



**EUROPEAN COMMISSION**  
DIRECTORATE-GENERAL FOR MIGRATION AND HOME AFFAIRS

Directorate B: Borders, Interoperability and Innovation

### **Copy of Frontex letter CBD/RIU/DRVO/11337/2019**

With regards to the question of MEP Özlem Demirel to the Commission, let me provide the following details:

The Automated Virtual Agent for Truth Assessment in Real-time (AVATAR) is a system designed to automate screening, interviewing, and credibility assessment of persons crossing international borders.

It was developed by researchers at the National Center for Border Security and Immigration (BORDERS), a United States Department of Homeland Security Center of Excellence headquartered at the University of Arizona.

It conducts primary and secondary screenings of entrants using a virtual human agent and an array of non-invasive sensors to automate the analysis of a person's credibility, documents, and identity.

In addition to automating screenings, the AVATAR is designed to support border guards and operational staff by providing a real-time risk score of an individual to indicate if additional scrutiny or investigation of the person is warranted.

In 2009, BORDERS initiated a multi-year collaboration with Frontex to conduct a series of workshops, experiments, and field tests. The purpose was to introduce border guards to the AVATAR, collect end-user requirements and feedback, and explore the technology's potential utility for the European Union.

The Frontex role was to facilitate the interaction with the European border guard community, define the concepts of the workshops together with the researchers, organize logistically (an partially content related) the workshops, and to help in the process of data collection.

The following activities have been performed:

- 2010 - Workshop: Artificial Intelligence for Screening and Decision Support at Border Crossings (including the "fake bomb" experiment), Warsaw, Poland.

In this experiment, participants were randomly assigned to one of two groups. The first group received a lead pipe with other components and told to assemble a fake improvised explosive device (IED) from printed instructions. After completion, they were instructed to pack the fake IED in a travel bag and to attempt to pass through a security screening that included being interviewed by the AVATAR system. The second group packed a travel bag only and went through the same screening process. During the automated interview, the AVATAR sensors measured changes in voice quality, eye gaze patterns, and pupil dilation for all persons in each group.

During the mentioned experiment, the AVATAR identified 100% of the fake bomb makers, with an overall accuracy of 87% (with false positives) using fused (aggregated) data from vocalic and eye-behavior sensors.

- 2011 - Workshop: Improving Border Checks with Next-generation Artificial Intelligence and Advanced Sensor Technology: Decision Support for Assessment, Screening and Interviewing (including the “document fraud” experiment), Warsaw, Poland.

For the 2011 workshop, a “document fraud” experiment was designed to test the AVATAR’s ability to identify holders of false documents by analysing their behavior and verbal responses during a simulated border check.

The AVATAR achieved an overall accuracy rate of 95% with fused vocalic and eye-behavior sensor data.

- 2012 - Workshop: Simulation on Passenger Risk Assessment, Joint Operation Champions League (including the “hooligan” experiment), Apeldoorn, Netherlands.

Hooligans are sports fans who are often violent. If their identities are known in advance, they may be banned from attending football (soccer) matches. Banned hooligans may try to use someone else’s ticket and identity to enter games. The rapid-screening identification (impster detection) and credibility assessment conducted by the AVATAR is suitable for various screening locales and checkpoints, including football matches to detect sports hooligans. Because of the basic functional similarity between the requirements of access control to a stadium and to a country (in terms of document and identity verification and of risk determination), this scenario became the basis for an operational exercise conducted at the Royal Netherlands Marechaussee National Centre for Training (border guard academy) in Apeldoorn, Netherlands.

The hooligan experiment demonstrated that the AVATAR’s accuracy rate surpassed that of humans in identifying imposters and allowing innocent participants to pass. The AVATAR identified 85% of imposters, while humans detected only 67%. Humans had up to an 80% false positive rate of innocent participants, while the AVATAR’s false positives were 15%.

- 2013 - Field test: AVATAR for Automated Interviewing and Passport Control at the Henri Coandă International Airport, Bucharest, Romania.

A major objective of the field test was to assess the newest generation AVATAR in an operational setting. Major findings included:

- Processing time: the AVATAR interview took an average of 30 seconds for the shortest interview type (Romanian citizen) and an average of 90 seconds for the longest interview type (third country national from a non-visa-waiver country).
- Reducing false positives: across all interviews, only 2% of passengers were flagged as high risk and 15% as low/medium risk. Because ground truth was unknown, specific accuracy measures could not be calculated.
- Passenger acceptance: passengers overwhelmingly liked using the AVATAR (90%), indicated they would use it in the future (75%), and found it easy to use (96%).
- Operational performance: the AVATAR performed well in terms of improved sensing, auto-height adjustment, installation, maintainability, and ruggedness for daily use.

Please find attached the report describing in details the above mentioned activities and their results.

No further activities were conducted with Frontex involvement after the field test in 2013.