

Economic Incentives in Air Cargo Screening

Some Topics for Discussion

Prepared by
Doug Pearl
Inzight Consulting, LLC
for ADSA11 November 4, 2014

~~Conclusions~~ Hypotheses

- **Air Cargo Vendors will use the least expensive screening methods available, subject to meeting requirements (and good citizenship)**
- **If new, *better*, and *more expensive* technologies become available, they probably will not be adopted if older, less expensive options are still allowed.**
- **In some circumstances, Air Cargo Vendors collectively may have an incentive to welcome government requirements for *better* and *more expensive* technology.**
- **Even if Air Cargo Vendors are not supportive, requiring new, *better* and *more expensive* technology is a policy trade-off that may be desired by society and government.**

Two Colleagues at an Air Cargo Vendor Discuss Screening Methods: Their Initial Conversation (Short Version)

We need to be good citizens, but if we don't use the least expensive solution, our competitors will take our customers

As long as it's on the QPL, or an accepted SOP, it's fine.



QPL: Qualified Product List.
SOP: Standard Operating Procedure.

Their Conversation After a New Product Launch (Short Version)

The Screening Vendor just launched a new, more expensive system that (they say) is better than what we do now. But... he can't tell me *how much better* it is or *why* it's better.

We're still allowed to use our old solution, so I don't see a reason reason to change it.



As long as it's on the QPL, or an accepted SOP, it's fine.

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- In some circumstances, Air Cargo Vendors *collectively* may have an incentive to welcome government requirements for *better* and *more expensive* technology.
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Value of Reducing Risk by One Order of Magnitude Air Cargo Vendor Perspective (Simplistic Model)

Vendor view: black font	Initial Risk	Lower Risk
Risk	0.1	0.01
Cost of Event if it occurs	\$100	\$100
“Expected” Cost (product of rows above)	\$10	\$1
Savings vs. One Column to Left	-	\$9
Breakeven Cost of Risk Reduction	-	\$9

Their Conversation, Continued... (Short Version)

OK; I'm convinced. I'd pay \$9 extra for the new technology to reduce risk. It makes economic sense, like buying insurance.

But if we do it and competitors don't they may drive us out of business....We don't live in a Monte Carlo simulation.

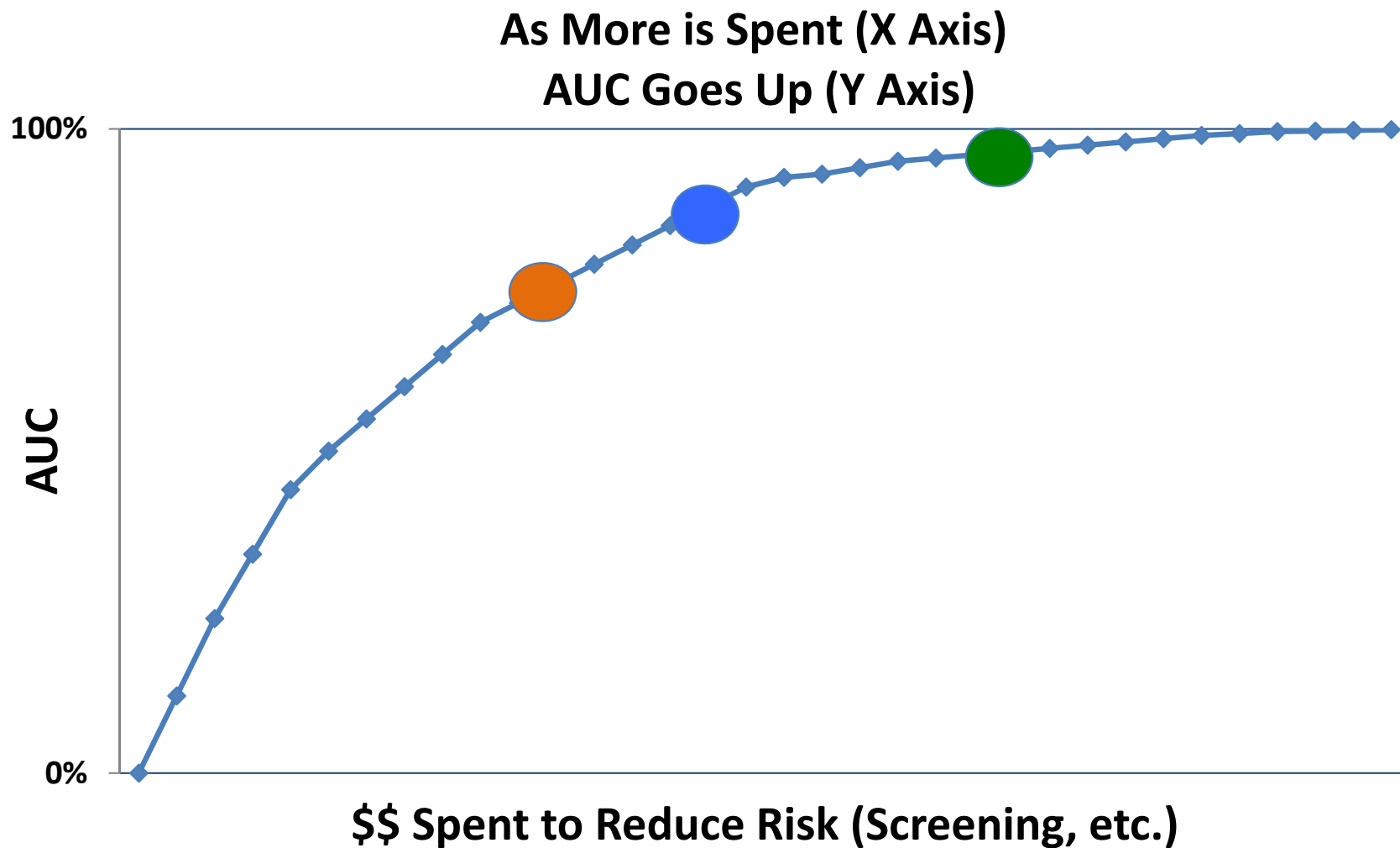
What if the QPL changed and we all had to do it?



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Who Decides How Much “Risk Reduction” to Buy Or Where We Should be On this Curve? Government? Industry?



*AUC (Area Under the Curve) is one statistical method of summarizing screening efficacy. Higher is better.

Whose “Risk” Are We Talking About? (Whose Cost if an Event Occurs?)

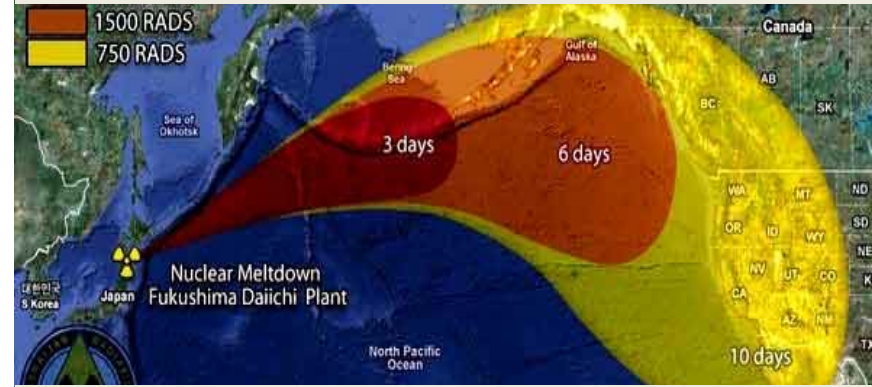
Externalities: Costs Borne by Society but Not by the Decision Makers in Private Sector

Fossil Fuel Power Plant



Utility's? Or Society's?

Fukushima Fallout Map



TEPCO's? Or Society's?

Pan Am 103



Pan Am's? Or Society's?

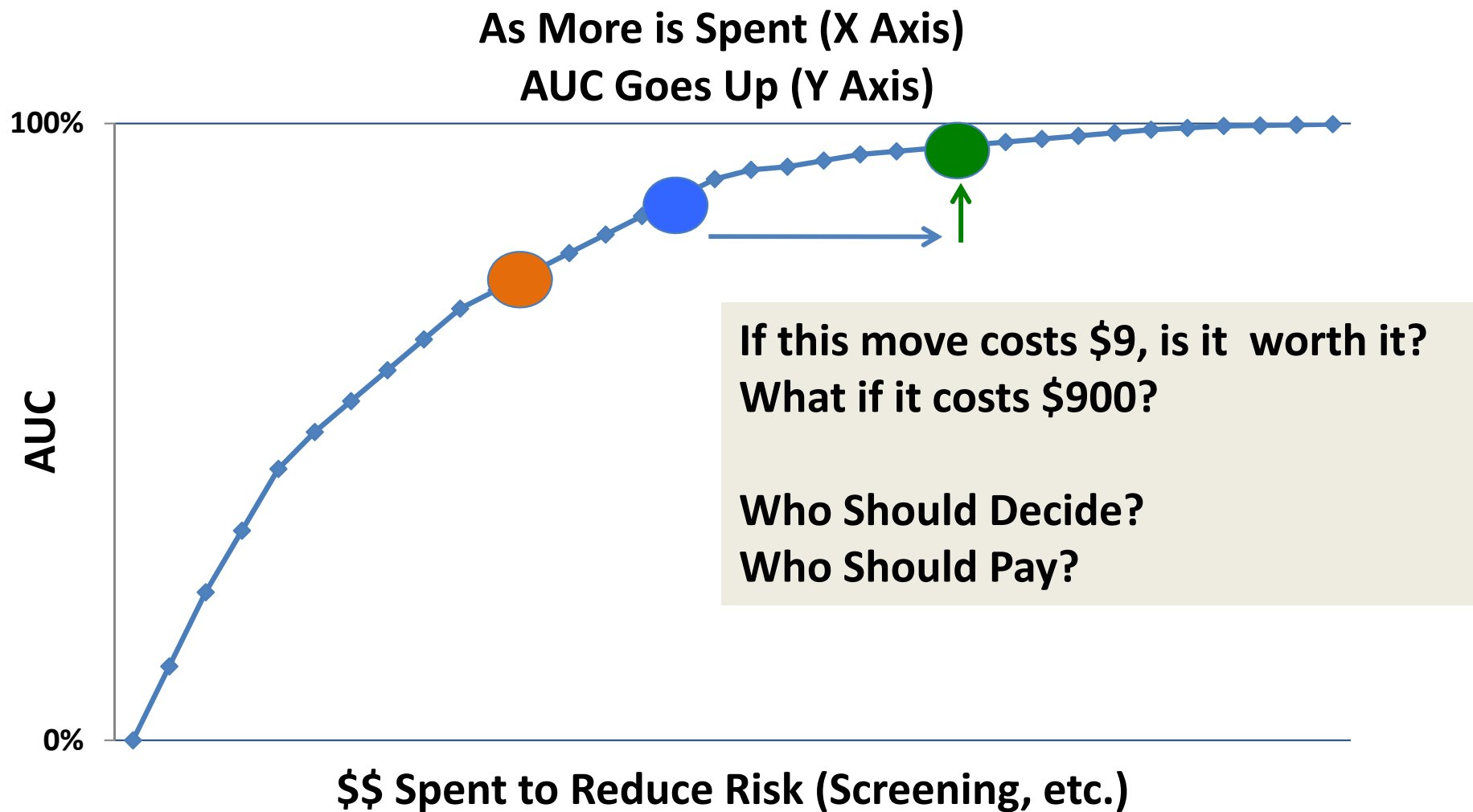
Value of Reducing Risk by One Order of Magnitude

Air Cargo Vendor View: \$9 (Black font). Society's View: \$900 (Red)

So How Much Should We Spend? Who is We? Who Should Bear the Cost?

Vendor view: black font Society view: red font	Initial Risk	Lower Risk
Risk	0.1	0.01
Cost of Event if it occurs	\$100 \$10,000	\$100 \$10,000
"Expected" Cost (product of rows above)	\$10 \$1000	\$1 \$100
Savings vs. One Column to Left	-	\$9 \$900
Breakeven Cost of Risk Reduction	-	\$9 \$900

Who Decides How Much “Risk Reduction” to Buy Or Where We Should be On this Curve? Government? Industry?



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Decision Makers Can Only Decide Based on What They Can Know

Who Knows What?

Potential Decision Criteria	Who Has Insight?	Gov't Agencies	Air Cargo Vendors
<u>COST of RISK REDUCTION</u>			
Cost to Acquire/Implement a Technology		Yes	Yes
Labor Cost to Operate		No?	Yes
Cost to Resolve (False) Alarms (and PFA in the Field)		No?	Yes
Total Cost of Ownership (TCO)		No?	Yes
<u>THE NEED</u>			
Cost of an Event (To Carrier?/ To Society?)		Yes?	Yes?/?
Actual Risk Level; Change in Risk Level (Intelligence, etc.)		Yes?	No
Change in Threat Type (Intelligence, etc.)		Yes?	No
<u>EFFICACY OF PRODUCTS ON QPL</u>			
Nominal PD of Products on QPL		Yes	No
Nominal PFA (lab tests)		Yes	No
PFA in the Field		No?	Yes

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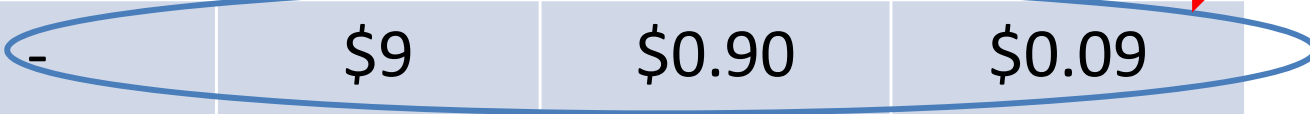
Backup

Value of Reducing Risk by One Order of Magnitude (OM)

Depends on Initial Risk and Cost of *Event* (as perceived by the decision maker)

Vendor view: black font Society view: red font	Initial Risk	Lower Risk	Lower Still	Even Lower
Risk	0.1	0.01	0.001	0.0001
Cost of Event if it occurs	\$100	\$100	\$100	\$100
“Expected” Cost (product of rows above)	\$10	\$1	\$0.10	\$0.01
Savings vs. One Column to Left	-	\$9	\$0.90	\$0.09
Breakeven Cost of Risk Reduction	-	\$9	\$0.90	\$0.09

Lower Risk; Lower Value of One OM Risk Reduction 



Value of Reducing Risk by One Order of Magnitude (OM)

Depends on Initial Risk and Cost of *Event* (as perceived by the decision maker)

From either perspective, value of OM risk reduction goes down as risk goes down

Vendor view: black font Society view: red font	Initial Risk	Lower Risk	Lower Still	Even Lower
Risk	0.1	0.01	0.001	0.0001
Cost of Event if it occurs	\$100 \$10,000	\$100 \$10,000	\$100 \$10,000	\$100 \$10,000
“Expected” Cost (product of rows above)	\$10 \$1000	\$1 \$100	\$0.10 \$10	\$0.01 \$1
Savings vs. One Column to Left	-	\$9 \$900	\$0.90 \$90	\$0.09 \$9
Breakeven Cost of Risk Reduction	-	\$9 \$900	\$0.90 \$90	\$0.09 \$9

Lower Risk; Lower Value of One OM Risk Reduction 

Model For Thinking About “Who Pays” and “Who Performs”

Who Performs the Work

Private Sector

Government

<ul style="list-style-type: none"> • Private contractors at airports (some) • Blackwater • Defense Contractors • National Labs 	<ul style="list-style-type: none"> • Air Cargo Screening (under regulation) • Some food inspection (under regulation)
<ul style="list-style-type: none"> • TSA at airports (most) • DOD • Police • Air Traffic Control 	<ul style="list-style-type: none"> • Unusual, but does exist • FDA PDUFA

Gov't (taxpayers)

Private Sector

Who Pays

Are there Limits on Liability?

Warsaw Convention (Updated by Montreal Convention, 1999)

Cargo on international flights

- **Liability limit: 19 SDR (roughly \$30) per kg**
- **Payload capacity of 747: 112,000kg**
- **Max liability for cargo, per plane, based on this: \$3.4 Million**

Human Life on international flights

- **\$169k per passenger (in absence of negligence; otherwise unlimited (?))**
- **500 passengers would be: \$84 Million**

Value of aircraft itself

- **~\$150 million (very rough estimate)**

Potential Direct \$ Cost to Air Carrier (and/or their insurer) for Total Loss of Plane

- **Plane full of cargo only: \$153 Million (mostly the plane's value)**
- **Plane full of passengers: \$234 Million**