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## Horizon EU Project: BAG-INTEL

### An intelligent system for improved efficiency and effectiveness of the customs control of passenger baggage from international flight arrivals

By Klaudia dos Santos, BAG-INTEL's Communication and Dissemination Lead, Martel Innovate

Today, we also shed light on [BAG-INTEL](#), a 36-month Horizon Europe Research and Innovation Action in the domain of border security, which kicked off in September 2023. The project brings together a diverse team of 24 partners from 8 European countries, including industrial players, universities and research organizations, consultancy and advisory firms, ministries, and customs, tax, and civil authorities, who have come together to develop innovative tools, which will increase the effectiveness and efficiency of baggage customs controls at airports without the need of involving extra human resources.

#### Context and operational scenario

While the security scanning of outgoing luggage is well-developed, the customs scanning of incoming luggage is not full-fledged. The utilization of external data for luggage risk assessment is also not exploited to its full potential for customs controls. Furthermore, the current state-of-the-art in luggage reidentification has several drawbacks:

Tags must be manually placed in or on the suspect luggage and then removed before the traveller leaves the customs area following the manual inspection of their luggage to ensure they do not face another inspection the next time they travel with the same bag.

The smugglers may realize their luggage has been tagged and remove the tags before entering the customs area, thereby hindering the reidentification and capturing process.

While some airports apply radio-frequency identification (RFID) tagging for the customs reidentification of luggage, the RFID tags might damage the bag during their removal.

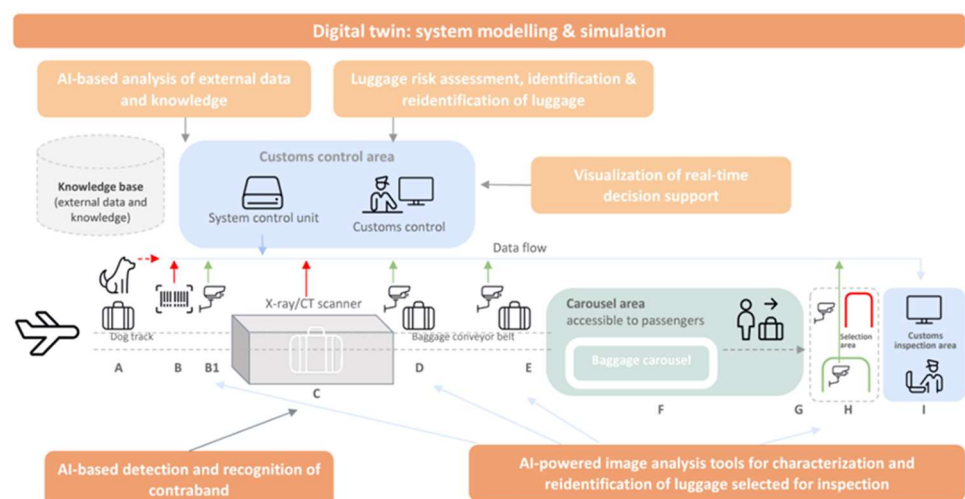
The current process has a relatively high operational and maintenance cost due to the manual labor involved, as well as an environmental impact caused by the production and immediate disposal of tags.

#### The BAG-INTEL solution

Addressing the limitations and drawbacks of the current processes, BAG-INTEL aims to enhance the effectiveness of the customs control of passenger baggage through several features and capabilities, including:

- an AI-powered functionality for enhanced contraband detection in X-ray scanning of incoming luggage,
- an AI-powered risk assessment based on external data analysis,
- an AI-camera-based end-to-end reidentification of luggage, and
- a digital twin for system visualization and performance optimization.

The '**BAG-INTEL system overview**' shown in Figure 1 illustrates the solution under development.



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Upon flight arrival, as the incoming luggage is unloaded and placed on the conveyor belt, the customs risk of each piece of baggage is assessed using AI-supported tools under the supervision of the customs control officer(s). The applied risk indicators come from 4 sources:

1. The external data and knowledge, such as the Passenger Name Record and the databases of Law Enforcement Agencies, which record suspicious travel patterns and links to organized crime.
2. An X-ray/CT scanner with absorption sensing and object recognition in the scanning image, which will be trained to detect various kinds of contraband.
3. The customs control officer(s) who may notice suspicious content, which has not been flagged by the scanner.
4. The dog handler input (if the customs team applies a sniffer-dog track before the X-ray/CT scanner).

The risk indicator data from all sources is then integrated into an overall risk assessment, based on which a decision whether the luggage should be manually inspected is taken.

In summary, **BAG-INTEL aims to enhance customs control processes so that more contraband is detected and the cases of unnecessary manual inspections not leading to finding contraband decrease.** The objective is to reduce false positives and flag only the pieces of luggage, which contain contraband. Because the manual inspections will focus on all, and only, suspect bags, more contraband will be captured without the need to involve extra human resources in the process. Furthermore, **the proposed AI-camera-based luggage reidentification is non-intrusive, eliminating the drawbacks of currently used methods.**

The 1<sup>st</sup> Newsletter is available at the following link:

<https://preview.mailerlite.io/preview/722703/emails/112712910042563859>

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Project videos: [www.bag-intel.eu/videos](http://www.bag-intel.eu/videos)

**BAG-INTEL**

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## ESReDA Project Groups – News



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### ESReDA Project group on Resilience Assessment of Critical Infrastructure

The ESReDA project group on Resilience Assessment of Critical Infrastructure, active since June 2023, has organised two special sessions at the ESREL 2024 conference, held in Cracow, June 23-27, 2024. The special sessions are focused on resilience assessment in electricity sector (session 1) and critical infrastructures in general (session 2). The eight papers submitted are authored by the ESReDA members: JRC, University of Nottingham, Kaunas University of Technology & 'Horia Hulubei' National Institute of Physics and Nuclear Engineering (the latter two applied for ESReDA membership in 2023) and ESReDA partners: University College Dublin, German Aerospace Centre, ETH Zurich.