SCALING UP
DETECTION CAPABILITIES

Designing an Effective Command Centre CONOPS

OBJECTIVES

Define and explain CONOPS in a Command Center.

Highlight the importance of a robust Command Center CONOPS.

Discuss integrated management benefits and case studies.

Review types of data for analysts and training best practices.

Introduce relevant international standards and implementation strategies.

Conduct a hands-on threat identification exercise.

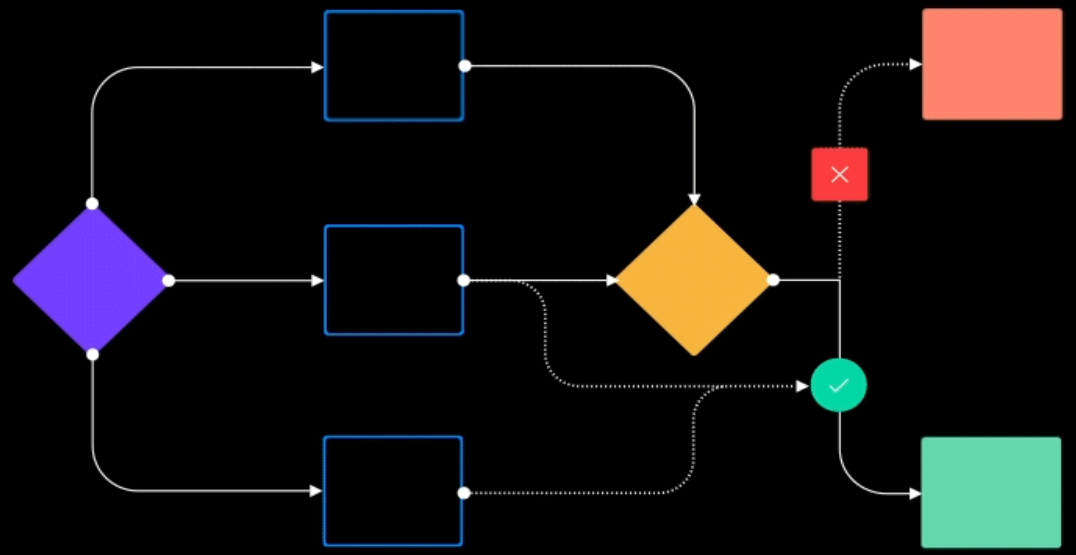
Facilitate a Q&A session and recap key points.

COMMAND CENTERS

A SHARED VISION

A command center is a centralized facility where operations are managed and supervised.
It serves as the hub for gathering, processing, and disseminating information, making decisions, and directing actions.

CONOPS



CONCEPT OF OPERATIONS

HOW DOES A THOUGHTFUL CONOPS SUPPORT COMMAND CENTERS?

Clarity and Direction

1

Resource Management Efficiency

2

Security and Compliance

3

Scalability and Flexibility

4

Training and Quality Control

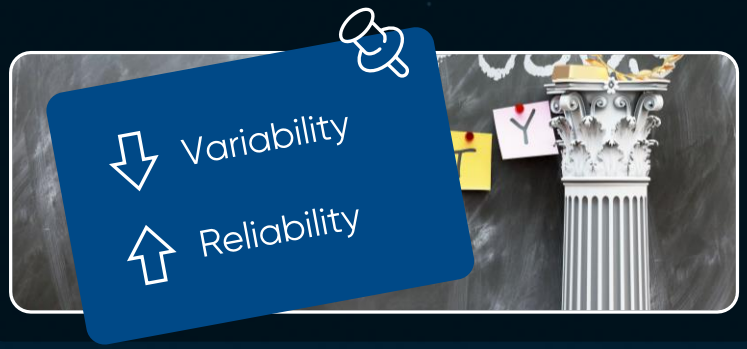
5

Operational Efficiency

6

HOW DOES A THOUGHTFUL CONOPS SUPPORT COMMAND CENTERS?

Clarity and Direction



Resource Management Efficiency

Security and Compliance

Scalability and Flexibility

Training and Quality Control

Operational Efficiency

WHICH OF THESE FACTORS PRESENTS THE GREATEST CHALLENGE TO IMPLEMENTING AN EFFECTIVE CONOPS?

A. Clarity and Direction

B. Resource Management Efficiency

C. Security and Compliance

D. Scalability and Flexibility

E. Training and Quality Control

F. Operational Efficiency

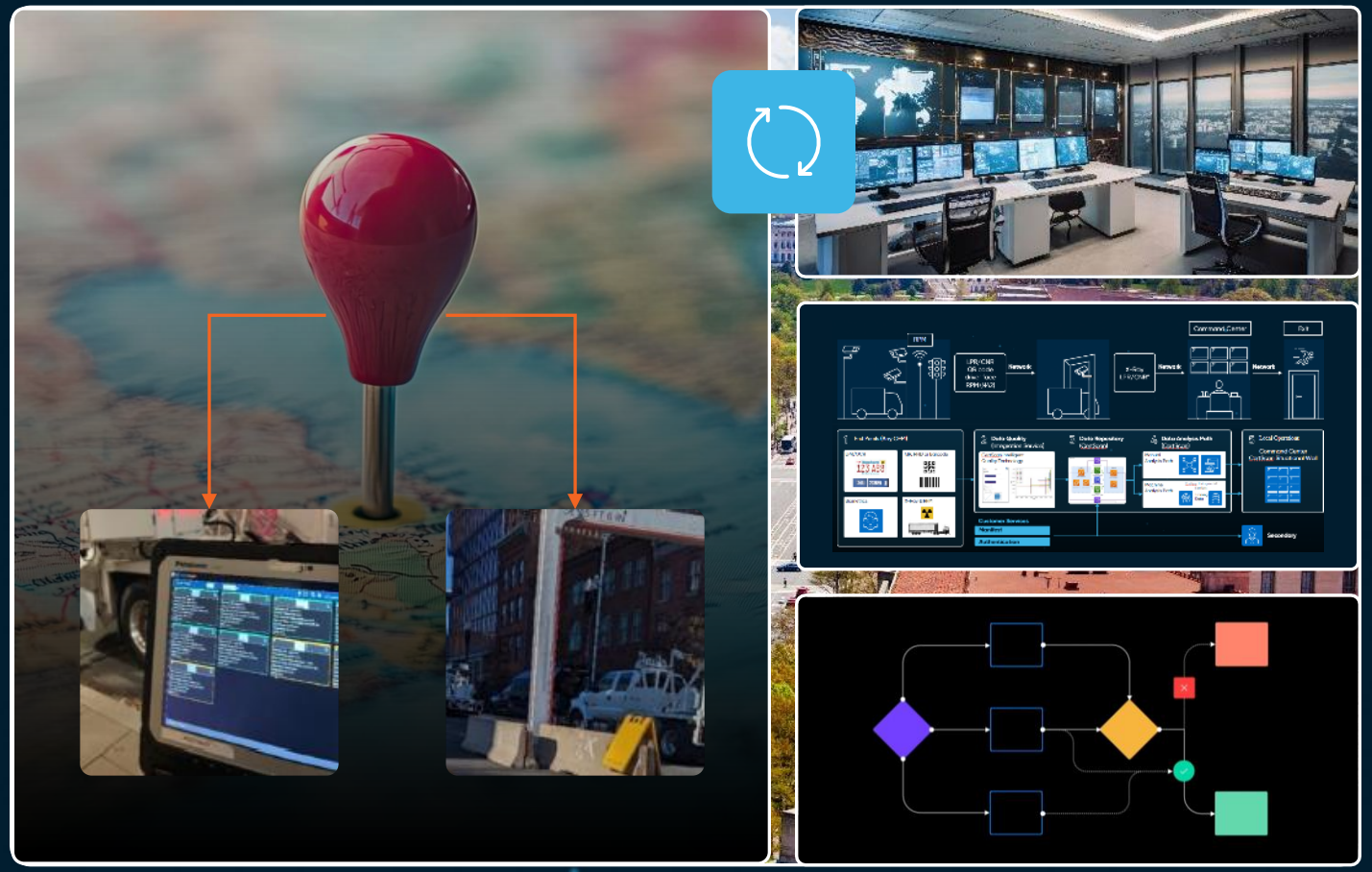
In the WCO app, please go to break-out session B1 and click on the link under the "Session information" title. This will open up Slido. In Slido navigate to the Polls section and answer the question.

A CASE STUDY: LEVERAGING A COMMAND CENTER

Identify the Current State and Challenges

A CASE STUDY: COMMAND CENTER CONSOLIDATION

- Identify the Current State and Challenges
- Define the Vision for Consolidation
- Develop Technical Infrastructure
- Leverage Remote Adjudication Operations
- Enhance Operational Efficiency and Resource Management
- Define ConOps



IF THIS IS A PROJECT MAP TIMELINE, WHERE ARE YOU IN ESTABLISHING A COMMAND CENTER?

1. Not started
2. Identify the current state and challenges
3. Define the Vision for Consolidation
4. Develop Technical Infrastructure
5. Implement Remote Operations
6. Enhance Operational Efficiency and Resource Management
7. Successfully Operational

The Research Foundation to Remote Screening

Sara Bracceschi

Head of Consulting and Services for Customs,
Customer Relations & Sales

Study Published in 2024

International Journal of Industrial Ergonomics 102 (2024) 103598

Contents lists available at ScienceDirect

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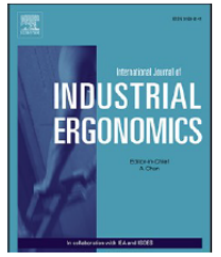
journal homepage: www.elsevier.com/locate/ergon



Performance of X-ray baggage screeners in different work environments: Comparing remote and local cabin baggage screening

Marius Latscha [a,*], Adrian Schwaninger [a], Jürgen Sauer [b], Yanik Sterchi [a]

[a] *University of Applied Sciences and Arts Northwestern Switzerland, School of Applied Psychology, Institute Humans in Complex Systems, Riggenbachstrasse 16, CH-4600, Olten, Switzerland*

[b] *University of Fribourg, Department of Psychology, Rue P.A. de Faucigny 2, CH-1700, Fribourg, Switzerland*

NEXT

Comparing Screening Performance in LCBS vs RCBS

Local cabin baggage screening (**LCBS**)

- Images are analysed at the checkpoint
- Screener is positioned at the **lane**

Remote cabin baggage screening (**RCBS**)

- Central image processing (CIP):
  Images are pooled and sent to a remote room
- Screener is positioned in a **remote room**

NEXT

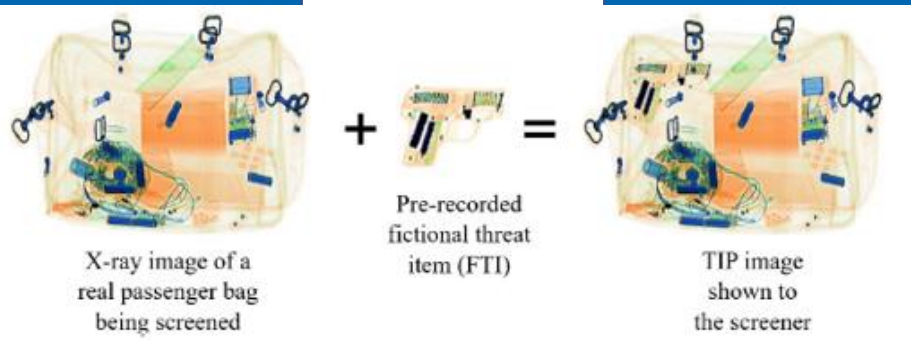
Method

Threat image projection (TIP)

- Fictional threat items (FTIs) are projected into X-ray images during regular baggage screening
- TIP system records whether the analyzing screener has detected (hit) or missed (miss) the item
- Hit rate and processing time on TIP images can be calculated

Data

- TIP data from a European airport with LCBS & RCBS in place
- The same screeners worked in both settings
  - 642,035 decisions on TIP images made by 1,482 screeners

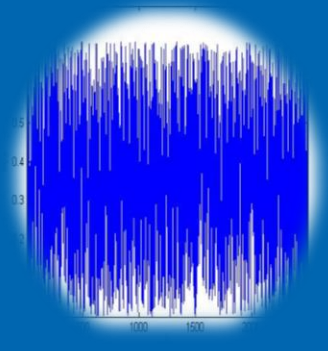


NEXT

Investigating Screening Performance

Detection of prohibited articles (hit rate)

Processing time/reaction time



Environmental stressors (noise) and social stressors (queuing)

Time on task and task load

Inter-individual performance of screening officers

NEXT →

Question for the Audience:

Expected findings for remote screening (RCBS)

Question:

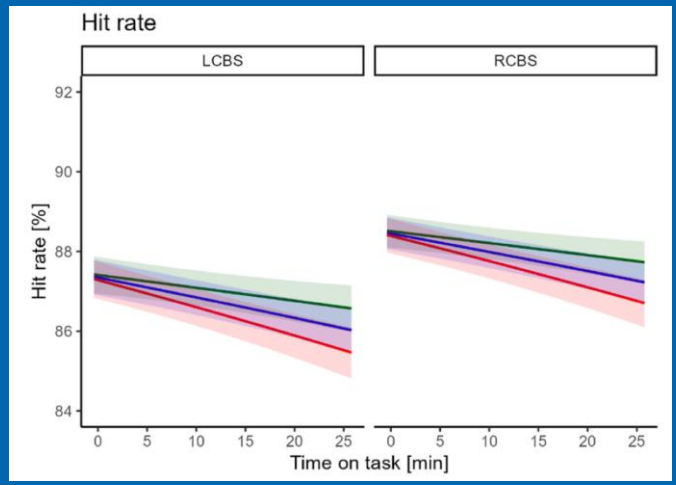
- Which of the following statements do you expect to be true?
  - A. Higher Hit Rate & Higher Reaction Time
  - B. Higher Hit Rate & Lower Reaction Time
  - C. Lower Hit Rate & Higher Reaction Time
  - D. Lower Hit Rate & Lower Reaction Time
  - E. There is no correlation

Detection of prohibited articles (hit rate)

Processing time/reaction time

The correct answer is:

- A. Higher Hit Rate & Higher Reaction Time

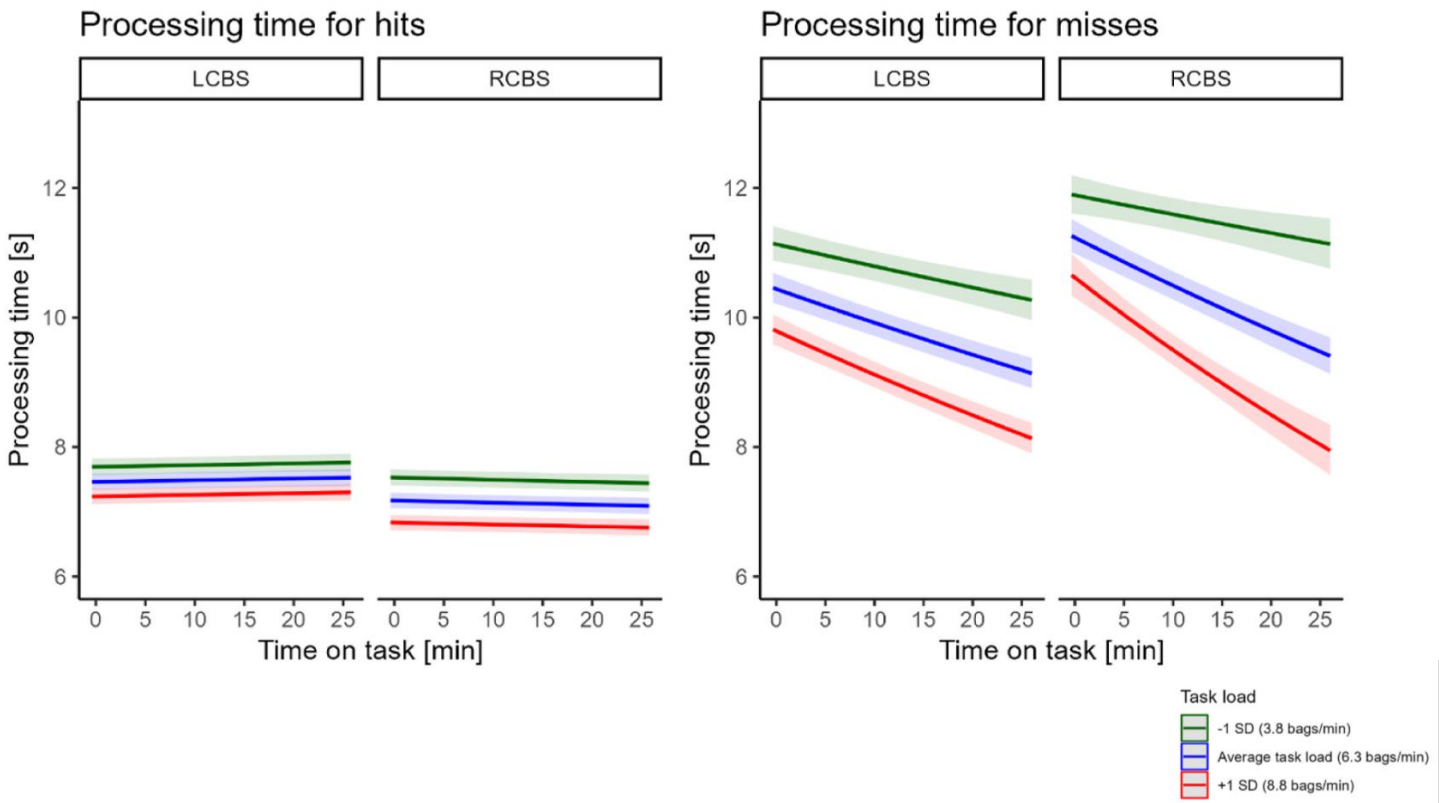


NEXT

Processing Times

Expected findings for remote screening (RCBS)

- Reaction times for hit and miss differ:
  - Processing times in remote screening are faster for hits
  - Processing times in remote screening are slower for misses



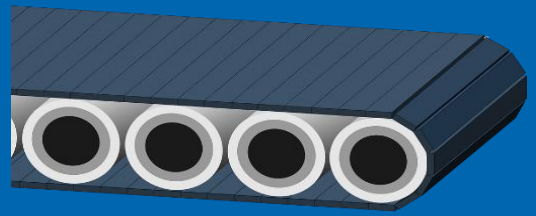
NEXT

Noise and Social Stressors

Expected findings for remote screening (RCBS)

Noise

- Conveyor belts, engines, chatting public, announcements
- LCBS = 56 to 68 dBA
- RCBS = approx. 40 dBA (office)



Social Stressors

- Difficult and impatient passengers or transporters
- Queues, time pressure

NEXT

Time on Task and Task Load

Expected findings for remote screening (RCBS)

- As expected, hit rate decreased with increasing time on task and task load (in both settings)
  - Stronger decrease when task load is higher

- What has the biggest effect in detection performance?
  - A. Noise and Social Stressors
  - B. Time on Task and Task Load
  - C. Both Equally

The correct answer is:

- A. Noise and Social Stressors

NEXT →

Conclusion

- First evidence for better human-machine system performance in RCBS
  - Higher hit rate in RCBS
  - Some costs in efficiency (response times slightly higher)

- Time on task and task load are relevant in both work settings
- Comparable effect sizes for [work setting], [time on task] and [task load]:
  - Each led to changes of 1-2 percentage points in the hit rate

- Differences between individual screeners are larger than effects of work setting, time on task and task load
  - This underlines the importance of computer-based training

NEXT

Thank you for now!

~~IMAGE ANALYST TRAINING~~

~~DATA ANALYST TRAINING~~

CUSTOMS ANALYST TRAINING

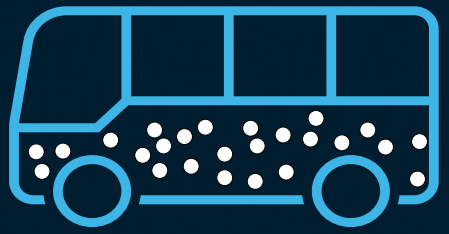
A PROFESSIONAL SPECIALIST

OVERVIEW OF DIFFERENT KINDS OF DATA THAT ANALYSTS NEED TO REVIEW:

- Machine and human resources
- X-ray and imaging data
- Historical data and trends

- Intelligence reports and risk assessments
- Cargo and shipment documentation
- Real-time alerts and sensor data

ARE YOU READY FOR AN INTERVIEW



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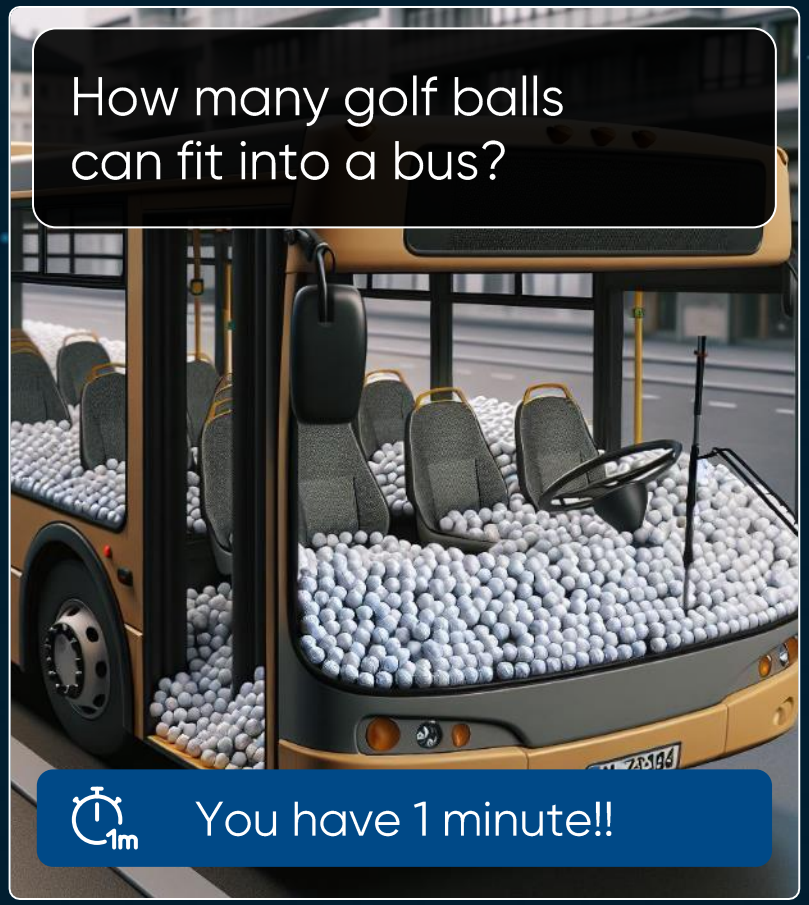


KEY SKILLS AND KNOWLEDGE REQUIRED FOR DATA ANALYSTS

Technical Proficiency	Clarifying assumptions, packing efficiency, knowledge of calculations
Analytical Skills	Define problem, identify assumptions, utilize logical reasoning
Attention to Detail	Identifying/researching exact measurements, real-world considerations
Problem Solving Abilities	Deconstructing the problem, evaluating options, reviewing and refining
Communication Skills	Asking questions, active listening, engagement, interaction

TRAINING METHODOLOGIES

- Comprehensive Training Programs
- Explore Learning Methodologies
- Simulation and Real-World Testing
- Feedback and Improvement
- Continuous Oversight and Quality Control

Enhancing Detection Capabilities in X-Ray Screening: The Human Factor

Sara Bracceschi

Head of Consulting and Services for Customs
Customer Relations & Sales

Enhancing Detection Capabilities

Inter-individual performance of screening officers

Individually adaptive computer-based training (CBT) is a very powerful tool

Exposure to objects not often encountered in everyday life

Training to identify objects in different rotations, when superimposed by other objects and in complex images

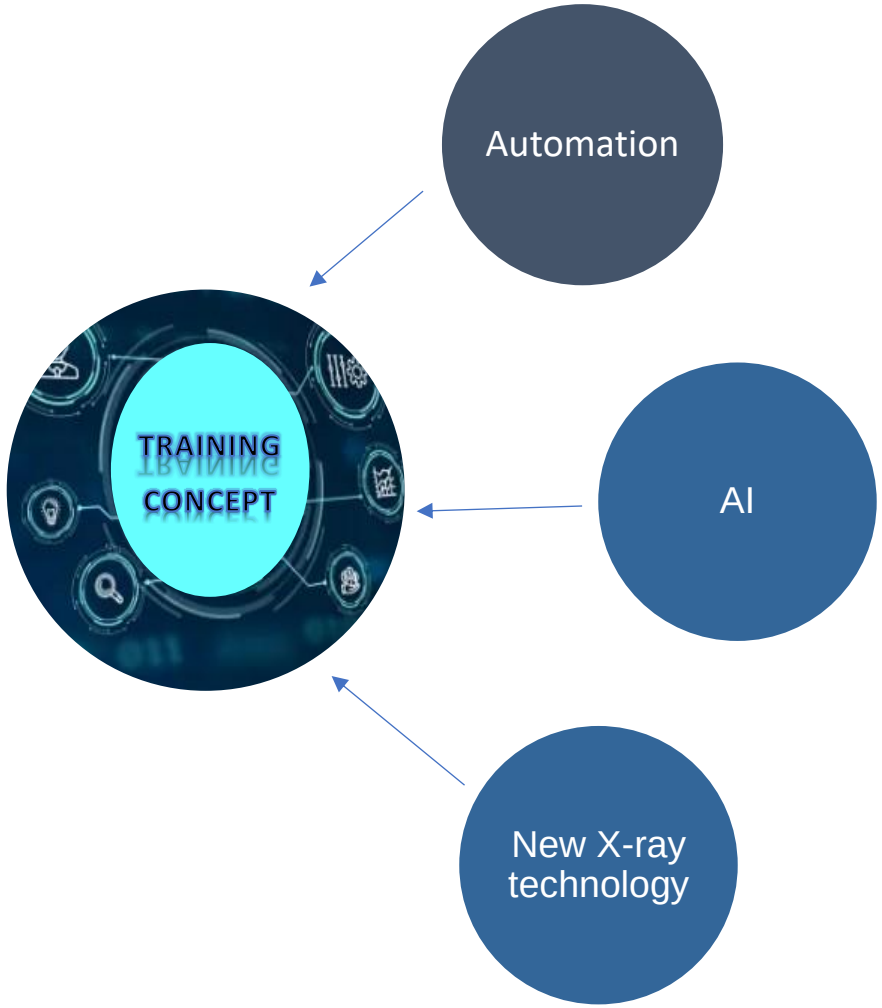
Display of training images tailored to the knowledge and skills of each individual

Increasing detection performance while decreasing response time despite geographical dispersion

NEXT →

Evolving Role for the X-Ray Image Analyst

Training and **E**valuation of new **S**ystems and **T**echnologies **(TEST)**



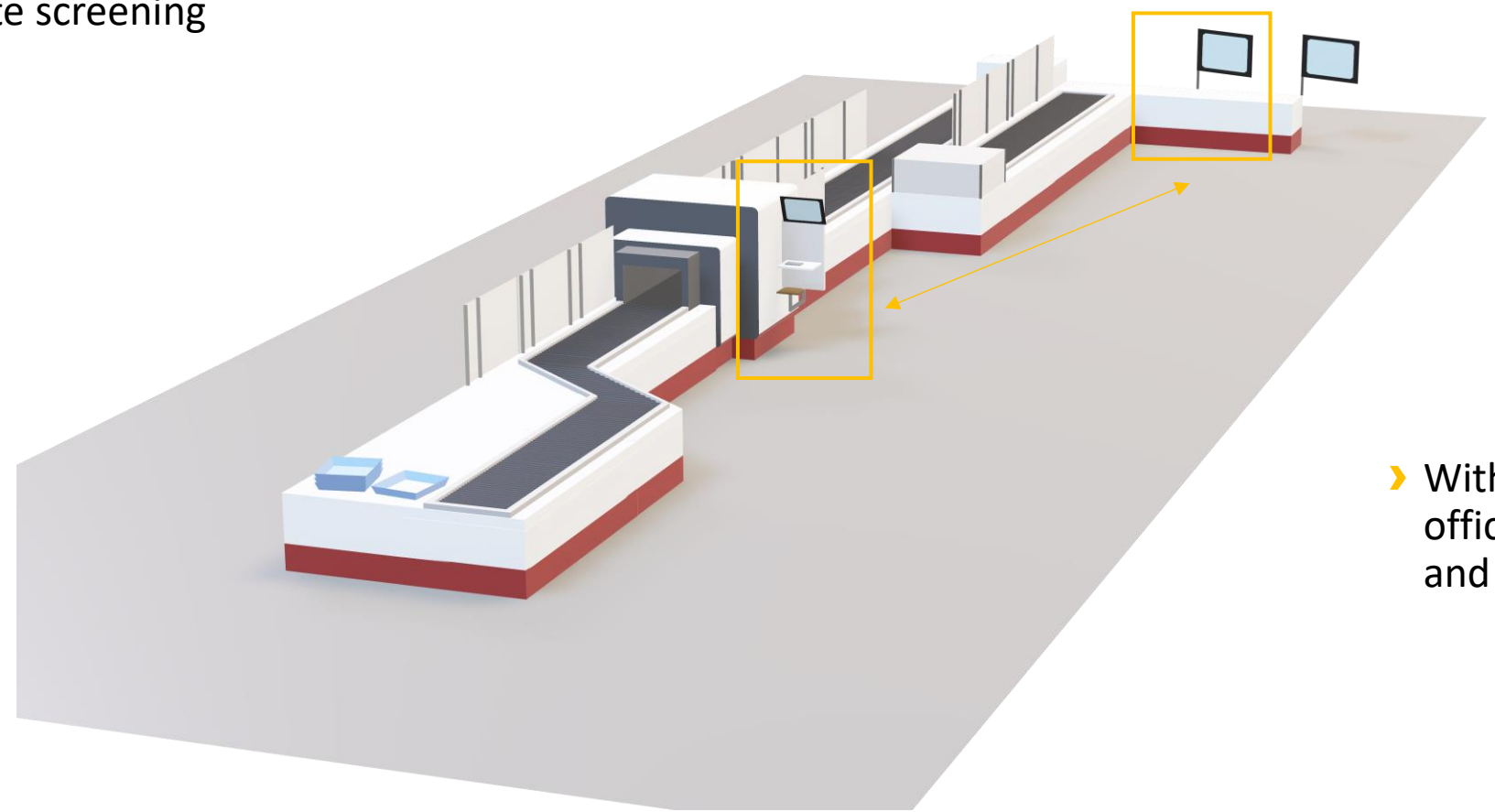
- Shift towards a **more expert role** for screening officers
  - Interpret and resolve alarm frames from different sources
  - More complexity and autonomy on task
  - More knowledge about technology and objects
- New challenges for training
  - Training needs to empower the screener
  - Training needs to enhance knowledge about forbidden objects and everyday objects
  - Training needs to be more in depth and not only simulate the decision itself

NEXT →

Evolving Role for the X-Ray Image Analyst

Training and **E**valuation of new **S**ystems and **T**echnologies **(TEST)**

- Local vs remote screening



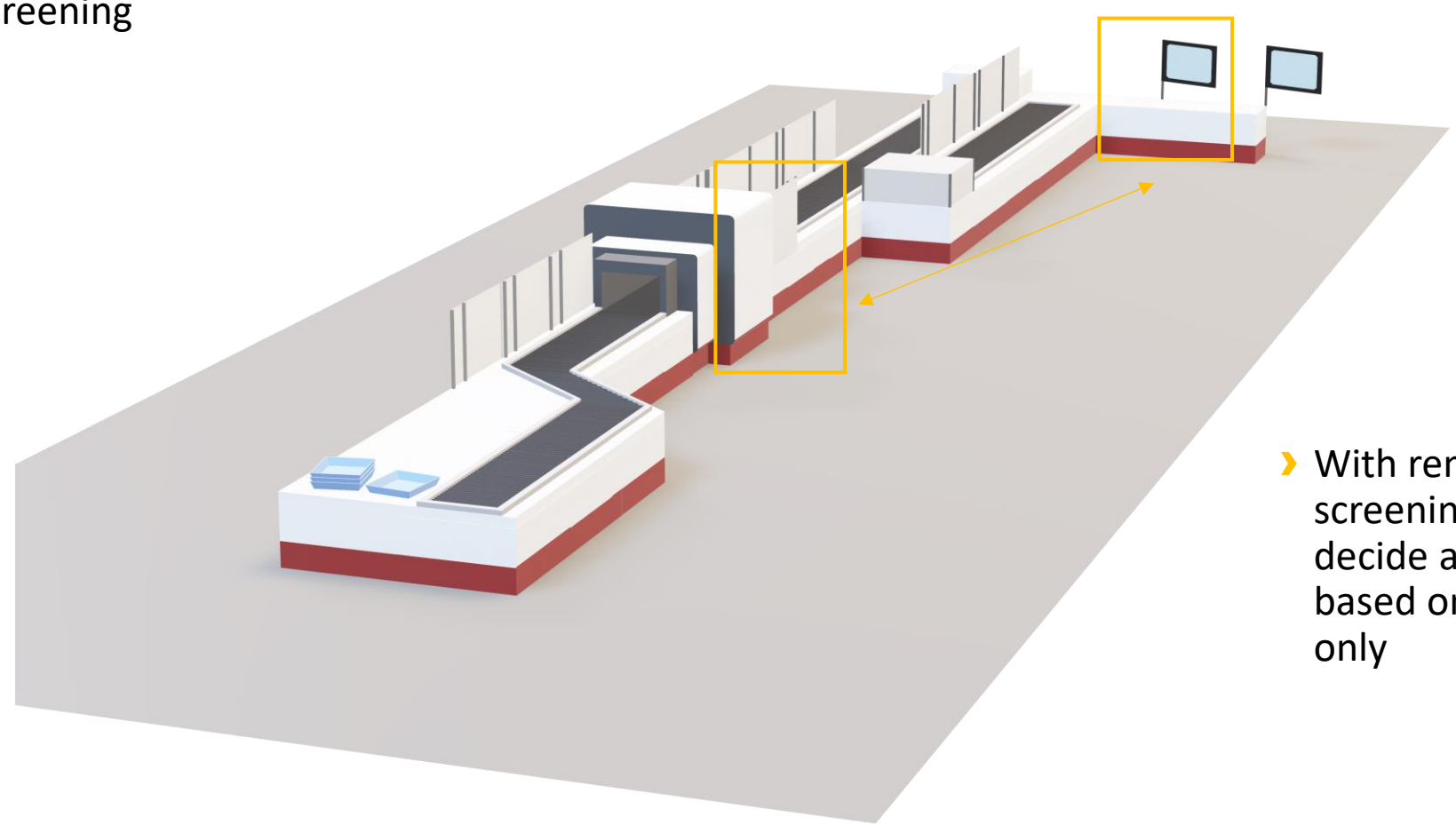
- With local screening, officers can communicate and work as a team

NEXT

Evolving Role for the X-Ray Image Analyst

Training and **E**valuation of new **S**ystems and **T**echnologies **(TEST)**

- Local vs remote screening



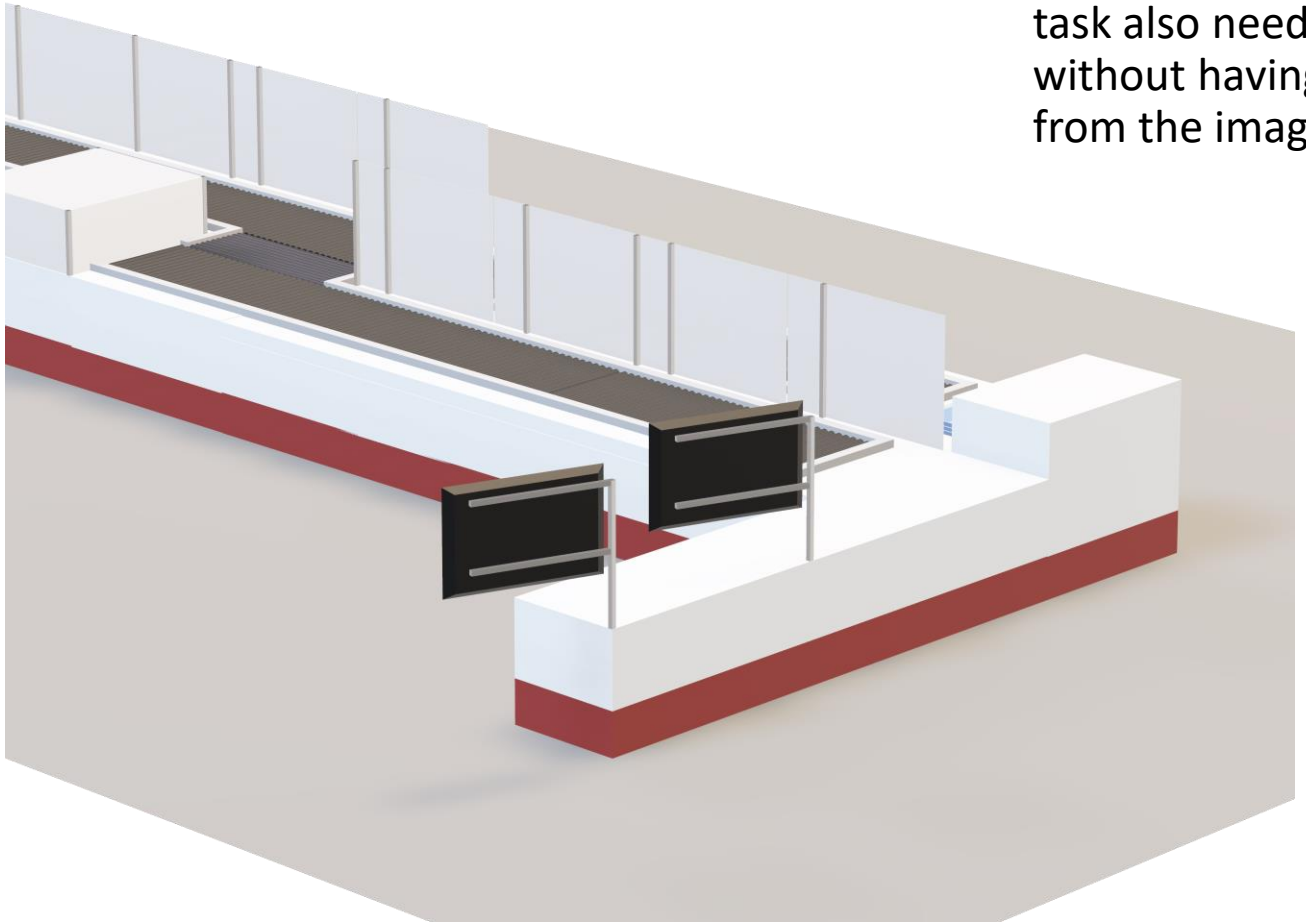
- With remote setting, the screening tasks needs to decide and take action based on own judgement only

NEXT

Evolving Role for the X-Ray Image Analyst

Training and **E**valuation of new **S**ystems and **T**echnologies **(TEST)**

- Local vs remote screening

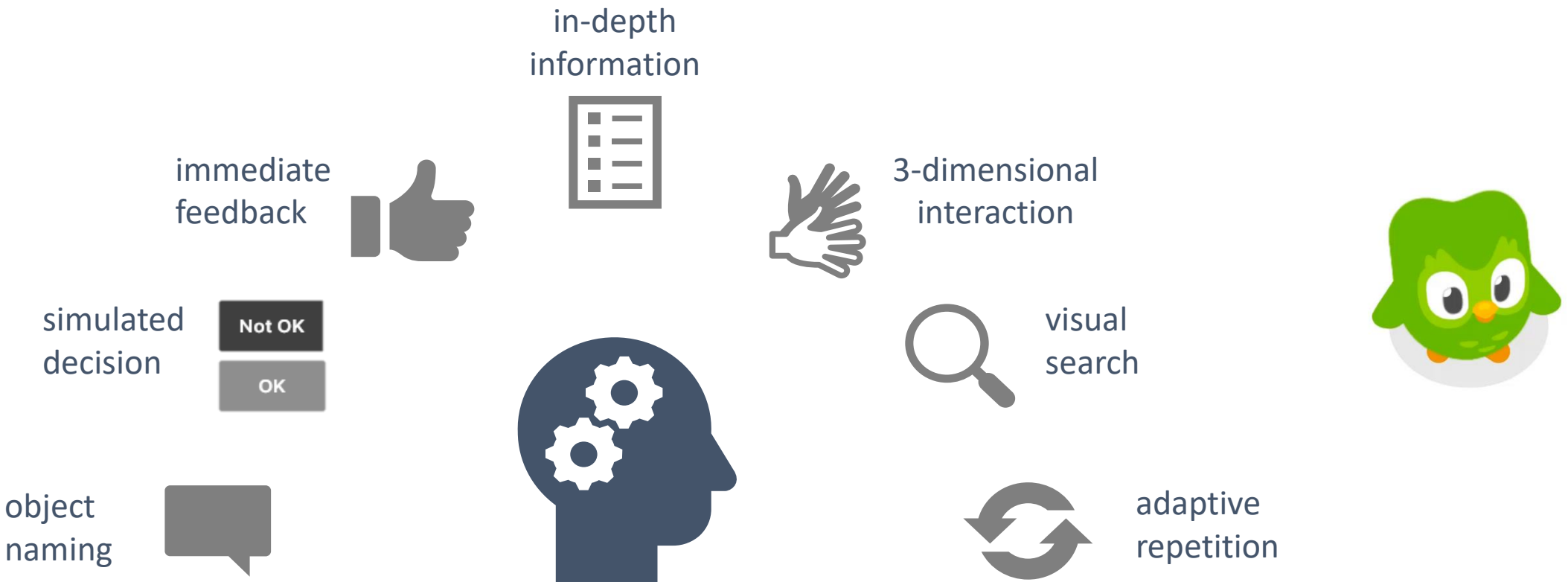


- With remote screening, the screening task also needs to provide decisions without having verbal information from the image analyst

NEXT

Evolving Training Concept for 3D Systems

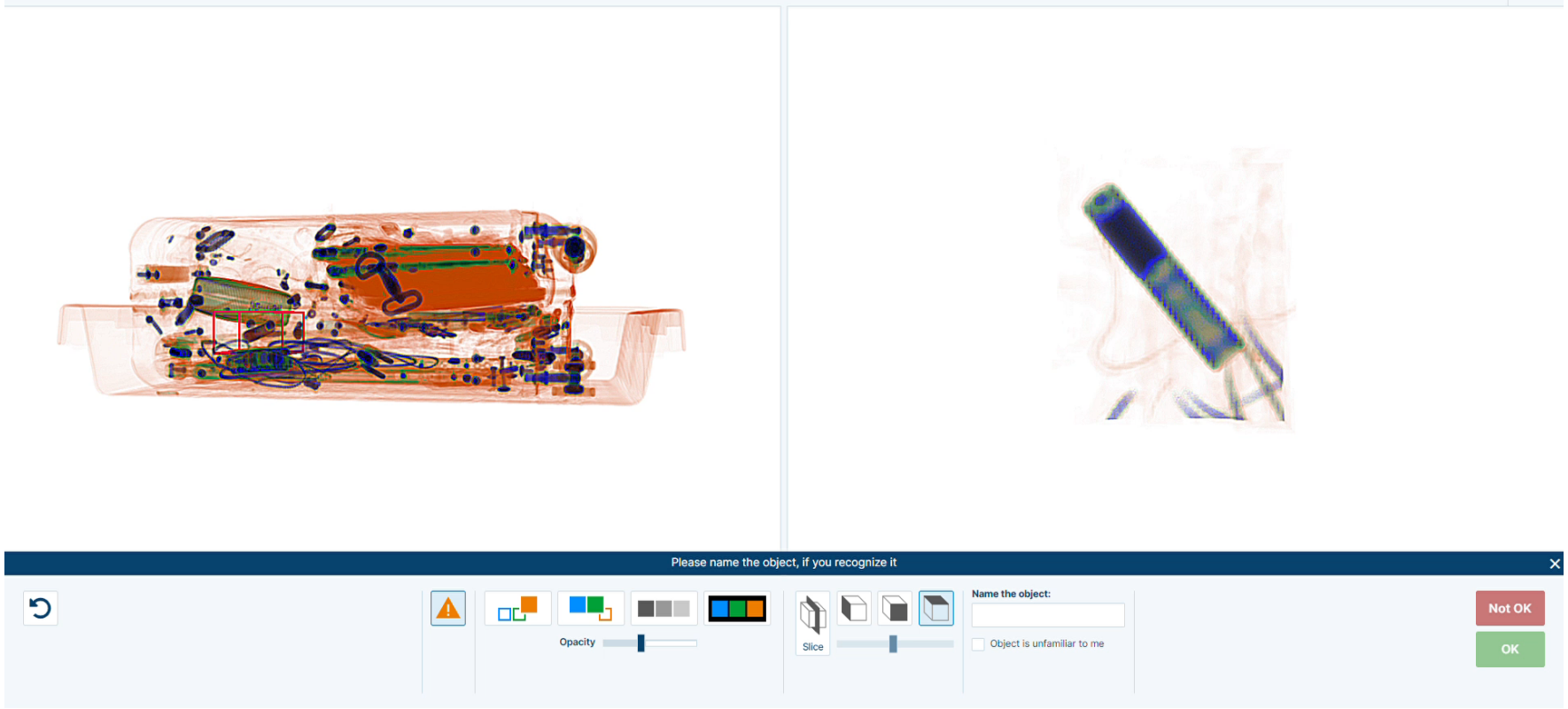
Integrated Aspects of Psychological Research



NEXT

Evolving Training Concept for 3D Systems

Simulation

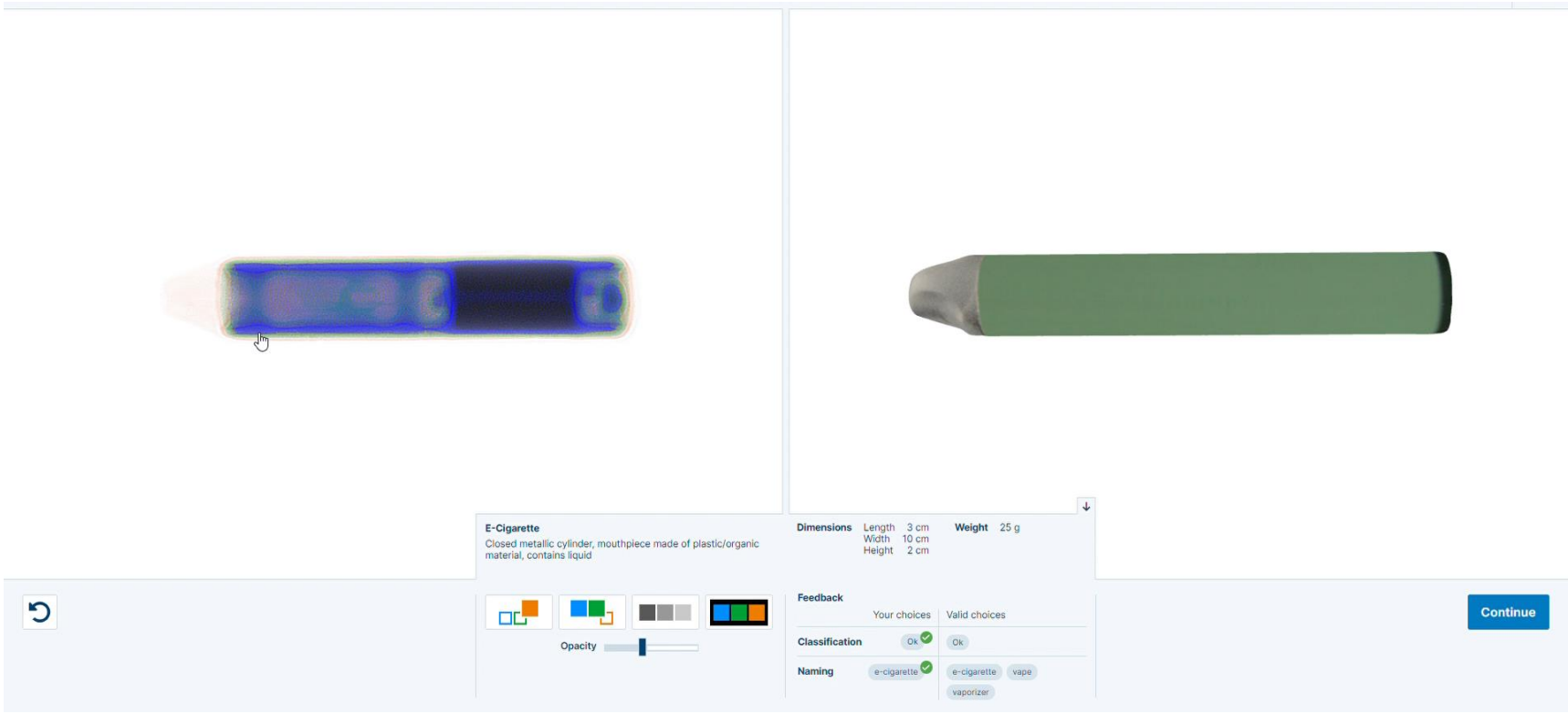


NEXT

Evolving Training Concept for 3D Systems

Simulation

Feedback



NEXT

Evolving Training Concept for 3D Systems

Simulation

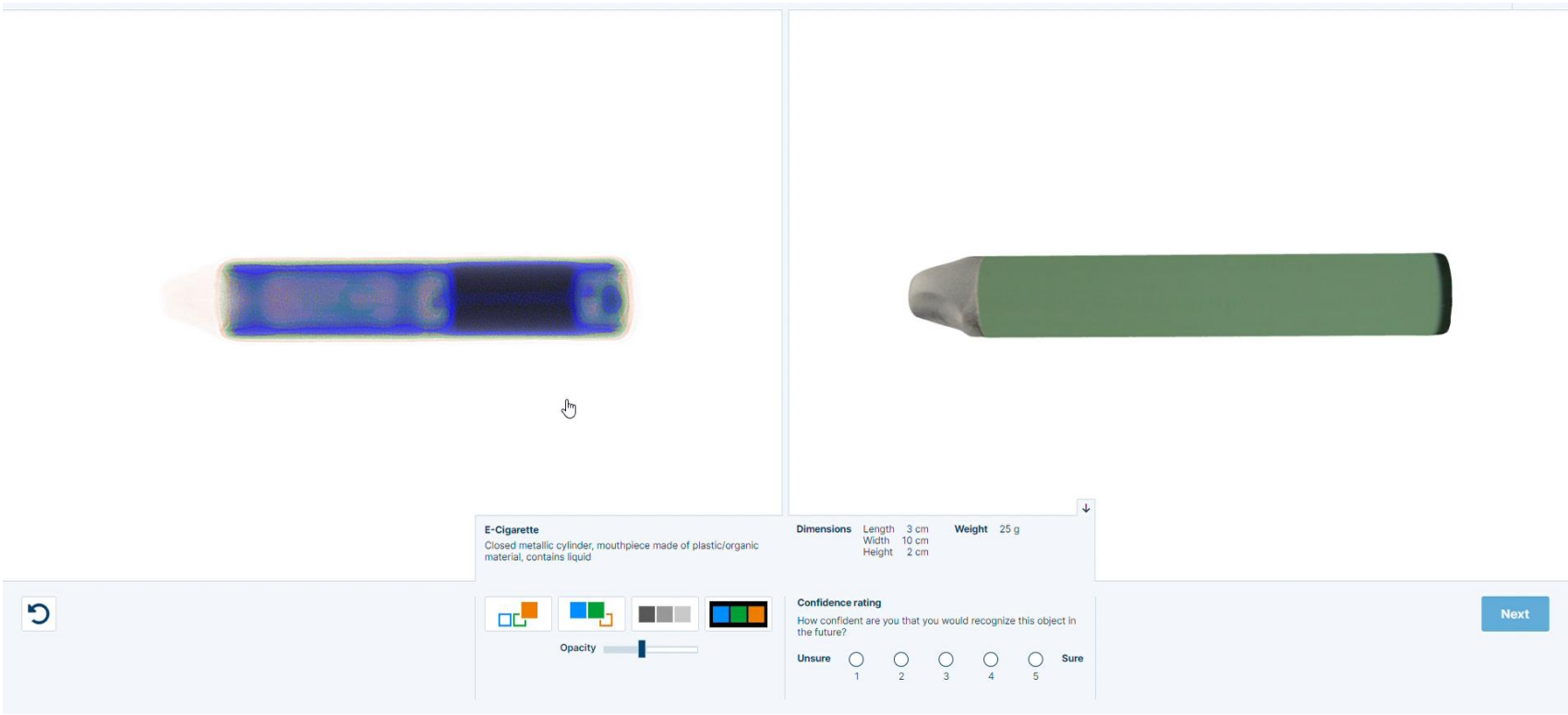
Feedback

Search task

NEXT

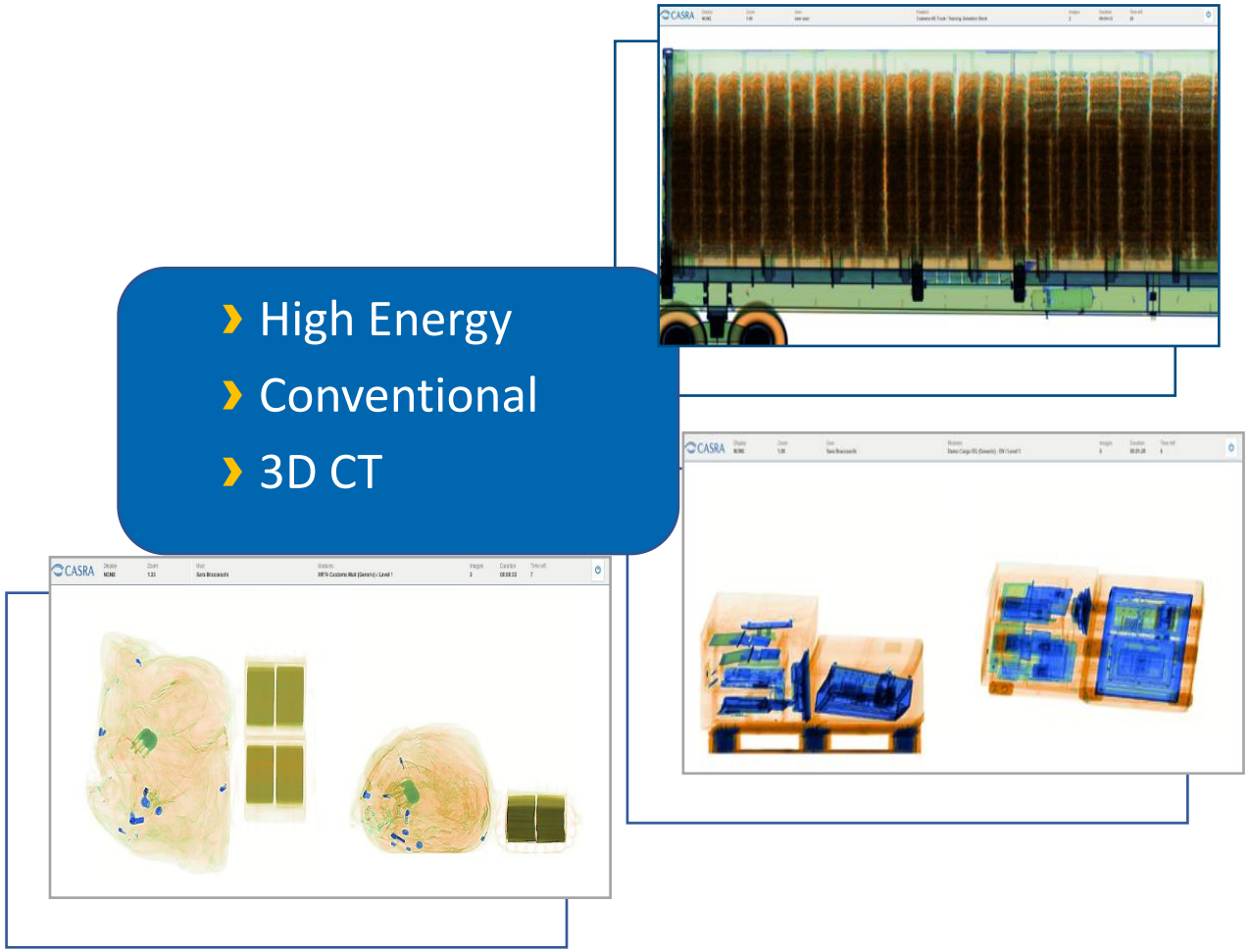
Evolving Training Concept for 3D Systems

- Simulation
- Feedback
- Search task
- Self-assessment



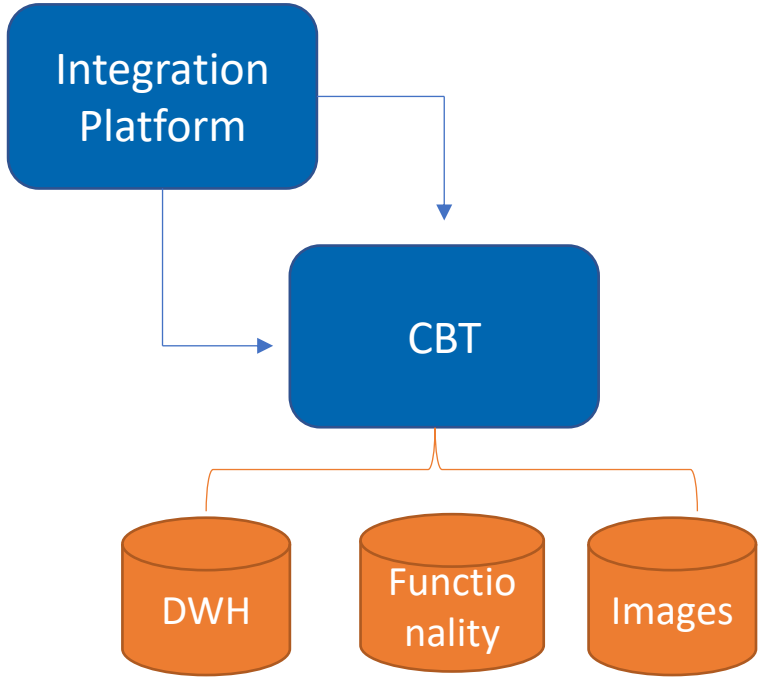
NEXT

Computer-based Training (CBT)



- High Energy
- Conventional
- 3D CT

- Standalone CBT
- Integrated CBT



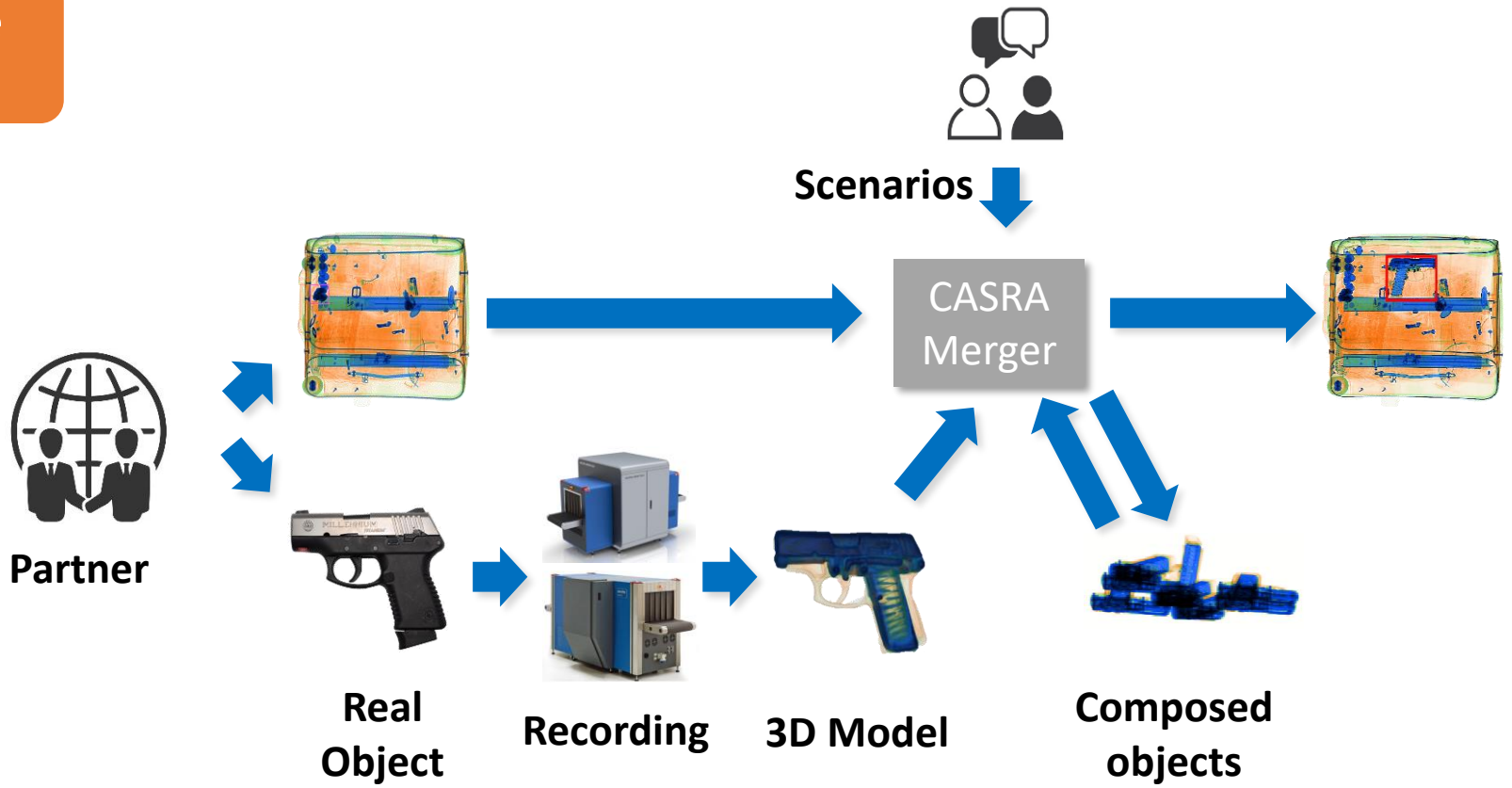
NEXT

Integrated Solution

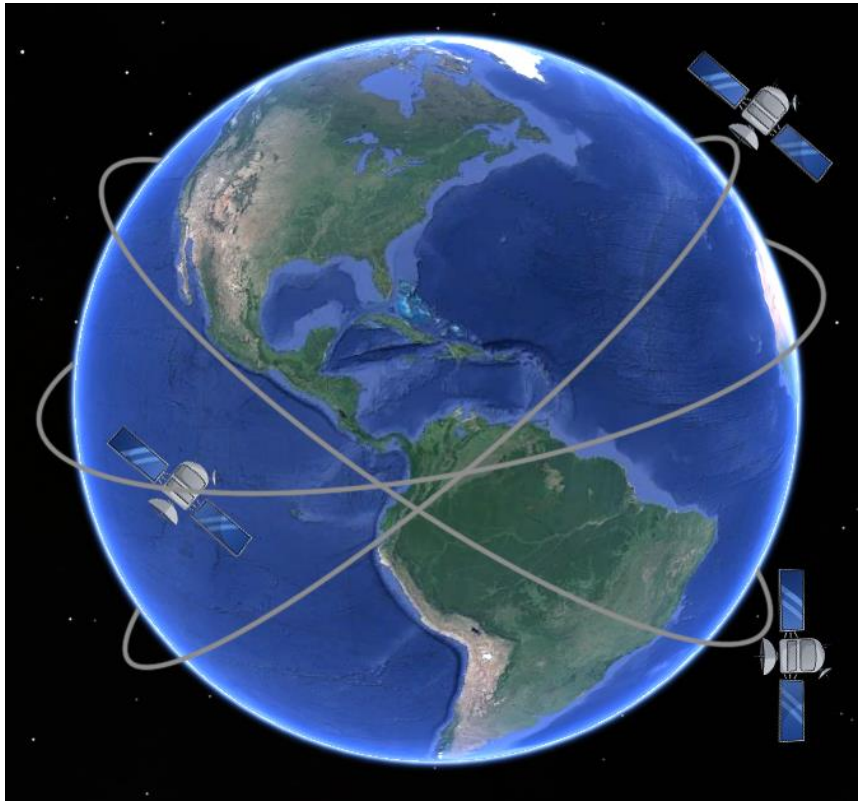
NEXT

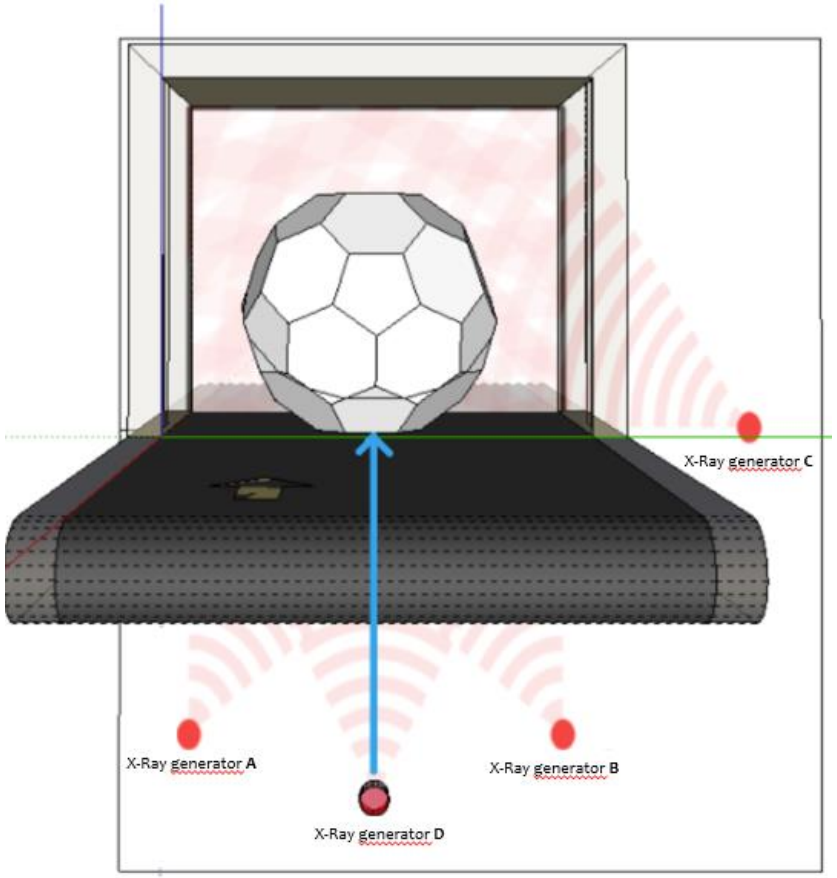
Integrated Solution

Bespoke image libraries



Principle of 2D Recording





3D object is scanned from as many angles as possible to create good 2D coverage

NEXT

Examples of Recorded Objects

NEXT

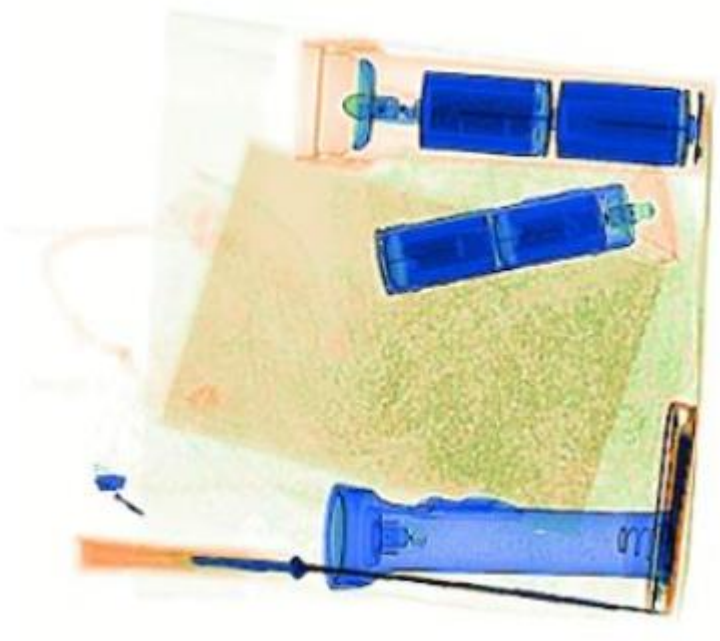
Real or Merged?

- Which one is the merged image?

A

real

B



merged

NEXT

Recorded or Merged?

- Which one is the merged image?

A

real

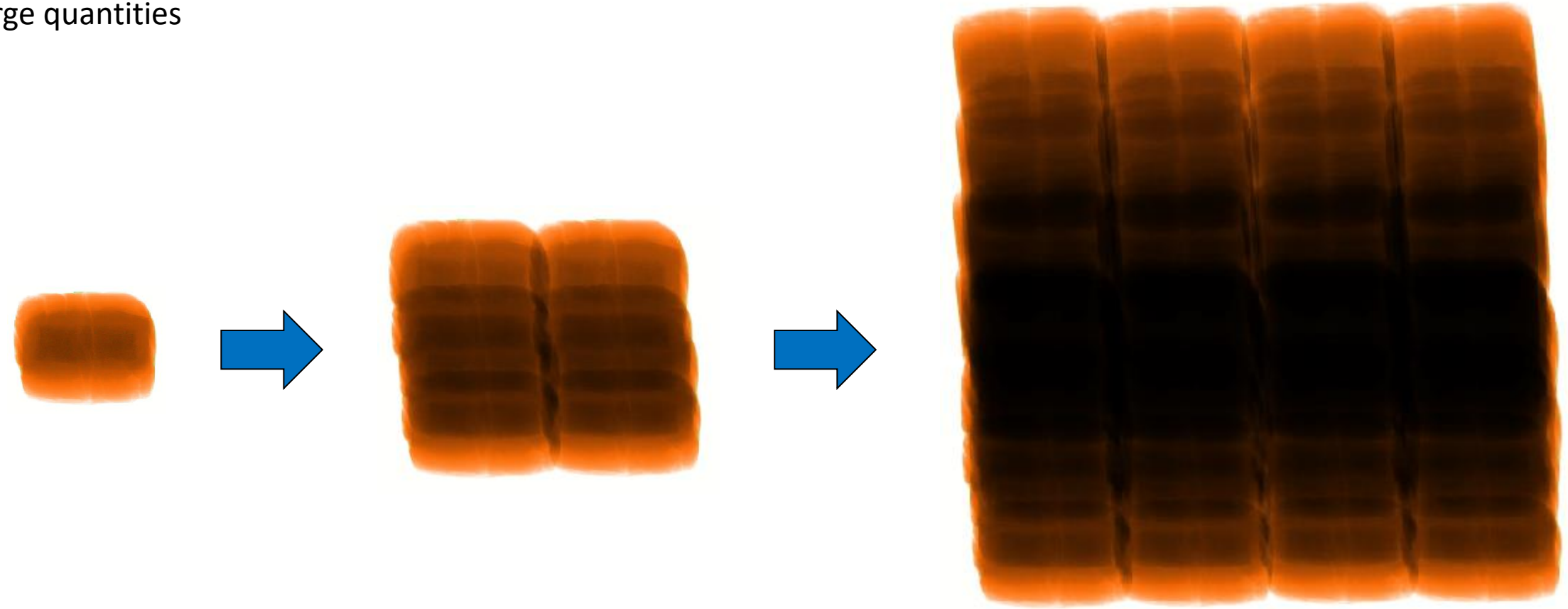
B

merged

NEXT

High Energy Merging

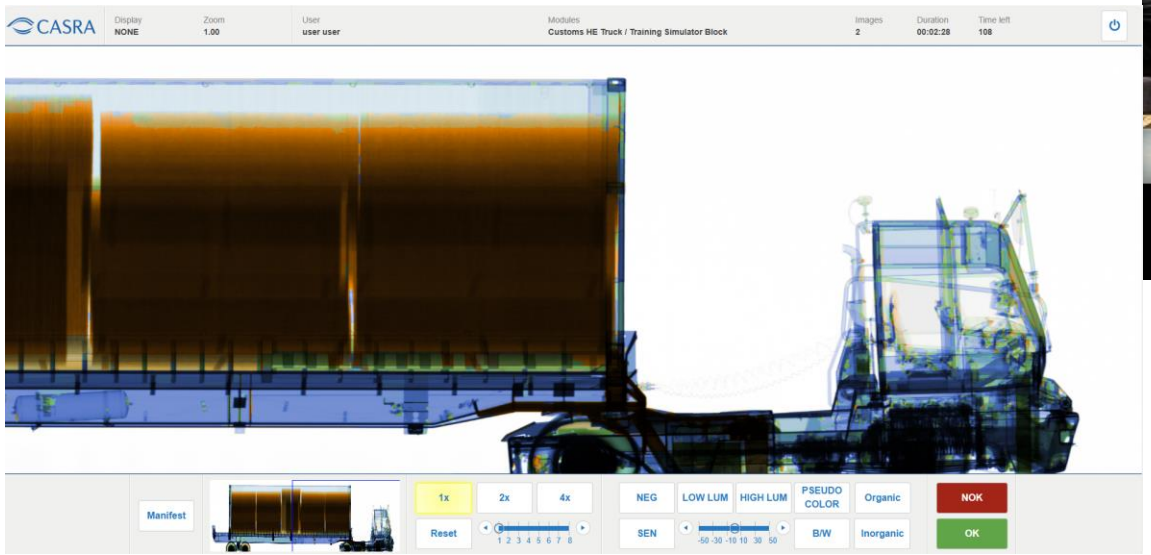
- Merging methodology refined to work with large quantities



NEXT

WCO TEG-NII & UFF

- UFF facilitates interoperability of NII systems
- UFF supports exchange of images within and between Customs administrations
- UFF has allowed the development of larger datasets and image libraries to train humans and beyond…..



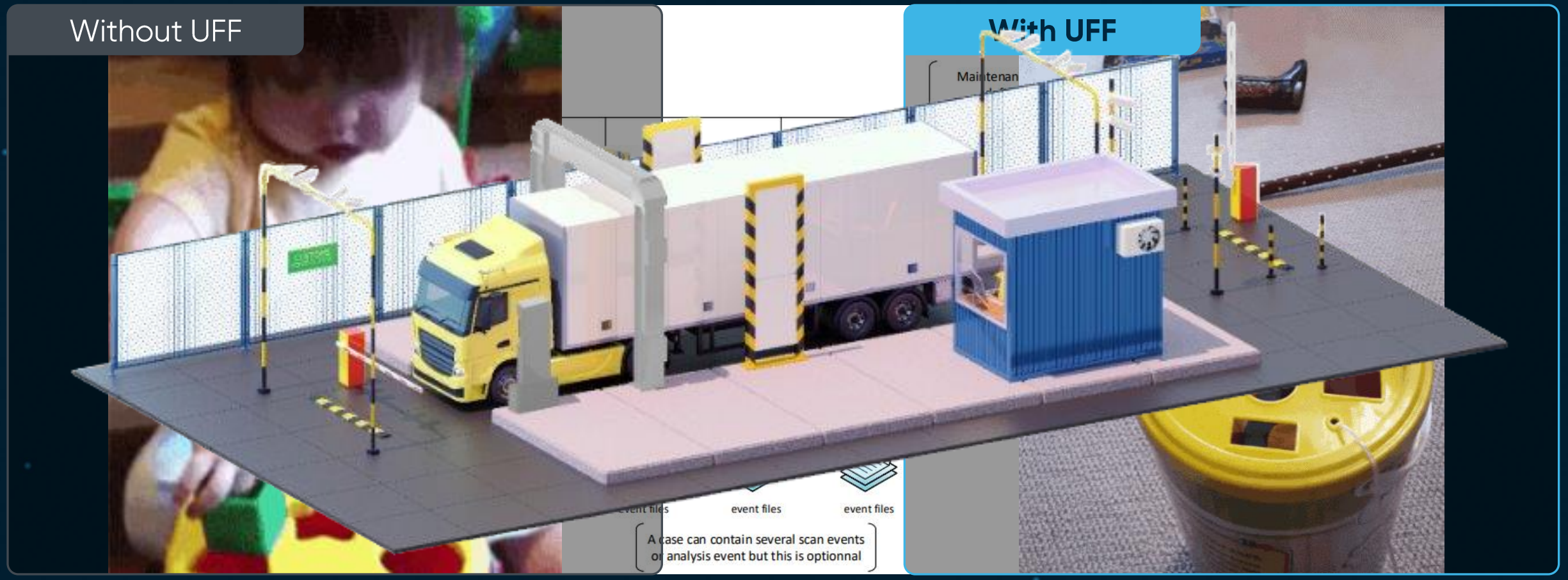
NEXT

Thank you for your attention!

INTERNATIONAL STANDARDS

FOR REMOTE DATA ANALYSIS

UNIFIED FILE FORMATS FOR COMMAND CENTERS

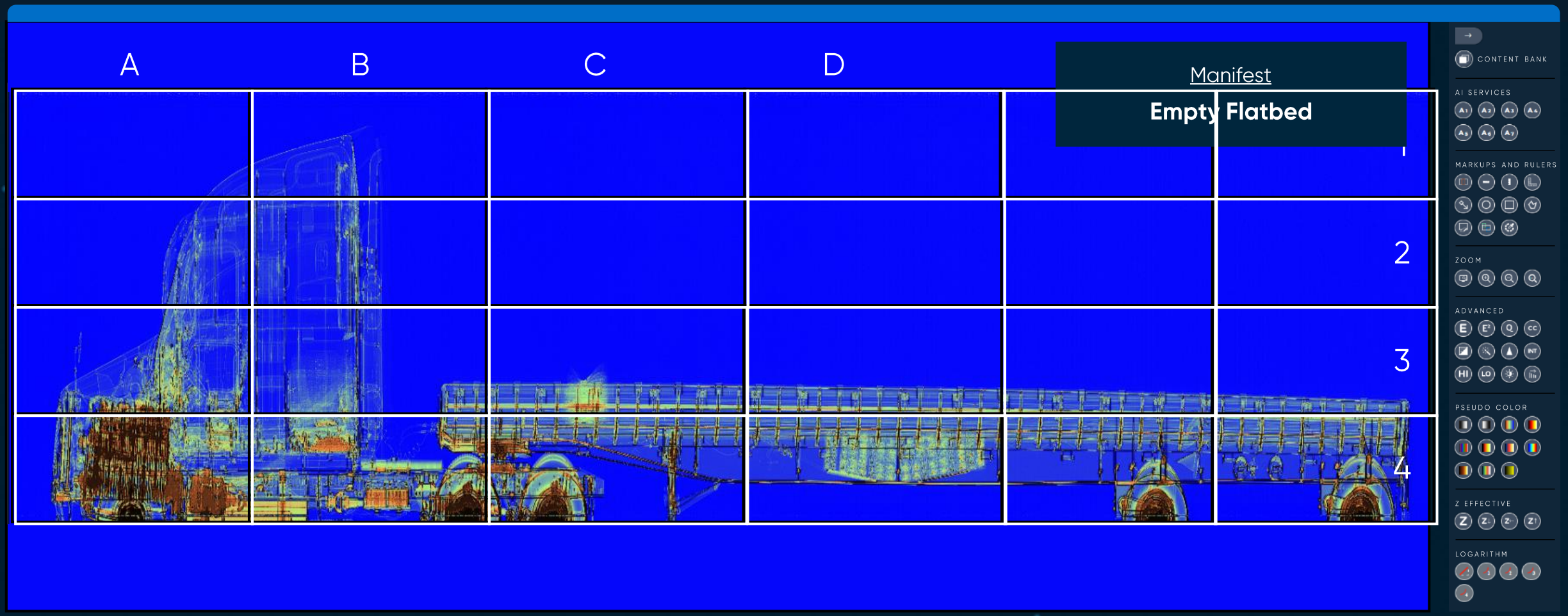


FIND THE CONTRABAND

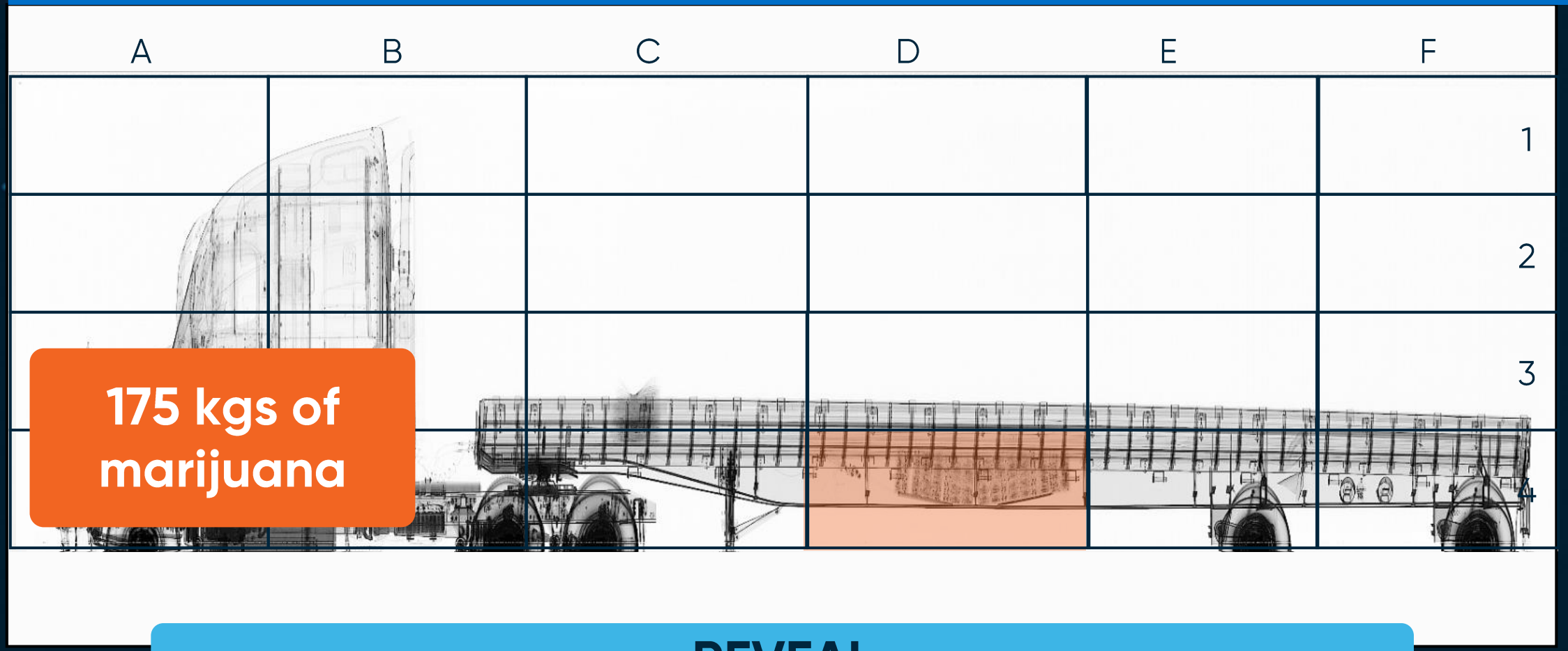
FROM YOUR COMMAND CENTER

INTEGRATED DATA PACKAGE (IDP) EXAMPLE

INTEGRATED DATA PACKAGE (IDP) EXAMPLE



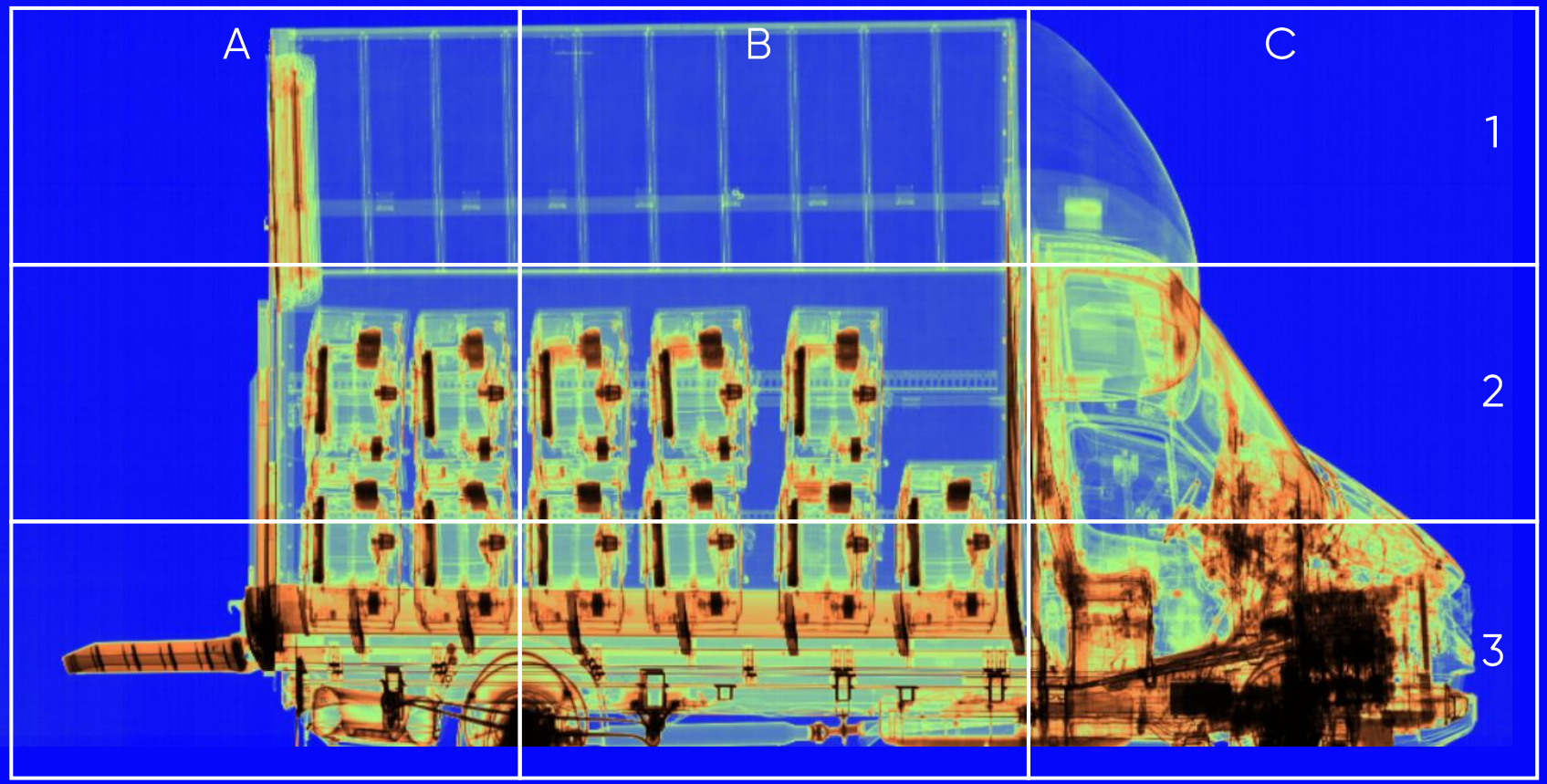
INTEGRATED DATA PACKAGE (IDP) EXAMPLE



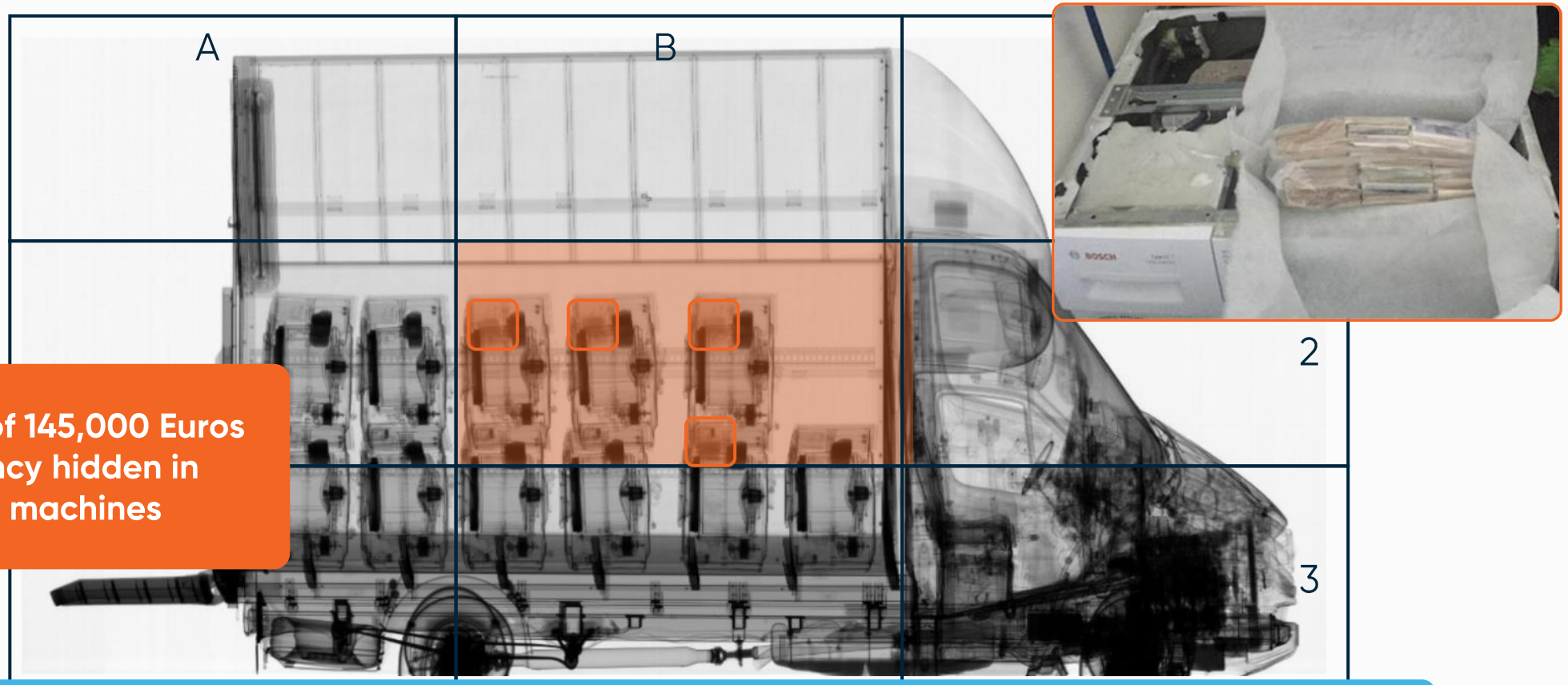
REVEAL

INTEGRATED DATA PACKAGE (IDP) 1

INTEGRATED DATA PACKAGE (IDP) 1



INTEGRATED DATA PACKAGE (IDP) 1

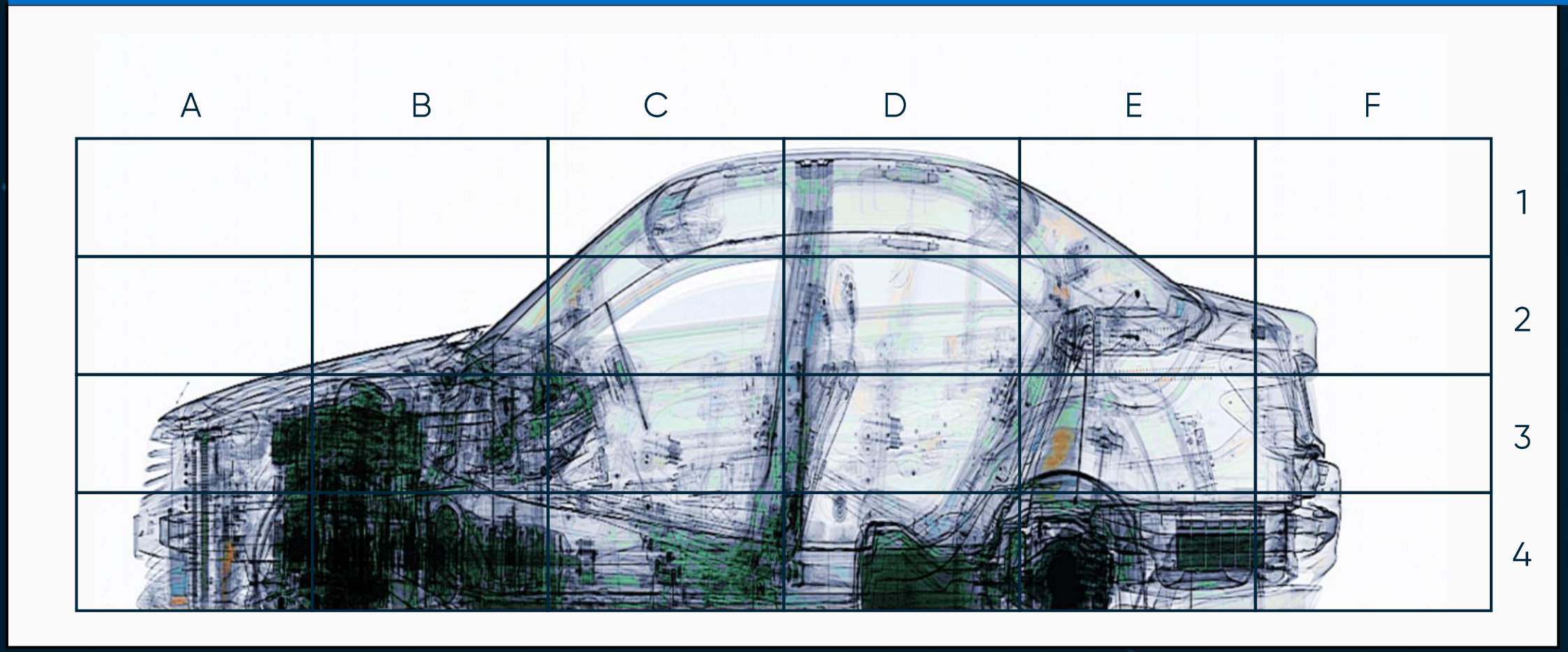


A total of 145,000 Euros in currency hidden in washing machines

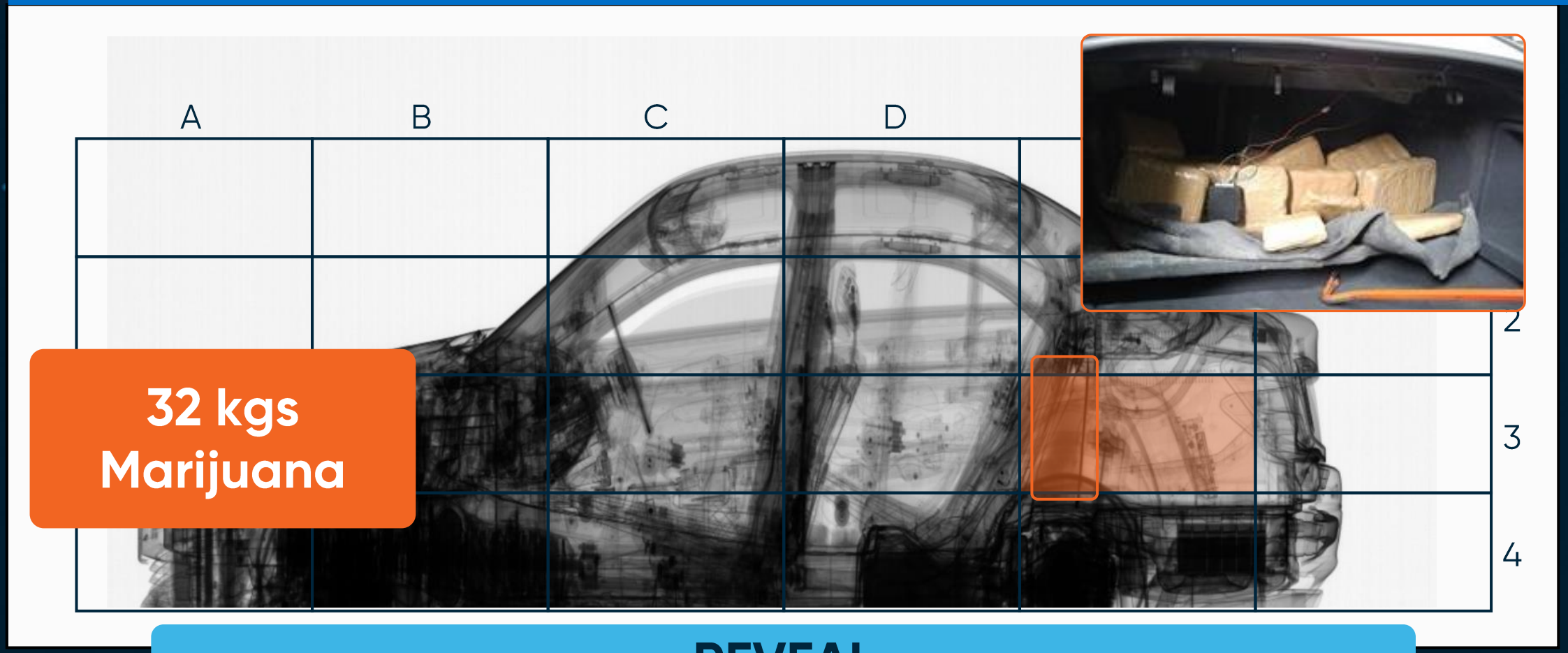
REVEAL

INTEGRATED DATA PACKAGE (IDP) 2

INTEGRATED DATA PACKAGE (IDP) 2



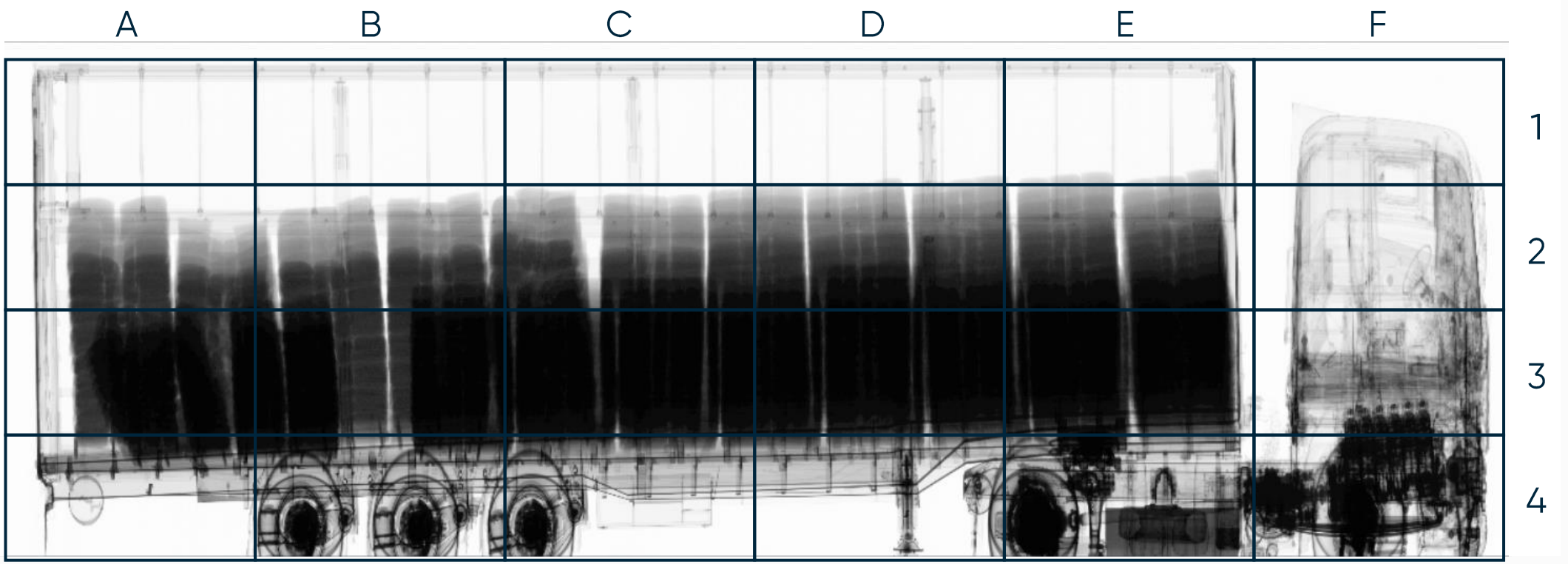
INTEGRATED DATA PACKAGE (IDP) 2



REVEAL

INTEGRATED DATA PACKAGE (IDP) 3

INTEGRATED DATA PACKAGE (IDP) 3



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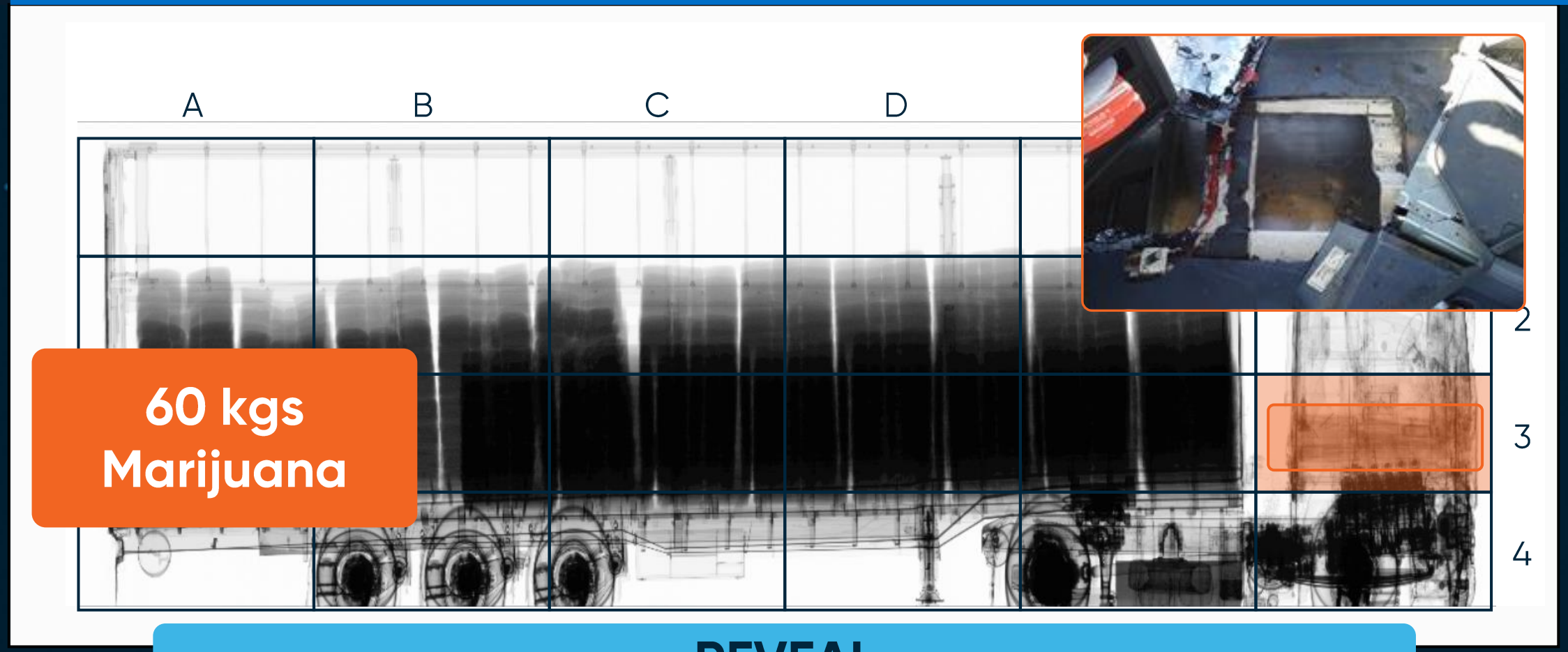

REVEAL

WRAP-UP