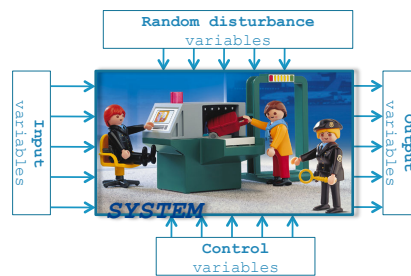


Is the whole system more than the sum of its certified parts?

1st ERNCIP Conference
12-13 December 2012

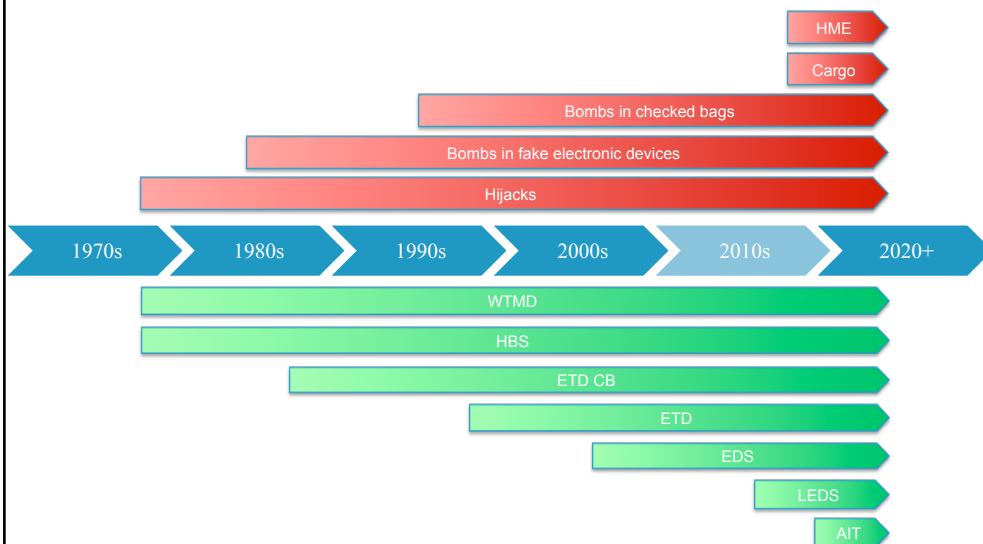
François MESQUI, Ph.D.
Morpho Detection



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ACTION, REACTION: IS IT THE WAY FORWARD?



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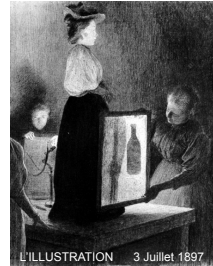


GROWING COMPLEXITY OF SECURITY SYSTEMS

In the early years of security systems:

Screening (e.g. HBS, checkpoint): very simple process with few types of equipment

⇒ The standardization of that equipment implied a certain **overall system performance**



Today:

The availability of screening equipments and potential technology combinations has drastically increased

Upcoming profiling methods will affect the operation of individual screening equipments in the system



Are all effects of increasing complexity of security systems well understood?

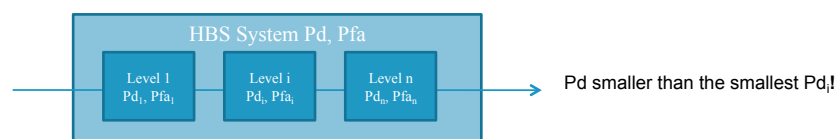
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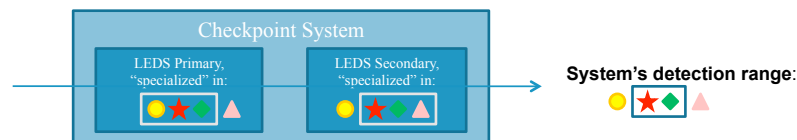


EXAMPLES WITH CURRENT SECURITY SYSTEMS

Hold Bag Screening, conventional cascading of “certified” EDS



Pairing of any LEDS, both “certified”



The combination of even certified components may yield unexpected/ unwanted overall security performance

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REGULATING THE MEANS AND PROCESSES

4.1.1.2 Passengers shall be screened by:

- (a) a **hand search**; or
- (b) **walk-through metal detection** (WTMD) equipment; or
- (c) **explosive detection dogs** in combination with point (a); or
- (d) **security scanners** which do not use ionising radiation.



4.1.2.3 Cabin baggage shall be screened by:

- (a) a **hand search**; or
- (b) **x-ray equipment**; or
- (c) **explosive detection systems** (EDS) equipment.

4.1.3.1 LAGs shall be screened by:

- (a) **x-ray equipment**;
- (b) **explosive detection systems** (EDS) equipment;
- (c) **explosive trace detection** (ETD) equipment;
- (d) **chemical reaction test strips**; or
- (e) **bottled liquid scanners**.

The detection of new threats i.e. the addition of screening methods with PASS/FAIL decisions complicates the process without clear benefit for the outcome

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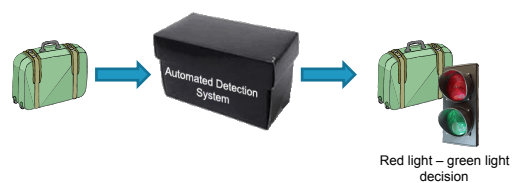
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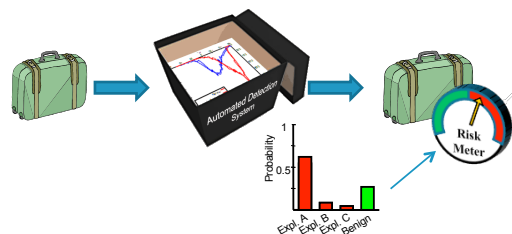
FROM PASS/FAIL DECISIONS TO RISK PROFILES

→ Manufacturers currently design automated detection black boxes that give binary decisions to fulfill criteria defined in standards :

- Targeted threats (types and characteristics)
- Detection performance (Pd, Pfa) set in regulatory standards



→ Instead of giving a binary decision, the future automated equipment may update a **risk profile** associated with the item being screened



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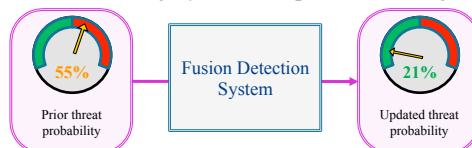


MANAGING RISK PROFILES: FUSION PROTOCOL*

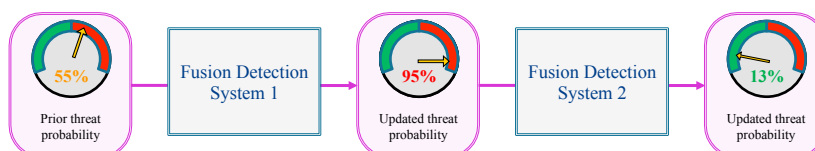
*: Based on Dr. Sondre SKATTER's work on DSFP

→ A Fusion Detection System outputs a threat probability (risk profile) that is function of :

- the "Pd" for each threat categories -- sensor characteristics
- prior probabilities of threat category -- a priori knowledge



→ If the Detection Systems are orthogonal:



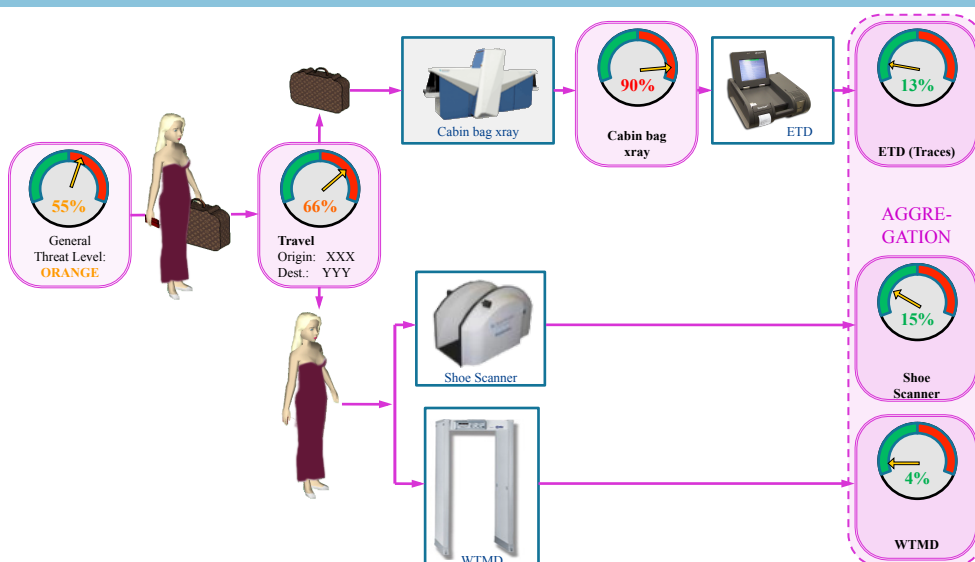
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RISK PROFILE AS AN ADAPTIVE SECURITY "TOKEN"

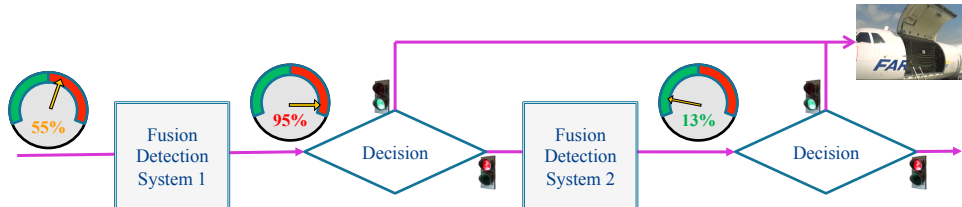


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ROLES OF MANUFACTURERS AND REGULATORS



→ Manufacturers manage Fusion Detection Systems

- Sensor design, algorithm development with data fusion API
- Establishment and certification of operating point

→ Regulators manage Decision Points

- Risk based tuning, certifications

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SECURITY IS A RISK MANAGEMENT BUSINESS

→ The Security system is about reducing overall risk

→ Due to the security system complexity, regulating its processes rather than the outcomes becomes increasingly opaque and inflexible

→ Updating the probability of threats (risk) through data fusion along the detection chain is making optimal use of all resources of the system's parts

→ The role of regulators would evolve from pure process compliance checking to active oversight of the system's effectiveness

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WHERE REGULATORS MEET MANUFACTURERS

