The world’s only scientifically-based, individually adaptive training program for X-ray image interpretation

Today’s security officers face daily challenges when examining X-ray images. X-Ray Tutor (XRT) was created to provide easy-to-use training software that enables security officers to detect prohibited items quickly and reliably and increase their visual knowledge for X-ray image interpretation.

**BASED ON SCIENTIFIC STUDIES**

X-Ray Tutor (XRT) is the only training system on the market designed on the basis of scientific studies which takes into account complex brain processes shaping the perception of visual information.

The effectiveness of the system has been proven in several studies, showing substantial increases in detection performance.

**INDIVIDUAL ADAPTIVE TRAINING**

Due to the adaptive level system, every user is presented images tailored to his/her individual knowledge and skills. The modules can be customized which ensures that the user is optimally challenged by the presented images and maximizes his/her motivation to achieve the next level.

**LARGE LIBRARY & MULTIPLE VIEWS**

XRT is available for different fields of operation, such as Cabin Baggage Screening, Cargo Screening, etc.

Each library contains high-quality X-ray images of several hundred prohibited objects from various angles and placed in several thousand containers (e.g. bags, parcels – depending on the field of operation).
CASRA is carrying out systematic threat assessments in collaboration with international authorities and experts on an ongoing basis. Insights gained from these analyses are being integrated into the XRT3 software regularly. Security officers benefit from early detection of new threats by knowing exactly what particular threats to look out for and where current risks might occur.

Thanks to the built-in merging algorithm, XRT is able to automatically generate unique bag-to-threat item combinations on the fly which reduces the possibility that a particular bag/threat item combination will be repeated during the training. The combinations are adapted to the individual level of the user which keeps motivation and training effectiveness high.

The management by objective allows the administrator to set training goals. This function enables to keep track of the users’ training progress and provides a reference and motivational tool to ensure that the training requirements are met. With our feedback options, security officers themselves can check their current training status and progress made.

The extensive administration functions help you to easily monitor and manage users and their profiles. The feature “Reporting” provides you with an overview of each user’s training behavior and results.

The multiple threat feature allows for a configuration of the number of illegitimate items in an image. Training images will be presented with either none, one or multiple threat objects. As a result, the security officer is challenged and his/her motivation positively impacted by the variety of scenarios.

XRT3 is being used successfully in more than 40 countries at over 900 airports and other institutions. The training is thus available in many languages. Further, the system’s scalability allows the integration for single organizations as well as country wide solutions for several thousands of users.

REAL-WORLD VIEWING OPTIONS

- **ORIGINAL** Removes image enhancement filters
- **B/W** Creates a greyscale image
- **CONTRAST** Calculates the best contrast for every pixel
- **HIGH LUM** Increases the brightness
- **LOW LUM** Decreases the brightness
- **OO** Shows only organic materials
- **METAL ONLY** Shows only metallic materials
- **OS** Removes all organic materials
- **NEG** Creates a photo negative of the image
- **METAL S.** Removes all metallic materials

**SYSTEMATIC THREAT ASSESSMENT**

**MERGING ALGORITHM**

**ADMINISTRATION AND REPORTING FUNCTIONS**

**MULTIPLE THREAT CONFIGURATIONS**

**GLOBAL PRESENCE**
DIFFERENT IMAGE LIBRARIES AVAILABLE

To be able to train security personnel effectively and efficiently it is crucial to identify the potential risks. For this reason, CASRA, in cooperation with international authorities and experts, carries out a Systematic Threat Assessment (STA) aimed at the early detection of new and emerging threats and subsequently issues regular updates of the XRT training libraries.

All our Cabin Baggage Screening (CBS) training libraries contain images of real passenger or staff bags. Various threat categories like guns, knives, IEDs (Improvised Explosive Devices), LAGs (liquids, aerosols and gels) and other prohibited items are available.\(^1\,3\)

- XRT3 CBS Beginner
- XRT3 CBS
- XRT3 CBS IEDs
- XRT3 CBS LAGs
- XRT3 STAFF

In the Hold Baggage Screening (HBS) area with images of real passenger bags, we provide training libraries with dangerous goods as well as a broad variety of IEDs. The IEDS of various shapes are made of different types of explosive material and contain various types of detonators.\(^1\,2\)

- XRT3 HBS
- XRT3 HBS DG

In the Cargo Baggage Screening area with images of real consignments for airfreight or airport supplies, we provide training libraries with a broad variety of IEDs as well as dangerous goods and other threat categories like guns and knives.\(^1\,2\)

- XRT3 Cargo
- XRT3 Cargo DG
- XRT3 Airport Supply

In the Mail Screening area we provide various types of mail consignment containers (letters, boxes, parcels), and the training libraries contain various threat categories like guns, knives, IEDs and other prohibited items.\(^1\)

- XRT3 MAIL
- XRT3 MAIL IED

In the Prison Screening area various container types are included (bags, letters, parcels, shoes) and a broad variety of guns, knives, IEDs as well as items which are prohibited in prison environments (e.g. cell phones, USB sticks, drugs).

- XRT3 PRISON
- XRT3 PRISON EXTENDED

Additionally we provide multiple training libraries for specific organizations and critical infra-structures.

- XRT3 POWER PLANT
- XRT3 DATA CENTER
- XRT3 Military

\(^1\) Fully compliant with the EU regulation 2015/1998.
\(^2\) There is also an extended version available including dangerous goods.
\(^3\) There is also an extended version of XRT CBS available which contains LAGs (liquids, gels and aerosols).
### XRT3 FEATURES

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<td>Individually adaptive</td>
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<tr>
<td>Millions of bag-to-threat combinations</td>
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<td>Up to three threat items per bag possible</td>
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<td>Webhosting</td>
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**LEARN MORE**

- You can also find a summary of a study as well as projects involving the XRT3 in the CASRA [newsletter issue 2, 7 and 8 here](#).
- If you would like to receive short and understandable articles summarizing our research results and security trends please [subscribe to our newsletter](#).