB program with the following key legislative features:

- **Eligible Issuers**– An eligible issuer of TCBs would be any commercial service airport classified by TSA as a Cat X—III airport, or a state or local public agency issuing debt on behalf of such an airport.

- **Eligible Costs** –Project costs eligible for TCB financing would include baggage handling system and infrastructure modification design and construction costs necessary to accommodate EDS implementation in accordance with the BSIS Planning and Design Guidelines described in the BSIS report. Eligible costs would include:

  – Costs associated with development phase activities, such as planning, engineering, design work, feasibility analysis, environmental review, permitting, etc.

  – Costs of construction, reconstruction, rehabilitation, replacement, acquisition of real property (including land related to the project and

improvements to land), environmental mitigation, construction contingencies, project management, etc.

– Financing costs, including issuance expenses, required reserves, etc.

Eligible projects must be based on designs that are completed and approved within the authorization period of the TCB program. Eligible uses of TCB proceeds would include:

– New optimal baggage screening systems at existing terminals

– Refunding of eligible project costs previously incurred by airports or airlines for self-funded systems not yet supported by federal investment

– Modification of existing systems necessary to accommodate traffic growth, changes in airline operations, and changes in TSA protocols

– Redesign of first generation systems

– Optimal EDS baggage screening systems for new terminals

- **Ineligible Costs**– The following projects would not be eligible for TCB funding:

  – Refunding of the local match for federally funded baggage screening systems

  – Augmented funding for baggage screening systems funded by TSA LOIs

  – Baggage screening systems for which final design was not completed and approved prior to the beginning (October 1) of the last federal fiscal year in which TCBs are authorized, unless the authorization period is extended or funds are carried over past the authorization period

- **Qualified Bonds.** A qualified TCB would be any bond issued by an eligible issuer for which:

  – The airport received a volume allocation (see below) from DHS/TSA

  – At least 90% of the bond proceeds are used to pay eligible costs

  – The use of bond proceeds meets certain spend-down requirements (e.g., the project sponsor reasonably expects to spend at least 85% of the proceeds for eligible costs within the 3-year period following the year of bond issuance, and 100% within 5 years)

  – The final maturity of the bonds does not extend beyond the earlier of (1) the useful economic life of the project or (2) 30 years (consistent with many other airport bonds)

– The payment of bond principal is the obligation of the airport or other eligible issuer

- **Issuance Volume**– The authorized volume of tax credit bonds would be limited to $3 billion, as shown below, based on the BSIS analysis of needs. The proposed annual issuance authority reflects (1) the life-cycle cost savings from expedited investment in optimal systems, and (2) critical needs at some airports for improved systems.

2008	$ 1 billion
2009	$ 800 million
2010	$ 600 million
2011	$ 600 million

  This additional infrastructure funding would jump start optimal EDS baggage screening system implementation by allowing many airports with the most urgent need and most expensive solutions to get started sooner than if the program were evenly divided over the 4-year period. However, given the voluntary nature of the TCB program and the potential startup time for issuing bonds, it is important that any authorized TCB amounts not issued in the year initially authorized carry forward to future years. This funding would also facilitate relatively quick payback to airports and airlines that self-fund their optimal baggage screening systems with the expectation of federal support. Any TCB proceed amounts not issued in the year initially authorized would be carried forward to future years.

- **Volume Allocation**– The DHS Secretary (or TSA Administrator) would allocate the right to issue certain principal amount among airports for eligible costs of baggage screening projects according to the EBSP prioritization criteria and methodology. In allocating these bonds, the Secretary (Administrator) would be directed to consult with the recommended Integrated National Deployment Team representing airport operators and the airline industry.

- **Bond Security; Sinking Funds**– Each TCB could be secured by an upfront deposit or annual contributions to an internal sinking fund that would be maintained with the bond trustee as sinking fund depository. The eligible issuer would identify a source of repayment for principal, to be invested in the sinking fund until maturity. The revenue stream may be PFC revenues, airport rents and fees, general or special taxes, or other available funds. The sinking fund contributions would be invested in U.S. Treasury, federal agency, or other highly rated obligations permitted by the issuer's trust indenture (or guaranteed investment contracts collateralized by the same). Together with interest earnings, the sinking fund contributions would be used to repay the bond principal at maturity. The TCBs would be structured as "bullet" maturities; there would be no amortization requirement prior to maturity.

- **Eligible Investors**– Any corporation, partnership, registered investment company (mutual fund), trust, or individual would be permitted to hold a TCB.

- **Credit Allowance**– An eligible investor holding a TCB would be entitled to a credit against its federal tax liability. The bondholder would be allowed to claim 25% of the annual tax credit amount on any quarterly date on which the taxpayer has a federal tax payment due. The annual tax credit amount would equal the face amount of bond principal held by the investor multiplied by the credit rate (defined below). A taxpayer holding a TCB would be entitled to offset its federal income tax, including any alternative minimum tax (AMT), as well as the employer share of Federal Insurance Contributions Act (FICA) taxes. To the extent that the bondholder had insufficient tax liability to fully use its tax credit in any given year, it could carry over the unused tax credit amount to a succeeding year. The bondholder would recognize the amount of the tax credit as taxable interest income earned in that year, for federal tax purposes. The bondholder could transfer the bond and tax credits to other parties through sale and repurchase agreements or other arrangements.

- **Credit Rate**– The applicable credit rate, which would be set at the time of initial issuance for each series of tax credit bonds, should be that rate enabling the airport or other issuer to sell its bonds without discount or interest cost. The Finance Team understands that the credit rates for the existing TCB programs are established by the U.S. Department of the Treasury and imperfectly approximate market rates. It is recommended that credit rates for the EBSP tax credit bonds be established by the markets, as is the case with other airport bonds, to ensure that the bonds can be sold at par.

- **Tax Treatment; Spend-Down Requirement**– As federally taxable obligations, the TCBs would not and should not be subject to the arbitrage rules for tax-exempt obligations under the Internal Revenue Code. However, there would likely be a requirement that the bond proceeds be expended within a certain number of years following bond issuance.

- **Credit Decoupling**– The stream of tax credits could be detached from the bond at issuance or on a subsequent date, to facilitate TCB marketability and deliver the intended subsidy more efficiently. The TCB program would follow the same procedures as for U.S. Treasury bonds, for which Congress authorized "stripping" the coupons from the principal in 1985. (Presently, more than $175 billion of outstanding Treasury bonds are held by investors in stripped form.) This would substantially broaden the market for TCBs.

- **Compliance and Recapture**– If an airport that issued TCBs failed to comply with the terms of the TCB program, for example, by not satisfying eligibility requirements or the spend-down requirement, the issuer could take

remedial action, such as waiving volume allocation or paying a penalty proportional to the credits claimed for the ineligible proceeds. Failure to take remedial action would result in credit recapture penalties. The issuer would be required to submit reports to the Internal Revenue Service similar to those required for issuers of tax-exempt bonds.

TCB Program Justification. The Finance Team believes that a TCB program is the most viable way to accelerate the EBSP and realize significant economic and security benefits of doing so. This recommendation takes into account (1) current budget realities, (2) the nature of the long-lived infrastructure improvements, and (3) the widespread security benefits accruing to the general public, as well as the direct benefits to be realized by system users. The TCB program is recommended for the following reasons:

- It is supportable by both airlines and airports, and would minimize the budgetary impact of the required federal contribution. These attributes make it the most feasible way to expedite implementation of optimal EDS baggage screening systems. Expedited implementation would enable a present value life-cycle cost savings to the federal government of approximately $1.5 billion compared to the current funding baseline.

- It effectively draws on general taxpayer support through a tax subsidy, thereby inducing airport investment to augment the current TSA EDS purchase and installation budget. This investment is appropriate because: (1) baggage screening at airports is a critical element in maintaining national security; (2) a safe and dependable commercial aviation system provides nationwide economic benefits; and (3) the primary beneficiary in terms of quantifiable economic benefits from automation investments is the federal government (through TSA staffing cost savings and avoidance).

- The use of tax credits would allow the budgetary cost of the federal assistance to be spread over a multi-year period, more in line with the useful economic life of the financed infrastructure improvements than conventional government investments, which are "expensed" up front.

- The TCB program results in a 25% local share. This ratio is consistent with baggage screening investments by TSA in recent years (through LOIs) and other federal infrastructure assistance programs.

- Providing federal assistance through a tax subsidy compared to outright grants minimizes the need for federal bureaucracy, and ensures that project-related borrowings by airports are subject to a market test for financial feasibility.

While firmly supporting the policy case for the level of subsidy to be provided by the recommended TCB program, the Finance Team recognized the need to carefully structure such a tax subsidy. The recommended features of the TCB program are intended to support effective implementation while addressing tax policy concerns. This balance can be accomplished by adhering as closely as possible to the policies and procedures airports currently follow in issuing tax-exempt governmental and private activity (AMT) bonds while recognizing certain exceptions necessary to achieve the required subsidy level.

In particular, the Finance Team wishes to emphasize the following features essential to TCB program success:

- Eligible projects must conform to the BSIS Planning and Design Guidelines and the volume allocation must follow the prioritization criteria and methodology outlined in the BSIS report to ensure that the intended economic and security benefits are realized.

- The TCBs should be structured to deliver the required subsidy as efficiently as possible (for example, by enabling market-based credit rates and maximizing liquidity through broad investor eligibility and decoupling of tax credits from bond principal).

- The TCB terms must be consistent with those of other airport bonds (tied to the economic life of the financed improvements, up to 30 years) and the TCB maturities must be structured as single-payment "bullets" to achieve the required subsidy (75%).

- The airport issuers of TCBs must file the customary information reports so that both the federal government and the aviation industry can monitor progress and ensure effective program implementation.

A.4.3 TSA EBSP Funding Protection and Flexibility

TSA's annual budget includes EDS purchase and installation funds, which have been the source of TSA's ability to acquire and install EDS equipment, to authorize and pay the outstanding obligations on TSA LOIs, and to issue direct grants to airports through OTAs. The Administration's budget request for FFY 2007 includes $435 million for EDS purchase and installation. The Finance Team believes that protecting or increasing this baseline funding level and enhancing TSA's ability to use this funding in a flexible manner are essential to successful implementation of the BSIS recommendations.

Protection of Baseline Capital Funding. The availability of a voluntary Tax Credit Bond program will greatly expedite implementation of optimal screening systems. However, the TCB program will fail if TSA is unable to keep pace by supplying the necessary equipment to match system construction. If airports are to move ahead to implement optimal screening systems, which, in many cases, will

require next-generation EDS screening technology, TSA must have the funds to purchase and install the necessary equipment or the systems will be unused. The anticipated rate of system implementation resulting from increased funding will require TSA to purchase and install more equipment annually than TSA has deployed since FFY 2002.

In addition, life-cycle replacement demands for existing EDS equipment will increase significantly beginning in approximately FFY 2013. This additional funding need will then compete with funding needs for new system implementation.

Also, many small and non-hub airports are unlikely to use the TCB program to fund optimal system implementation and some larger airports may choose not to access TCBs as well. These airports will likely rely on a continuing TSA grant program, both for funding of new optimal systems and reimbursement of self-funded optimal systems. As such, TSA must have a predictable, consistent funding stream available to support those airports not accessing TCBs. This availability could be difficult considering that the purchase and installation budget is dependent on annual General Fund appropriations. Nonetheless, the Finance Team strongly urges the Administration and Congress to make the required funding a high priority in the annual appropriations process.

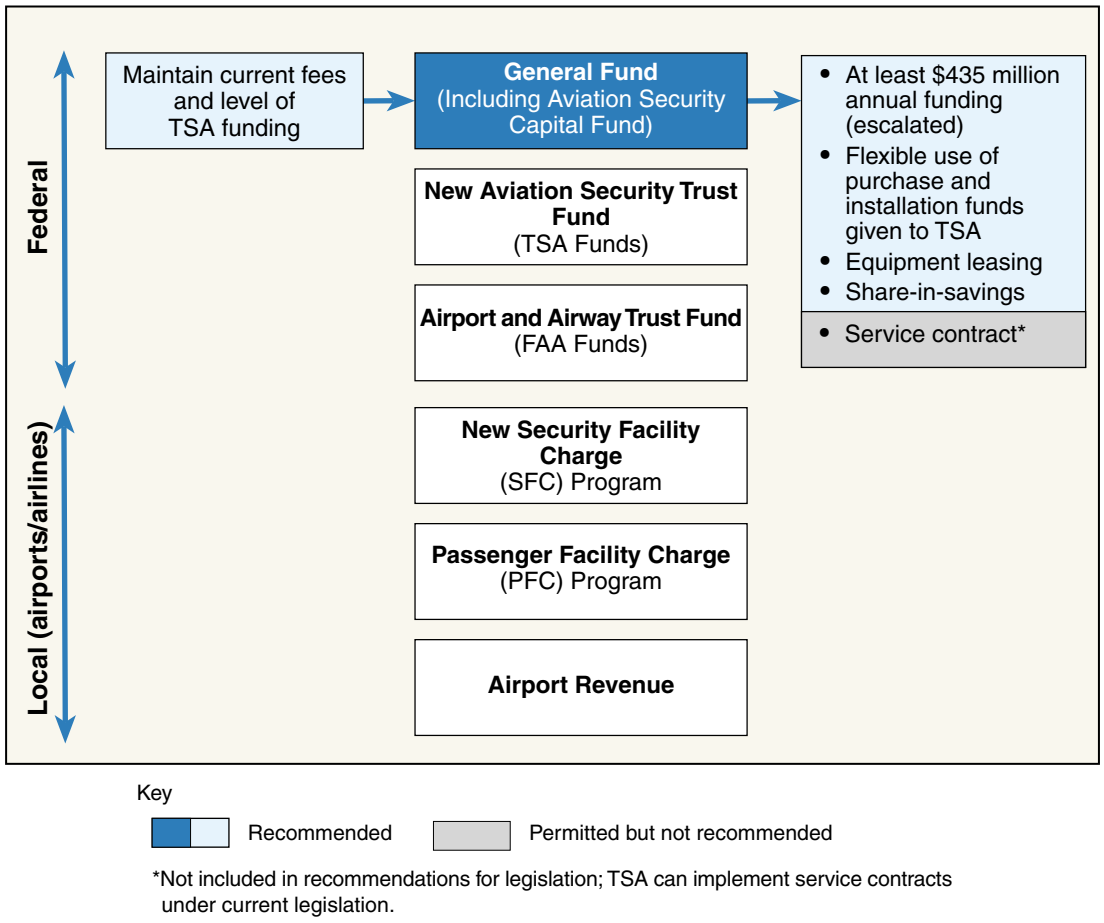
Enhanced TSA Funding Flexibility. Nearly as important to successful program implementation as the capital baseline is funding flexibility. Since 2001, the TSA EDS Purchase and Installation funds have been appropriated with significant restrictions. For example, TSA has not been able to shift the mix of purchase and installation funds without reprogramming funds. This has hindered TSA's ability to effectively address screening compliance issues as they arise during the year or as passenger numbers change. Funding requirements could also change as new technology is certified that is less expensive, which could change the amounts of purchase and installation funding needed during the course of the year.

In addition, the voluntary nature of the TCB program will result in less predictability of funding needs. TSA will, therefore, need more flexibility to use purchase and installation funds interchangeably to fund then-current needs, through the appropriation of a combined purchase and installation budget line item. This flexibility will allow TSA to respond to the needs of airports and airlines in the context of a more transparent long-term investment strategy. Figure A-15 presents several ways in which additional flexibility might be afforded TSA.

Figure A-15

CONSIDERATION OF CURRENT TSA FUNDING PROTECTION/INCREASED FLEXIBILITY

Transportation Security Administration



While the BSIS recommends a logical methodology that TSA would follow in implementing optimal baggage screening, the implementation schedule would not solely be under TSA's control. Given that the TCB program would be voluntary, TSA would have limited ability to manage the timing for airports to move forward. The recommended investment strategy is dependent on TSA's purchase and installation funding being flexible to allow TSA's timely response to airports accessing TCBs, airports relying on grant monies, and life-cycle replacement demands. Thus the Finance Team recommends:

- Appropriating purchase and installation funding as a combined line item to provide TSA the greatest flexibility to respond to equipment purchase, life-cycle replacement, or installation demands, or to provide grants to airports not accessing TCBs

- Ensuring that all EDS purchase and installation funding be unrestricted as to specific technology equipment

- Ensuring that all EDS purchase and installation funding be unrestricted as to specific hub size categories or other airport categories, as was the case in FFY 2006 and FFY 2007, but was not in prior years

Beyond these basic flexibilities, the Finance Team considered other approaches that might enable TSA to use its EDS funds more effectively. A common theme was the "rationalization" of federal spending by annualizing the fiscal impact.

The Finance Team recognized the appeal of trying to spread out the budgetary cost of federal investment in EDS equipment and related infrastructure. Private companies and state and local governments frequently amortize the costs of their capital investments and technology acquisitions through multi-year leases, service contracts, or other mechanisms. However, federal regulatory accounting ("budget scoring") procedures do not readily accommodate such approaches. The funding principles and scoring guidelines reflect a federal budget that generally uses a cash basis of accounting (not accrual) and does not distinguish between spending for operating and capital purposes. Even if federal expenditures (cash outlays) occur over a multi-year period, the funding (budget authority) to enter into long-term commitments for capital assets generally must be provided up front.

After closely examining several alternative approaches, the Finance Team concluded that restructuring TSA's current funding to achieve annual budget scoring and accelerate optimal deployment would be problematic. It was determined that the structural features needed to avoid the up-front scoring (expensing) of federal capital spending for EDS equipment and related infrastructure would place significant burdens on airports and airlines. While relieving the federal government from long-term funding commitments that would have to be recognized up front in the budget process, these approaches would shift substantial (but hard-to-assess) financing, operating, and ownership risks to airports and/or private parties.

The Finance Team acknowledges that, as baggage screening technology evolves and the aviation security market matures, it might be possible to structure a more flexible TSA funding approach that achieves the right balance between federal fiscal "prudence" and private sector "bankability." However, within the desired time frame for accelerating system deployment and realizing the economic and security benefits, these alternatives were deemed less feasible than the recommended TCB program.

The following sections briefly describe some of the alternative concepts examined by the BSIS Working Group.

Equipment Leasing. DHS and TSA decision-makers are interested in exploring the option to lease EDS equipment, with a goal of deploying new equipment more quickly than would otherwise be possible. A key question is whether, in the long run, it might be more cost-effective to lease rather than purchase such equipment, given the high maintenance and rapid demands for new technology. Even so, the acceleration benefit of leasing EDS equipment would be

minimal because equipment purchase costs represent only a small portion of the initial capital costs associated with EDS deployment (typically 15% to 30%). The installation and associated infrastructure costs—which do not mesh with leasing—represent the largest share of the program funding needs.

EDS equipment leasing would involve a contract between the federal government and either the equipment manufacturer or a third party. To facilitate accelerated acquisition of equipment without a significant increase in TSA appropriations, the lease would need to be treated as an operating lease for federal budget purposes. Under an operating lease, the budget authority necessary to fund annual lease payments would be scored against the budget *each year* as the payments come due. This scoring contrasts with capital leases and other borrowing arrangements, where sufficient budget authority to cover the full cost of the asset being acquired must be provided *up front*—even if the payments (outlays) are spread over a multi-year period. Annual scoring through an operating lease would allow TSA's budget to support more equipment each year.

OMB Circular No. A-11 (A-11), Appendix B, sets forth the terms that a lease must meet to be classified as an operating lease:

- Ownership of the asset remains with the lessor during the term of the lease and is not transferred to the federal government at or shortly after the end of the lease period.

- The lease does not contain a bargain-price purchase option (e.g., the lease does not have a buyout clause at less than the fair market value of the asset at the end of the lease).

- The lease term does not exceed 75% of the estimated economic life of the asset.

- The present value of the minimum lease payments over the life of the lease does not exceed 90% of the fair market value of the asset at the inception of the lease.

- The asset is a general-purpose asset rather than being for a special purpose of the federal government, and is not built to unique specification for the federal government as lessee.

- There is a private-sector market for the asset.

The first four conditions depend on the specific structure of the lease, while the last two depend on the assets being leased. Essentially, meeting these conditions requires shifting risk (contingent financial liability) from the government to the lessor.

TSA would likely face several challenges in structuring favorable EDS equipment lease terms, given the specialized nature of the assets and potential market conditions: EDS equipment has a fairly short life (approximately 7 years) before it must be significantly overhauled ("refreshed"); there are few manufacturers of approved equipment; market demand (by the federal government, thus far) is uncertain; and the technology/performance risks are high.

It may be especially difficult to satisfy the regulatory requirement that there be a private-sector market for EDS equipment, especially if a market for *used* EDS equipment is required. As a practical matter, without a secondary market to re-sell or re-lease equipment, vendors and/or third-party leasing companies would likely add to the lease cost for the risk of not finding alternative buyers/lessees of the equipment, which could greatly increase the cost of the lease.

TSA has held initial discussions with the Administration regarding the leasing of EDS equipment. Significant concerns have been expressed about whether a leasing program for EDS equipment could satisfy the operating lease tests in A-11. In addition to analyzing the budgetary treatment, an assessment of the economics of the transaction is required- the terms of the lease and the lease payments must be structured so that the lease has a lower present-value cost than the purchase of the equipment, discounted at the federal government's low cost of capital. This lower cost may be difficult to achieve in the relatively high-risk manufacturing environment for EDS equipment.

Because of concerns about both economic feasibility and budgetary impact, and because EDS equipment costs are only a modest part of the overall system implementation challenge, the Finance Team did not specifically recommend equipment leasing. But the Finance Team did conclude that TSA should be able to continue exploring potential lease arrangements and issues with private vendors/lease providers.

Service Contract. This concept involves bundling some or all of the activities and costs associated with EDS screening of baggage into a single contract through which TSA would procure the necessary services. Significant responsibility would shift to the airport, airline, or third party, which would be in charge of providing all services and systems necessary to meet federal baggage screening performance standards. The TSA's annual service contract payments would provide the airport, airline or third party with reliable and predictable revenue from which the provider of the services could pay their costs. This concept is intended to simplify the current "disaggregated" approach toward funding and providing equipment, related infrastructure, screening personnel, and various operating and maintenance costs. In bundling these baggage screening components, it is hoped that both the federal government and the participating airport (and its airline tenants) would benefit from resulting economies.

TSA could realize a potentially significant budget advantage if the service contracts were scored as operating leases, allowing annual vs. up-front scoring of budget authority. Including screener personnel costs in the contract "bundle" would make the arrangement more like a conventional "service" that could be scored annually, as those operating costs are very large relative to the costs of the "incidental" equipment. Nonetheless, the Finance Team understands that it is possible that any capital component in such a contract bundle would be scored up front as an asset cost, thereby minimizing any potential budget benefit.

The airport would have the advantage of more direct control over service delivery and could, potentially, provide the service more seamlessly and cost-effectively than TSA.

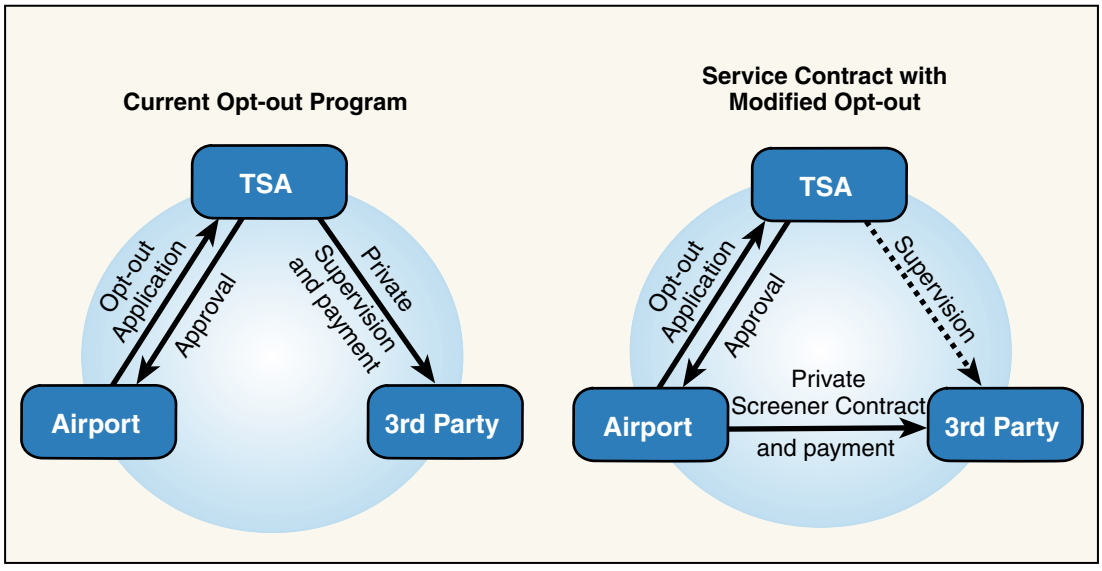
Under a service contract, the airport, airline, or third party would need to:

- **Hire Screeners** – Hiring screeners would entail participating in the Screening Partnership Program by opting not to have TSA screeners at the airport. Rather than the standard form of opting out used to date, where TSA selects, contracts with, and pays a private screening company at the airport, the airport would either provide screening services using its own staff or contract out and pay a private screening company, as shown on Figure A-16. This change may require a legislative change to the existing SPP. Another significant concern relates to liability risks; many airports have expressed concerns that the current contracting provisions and indemnifications are not sufficient to address their liability concerns.

Figure A-16

SERVICE CONTRACT PILOT PROGRAM BUSINESS RELATIONSHIPS

Transportation Security Administration



- **Provide and Maintain Equipment** – The airport, airline, or third party would either purchase or lease equipment from vendors, most likely with a maintenance program included in the contract.

- **Pay O&M and Other Costs** – The airport, airline, or third party would be responsible for other O&M costs, primarily utilities to run the equipment and BHS.

TSA would have a greater probability of achieving annual scoring if screener costs were included in a service contract, as they are clearly operating costs and are quite large, potentially overwhelming the costs of equipment and maintenance.

In addition, a comprehensive service contract could include:

- **Infrastructure** – The airport, airline, or third party would fund the infrastructure necessary to support optimal automated EDS baggage screening systems, the cost of which would be included as part of the service bundle.

It is contemplated that TSA and the airport, airline, or third party would negotiate an annual payment, perhaps fixed within certain bounds, whereby the airport would assume "business risk." If the airport, airline, or third party could arrange the service at a lower cost than the TSA funding level, then it could retain the savings, but it would also take downside risk if actual costs exceeded the contractual level of TSA payments. A fairly predictable annual amount, perhaps with appropriate escalation, might be simplest to accommodate in TSA's budgeting process. Alternatively, TSA could pay on a per-bag basis, but that would introduce another element of risk for both TSA and the airport, airline, or third party (i.e., the risk of not accurately forecasting activity) and it would make TSA's budgeting process more challenging.

The service contract option does not have full airport or airline support. However, if an airport expresses the desire to follow through and appropriate legislative authority exists, a majority of the Finance Team agreed that TSA currently has the authority to pursue this mechanism, and is permitted to do so, but the Finance Team did not specifically recommend implementing service contracts.

Share-in-Savings. Under this general concept, TSA would share with the airport some of the significant screener staff savings anticipated to result from the installation of an optimal system at that airport. The concept is intended to "incentivize" airports to accelerate investment in optimal baggage screening systems *using their own resources*, including tax credit bonds, rather than waiting for TSA grants to become available. The screeners could be either TSA staff or outsourced personnel operating under a service contract. A participating airport could use its share of the savings to reimburse itself for pay-as-you-go costs or debt service associated with the capital investment. Conference Report language accompanying

TSA's FFY 2006 Appropriations Act encourages TSA to enter into share-in-savings agreements with airports, but the program has not been used to date.

While the concept has merit, several practical challenges exist to implementation:

- **Calculating Savings** – It is very difficult to establish the "baseline" cost to use in calculating expected savings, especially if TSA does not have its required complement of screeners at the airport initially. Additionally, at many airports, screener resources are shared extensively between checked baggage and passenger checkpoint functions, making a precise count for each component difficult. Another complication is how to account for traffic growth in establishing the baseline.

- **TSA Checkpoint Screener Needs** – To improve security and level-of-service at passenger screening checkpoints, especially as traffic increases, TSA may need to redeploy baggage screeners (made available due to EDS optimal system automation) to the checkpoints at an airport, or from one airport to another.

- **Potential for Reduced TSA Budget--** If TSA were successful in realizing screener savings, Congress could at some point reduce TSA's funding and reduce or eliminate TSA's ability to pay the airport, since it is likely that TSA payments as part of the share-in-savings program would be subject to annual appropriations – i.e., appropriations for these payments would not be "locked in" without a guaranteed source of funding, such as a trust fund. This uncertainty would make it difficult for an airport or airline to issue debt secured by share-in-savings payments and would necessitate securitizing the bonds with more reliable sources of revenue.

Recognizing these significant challenges, the Finance Team did not seek to rely on the share-in-savings mechanism as a key element of one or more specific baggage screening funding sources or financing tools. However, the Finance Team recognized that the general concept could conceivably be used in the future in tandem with an existing mechanism or any new mechanisms.

A.4.4 New Aviation Security Trust Fund

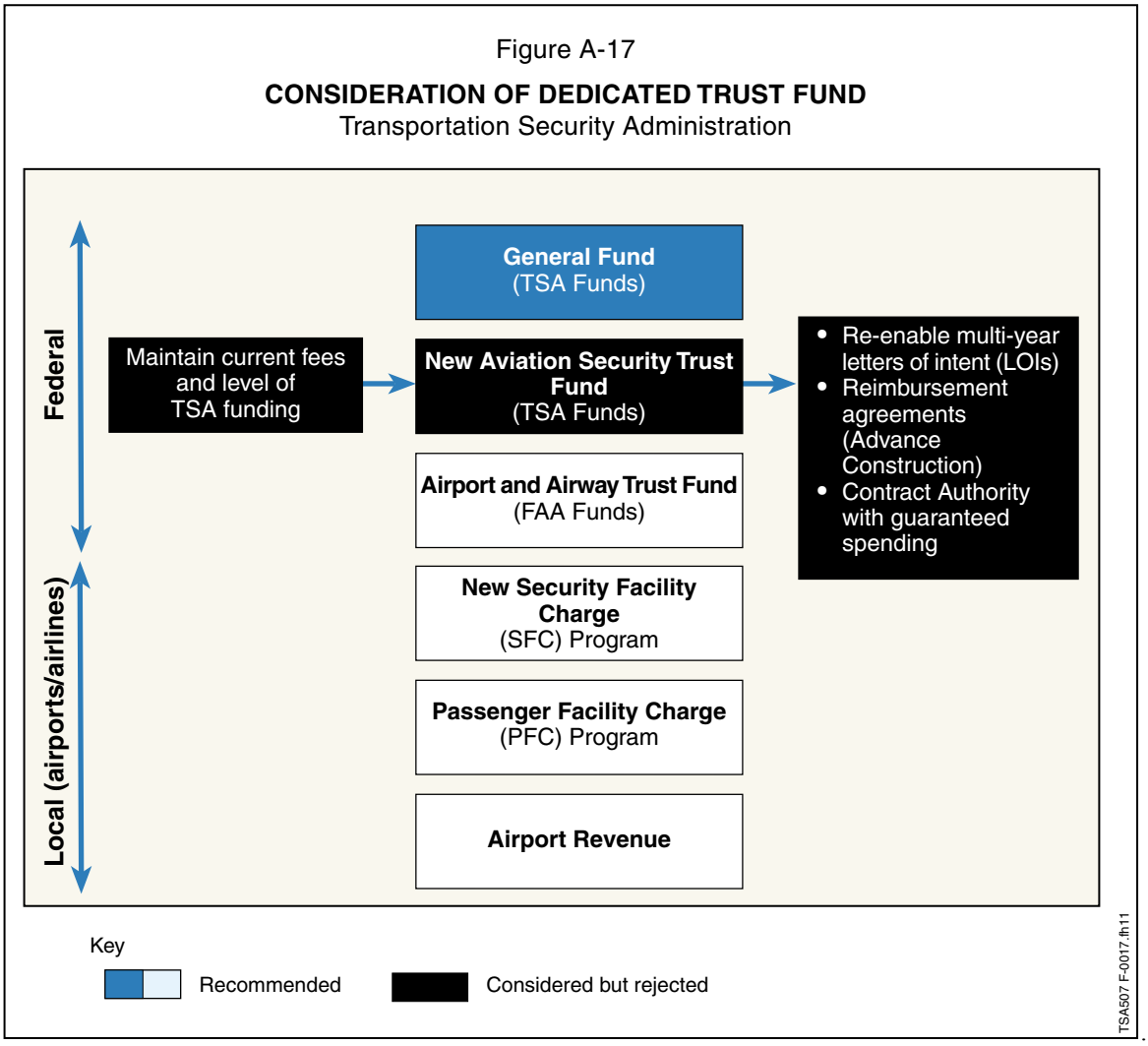
The Finance Team explored the possibility of seeking legislation to establish a dedicated trust fund (or similar type of special fund) for TSA, such as the Airport and Airway Trust Fund that supports most of the federal aviation programs, including AIP, or the Highway Trust Fund for surface transportation programs. Under this concept, some or all of the existing $2.50 Passenger Security Fees (which generate revenues of about $1.9 billion per year), and the Aviation Security Infrastructure Fees (which are paid directly by the airlines and generate $300 million to $448 million per year), would be credited to a newly established Aviation Security Trust Fund. These resources would be intended to provide more reliable funding for deployment of optimal screening systems.

As shown on Figure A-17, potential benefits of an Aviation Security Trust Fund that would be considered "self insured" include:

- Re-enabling TSA to issue multi-year TSA LOIs for airports
- Facilitating other types of reimbursement agreements by which an airport could construct BHS/infrastructure with its own internally generated funds or debt and preserve its eligibility for later grant reimbursement by TSA
- Giving TSA multi-year contract authority with guaranteed annual spending (similar to the Highway Trust Fund)

Figure A-17

CONSIDERATION OF DEDICATED TRUST FUND
Transportation Security Administration



Despite the nominal appeal of trust-funded budget resources, the Finance Team identified significant challenges with this approach.

- A key issue is the nature of federal trust funds, which generally are considered to be accounting mechanisms rather than fiduciary trusts. Unlike other trusts, where beneficiaries own the assets managed by trustees,

the federal government owns and manages the assets of federal trust funds. The federal government can, and frequently does, change the collections, payments, and purposes of its trust funds by changing the laws governing them.

- A second challenge would be the potential opposition to creating yet another special fund of the federal government. Notwithstanding their legislative origins and political support, trust funds exist within the larger framework of federal budget policies and spending decisions. Attempts to create special / trust funds frequently are resisted as they reduce appropriations oversight and budget flexibility

- Another concern is that this approach would not – in and of itself –result in new resources. Directing existing Passenger Security Fees and/or Aviation Security Infrastructure Fees to a new special / trust fund would not increase overall resources to facilitate deployment of optimal screening systems or address the budget tension between operating costs and capital improvements. New fees or general revenues would be required to replace those fees credited to the new fund to enhance investment in baggage screening.

- Finally, and perhaps most fundamentally, the source of revenue for any new trust fund is a concern. By definition, federal trust funds are supported by "user fees" – receipts or offsetting collections earmarked for specific purposes. As indicated previously, the airport and airline members of the Finance Team believe that baggage screening is a federal responsibility that generates national benefits and, therefore, should be supported principally from the General Fund. They feel strongly that direct users of the aviation system (passengers and airlines) already bear a significant share of screening and airport security costs through the existing federal user fees. Establishing a new federal trust fund might imply that any further resources required for airport security should come exclusively from federal user fees. The industry strongly opposes any further increases in costs paid by users of the system through new or increased fees.

The Finance Team consensus was not to pursue the Aviation Security Trust Fund concept, because the TCB program is viewed as a more effective and feasible approach for supplementing current resources and accelerating deployment of optimal screening systems. Also, it was agreed that concurrently pursuing two major initiatives—the TCB program and the Aviation Security Trust Fund— would be difficult, and might undermine the prospects for enactment of either proposal.

A.4.5 Reinstatement of Airport Improvement Program Eligibility

The Finance Team explored the concept of seeking reinstatement of FAA AIP eligibility for baggage screening. This concept is shown on Figure A-18. As previously indicated, ATSA made baggage screening infrastructure eligible for AIP discretionary and passenger entitlement funds (but not cargo entitlement funds). Effective in FFY 2004, the Century of Aviation Reauthorization Act (Public Law 108-176), referred to as Vision 100, limited baggage screening infrastructure eligibility to passenger entitlement funds. Since FFY 2004, U.S. DOT's appropriation acts have prohibited use of any AIP funds for baggage screening infrastructure.

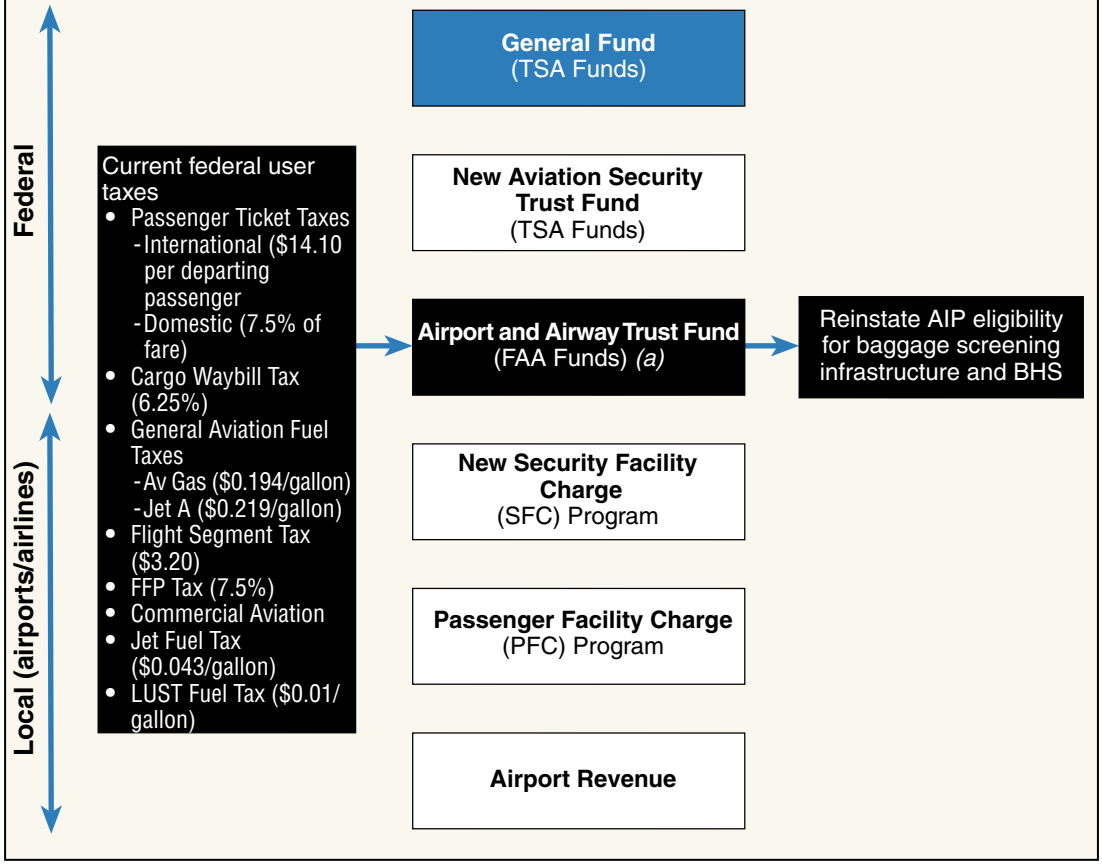
Airport representatives and FAA's technical advisors to the Finance Team expressed significant concern that providing substantial AIP support for EDS installation at current AIP funding levels could require FAA to defer funding for other important projects to enhance or preserve capacity, leading the Finance Team to abandon the concept.

A.4.6 Continued Use of Available State Funding

State funding for aviation security purposes is very rare, but Florida is one state that provides grants for such purposes. Specifically, the State of Florida Trust Fund Program provides grant funding through the Florida DOT. The Finance Team's view was that any such funding could play a role in an airport's funding strategy, but such funding is generally likely to be *de minimis*.

Figure A-18

CONSIDERATION OF REINSTATING AIP ELIGIBILITY
Transportation Security Administration



(a) The Aviation and Transportation Security Act (ATSA) made baggage security infrastructure eligible for AIP discretionary and passenger entitlement funds. Effective in FFY 2004, the Vision 100 reauthorization of AIP limited baggage security infrastructure eligibility to passenger entitlement funds. However, beginning in FFY 2004 and continuing through FFY 2006, the Department of Transportation's appropriation act has prohibited spending any AIP funds for baggage security infrastructure.

FFP = Frequent Flyer Program Mileage Tax
LUST = Leaking Underground Storage Tanks

TSA507 F-0018.fh11

A.4.7 New Security Facility Charge Program

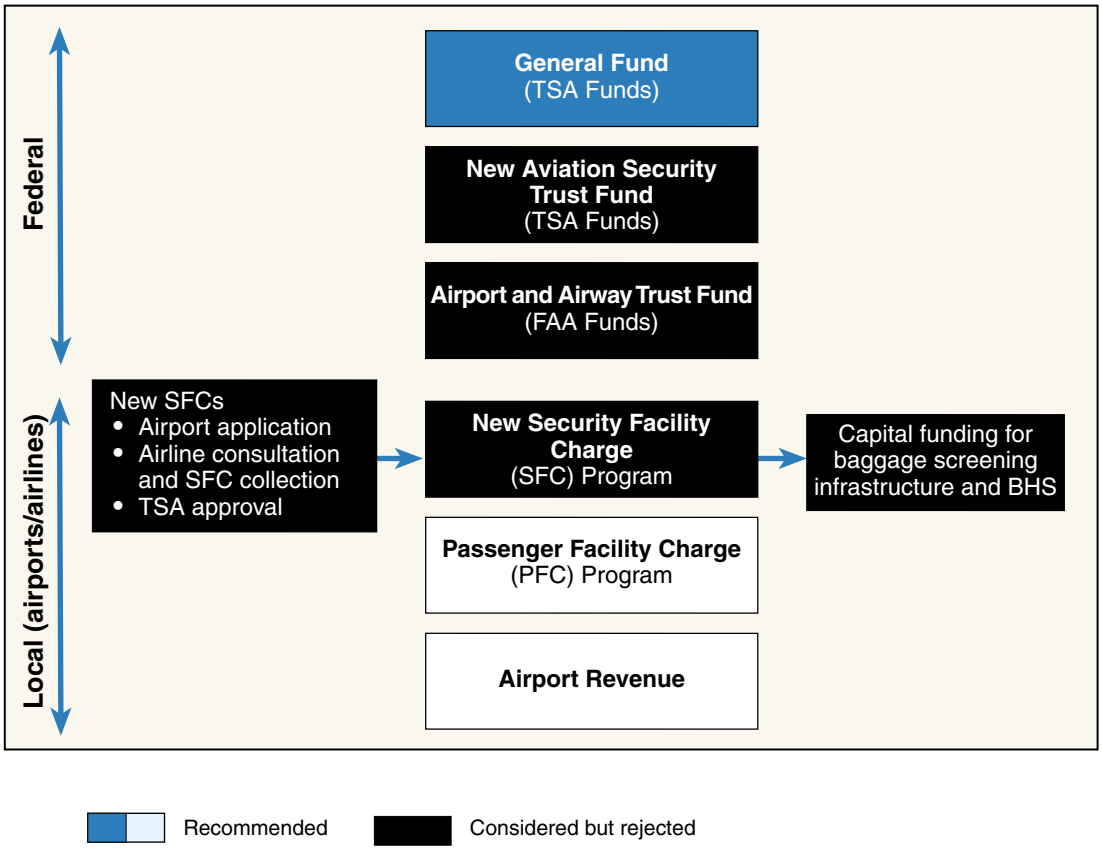
The Finance Team assessed the possibility of a Security Facility Charge (SFC) administered by TSA and modeled after FAA's PFC program. Similar to PFCs, SFCs would be federally authorized local funds that could be used as the local match to TSA grants or to fund projects in their entirety. SFC revenue could be used on a pay-as-you-go basis, to make TCB sinking fund payments, or to pay debt service on traditional interest-bearing bonds.

As shown on Figure A-19, an airport would develop its proposed project(s) and funding plan, consult with the airlines, and submit an application to TSA for approval to collect an SFC and use the revenue for the project(s). The airlines would include the SFC in the ticket price, and remit the SFC revenues to the airport, minus a collection fee that the airlines would retain.

Airport members in the Finance Team expressed concern that implementation of an SFC might obviate the chances of making desired changes to the PFC program. Airline members also argued against the concept, stating that it would be another fee they may not be able to pass on to passengers and would need to absorb themselves. "Direct collect" approaches such as Airport Improvement Fund (AIF) collections in Canada where passengers pay an airport directly have not worked well, and would add yet another line for passengers to navigate as they depart an airport. The Finance Team members also expressed concern about TSA's ability to find the resources necessary to administer such a program. Due to these various concerns, the Finance Team did not recommend this concept.

Figure A-19

CONSIDERATION OF SECURITY FACILITY CHARGE (SFC)
Transportation Security Administration



A.4.8 Changes to Passenger Facility Charge Program

PFC revenues are the primary source to date of local matching funds to federal grants used to fund BHS and infrastructure at airports. Certain airports, such as Tampa International Airport, have used PFC revenues to fund all or nearly all of their baggage screening investments. PFC revenues can currently be used to fund common-use baggage handling systems and related infrastructure.

Title 49 currently allows FAA to permit airports to apply PFC revenues to support the costs of common-use baggage systems. Airport members of the Finance Team expressed concern about increasing the PFC level for the specific purpose of funding infrastructure to accommodate EDS baggage screening systems and BHS, given their view that checked baggage screening is the federal government's responsibility, and the need to increase PFCs to fund capacity, noise, and safety projects. Airline members shared those concerns, but also expressed concern about increasing the PFC for any reason, because they may not be able to pass the increase on to passengers, and would need to absorb it themselves.

While the Finance Team rejected PFC revenues as a primary source for increased EDS baggage screening system funding, it did recommend eligibility changes to permit PFC revenues to be used for limited purposes. As shown on Figure A-20, the Finance Team recommends modifications to Title 49 to explicitly allow PFC revenues to be used as follows:

- **Modification or Construction of Exclusive-use Outbound Baggage Handling Systems and Infrastructure to Accommodate EDS Screening Systems** – PFCs were originally intended to support capital costs incurred by airports for projects and systems applicable to the broad spectrum of users at that airport. Exclusive-use baggage systems were not eligible uses because they were privately owned and benefited only one (or a very few) airline(s). Several airports have used PFC revenues to self-fund EDS implementation of common-use systems and to pay the local share of TSA LOI obligations. The current challenge of incorporating EDS into outbound baggage systems is an across-the-board federal requirement for all outbound baggage systems. Therefore, the Finance Team recommends that PFC revenues be considered an authorized source of funding for incorporating EDS into airline-owned outbound baggage systems.

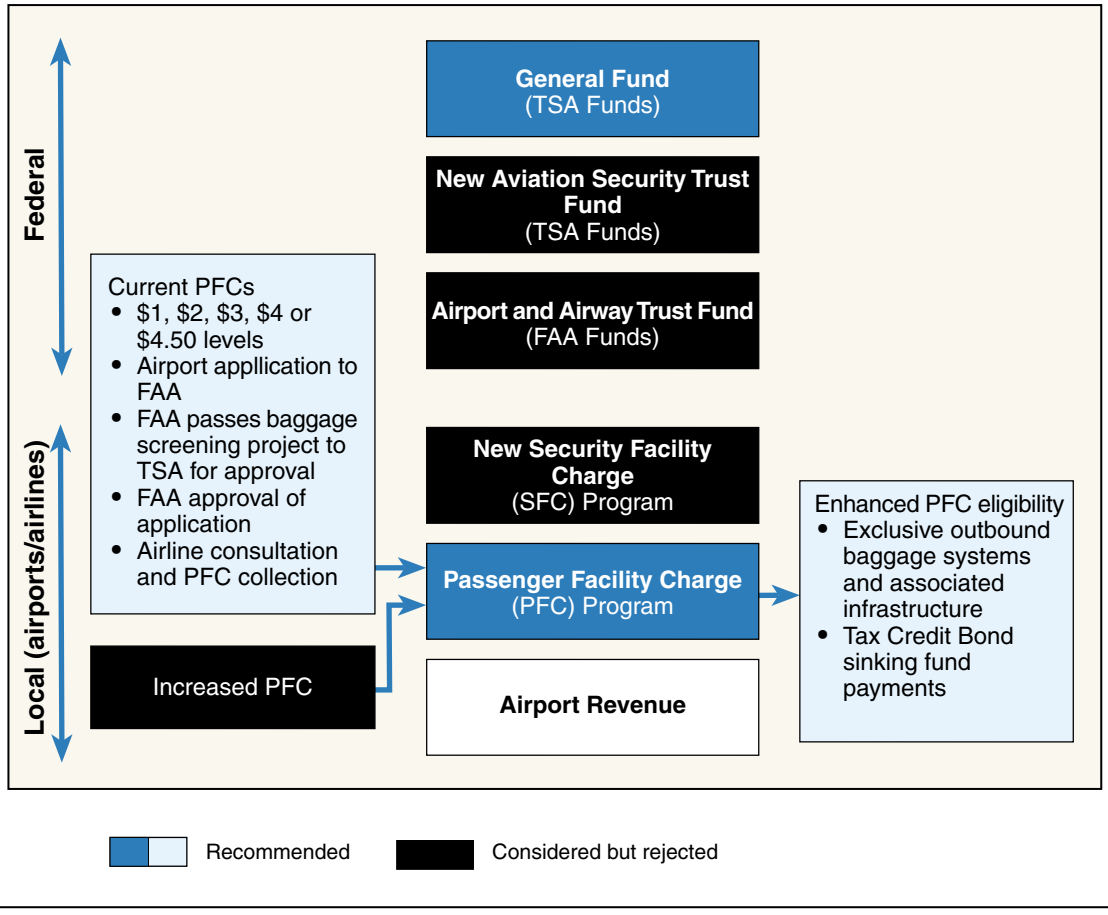
- **TCB Sinking Fund Deposits** -- Once TCBs are issued for baggage system and infrastructure improvements, they require airports to make annual deposits into a sinking fund for ultimate repayment to investors. PFC revenues can currently be used to pay debt service on bonds funding eligible projects, so sinking fund deposits to repay principal are likely eligible. The Finance Team would like to make that eligibility explicit.

Since ATSA was adopted, EDS equipment has been purchased and installed by TSA. The Finance Team also recommends that the responsibility for equipment funding and installation remain with TSA and expressly rejected any consideration of expanding the use of PFCs for equipment purchase.

Figure A-20

CONSIDERATION OF PASSENGER FACILITY CHARGE (PFC) USE

Transportation Security Administration



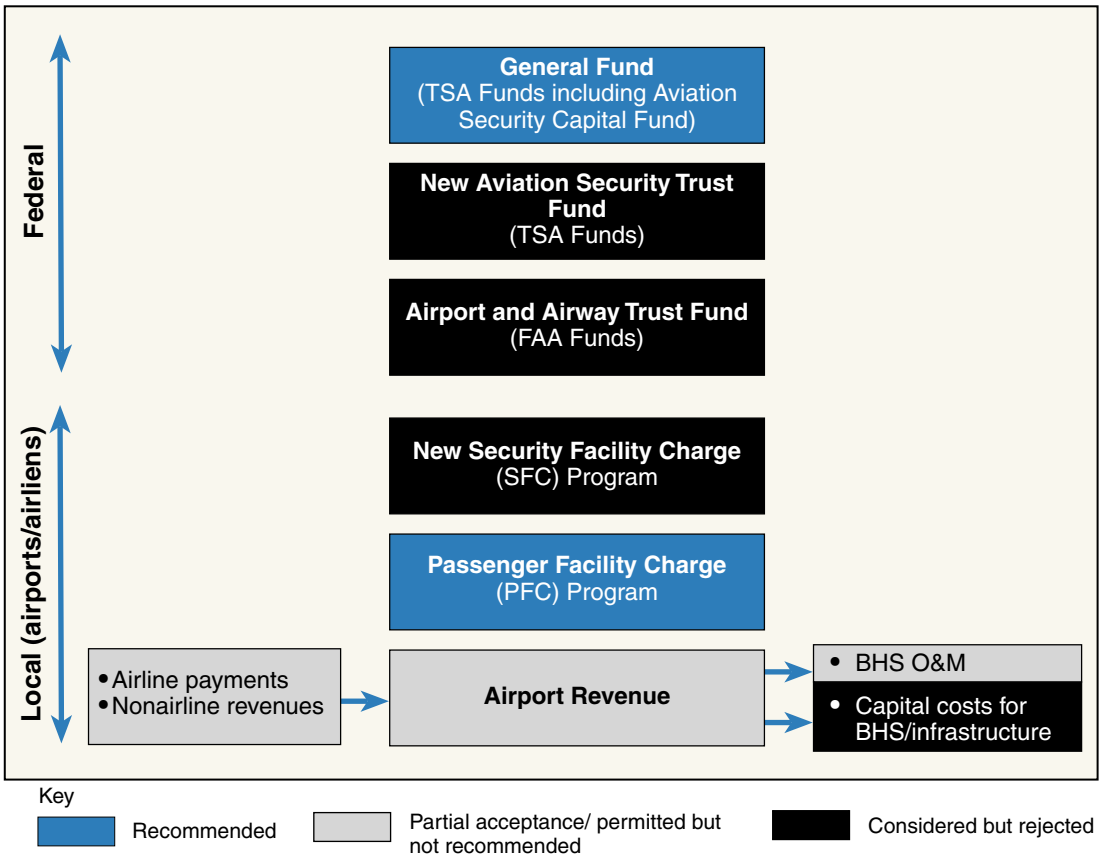
A.4.9 Increased Use of Airport/Airline Revenue

Several airports (and airlines operating unit terminals) have used internally generated funds to pay for infrastructure and BHS. Several others that received TSA LOIs, OTAs, and/or FAA AIP funding used internally generated airport funds, and/or proceeds of bonds supported by airport revenues including airline rates and charges, as all or part of their local contribution. Airport revenues may be used for any allowable airport purpose under federal law. However, depending on the terms of an airport's use and lease agreement with the airlines, if one exists, the airlines may have the right to approve capital investments or the issuance of bonds to accommodate in-line EDS screening systems. Airlines may be reluctant to approve or support proposed airport investments to accommodate in-line EDS screening

systems at airports, because they view baggage screening to be the federal government's responsibility and the increased burden on airline finances, except at key hub airports or other locations with severe operational problems resulting from stand-alone baggage screening systems. As shown on Figure A-12, the Finance Team recognized that airport revenues from airline payments and nonairline sources are currently used to pay BHS O&M costs and are expected to continue to be used for BHS O&M, and perhaps to pay TCB sinking fund deposits, but rejected using airport revenues as a primary source for increased EDS baggage screening system capital funding.

Figure A-21

CONSIDERATION OF USE OF AIRPORT/AIRLINE REVENUES
Transportation Security Administration



A.5 SUMMARY-- RECOMMENDED FUNDING AND FINANCING APPROACH

The Finance Team recommends implementing the following funding and financing approach:

Tax Credit Bond Program – Create a voluntary $3 billion TCB program that airports could access to fund BHS and associated infrastructure to accommodate automated EDS baggage screening equipment. A funding profile of $1 billion in the first year, stepping down to $800 million in the second year, and then to $600 million each in the third and fourth years is recommended. Higher authorization levels are requested in the early years to (1) assist with reimbursing airports and airlines that have already self-funded in-line systems, and (2) address the backlog of infrastructure needs at many large, complex airports. Any authorized TCB proceeds not issued in the year initially authorized would carry forward to future years. The TCB program is anticipated to reduce U.S. Treasury net revenue by about $130 million annually once the total amount of authorized tax credit bonds is issued, thus effectively amortizing the federal government's investment in these systems. The effective share of facility modification costs financed with tax credit bonds borne by the federal government would be about 75%.

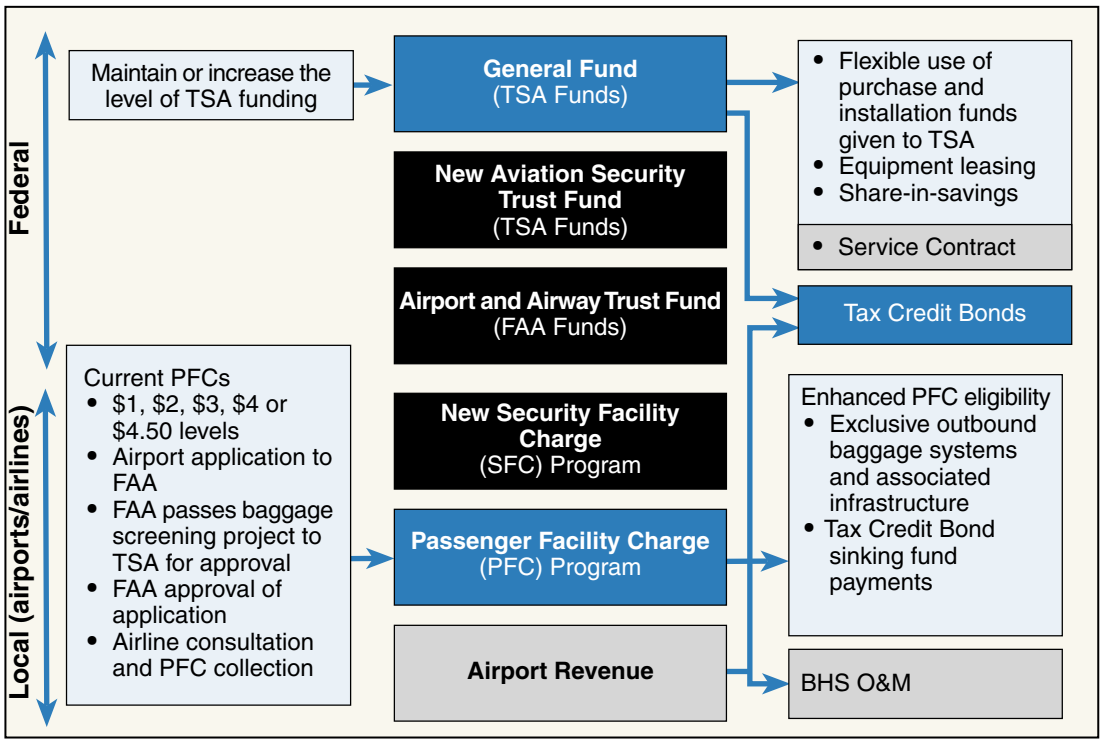
TSA Purchase and Installation Funding Protection and Flexibility – Maintaining or increasing the $435 million escalating annual federal appropriations baseline for EDS purchase and installation is critical to the success of the program. These funds will be necessary to provide EDS equipment to airports that move forward using the TCB program and to provide equipment and direct grants for facility modifications to airports that choose not to use the program. Any restrictions associated with combining purchase and installation funds should be eliminated to provide TSA with increased flexibility to manage the effects of the voluntary TCB program.

Enhance PFC Eligibility -- Another key recommendation is to modify Title 49 to allow PFC revenues to be used for (1) modification or construction of exclusive-use outbound baggage handling systems and infrastructure to accommodate EDS screening, and (2) TCB sinking fund deposits.

Figure A-22 shows the suite of funding tools that represent the consensus of the Finance Team.

Figure A-22

SUMMARY OF FUNDING CONCEPTS
Transportation Security Administration



Appendix B

TECHNICAL TEAM REPORT

The Technical Team Report provides a summary of the technology and cost assumptions that underlie the top-down modeling and life-cycle cost estimates supporting the Baggage Screening Investment Study (BSIS). The assumptions have been reviewed and approved by the BSIS Technical Team, a group composed of airline representatives, airport operations and security managers, Transportation Security Administration (TSA) personnel, and baggage handling system designers. The Technical Team Report also summarizes the BSIS Planning and Design Guidelines (BSIS Guidelines), suggests potential refinements to the economic modeling and technical analysis, and proposes future cost-saving measures for screening system maintenance and design.

The report is organized as follows: section B.1 is a basic description of the typical processes, or "levels", that constitute a baggage screening system operation; section B.2 summarizes the screening system types and technologies considered in the technical and economic models; section B.3 presents the cost assumptions from which program spending and present values are derived; and section B.4 provides a consolidated list of critical design principles, potential revisions to the analyses, and possible cost-saving measures.

B.1 CONCEPT OF OPERATIONS

A checked baggage screening system generally comprises the following four processes:

- Level 1—Primary screening using Explosive Detection Systems (EDS).
- Level 2—Resolution of alarmed bags from Level 1 using on-screen resolution (OSR) techniques. Monitoring stations can be located at the EDS machine for local resolution or at remote locations with multiplexing capabilities.
- Level 3—Resolution of alarmed bags from Level 2 using Explosive Trace Detection (ETD) machines in the checked baggage resolution area (CBRA).
- Level 4—Ordinance disposal.

B.2 SCREENING SYSTEMS CONSIDERED AND TECHNOLOGY ASSUMPTIONS

The uniqueness of airport terminal layouts creates the need for a wide range of "optimally-scaled" baggage screening solutions. Screening systems range from the highly integrated, highly automated system (e.g., high-speed in-line) to the non-integrated, highly labor-intensive system (e.g., stand-alone EDS and ETD). Moreover, for a given system type, the selection of a machine model is not obvious – there are machines with comparable rates of throughput and false alarm.

Six screening system types, which define the spectrum of optimally-scaled solutions used in the BSIS technical modeling, have been approved as modeling concepts by the Technical Team. This section describes the six screening system types, the appropriate screening machines for each type, and the assumed screening capacity of each machine.

For each of the feasible combinations of screening system type and EDS machine, the machine throughput (i.e., the capacity) is reported here as a range derived from the physical characteristics of the machine itself, the baggage, and the baggage handling system. For example, conveyer speeds are machine-specific and is assumed to be as high as 67 feet per minute; the assumed average baggage length ranges from 34 inches (in the case of purely international bags) to 28 inches (in the case of purely domestic bags); the bag spacing, a parameter set by the baggage handling system, is assumed to be 12 inches.

With regard to screening equipment that has yet to be certified, throughput assumptions are based on information obtained from EDS manufacturers as well as the Transportation Security Laboratory. Assuming that this equipment receives TSA certification by federal fiscal year (FFY) 2007, estimated system availability is projected to be in FFY 2008. These systems are currently in development under a number of TSA's Project Phoenix programs, Manhattan II programs, or other efforts that involve TSA.

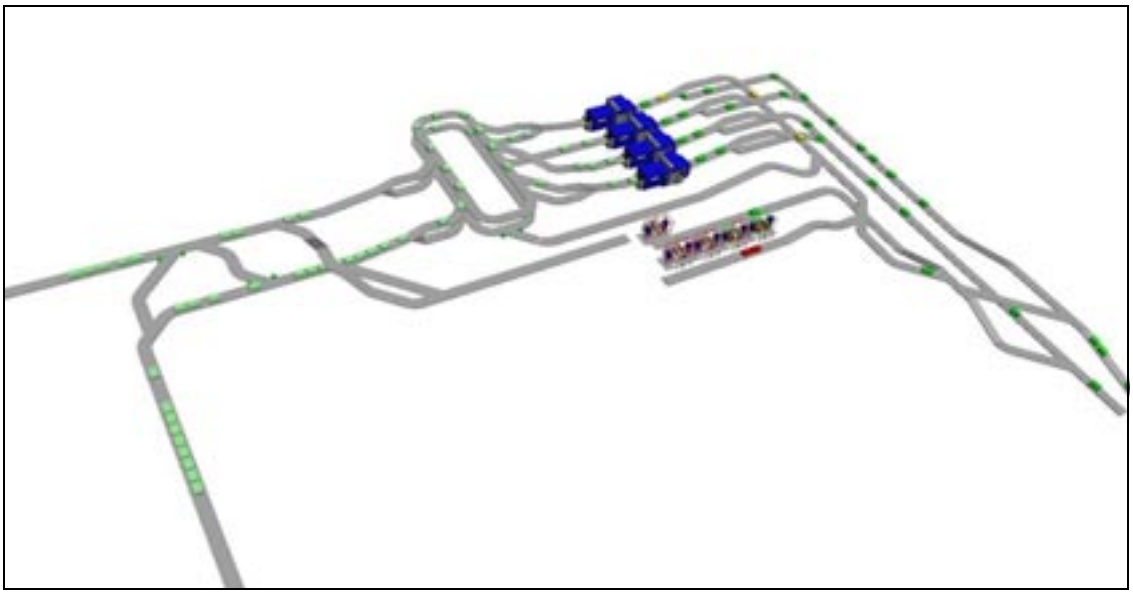
B.2.1 System Type 1: High-Speed In-Line Systems

In-line systems using high-speed EDS require a very high level of integration and sophisticated in-line conveyor infrastructure. The BHS must provide sufficient queuing capacity and OSR circulation time, while maintaining high throughput and accurate bag tracking. These systems are assumed to have multiplexed EDS technology, centralized control room(s), OSR capability, optional recirculation system(s), multiple baggage inputs, and checked baggage resolution area(s). Typically, these systems require automated baggage sorting.

Figure B-1 contains a schematic visualization of a high-speed in-line baggage screening system.

Figure B-1

A SCHEMATIC VISUALIZATION OF A HIGH-SPEED IN-LINE SYSEM



High-Speed EDS Machines. High-speed EDS machines are intended for use in fully automated in-line systems that are designed to handle very high demand peaks. Although not currently available, high-speed EDS machines are in development under TSA's Project Phoenix programs, Manhattan II programs, and other efforts supported by TSA. These machines are expected to be deployable by CY 2008 (assuming that they receive TSA certification). EDS machines that are potential candidates as high-speed EDS are the Analogic AN XLB, the GE CTX-10K (with estimated availability projected to be by CY 2009) and SureScan x1000 (also with estimated availability projected to be by CY 2009)

High-speed EDS machines are estimated to achieve throughputs of up to 1,000 bph. Also, these machines are expected to have improved image quality and better operator tools.

Table B-1 summarizes the assumed maximum throughputs, the principal costs, and the useful lives of high-speed EDS machines.

Table B-1

POTENTIAL HIGH-SPEED EDS MACHINES—EQUIPMENT ASSUMPTIONS

Vendor	Model	Throughput (bags per hour)	FFY 2005 purchase cost (thousands)	FFY 2005 installation cost (thousands)	FFY 2005 maintenance cost (thousands)	Useful life and life-after-refurbishment (years)
Analogic	XLB	890-1,020	$880	$425	$88	7, 4
SureScan	x1000	900-1,000	$1,200	$425	$120	7, 4
GE	CTX-10K	900-1,000	$1,300	$425	$130	7, 4

Note: All high-speed EDS are currently under development and are not yet certified. Specifications are based on information from the manufacturers as well as the Transportation Security Laboratory.

Source: Leigh Fisher Associates, May 2006.

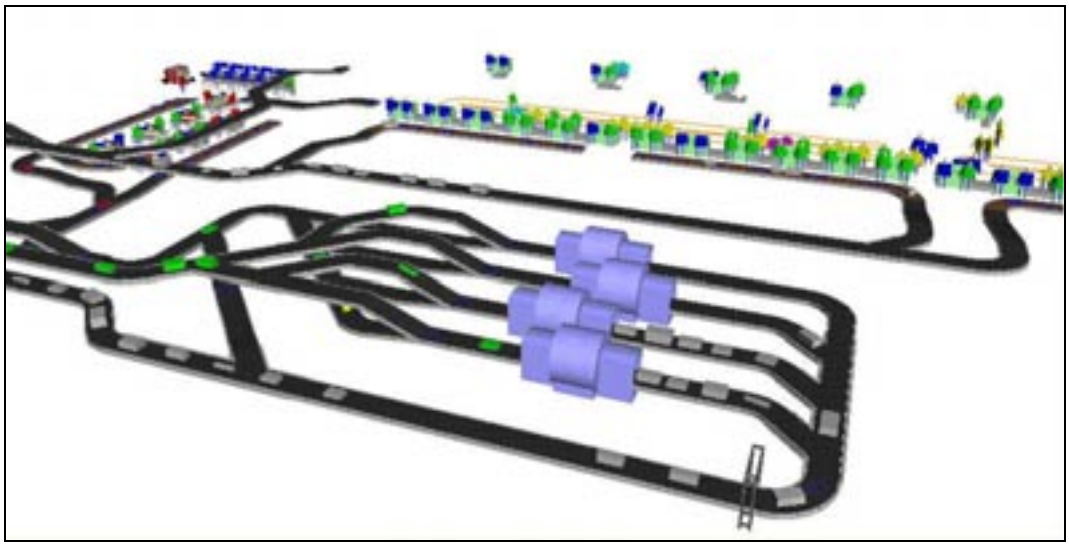
B.2.2 System Type 2: Medium-Speed In-Line Systems

The medium-speed in-line system type is similar to the current generation of in-line systems recently deployed at Oakland International Airport's Terminal 2, Harrisburg International Airport, and Dallas/Fort Worth International Airport. Medium-speed systems typically have multiplexed EDS technology, relatively complex baggage handling system(s), control room(s) (central or local), OSR capability, optional recirculation system(s), single or multiple baggage inputs, and checked baggage resolution area(s). Compared to high-speed in-line systems, up-front capital costs can be avoided by using EDS machines with throughputs on the order of 400 to 700 bph – which allows for a reduction in the conveyor system size and complexity.

Figure B-2 contains a schematic visualization of a medium-speed in-line baggage screening system.

Figure B-2

A SCHEMATIC VISUALIZATION OF A MEDIUM-SPEED IN-LINE SYSEM



Medium-Speed EDS Machines. Medium-speed EDS machines are those that achieve throughputs of 400 to 700 bph.

Table B-2 summarizes the assumed maximum throughputs, the principal costs, and the useful lives of medium-speed EDS machines.

Table B-2

MEDIUM-SPEED EDS—EQUIPMENT ASSUMPTIONS

Vendor	Model	Throughput (bags per hour)	FFY 2005 purchase cost (thousands)	FFY 2005 installation cost (thousands)	FFY 2005 maintenance cost (thousands)	Useful life and life-after-refurbishment (years)
Analogic	AN6400	480-550	$880	$425	$88	7, 4
L-3	3DX 6000	480-550	$880	$425	$98	7, 4
GE	CTX-9000	400-500	$1,200	$425	$93	7, 4
GE	CTX-9800 *(b)*	600-700	$1,300	$425	$130	7, 4

(a) Include two 60-inch tunnels (input and exit tunnel).
(b) Uncertified equipment currently in development under the TSA sponsorship. Expected to be certified by CY2008.

Source: Leigh Fisher Associates, May 2006.

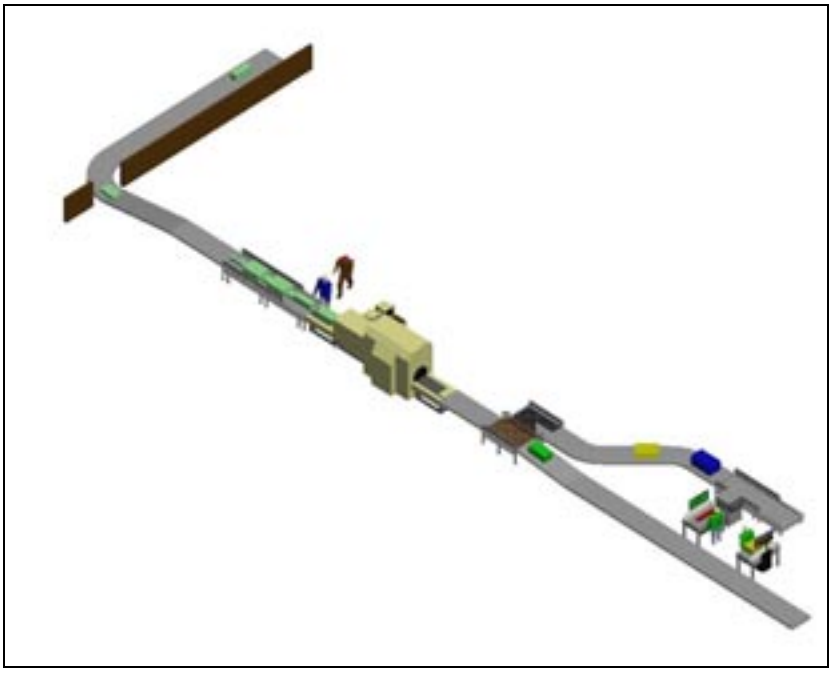
B.2.3 System Type 3: Mini In-Line Systems

Compared to a medium-speed system, a mini in-line system employs a simpler conveyor design and require a smaller footprint. These systems can be located closer to airline ticket counters or make-up devices – which can help reduce travel time, the need for a baggage sortation system, and the associated risks of improper baggage sorting. Typically, a mini-inline system is located on the take-away belt in the bag rooms or the airline ticket office (ATO) area. Due to the decentralized nature of these systems, staff and equipment needs are generally higher than they are in more centralized systems (such as in-line systems using high-speed or medium-speed EDS); facility modification costs, however, will be significantly lower. Typically, in mini in-line systems, a centralized OSR room is not as staff efficient as a combined OSR/ETD operation; however, if the airport layout can support a centralized CBRA, then a centralized OSR room should be considered.

Figure B-3 contains a schematic visualization of a mini in-line baggage screening system.

Figure B-3

A SCHEMATIC VISUALIZATION OF A MINI IN-LINE SYSEM



Mini In-Line EDS Machines. The mini in-line system allows for a reduction in up-front capital cost by using EDS machines with throughputs on the order of 100 to 400 bph. This permits the use of EDS equipment that is: (a) currently in

warehouses waiting to be deployed, (b) going to be taken out of sites in which high-speed and medium-speed EDS systems will be installed, or (c) one of the next-generation EDS that are small enough to be integrated into existing conveyor infrastructure.

EDS throughputs of 100 to 400 bph are achievable with current equipment, such as the L-3 3DX 6000, the GE CTX-5500 (with ViewLink add-on), or the Reveal CT-80. Pending the results of TSA certification tests, other future technologies that are projected to be deployable beginning in FFY 2008, such as the Analogic King Cobra, will also be appropriate for this configuration.

OSR is assumed to be done at the CBRA. When bag volumes are relatively low, a combined OSR/ETD procedure is likely to be more cost effective than a centralized OSR room (with dedicated OSR screeners) and separate baggage inspection rooms with dedicated ETD screeners.

Table B-3 summarizes the assumed maximum throughputs, the principal costs, and the useful lives of mini in-line EDS machines.

Table B-3

MINI IN-LINE EDS—EQUIPMENT ASSUMPTIONS

Vendor	Model	Throughput (bags per hour)	FFY 2005 purchase cost (thousands)	FFY 2005 installation cost (thousands)	FFY 2005 maintenance cost (thousands)	Useful life and life-after-refurbishment (years)
L-3	3DX 6000	350-400 *(a)*	$880	$425	$98	7, 4
Reveal	CT-80	80-100	$300	$100	$30	7, 4
Analogic	King Cobra *(b)*	300-350	$350	$100	$35	7, 4
GE	CTX-5500 (with ViewLink)	200-270	$880	$100	$72	7, 4

(a) The L-3 3DX 6000 can achieve a higher throughput rate when installed into a full in-line baggage handling system with a higher level of integration. However, when used in a mini-in-line system with a lower level of integration and more labor-intensive operation, the machine throughput is limited to 350 to 400 bph.

(b) Uncertified equipment in development for TSA. Expected to be certified by CY2008.

Source: Leigh Fisher Associates, May 2006.

B.2.4 System Type 4: Micro In-Line Systems

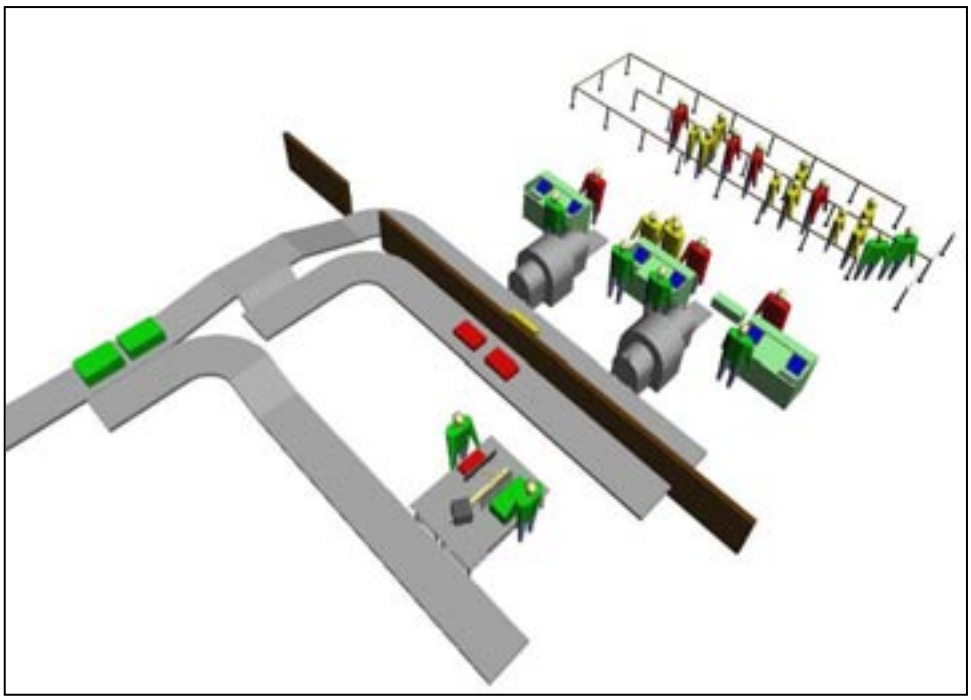
For facilities in which architectural constraints render certain systems cost-prohibitive, the micro in-line system configuration - based on compact machines placed at or near ticket counters - may be the appropriate option. The small size and

low weight of the low-throughput EDS allow for design flexibility and a relatively large variety of possible configurations. This type of system is well-suited for curbside deployment, for use with self-ticketing e-kiosk clusters, or for low-volume international recheck facilities. The machines themselves are significantly less expensive than higher-throughput machines. Several EDS models fit into this system type, and they include the GE CTX-2500, the Reveal CT-80 and, pending certification, the Analogic King Cobra. Combined OSR/ETD is likely to be the most cost-effective resolution approach – especially in sites that have decentralized CBRAs.

Figure B-4 contains a schematic visualization of a micro in-line baggage screening system.

Figure B-4

A SCHEMATIC VISUALIZATION OF A MICRO IN-LINE SYSEM



Micro In-Line EDS Machines. The micro-in-line system seeks to dramatically reduce up-front capital cost by using EDS machines with low throughputs (approximately 100 bph). The micro in-line system type is well-suited for sites where there is no economic justification to design and implement either a highly-integrated in-line or, even still, a more moderately integrated system. The micro in-line system, like the mini in-line, allows the use of EDS equipment that is either: (a) currently in warehouses waiting to be deployed or (b) going to be taken out of sites into which high-speed, medium-speed EDS and mini in-line systems will be installed.

EDS machine throughput of 100 bph is achievable with equipment such as the GE CTX-2500 (with ViewLink add-on) or the Reveal CT-80. In addition, higher throughput machines, such as the Analogic King Cobra (if it receives certification), are expected to have a similar price to the CTX-2500 and the Reveal CT-80.

These EDS systems are assumed to enable a combined OSR /ETD process.

Table B-4 summarizes the assumed maximum throughputs, the principal costs, and the useful lives micro in-line EDS machines.

Table B-4

MICRO IN-LINE EDS—EQUIPMENT ASSUMPTIONS

Vendor	Model	Throughput (bags per hour)	FFY 2005 purchase cost (thousands)	FFY 2005 installation cost (thousands)	FFY 2005 maintenance cost (thousands)	Useful life and life-after-refurbishment (years)
Reveal	CT-80	40-100 *(a)*	$300	$50	$30	7, 4
GE	CTX-2500	40-120 *(a)*	$625	$50	$62	7, 4
Analogic	King Cobra *(b)*	40-350 *(a)*	$350	$100	$35	7, 4

(a) The throughputs achievable by micro in-line installations varies according to the level of integration with the ticketing process. For those installations in which bags are screened during the ticketing process, machine throughput may be limited by the capacity of the ticketing process rather than the screening itself.

(b) Uncertified equipment in development for TSA. Expected to be certified by CY2008.

Source: Leigh Fisher Associates, May 2006.

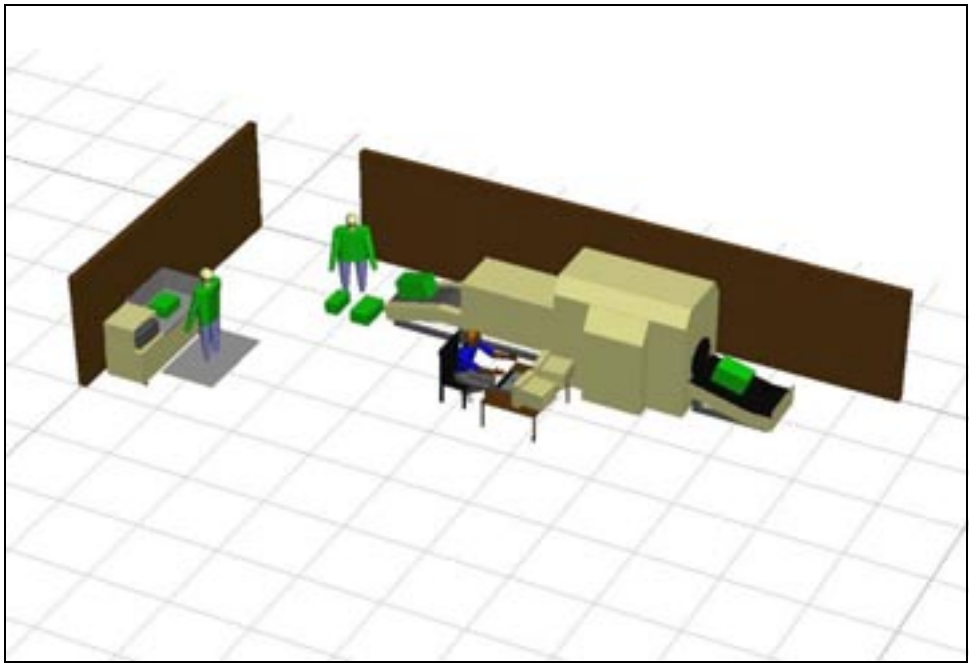
B.2.5 System Type 5: Stand-Alone EDS

For use in small airports or small operations in larger airports, a stand-alone EDS screening system is one of the least capital-cost-intensive options. This system type is ideal for baggage make-up areas or other locations where disruptions to passenger flow or other airport operations are slight. The stand-alone operation is similar to lobby screening nodes installed today at many Category X and Category I airports. In some stand-alone systems, combined OSR/ETD can be used.

Figure B-5 contains a schematic visualization of a stand-alone EDS baggage screening system.

Figure B-5

A SCHEMATIC VISUALIZATION OF A STAND-ALONE EDS SYSTEM



Stand-Alone EDS Machines. Many of the EDS machines suitable for a stand-alone configuration are currently in warehouses awaiting deployment. Moreover, other suitable EDS equipment will be taken out of airport terminals in which high-speed and medium-speed EDS systems will be installed.

The assumed stand-alone EDS throughput of 100 to 200 bph is achievable with current equipment such as the Reveal CT-80, GE CTX-2500, GE CTX-5500 or, if certified, the Analogic King Cobra.

Table B-5 summarizes the assumed maximum throughputs, the principal costs, and the useful lives of stand-alone EDS machines.

Table B-5

STAND-ALONE EDS—EQUIPMENT ASSUMPTIONS

Vendor	Model	Throughput (bags per hour)	FFY 2005 purchase cost (thousands)	FFY 2005 installation cost (thousands)	FFY 2005 maintenance cost (thousands)	Useful life and life-after-refurbishment (years)
Reveal	CT-80	80-100	$300	$50	$30	7, 4
GE	CTX-2500	100-120	$625	$50	$62	7, 4
GE	CTX-5500	180-220	$880	$50	$72	7, 4
Analogic	King Cobra *(a)*	300-350	$350	$100	$35	7, 4

(a) Uncertified equipment in development for TSA. Expected to be certified by CY2008.

Source: Leigh Fisher Associates, May 2006.

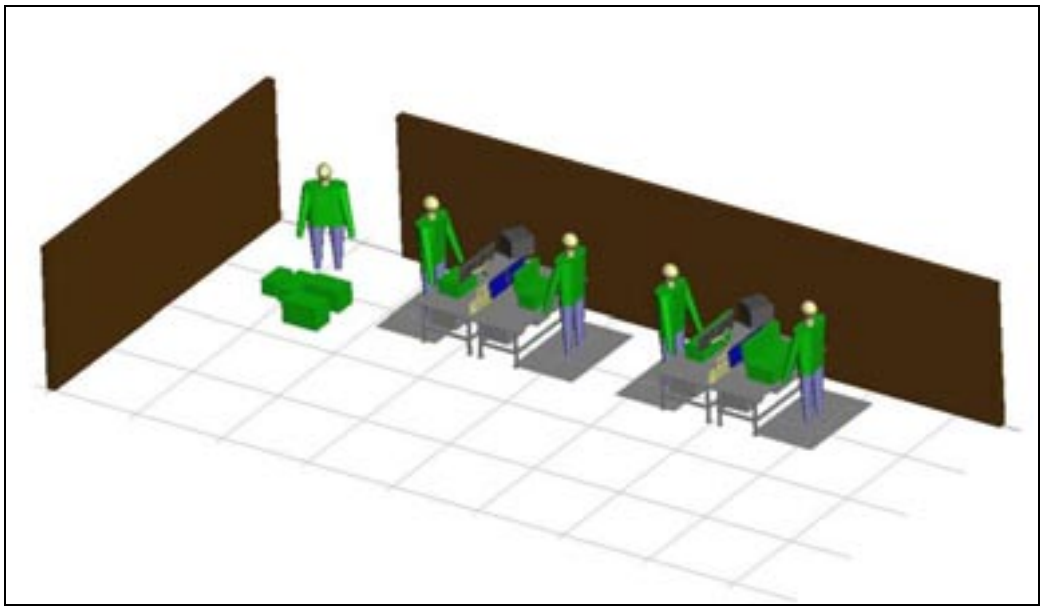
B.2.6 System Type 6: Stand-Alone ETD Systems

More labor-intensive than all other system types, the stand-alone ETD system uses ETD machines in lobbies, baggage make-up areas, or other appropriate locations for primary screening of baggage. Use of these systems for primary screening is permitted only at threat-category IV airports or for screening of oversize, fragile, or other types of baggage not suitable for EDS screening. Baggage is screened using the standard TSA-approved protocol or other, more strict protocols deemed appropriate by TSA.

Figure B-6 contains a schematic visualization of a stand-alone ETD baggage screening system.

Figure B-6

A SCHEMATIC VISUALIZATION OF A STAND-ALONE ETD SYSEM



ETD Machines. A stand-alone ETD system is assumed to have a capacity of 36 bph per screener (and 72 bph for an ETD shared by two screeners). This throughput is known to be achievable with current equipment such as the GE Itemizer II, Smiths Detection Ionscan 400B, or a Thermodetection EGIS II.

In addition, ETD equipment is used to screen EDS alarm bags that have not been cleared by OSR. The throughput of alarm bags resolved (by a screener) using ETD is assumed to be 13.6 bph per screener.

Table B-6 summarizes the assumed maximum throughputs, the principal costs, and the useful lives of ETD machines.

Table B-6

ETD EQUIPMENT ASSUMPTIONS

Vendor	Model	Throughput per screener, level 1 and level 3 (bags per hour) *(a)*	FFY 2005 purchase cost (thousands)	FFY 2005 maintenance cost (thousands)	Useful life (years)
Smiths	Ionscan 400B	36, 13.6	$40	$9	5
GE	Itemizer II	36, 13.6	$40	$9	5
Thermodetection	EGIS III	36, 13.6	$40	$9	5

(a) This is an average over a mix of international and domestic bags of a variety of types and sizes.

(b) Beginning in FFY 06, new models of ETD equipment will be purchased by TSA and old models will be phased out of the fleet. Using a weighted average of existing ETD models, the maintenance cost for FFY 05 based on the current contract is $8,834. TSA does not expect the future negotiated cost per machine to exceed the weighted average cost of existing ETD models.

Source: Leigh Fisher Associates, May 2006.

B.3 INPUT COST ASSUMPTIONS

This section describes the cost assumptions used to develop the 20-year life-cycle cost estimates presented in the main body of the BSIS report. The following key cost assumptions are discussed in turn:

- TSA screener costs (Section B.3.1)
- Screening equipment acquisition costs (Section B.3.2)
- Screening equipment installation costs, including facility modification costs (Section B.3.3)
- Screening equipment maintenance costs (Section B.3.4)
- Baggage handling system operating and maintenance costs (Section B.3.5)
- Baggage porter costs (Section B.3.6)
- Other program costs, including research and development (Section B.3.7)

B.3.1 Screener Cost Inputs

Screener costs include both the "fully–loaded" cost of screener compensation and the costs of on-the-job injury claims. The latter is estimated for each screening system type to properly account for the differences in injury rates between checked baggage installations.

Screener Compensation. The cost of human capital required to operate the EBSP is the largest expense of the program. This analysis derives screener costs from TSA's Consolidated Uniform Payroll System records for FFY 2005. Due to high screener attrition rates and the seasonality of hiring and firing, one year of payroll data was used to infer an average compensation for each screener type.

Table B-7 shows the components extracted from the payroll system to calculate total compensation:

Table B-7

COMPONENTS OF SCREENING COMPENSATION

Direct Pay	Leave	Benefits
Base Pay	Holiday Leave	Healthcare
Overtime	Sick Leave	Retirement
Bonus	Excused Leave	
Night Differential	Time Off Incentive Leave	
Sunday Pay	Court Leave	
Holiday Pay	Military Leave	
Lump	Other Leave	

Source: TSA Consolidated Uniform Payroll System.

The model reflects the average reported compensation for regular screeners of $45,379 and the average for supervisors of $68,626. In addition, the model assumes that there are 9.2 regular screeners for every screener supervisor. Based on the average cost of labor increase from 1991 to 2003 as reported by the U.S. Bureau of Labor Statistics, screener compensation is assumed to increase at a rate of 3.39% annually.

On-the-Job Injuries and Workers Compensation. The manual nature of current screening operations requires screeners to repeatedly lift, carry, and inspect baggage. As a result, TSA employees have the highest rate of injury and illness

among federal employees (approximately 20% injury rate*). Common injuries include back strain, cuts, and broken bones.

According to data from TSA's Office of Occupational Safety, Health and Environment, TSA reimbursed the Department of Labor approximately $59.6 million as a result of workers compensation claims in FFY 2005. These claims are made for a combination of leave-time wages and medical costs. Table B-8 summarizes, for 4 categories of baggage screening systems, estimates of the percentage of short-term medical leave attributable to checked baggage screening on-the-job injuries.

Table B-8

WORKERS COMPENSATION ATTRIBUTABLE TO CHECKED BAGGAGE

System Type	Fraction of short-term injury leave due to checked baggage injuries
ETD	78%
Stand-alone EDS / ETD	66%
Mini in-line	32%
Fully in-line	13%

Source: TSA, Office of Occupational Safety, Health and Environment injury logs, as estimated by Leigh Fisher Associates, May 2006.

Under the assumption that long-term injury leave and medical costs are divided between checked-baggage and checkpoint screening according to the same percentages as short-term injury leave, the injury cost per checked-bag varies by system type. Estimates are given in Table B-9.

*The injury rate represents how many times the government reimburses employees for on-the-job injuries or illnesses, divided by the total work force. Source: http://msnbc.msn.com/id/4441227/.

Table B-9

CHECKED BAGGAGE INJURY COSTS PER BAG

System Type	Cost of Checked Baggage Screening On-the-Job Injuries per Bag Screened
ETD	$0.13
Stand-alone EDS / ETD	$0.06
Mini In-line	$0.03
Fully In-line	$0.01

Source: TSA, Office of Occupational Safety, Health and Environment injury logs, as estimated by Leigh Fisher Associates, May 2006.

B.3.2 Acquisition Cost Inputs

Acquisition costs include the purchase and installation of screening equipment as well as all facility modifications necessary to accommodate redesigned baggage handling systems, baggage inspection rooms, and on-screen resolution rooms.

The costs of existing screening technology, including both purchase prices and other acquisition costs, were used as a basis for estimating the costs of future technology. Although capabilities and functionality of future technology are expected to improve significantly over the next few years, the BSIS Technical Team concurred with the modeling assumption that purchase, refurbishment, and upgrade costs will remain, in a nominal sense, close to their current price levels. The implication is that, relative to labor costs, screening equipment will become less expensive to procure.

Purchase Price. The purchase prices of existing technology and assumed purchase prices of future technology are shown in Table B-10.

Table B-10

PURCHASE PRICE OF CHECKED BAGGAGE SCREENING EQUIPMENT

Manufacturer and Model	Assumed Purchase Price	Source
GE CTX-9000	$1,200,000	*(a)*
L-3 3DX 6000	$880,000	*(b)*
GE CTX-5500 w/ ViewLink	$880,000	*(c)*
GE CTX-2500	$625,000	*(c)*
Reveal CT-80	$300,000	*(d)*
AN 6400	$880,000	*(d)*
Analogic XLB	$880,000	*(e)*
Analogic King Cobra	$350,000	*(e)*
ETD (various manufacturers)	$40,000	*(f)*

Note: Actual prices will be determined through negotiations with the vendor and will likely depend upon volume purchased.

(*a*) As specified in most recent GE contract.
(*b*) As specified in most recent L-3 contract (Contract number DTSA20-03-D00928).
(*c*) Assumed. TSA does not currently have plans to purchase additional units. If TSA purchases additional units, prices will be determined through negotiations with the vendor.
(*d*) Anticipated cost based on initial pilot testing.
(*e*) Based on design-to-cost estimate and discussions with the Transportation Security Laboratory.
(*f*) As observed in TSA equipment databases.

Refurbishment and Upgrade Costs. Refurbishment extends the useful life of a machine but does not enhance throughput or other operational capabilities. Upgrades, however, do provide additional capabilities. Modeling assumptions regarding upgrades and refurbishment are presented in Table B-11. For all types of machines, it is assumed that upgrade and refurbishment options would provide an additional 4 years of useful life.

Table B-11

REFURBISHMENT AND UPGRADE OPTIONS

Manufacturer/ Model	Option	Additional Useful Life (Years)	Assumed Cost
Reveal / CT-80	Refurbish	4	$100,000
GE / CTX 2500	Refurbish	4	$150,000
GE / CTX 5500	Refurbish	4	$250,000
GE / CTX 5500	Upgrade to ViewLink	n.a.	$100,000
GE / CTX 5500	Refurbish + Upgrade to ViewLink	4	$350,000
GE / CTX 9000	Refurbish	4	$350,000
L-3 / 3DX 6000 (In-line)	Refurbish + Upgrade to AN 6400 / 3DX 6500	4	$350,000
L-3 / 3DX 6000 (Lobby)	Refurbish	4	$250,000
L-3 / 3DX 6000 (Lobby)	Refurbish + Upgrade to AN 6400 / 3DX 6500	4	$350,000
AN 6400 *(a)*	Refurbish	4	$350,000
Analogic / XLB	Refurbish	4	$350,000
Analogic / King Cobra	Refurbish	4	$100,000

(a) New AN 6400 equipment can be purchased from L-3 and upgrade kits for upgrading an L-3 3DX 6000 to an AN 6400 can be purchased from L-3, Lockheed Martin, or Analogic.

Source: Assumed based on TSA input, May 2006.

B.3.3 Installation Costs

Installation cost, as defined in the context of checked-baggage screening, comprises a diverse group of initial, one-time processes and the physical components associated with them. For the purposes of this study, installation costs are divided into two categories: (1) direct installation costs and (2) facility and infrastructure costs. The two are summarized in the following sections.

Direct Installation Costs. Direct installation costs relate to the set-up and preparation of equipment for use, in the components of direct installation cost are summarized in Table B-12.

Table B-12

COMPONENTS OF DIRECT INSTALLATION COSTS

Equipment	Labor	Logistics	On-Site Installation
Auxiliary equipment (including hardware & software)	Program management (on-site and HQ), including technical contracts	Warehousing	Site preparation
Initial spares/repair parts and consumables	Systems engineering personnel	Shipping and handling	Facility modifications (construction) and design *(a)*
	Initial training	Data (training manuals, maintenance manuals, operations manuals)	Integration and multiplexing
		Travel	Testing & evaluation
		Other	

(a) Includes any on-site modifications required to install screening equipment. Does not cover expenses related to baggage handling system design and associated facilities modifications.

Direct installation costs vary significantly between configurations of the same model of EDS machine. For example, an L-3 3DX 6000 installed in a stand-alone configuration will cost significantly less than the same unit installed in a multiplexed arrangement (i.e., electronically linked to other EDS machines). Table B-13 details the installation cost assumptions of each system type.

Table B-13

DIRECT INSTALLATION COST OF CHECKED BAGGAGE SCREENING SYSTEMS

System Type	Assumed Installation Cost per Machine
High-speed in-line	$425,000
Medium-speed in-line	$425,000
Mini in-line	$100,000 – $425,000
Micro in-line	$50,000
Stand-alone EDS	$50,000
ETD	$2,500

Source: Assumed based on TSA input, May 2006.

Installation costs are assumed to escalate a rate of 4% per year.

Facility Modification and Infrastructure Costs. Each airport is uniquely designed and has different system requirements. Because of the diversity in configurations, the cost of facility modifications necessary to support in-line baggage screening systems are extremely site-specific. Given the top-down nature of the models used in the BSIS, site-specific cost estimates for facility modifications were not feasible. However, average cost multipliers were developed from both the historical costs of preexisting screening systems and from bottom-up cost estimates of future systems.

Facility modifications and infrastructure costs represent the bulk of the upfront costs associated with implementing an in-line system. These costs are attributable to the size of EDS machines, their weight, and the need to integrate them into the baggage handling system. Examples of facility modification work include:

- Construction of extra baggage makeup rooms to replace existing baggage makeup areas displaced by EDS equipment;
- Construction of baggage inspection rooms to provide conditioned workspace for alarm resolution screening;
- Redesign and upgrading of baggage handling system conveyors to support integration with EDS equipment;
- Moving walls and partitions;
- Reinforcing flooring to support additional weight; and
- Upgrading and rerouting power sources.

Facility modification costs of EDS screening systems vary significantly due to site-specific considerations; per EDS machine, they range from $45,000 to upwards of $10.0 million.

Due to their large up-front capital cost and the high degree of cost variability, facility modification and infrastructure costs represent the highest risk to overall project cost and schedule. Small percentage changes in these costs can significantly impact the net present value of a project.

For each of the screening system types, Table B-14 enumerates the assumed average cost of facility modifications and infrastructure per EDS machine. For modeling purposes, facility modification costs are adjusted to account for regional differences in construction costs based on the Means Construction Cost Indexes* published by Reed Construction Data.

Table B-14

AVERAGE COST OF FACILITY MODIFICATIONS AND INFRASTRUCTURE

System Type	Assumed Average Cost per Machine	Source
High-speed in-line	$6,000,000	*(a)*
Medium-speed in-line	$4,000,000	*(b)*
Mini in-line	$325,000 – $1,500,000 *(c)*	*(d)*
Micro in-line	$250,000	*(e)*
Stand-alone EDS	$45,000	*(f)*
Stand-alone ETD	$4,000	*(f)*

(a) Bottom-up cost estimate from template baggage handling system designs and adjusted for variation between template designs and actual installations of medium-speed in-line systems.
(b) Average of selected existing in-line installations with fully integrated EDS equipment.
(c) Facility modification and infrastructure cost per EDS depends on the level of integration with the baggage handling system.
(d) Bottom-up cost estimates of template designs and data from existing installations of mini in-line EDS machines.
(e) Bottom-up cost estimates of template designs.
(f) TSA estimates from existing installations.

The escalation of facility modification cost and infrastructure cost is estimated from a historical trend of the Producer Price Index (PPI) published by the U.S. Department of Labor. Specifically, it is assumed that the escalation rate for infrastructure costs will gradually decline from the current rate (measured between January 2005 and January 2006) of 5.7% to a long-term average of 2.1% per year. The

* Reed Construction Data, *Means Construction Cost Indexes*, Volume 32, Number 1, January 2006.

long-term average escalation rate is estimated as the average rate of change for the PPI between 1996 and 2006. As shown in Table B-15 below, the rate is assumed to decline by 1% per year until the 2.1% per year average rate of escalation is reached.

Table B-15

FACILITY MODIFICATIONS AND INFRASTRUCTURE ESCALATION

Date Range	Annual Escalation Rate	Source
2005-2006	5.7%	*(a)*
2006-2007	4.7%	*(b)*
2007-2008	3.7%	*(b)*
2008-2009	2.7%	*(b)*
2009-2010	2.1%	*(b)*
2010 and beyond	2.1%	(c)

Sources:
(a) Estimated rate of change in the Producer Price Index - Commodities for finished goods (PPI) between January 2005 and January 2006, downloaded from the Bureau of Transportation Statistics, U.S. Department of Transportation (http://www.bts.gov) on March 16, 2006.
(b) Assumed based on 1% per year decrease to long-term average rate of change for the PPI.
(c) Assumed based on 20-year average rate of change for the PPI (measured between January 1986 and January 2006).

Costs Associated with Optimal System Expansion. For each initial optimal system, the model identifies equipment requirements such that there is sufficient capacity to accommodate traffic growth for the five years following installation. However, each initial optimal system may require additional equipment to accommodate growth at the end of those five years and beyond, and, to account for this need, the model resizes systems every five years to accommodate demand in the upcoming five years. The facility modification and infrastructure costs shown in Table B-14 are used to account for any modifications necessary to support system expansion

In practice, the best approach – expansion at a later date or additional capacity up front – would need to be determined on a case-by-case basis during the planning and design of the initial system. The approach that minimizes 20-year life-cycle costs should be selected. Rather than try to predict this choice for each airport, all airports in the model were assumed to expand incrementally over time.

Costs Associated with Replacement of EDS Equipment. When an EDS machine reaches the end of its useful life and therefore needs to be replaced, modifications to the existing infrastructure are required. These modifications

depend on the type of system being replaced and may include modifications to the programmable logic controller (PLC), provision of additional queuing belts, replacement of conveyor motor components to accommodate faster conveyor speeds, and additional supporting infrastructure. Given that there is little field data to suggest the exact cost of these modifications, the Technical Team developed the estimates shown in Table B-16 to provide a reasonable estimate of the costs. These estimates are based on expert judgment as well as data from several current or planning redesigns of existing, first generation systems to improve throughput, operations, and system reliability.

Table B-16

COST OF FACILITY MODIFICATIONS RELATED TO EDS MACHINE REPLACEMENT

System Type	Cost per EDS
High-speed in-line	$200,000
Medium-speed in-line	$133,333
Mini in-line	$ 50,000
Micro in-line	$ 25,000
Stand-alone EDS	$ --
Stand-alone ETD	$ --

Source: Assumed based on input from TSA and the cost of system redesigns to improve the integration of first generation EDS machines.

Costs of Checked-Baggage Screening at Future Terminals. The model explicitly prescribes optimal checked-baggage screening systems for all U.S. airports included in TSA threat-categories X through III. These optimal systems are designed for only the near term (5 years from installation), and so, over the 20-year analysis period, some airports will inevitably be building new terminals and new checked-baggage screening systems to support the new facilities.

To estimate a rate of new terminal construction in the medium- to long-term (i.e., 2010-2025), surveys that were conducted by industry associations are used. Based on reported project data in the next several years, the annual cost of new terminals was estimated to be approximately $911 million dollars.

Using data from three existing in-line systems installed in new terminal facilities, 5.7% of total new-terminal cost is estimated to be attributable to checked-baggage screening facilities. The corresponding rate of in-line checked baggage screening infrastructure cost for future new terminals is $52 million per year (in 2006 dollars). Including equipment, the present-value cost of capital for checked-baggage screening at new terminals is $433 million under strategies that entail optimal system deployment.

To estimate the cost of screening at future new terminals as part of a compliance-only scenario, screening capacity is assumed to increase at the same annual rate ($52 million) as it does in the deployment scenarios. Assuming that this capacity will be provided by ETD screening, the cost to provide ETD equipment at these new future terminals is estimated at $35 million in present value over the 20-year analysis period.

B.3.4 Screening Equipment Maintenance Cost Inputs

Screening equipment maintenance includes the maintenance costs associated with EDS equipment, ETD equipment, and other integrated logistics support (ILS) costs borne by TSA as program-level costs.

Screening Equipment Maintenance. Equipment maintenance costs include preventive and corrective maintenance, related program management, moving equipment, replenishment spares, repair parts, shipping and handling, technical refresh, training, data manuals, other direct costs, dismantling, and destruction.

In spring 2005, TSA renegotiated all maintenance contracts on a fixed price per unit basis. Because TSA plans to continue to contract maintenance on a fixed price per unit basis for new technology, and because the government has not negotiated maintenance costs for equipment not yet developed or in service, annual maintenance costs per machine are estimated as a percentage of the purchase cost. Currently, the weighted average maintenance cost of existing EDS equipment as a percentage of the purchase price is about 9.4% annually. Therefore, it is assumed that the annual maintenance cost of new equipment will be 10% of the assumed purchase price.

Consistent with previous contracts, all EDS vendors are responsible for covering the first year's maintenance contracts. Since the first year's maintenance cost is included in the purchase price, the model calculates maintenance costs as $0 in the first year for all EDS machines. However, in-warranty maintenance costs for the GE CTX-9000 include an additional fee of $22,642 per machine in the first year, escalated at 4% annually, for increased service (i.e., at times other than Monday through Friday, 9am – 5pm). Table B-17 shows the maintenance unit cost assumptions based on the latest maintenance contracts.

Table B-17

EXISTING SCREENING EQUIPMENT MAINTENANCE COST ASSUMPTIONS

Manufacturer and Model	2006	2007	2008	2009	2010
L-3 3DX 6000 *(a) (b)*	$97,846	$ 93,773	$ 89,703	$ 84,596	$ 87,980
GE CTX-2500 *(c)*	64,050	66,612	69,277	72,048	74,930
GE CTX-5500 *(c)*	74,411	77,387	80,483	83,702	87,050
GE CTX-9000 *(c)*	97,017	100,898	104,934	109,131	113,497
ETD (various manufacturers) *(d)*	9,152	9,518	9,899	10,295	10,707

(a) TSA was able to successfully negotiate decreasing maintenance costs per unit from FFY 05 through FFY 08 based on the notion that the vendor will experience "learning curve" savings during that time period. After FFY 08, the benefits of the learning curve will be exhausted and the price per unit is assumed to increase at 4% annually thereafter.

(b) The L-3 unit maintenance costs stated above are higher than those stated in the contract as the one time costs and additional management fees were fully loaded into the fixed price amount. This calculation was performed by TSA acquisitions.

(c) For 2005, the maintenance cost per unit was specified in the GE contract (HSTS04-05-DEP008). After 2005, prices were inflated by 4% annually.

(d) Beginning in FFY 06, new models of ETD equipment will be purchased by TSA and old models will be phased out of the fleet. Using a weighted average of existing ETD models, the maintenance cost based on the current contract is $8,834. TSA does not expect the future negotiated cost per machine to exceed the weighted average cost of existing ETD models.

Other Integrated Logistics Support. Integrated logistics activities refer to program-level costs borne by TSA to support maintenance activities. These costs are summarized in Table B-18.

Table B-18

OTHER ILS COST ASSUMPTIONS

Cost Type	2005
Auxiliary Equipment Maintenance	$13,000,000
ETD Consumables *(a)*	10,000,000
ILS Call Center (EBSP portion only) *(b)*	2,800,000
ILS Contractor Support *(c)*	5,000,000
Total Other ILS Costs	$30,800,000

(a) A TSA estimate of additional cost for swabs and desacent used for ETD units.

(b) A centralized maintenance call center is operated for a flat fee of $3.5M. TSA estimates that 80% of this cost (or $2.8M) is attributable to the checked baggage program.

(c) A TSA estimate of cost of contractor economic, life-cycle, and acquisition analyses to be done on an annual basis.

B.3.5 Baggage Handling System Operating and Maintenance Cost Inputs

Accommodating an in-line screening system usually requires extensive modification to the existing baggage handling system. As a result, the system becomes both more extensive and more complicated, and, in turn, this leads to a rise in operating and maintenance (O&M) costs. The increased operating costs include: janitorial staff, manual bag encoders, bag-jam clearers, and the utilities associated with EDS machines and new conveyors. Increased maintenance costs include dedicated maintenance staff and spare parts.

The BSIS study estimates the O&M cost increase from data obtained by airport interviews; ten of the airports have in-line systems, and three have mini in-line systems. Table B-19 summarizes the estimated increase in maintenance costs and utility usage per EDS machine in a system. Costs and utilities usage include both the BHS and the EDS screening system.

Table B-19

INCREMENTAL BAGGAGE HANDLING SYSTEM OPERATING AND MAINTENANCE COSTS

System type	O&M cost increase per EDS	Electricity usage increase per EDS (kWh per year)	Source
High-speed in-line	$314,000	618,525	Assumed to be 1.5 times the medium-speed cost or usage increase
Medium-speed in-line	$209,000 *(a)*	412,350 *(c)*	Airport survey
Mini in-line	$28,000 *(b)*	91,180 *(d)*	Airport survey
Micro in-line	$14,000	45,590	Assumed to be half of mini in-line cost or usage increase
Stand-alone	n/a	n/a	

Note: Utility usage shown in kilowatt hours (kWh) and translated into utility costs using assumed costs per kWh assumptions for each state, as discussed below.

(a) The weighted average value at 8 airports with a total of 54 EDS machines
(b) The weighted average value at 3 airports with a total of 12 EDS machines
(c) Weighted average of usage at 6 airport terminals
(d) Single medium-hub airport usage

The cost of utilities is derived from the CY2005 records of the Energy Information Administration. Specifically, the cost of electricity at each airport is taken to be the average cost of electricity consumed for commercial purposes in the state where the airport is located.

Utilities cost and maintenance costs are assumed to escalate at an annual rate of 4%.

B.3.6 Baggage Porter Costs

The cost of transporting bags from lobby screening locations to airline takeaway belts is estimated from data at 20 airports, of which 3 have in-line screening and 17 have lobby-based screening. For those airports with lobby-based systems, bag portering costs an average of $0.08 per bag; whereas in-line airports average $0.06 per bag. The costs associated with portering at in-line airports are assumed to include normal airline business arrangements for transporting oversize, fragile, or other types of baggage not suitable for conveyance on standard baggage handling systems. To assess the incremental cost associated with lobby-screening, the difference between lobby-based and in-line systems is calculated. Consequently, at airports with lobby-based screening systems, the incremental cost of portering is assumed to be $0.02 per bag.

B.3.7 Other Cost Inputs

Other program-level costs incurred by TSA include research and development, training, disposal and warehouse costs, and headquarters staffing.

Research and Development. The costs for research and development include program initiation, planning, management tools, software licenses, supplies, concept and technology development, related program management and systems engineering, prototypes, analysis and evaluation, facilities, travel, hardware-software integration, developmental test and evaluation, operational test and evaluation, test item spare parts, consumables, data manuals, and other direct costs.

Continued research and development efforts are critical to ensure rapid development of new technologies that provide increased threat protection and lower life cycle costs. The EBSP's research and development (R&D) efforts are undertaken by the Transportation Security Laboratory (TSL), which was formerly managed by the FAA. In FFY 06, the TSL will transition out of TSA and into the Department of Homeland Security's Science and Technology Directorate. Nevertheless, the R&D costs are expected to remain stable over time.

In FFY 05, R&D costs were estimated at $35.3 million. R&D costs are assumed to continue at this level, escalated 4% annually, as part of the compliance-only scenario described in the main body of the BSIS report. For deployment scenarios that rely on accelerating and leveraging deployment of next generation technologies, this cost is assumed to double to $70.6 million.

Training Costs. TSA incurs training costs related to the hiring of new personnel and any subsequent training of existing personnel at a given airport after the implementation of any new technology. Training costs include costs associated with training classes, manuals, and other tools required to support new technology. The FFY 05 President's Budget Request included $145 million for screener training. Since TSA estimates that 50% of all screeners are used in the checked baggage program, a proportionate amount was allocated to the checked baggage program ($145M x 50% = $72.50M annually).

Disposal and Warehouse Costs. Disposal costs may include costs of redistribution, transfer, shipping and handling, dismantling, donation, sales, salvage, and/or destruction. Currently, there is no property management plan that estimates the cost of disposal for equipment, as no significant disposals of equipment have been made to date. Thus far, the government has not paid any additional costs for disposal as the original equipment manufacturers have taken back equipment free of charge. If the manufacturer does not take back the equipment, the equipment is placed in one of the four warehouses. The cost of warehousing is an annual flat fee of approximately $2.8 million. TSA does not expect to lease out additional space within the next 5 years. For the purposes of this report, disposal costs are assumed to be equal to the salvage value of the equipment and therefore not included. However, the $2.8 million warehousing fee is included in the analysis.

TSA Headquarters Staff. In addition to screeners, there are indirect government employee costs associated with the EBSP program. Within the Office of Security Technology, approximately 50% of the government full time equivalents devote their time to the EBSP program. In the July 2004 CFO passback, the total compensation (including salary, benefits, training, etc.) in FFY 05 was estimated at $14.09 million. Thus, the EBSP is estimated to account for $7.04 million of headquarters personnel cost in FFY 05 (50% of $14.09 million).

B.4 CRITICAL BAGGAGE SCREENING SYSTEM DESIGN PRINCIPLES

This section provides a summary of the operational standards documented in the BSIS Planning and Design Guidelines (BSIS Guidelines) developed by the BSIS Technical Team. These standards serve as a quantitative method to capture the quality of Checked Baggage Inspection System (CBIS) design and its performance. The underlying assumption is that a well-designed CBIS will be able to meet all operational standards thereby ensuring an efficient and flexible operation.

In addition, this section also describes CBIS design best practices and provides a list of design lessons learned. The information in this section is based on the valuable experience that the industry has gained over the past several years from the design and implementation of various first generation CBIS designs.

Operational standards, best practices and lessons learned as presented in this section and as detailed in the BSIS Guidelines were reviewed and approved by the BSIS Technical Team (as well as a number of BHS designers).

B.4.1 CBIS Operational Standards

Table B-20 displays a summary of operational standards that are aimed to assist planners in planning and generating efficient CBIS designs that will be able to meet performance standards as specified in the BSIS Guidelines. In addition during the planning and design phase, the planning standards mentioned below will enable planners to assess the efficiency of the CBIS design being simulated:

Table B-20

SUMMARY OF CBIS OPERATIONAL STANDARDS

Planning Standards	Fielded Tested Operational Standards
Additional Bag Travel Time in BHS (up to 10 min)	Rate of Error Bag s at a Resolution Area (1% or 2% depending on CBIS design)
System Capacity Test (Stress Testing)	Rate of Bag Jams (up to 1%)
	Alarm Bag Images at a Resolution Area (equal to actual alarm bags)
	Throughput Calculation Method
	Baggage Characteristics

Source Leigh Fisher Associates, May 2006.

Operational Standards to be Tested during Planning & Design. The following is a summarized version of CBIS operational standards that have been identified by the BSIS Technical Team. These standards are to be tested during the planning and design phases. Planners are required to use appropriate analysis to test the CBIS design and verify that standards are fully met. The BSIS Technical Team recommended that simulation or other appropriate modeling tools are used.

- **Bag Travel Time in the Baggage Handling System**—The maximum incremental time that 95% of peak hour bags spend in the CBIS (due to screening requirements) is not to exceed 10 minutes. Whenever feasible, it is recommended to design the CBIS such that total time (rather than incremental time) of 95% of peak hour bags spend in the entire BHS is no more than 10 minutes.

- **System Capacity Test**—Overall system capacity shall be tested by using a checked baggage demand level significantly higher than the overall system design capacity to verify that the BHS does not constrain the combined capacity of the EDS equipment. When system capacity exceeds the combined EDS capacity the test is passed. This test shall meet or exceed the performance standards the live CBIS is being designed to meet.

Operational Standards to be Tested in the Field. These standards should guide planners toward designing efficient CBIS and should ensure that, during the commissioning phase, the CBIS will be able to meet the performance requirements stated in the TSA Integrated Site Acceptance Test (ISAT).

- **Error Bags* at CBRA—**allowable rate of error bags at CBRA shall not exceed 1% or 2% depending on the inclusion of a Baggage Reinsertion Line (BRL) conveyor in the CBIS design. A BRL allows bags to be sent back to the screening matrix if they arrived in error at the CBRA and, if used, can allow for a higher rate of error bags.

- **Rate of Bag Jams**—CBIS designs are to ensure that the rate of bag jams is no higher than that specified in the SSTP (typically no higher than 1%). This rate can be achieved by properly locating and configuring baggage measurement arrays (BMAs) that would effectively redirect out-of-gauge (OOG) bags as well as using mechanical or static devices to properly orient bags prior to being screening by the EDS. In addition, the designs should include measures to facilitate the quick and effective clearing of bag jams.

- **Bag Tracking Error Rate**—CBIS designs shall ensure that overall bag tracking error rate shall be no higher than 2%. This can be achieved through the use of several methods as specified in the "Best Practices" section of this appendix.

- **Alarm Bag Images at CBRA**—The number of alarm bag images available at the CBRA should not exceed the actual number of alarm bags that have not lost tracking. The CBIS shall report all bags with repeat images (i.e., bags that have been scanned more than once by an EDS) that arrive at the CBRA. The CBIS shall maintain and show the original bag ID of these repeat scan bags.

- **Throughput Calculation Method**—The designer shall declare the throughput screening rate, which is defined as the rate at which all bags (clear and suspect once cleared at CBRA) are returned to the outbound makeup system after passing through screening operations. Rate calculation methodology is detailed in the ISAT testing document and should be used for testing in-line systems. The CBIS overall throughput (also known as system overall capacity) shall be tested for all EDS machines included in the design unless specific EDS machines are defined by the designer as redundant machines. For example, if a CBIS design includes 4 EDS machines, each with a throughput of 500 bph, and no machines are defined as redundant machines, then the CBIS overall throughput to be tested during the commissioning phase should be 2,000 bph. If, in the same

* Error bags are defined as: total bags arriving at CBRA minus tracked suspect bags with valid bag IDs at CBRA minus valid oversize bags as sent by CBIS. The end result should be divided by the total bags inducted into that CBIS.

CBIS design, 3 EDS machines are defined as regular EDS machines and 1 is defined as redundant, than the expected CBIS throughput shall be 1,500 bph.

- **System Type Throughput Rates** – A CBIS should be designed to meet the average throughput rates as defined in section B.1. For testing and commissioning purposes, the ISAT document shall specify minimum throughput requirements to be met by a CBIS depending on the EDS machine type used in the CBIS. These minimum throughput rates shall be reviewed by the integrated, local design team during the planning and design process (specifically during the Pre-Design phase) and finalized according to known throughput rates at the time of the review and specifics of the CBIS design being reviewed.

- **Bag Characteristics**—The CBIS shall be designed to accommodate bags with characteristics defined by the ISAT document.

For clarification, throughput rates stated for each EDS machine in section B.1 are based on a standard bag length and bag spacing as stated in the tables. Designers shall define and document the throughput values used for their CBIS design at a particular airport.

Note: additional details on operational standards can be found in the BSIS Guidelines.

B.4.2 Best Practices and Lessons Learned for In-Line Systems

The following lessons learned are related to baggage tracking issues, commingling of clear and non-clear bags, and the proper conveyance of baggage in an orderly, controlled, and timely fashion. Table B-21 summaries the best practices and lessons learned discussed in the remainder of this section.

Table B-21

SUMMARY OF BEST PRACTICES AND LESSONS LEARNED

Best Practices and Lessons Learned
Reducing Error Rate at CBRA and Reducing Bag Tracking Error Rate
Steep Conveyor Slopes
Gradual Conveyor Speed Transitions
Correct Placement of Photo-Electric Cells
Proper Use of Diverters, Pushers and Merges • Static-ploughs and roller diverters • Improper merging • Pusher operation • 90-degree merges • Directly opposing diverters • Merges at EDS output
Recommended Configuration of Conveyors Directly Supporting EDS Units • Power turns after EDS • Baggage tubs • Bag orientation • Placement of reinsertion points • Proper decision time
General Design Recommendations • Variable frequency drives • Avoid unnecessary merges • Non-powered rollers • Draft curtains • BHS displays at CBRA
Fail-Safe and Efficient Design

Source Leigh Fisher Associates, May 2006.

Reducing Rate of Error Bags at CBRA and Bag Tracking Error Rate. Reducing the rate of error bags arriving at the CBRA, often caused by incorrect acquisition of a bag ID by Automatic Tag Readers (ATRs), can be done by the PLC automatically assigning a pseudo ID. The bag can then be tracked and screened as a regular bag. Similarly, assignment of a pseudo ID can reduce bag tracking error rates. In general, placement of ATRs prior to the screening matrix (typically in combination with a BMA) should be avoided as it will increase the rate of error bags and mistracked bags. Instead it is recommended that an ATR be used prior to each EDS machine. In addition baggage tracking should do done using real time belt speeds. As much as possible unique bag IDs should be used.

Steep Conveyor Slopes and Gradual Conveyor Speed Transitions. Steep slopes lead to baggage rolling and sliding, which results in tracking losses, bag jams, and bags doubling up. Slopes that are both greater than 18% and in non-tracking zones should be avoided (and 12% in baggage tracking zones). Significant consecutive conveyor speed transitions often result in bag spacing problems that can lead to baggage tracking losses. Changes in conveyor belt speeds should be in a range as to not affect the stability or orientation of bags while still maintaining accurate tracking of the bags.

Correct Placement of Photoelectric Cells. Photoelectric cells (PECs) should be properly located (at a height capable of detecting the minimum bag height (typically 1 inch above conveyor belts) and not too close to conveyor ends. Plexiglas PEC guards should be avoided.

Proper Use of Diverters, Pushers, and Merges. Several best practices related to diverters, pushers, and merges were documented as part of the BSIS Guidelines.

- Static-ploughs and roller diverters should be avoided since they typically have multiple jam points. If possible, only high speed diverters should be used.

- Improper merging and multiple merge points (excessive merges) should be avoided as they increase bag jams and mis-tracking and, thereby, reduce system throughput. Also 90-degree merges should be avoided; instead, 45-degree merges should be used. Immediately merging the outputs of EDS machines should be avoided, as it has proven to result in a complicated mixing of bags of different status.

- Inaccurate pusher operation typically due to improperly timed pushers can lead to bag jams and security violations. Use of pushers, if possible, should be avoided in all screening and tracking zones.

- Directly opposing diverters should be avoided. This configuration typically results in tracking failures and reduced throughput.

Recommended Configuration of Conveyors Directly Supporting EDS Units. The following recommendations regarding the integration of the BHS conveyors directly supporting EDS units were made as part of the BSIS Guidelines.

- **Power Turns after EDS** exits should be avoided since they increase the rate of bag jams induced by longer length baggage.

- **Baggage Tubs.** Use of baggage tubs can enhance the ability to maintain positive tracking and minimize bag jams especially for irregularly shaped bags, bags with straps or obtrusions, or light bags.

- **Bag Orientation.** The effective application of bag straightening devices such as bump-outs, iron arms as well as more complex centering or alignment

belts and mechanical bag alignment devices, will improve system throughput when applied prior to induction to EDS equipment, ATRs, or BMAs.

- **Proper Decision Time** should be provided before bags are recombined and sorted (typically a minimum of 45 seconds) but longer times can allow for extra OSR time and therefore result in a less bags arriving at the CBRA.

- **Baggage Induction Training** to airline staff is critical for the optimization of system throughput.

General Design Recommendations. The following general design recommendations were made as part of the BSIS Guidelines.

- **Variable Frequency Drives (VFDs)** are recommended to use in addition to conveyor brakes. Both allow proper queuing and baggage spacing. VFDs are necessary to support higher throughput screening equipment that may later replace lower throughput screening equipment.

- **Non-powered rollers** should be avoided as they cause bag jams and tracking losses.

- **BHS displays at CBRA** showing bag ID and screening status displays should be considered for installation on all incoming reconciliation lines. These will result in higher system throughput and better CBRA results.

- **BHS Reporting.** Investment in PLC error-logging and reporting (or some other form of system diagnostic capability) has proven valuable. It allows for monitoring of EDS and BHS performance – so that developing problems can be spotted early and preventive maintenance can be performed. BHS control and diagnostic system shall be provided with standard reporting functions. The BSIS Guidelines contain a list of minimal features and reports. In addition the Guidelines contain some recommendations on future reporting capabilities that are desirable.

- **Fail-Safe and Efficient Design**. All CBIS should be designed to have a fail-safe configuration. Designs should minimize the mixing non-cleared baggage with cleared bags and should quickly separate baggage based upon the screening status.

General Comments. The BSIS Technical Team also made the following general comments regarding EDS screening system planning, design, testing, implementation, and operation.

- **Test, Inspection, and Commissioning.** Schedules must allow sufficient time for thorough test and inspection. The commissioning process should be clear and open to all stakeholders.

- **Simulation Analysis.** Simulation analysis shall be performed for in-line systems. The control logic in these simulations should be formally documented and submitted to the BHS design team for the initiation of their work and the selected baggage contractor for use in programming the BHS.

- **Maintenance Responsibility** for the first year is on the BHS contractor. Thereafter, the CBIS operator should maintain the design performance of the system. At the end of the first year, and annually thereafter, the CBIS capability to meet operational standards should be demonstrated.

- **CBIS Storage Capacity** can enhance efficiency for high-speed in-line systems and ensure a high EDS utilization rate by maintaining a constant baggage flow to high-speed EDS units. This allows the CBIS to withstand high peaks of demand for short durations beyond the overall system capacity.

B.4.3 REMAINING ISSUES

The BSIS Technical Team identified several remaining issues that, due to the time constraints of this study, could not be addressed as part of the study. These include:

- **Canadian and international recheck screening facilities.** Technical Team members expressed concern over the cost implications of screening Canadian and international recheck baggage at many airports around the country. Members suggested that, at a minimum, options for screening these bags at Customs and Border Patrol pre-clearance facilities in Canada, the Caribbean, and Ireland be investigated.

- **Best practices for maintenance and operation.** The Technical Team felt that significant cost savings could be achieved by developing and promulgating best practices for maintenance and operation of the various types of baggage screening systems.

- **More detailed design guidance for high-speed in-line systems.** The Technical Team believes more detailed guidance regarding the design of cost-effective high-speed in-line systems should be added to the BSIS Guidelines over time as more information becomes available about the specific performance characteristics of the new high-speed EDS machines.

- **IT design standards.** The Technical Team believes that design standards should be developed for IT infrastructure. Both for lower IT levels (such as controls) and for higher IT levels that will lead to system operational commonality, ease of maintenance, proper interfaces with x-ray machines, and will further lower the cost of the overall implementation and on-going support.

- **Performance-based standards for BHS equipment.** The Technical Team recommended that BHS equipment standards and criteria be developed that would be less product-specific and, instead, more performance-based. Performance-based standards would ensure that necessary functionality is provided without restricting the types of equipment installed by BHS manufacturers.