Aviation Security: How Much Is Enough?

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There have been vast efforts since 9/11 to improve aviation security. But has an obsession with aviation diverted resources from other more serious threats that have scarcely been addressed?
Perhaps, but we should note that:

- More US civilians were killed by terrorists during air journeys than during any other activity.

- On a per-hour basis, the terrorism death risk during air journeys was 600 times higher than at other times.
And these statistics are all based on the 35-year period prior to 9/11!
Since 9/11, we have seen:

- The **Shoe Bomber’s attempt** to destroy a Transatlantic US jet

- A **shootout at LAX** that caused several deaths and injuries

- Strange flight cancellations in late 2003/early 2004 that, according to Tom Ridge, “**probably**” prevented a terrorist attack
The terrorist fascination with aviation, in short, *long preceded 9/11 and has persisted since then*. It seems hard to argue that the massive attention to aerial security is excessive or irrational.
Indeed, the very fact that aviation has been hardened as a target might make it especially attractive to terrorists.

(Academics love paradoxical statements like this one.)
How Much Would Further Terrorism Against Aviation Affect the Industry Economically?
“If there were another incident on a commercial airliner in the United States, it’s game over, lights out. It’s beyond a disastrous fall. It’s over.”

--Kevin Mitchell, head Business Travel Coalition
August 29, 2003
On the Other Hand, Consider Some Reactions to:

- *The Israeli Bus Bombings*
- *AA 587*
- *The Start of War in Iraq*
- *The Madrid Train Bombings*
Most present air travelers may already believe that further terrorism against aviation is a question of “when not if.”

And they might not be deterred from flying should their grim expectations be realized.
Has aviation actually been as hardened against terrorists as it should be?
Some Issues We Will Discuss:

* Photo ID’s at Airport Boarding Gates
* Security Questions for Airline Passengers
* Positive Bag Match for Checked Luggage
* US Mail on Passenger Aircraft
Conjecture:

The kind of analytic thinking we hold so dear plays *a lesser role than is ideal* in decision making about US aviation security.
Why don’t they check photo ID’s at the boarding gate anymore?
Photo ID checks at boarding gates *cost virtually nothing* to either airlines or passengers.

(The only conceivable argument against the checks relies on *an amorphous notion of “hassle”* that can be invoked anywhere.)
No Further Questions?

Until late 2002, US airline personnel were required to ask two questions of passengers who were checking in.
(1) Has *anyone unknown to you* given you something that you are bringing aboard the aircraft?

(2) Has your luggage been *in your possession* at all times since you packed it?
The questions were 
abolished late in 2002 because 
TSA and US airlines deemed 
the inquiries useless.

ORLANDO, Fla. -- Airport security workers found a loaded handgun stuffed inside a brown teddy bear that a 9-year-old boy was carrying on a trip home after his family's Florida vacation, authorities said Thursday.
Can we attempt even a crude *cost-benefit analysis* of the “two question” policy?

(Sure.)
The actual dollar costs of implementing the policy are close to zero, but the added check-in time for travelers has some financial cost under the principle that “time is money.”
Estimated Dollar Equivalent of Check-In Delays:

--67 cents per minute for business travelers

--33 cents per minute for leisure travelers

(These statistics are tied to FAA estimates.)
Estimated Increase in Check-in Time Because of the Questions:

--30 seconds for business travelers

--90 seconds for leisure travelers
Calculations using these statistics imply that, among the 500 million annual US domestic passengers per year, the total added cost of asking the questions is roughly $200 million per year.
What would be the dollar cost of another air disaster caused by terrorism?

The Air Transport Association has suggested a figure of about $5 billion to the airline industry and its workers. (We will use that estimate.)
Comparing $5$ billion to $200$ million suggests a rule of thumb:

The two-question policy would be “cost effective” if it prevented one air disaster over a 25-year period.
To put it another way:

The policy would be cost effective if it stopped one of the next 12 billion passengers from unintentionally bringing something aboard an aircraft that caused a crash.
This linear analysis is far from perfect. But have there any better cost-benefit analyses been performed in the decision process?
Why did they end *positive passenger bag match* (PPBM) when they extended physical screening to all checked bags?
Absent PPBM, the terrorist can view the explosives detector as a huge roulette wheel, which costs virtually nothing to play and which gives odds of winning equal to the false negative rate of the machine.

(And one can play again and again....)
Cost-Benefit?

When US carriers performed PPBM in 2002, approximately 1.2% of departures were thereby delayed, and the mean delay given that one occurred was 10 minutes.

(That works out to an average of seven seconds per flight.)
Dollar cost per minute of gate delay:

$24 in direct costs per flight
(Air Transport Association)

45 cents per passenger in monetized time delay
(FAA)

Overall, PPBM cost about $50 million per year for the US domestic air system.
Thus, roughly one averted crash per century would make the measure cost-effective.
Why have they resumed transporting *heavier US mail* on US passenger planes?
Keeping heavier mail (weighing more than one pound) off passenger aircraft cost US airlines $250 million in revenue per year. (ATA)
Comparing $5 billion to $250 million suggests that:

A ban on heavier mail would be “cost effective” if it prevented one air disaster over a 20-year period.
Equivalently, a ban on heavier mail would be “cost effective” if there is a 5% chance per year that the measure would avert a terrorist act.

(Not the same as 5% chance of an attempted mail bombing.)
Spurious Argument:

If heavier US Mail is banned from passenger planes for security reasons, then it follows logically that all cargo must be banned.
Of course, it is imperfect to consider individual security measures one-at-a-time, because of *interaction effects* that could be substantial.
So, where are we?