

Review of Previous ADSAs Addressing Fused Systems (ADSA05 and ADSA06)

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Summary

- There is no silver bullet
- Have to combine (fuse, integrate) multiple technologies to achieve performance (PD, PFA, throughput, operating cost) required
- No infrastructure to support this within the government: specification, integration, testing, deployment, networking, etc.
- Most previous fusion attempts have failed for many reasons, e.g., engineering issues and data may be correlated
- We should learn from the past successes and failures

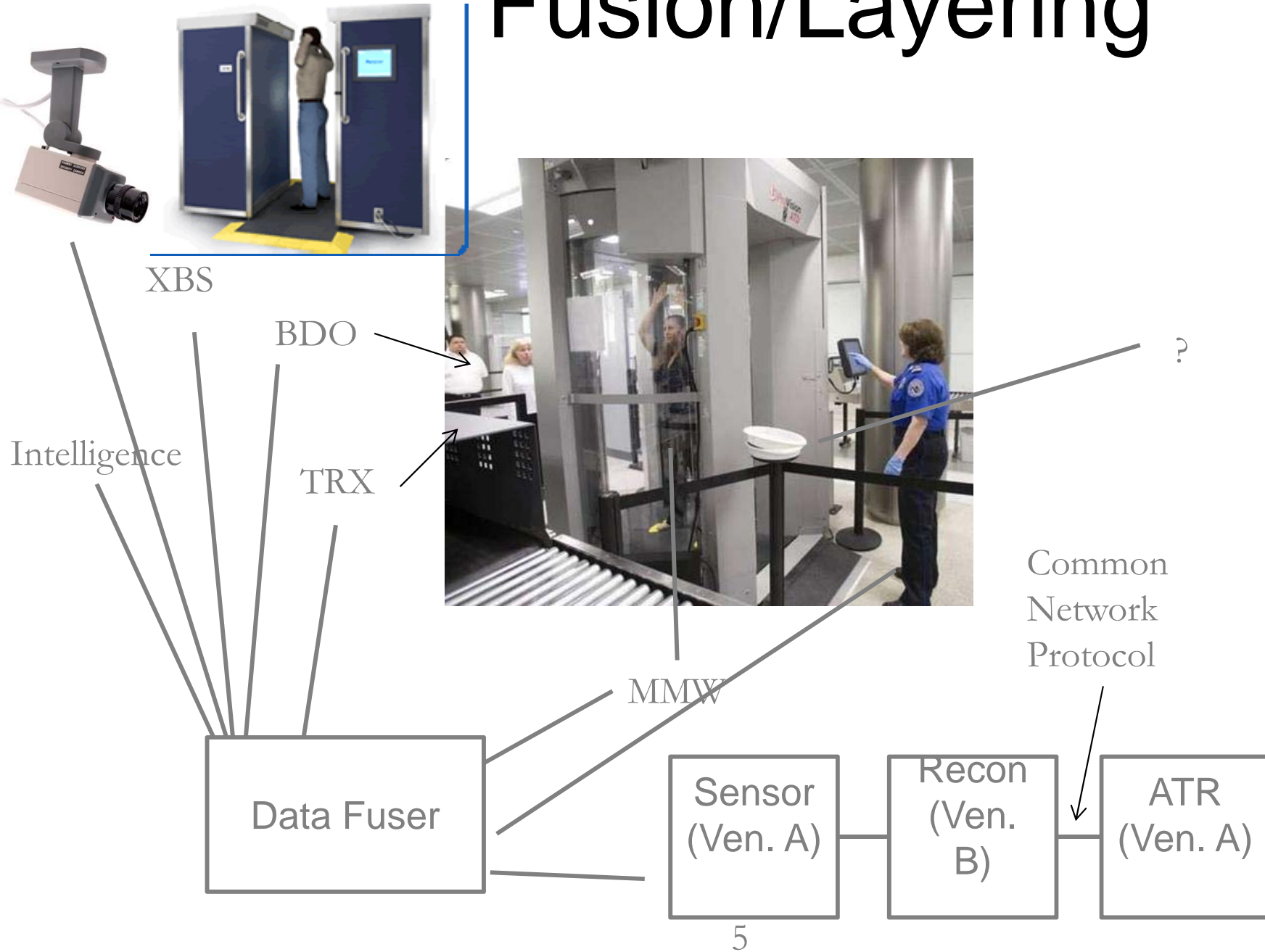
Backup Slides

Fused systems: So What? Who Cares?

- Why are systems being fused (layered)
 - In the field by TSA
 - By manufacturers?
- Have we figured out there is no silver bullet?
- What has worked in the past?
- What hasn't worked?
- Can we end up with better results if we fuse at the beginning of development vs. at the end?
- Should testing be on fused systems instead of individual systems?



Fusion/Layering



Conclusions

- Fused systems recommended because present technology may be near limits for detection, throughput and operating costs
- Fusion types/examples
 - Hardware : CT + XRD, TRX + NQR
 - Data : risk based screening (Precheck) or combining images and ATR results from multiple devices
- Fusion already deployed (denoted layering)
 - Precheck, LBS, AT2, AIT, WTMD
 - EDS + ETD
- Emphasis has been on retrospective data fusion instead on designing fused systems that improve detection performance
 - Two devices combined may not lead to better performance because of correlation of features & nonlinear effects with PD/PFA
- Changes required to support fusion: requirement specs, funding, testing, system integration, networking, standards, and concept of operations.

Silver Bullets Missing

- Improved performance required
 - Detection: PD, PFA, mass, sheet thickness, more threats
 - Performance: throughput, divestiture
 - Cost: operating and need for TSOs
- Present equipment may be at limits
- No silver bullets – nothing on horizon
- Fusion recommended
- Fusion already deployed

Fusion Types

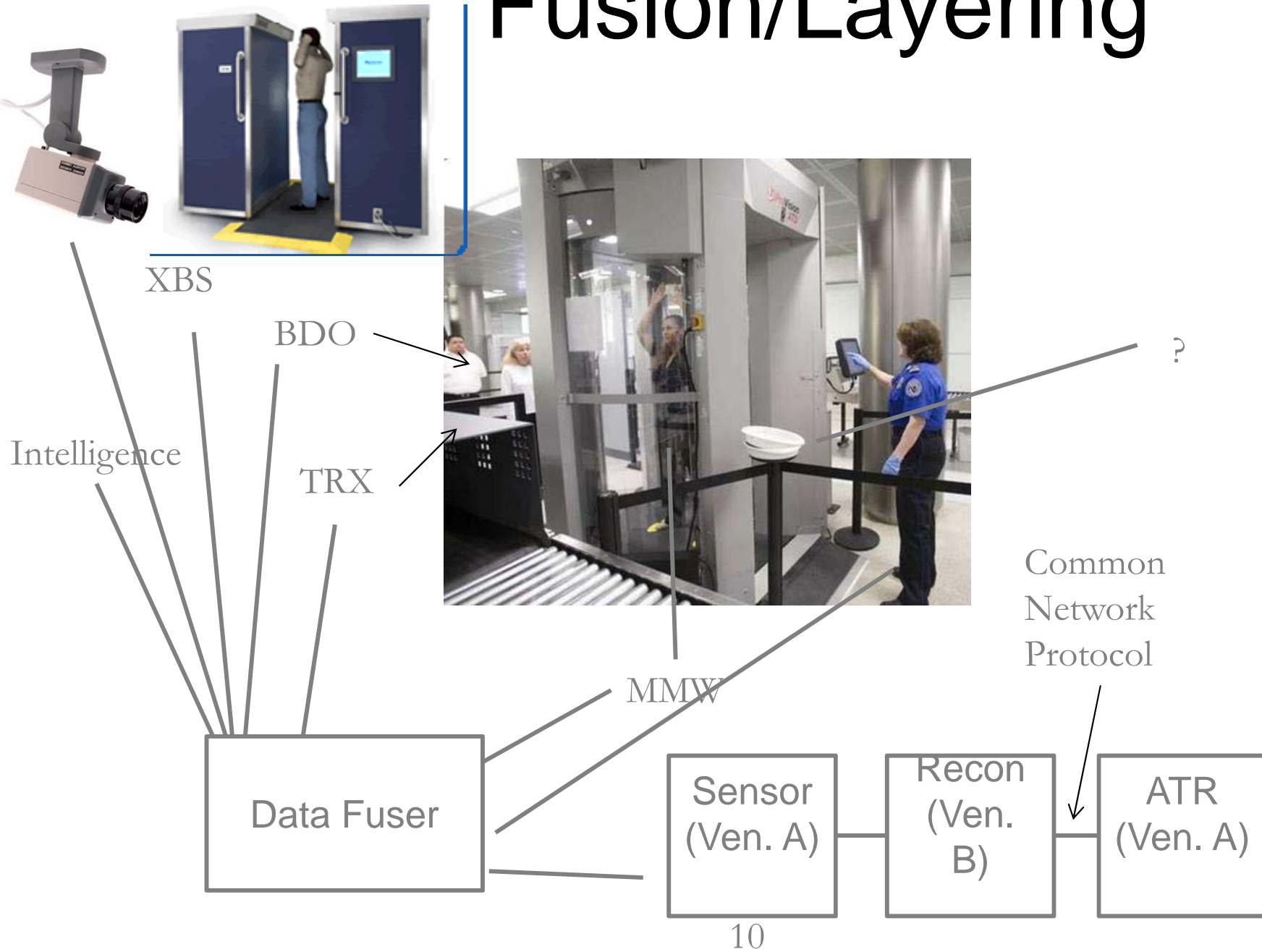
- Hardware
 - Two types of hardware in parallel – “or” results
 - Also known as layering
- Data
 - Outputs: combine outputs of multiple systems
 - ATR, images, spectra, risk
 - Inputs: control operation of device based on another device
 - RBS

Fusion Today

- LBS + AT2
- EDS + ETD
- Precheck + WTMD, AIT



Fusion/Layering



Previous Attempts

- Emphasis has been on retrospective data fusion instead on designing fused systems that improve detection performance
 - Two devices combined may not lead to better performance because of correlation of features & nonlinear effects with PD/PFA
- Need more prospective studies to assess efficacy
 - Paper predictions, simulations

Changes Required for Fusion

- Present TSA procurement policies not optimized for fused systems
 - Requirement specs: for pieces of systems that can later be fused
 - Funding: for pieces that can be fused; tied to requirement specs
 - Testing: test pieces separately and combine results virtually
 - system integration: field integration required
 - networking, standards: new open standards
 - concept of operations: will change depending how equipment is connected