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Kiosk systems in border control

Why kiosks play a key role in the launch of the European Entry/Exit System

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Introduction

In connection with the Smart Borders Initiative, the European Parliament has agreed to introduce the common biometric Entry/Exit System, EES for short, in order to register all travellers from Third Countries. This means that, as of 2022, nationals of Third Countries will have to register with four fingerprints and a facial image when entering Schengen countries through land, sea and air borders. The biometric data is stored in the EES together with biographical data of the person and other information taken from the travel document. The many new and equally complex and time-consuming tasks that the launch of EES entails, present first-line border control officers with new challenges. The challenging process of collecting biometric data in particular will be highly time-consuming.

EU Regulation 2017/2226 implies that the use of automated methods and self-service systems, as defined by Article 2, Number 23 of Regulation (EU) 2016/399, can simplify and speed up the border control process. The pre-enrolment of data enables early verification to be performed at self-service systems. The traveller is then referred to border control officers, who decide whether to permit or deny entry into the country after examining the travel document, the acquired facial image and possibly the fingerprints. As a result, self-service systems, also known as kiosks, can help simplify and speed up processes at critical points.

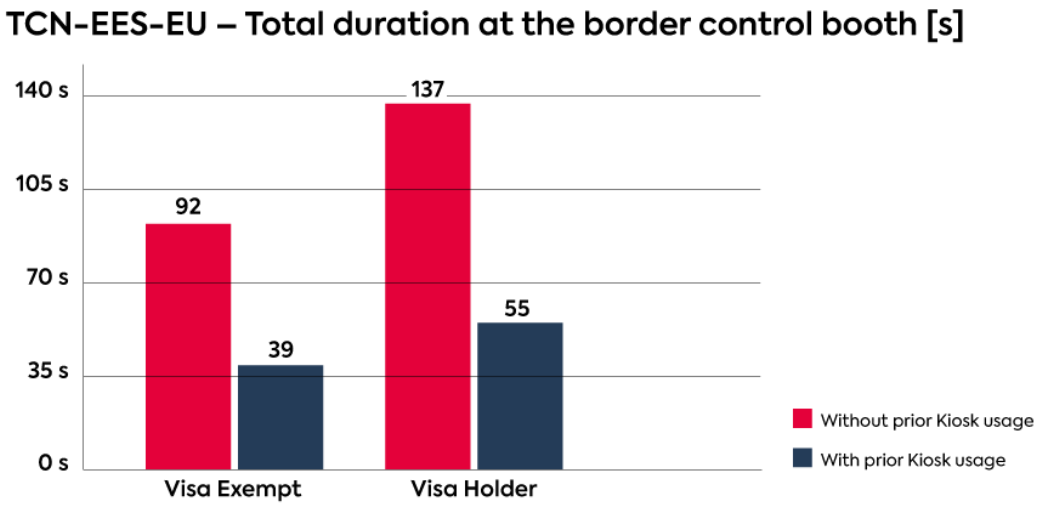
This document summarises the key advantages and long-term benefits that arise for border control and the authorities tasked with border control operations through the use of kiosks.

Kiosks help to speed up processes during border crossings

The more complex process of capturing biometric data at border crossings and the continuous growth in passenger numbers will lead to longer waiting times at the EU's external borders unless automated systems are used to provide help & support. The study of the German Smart Borders pilot project revealed that the wait time for Third Country Nationals at the border control desk more than doubles if additional biometric data acquisition (face and finger) and the required searches of the central EES system are performed entirely at the desk.

Kiosks reduce inspection times at the desk

As already mentioned in EU Regulation 2017/2226, kiosks can optimise the passenger flow while also compensating for the extra time needed. Figure 1 shows that prior kiosk usage can save massive amounts of time at the stationary border control desk. For border control officers, the inspection time for travellers requiring visa falls by an average of 60% (82 seconds saved) and for visa-exempt travellers by an average of 58% (53 seconds saved). Accordingly, the self-registration of data at kiosks allows the time needed at the border control desk to be reduced by more than half.



Source: Results of the Smart Borders pilot project in Germany

Figure 1: Comparison of time needed at the border control desk with and without prior kiosk usage

A significantly longer inspection process at the desk would not only have an impact on the border control process and result in longer waiting times for travellers, but would also have an impact on subsequent processes outside of border control. In airports, for example, this would result in increased transfer times, increased time for baggage claim, and consequently also changes to flight schedules. The introduction of kiosks could therefore not only minimise the impact of the introduction of the EES on the actual border control process, but also on travel processes as a whole.

Kiosks compensate for the effects on all travel processes preceding and following border control

Due to Article 8a of the Schengen Borders Code, it is currently not yet known which form the review of the biometric data collected at self-service systems would ultimately have to take. Even if biometric data need to be verified by having the border control official re-capture it at the desk, kiosks still have significant advantages by compensating the response times of the central EES. In this regard, it is important to note that when a traveller is first registered, their biometric data is searched for in an estimated total of 300 million records to ensure that the person has not already been registered under a different identity ("so called deduplication"). Due to the massive amounts of data, this search takes a while – early estimates assume between 20 and 30 seconds (as per ICD specification and the implementing act for EES performance). The self-service systems can better compensate for the long response times of the central EES system by allowing prior data registration and breakdown of the process times, as the time in which the passenger is moving to the desk can be used for the EES queries. If data is not registered beforehand at kiosks, the response needed by the central EES systems, between 20 and 30 seconds per search, would lead to longer waiting times at the stationary desk. In addition, kiosks can also be used not only for first-time registration, but also help to optimise processes for return travellers. Their ability to automatically pre-register and examine identity data therefore allows kiosks to speed up processes for any inspection at land, sea or air borders.

Kiosks compensate for the long response times of the central EES system

Kiosks help to optimise processes not only for first-time registration, but also for return travellers

Kiosks support border control officers in their day-to-day duties

After the EES has been put into operation, border control officers will have to integrate biometric registration processes for EES data collection into the control processes alongside their existing inspection and verification duties. This massively increases the complexity of the duties for the personnel tasked with performing these inspections. The need to focus on travellers directly and on the scanning technology being used for the registration of biometric data presents the risk that officers may be forced to pay less attention to other aspects of border control such as observing the behaviour of the person before they reach the desk. This means that border control officers risk becoming little more than simple clerks for biometric data capture as a result of the new EES regulations.

Kiosks allow border control personnel to concentrate on their essential tasks

To enable border control officers to continue focusing on essential duties such as the control of arriving and departing travellers and the monitoring of the border crossing area, technology needs to be integrated to support them in this. By enabling pre-enrolment of biometric data and prior interviewing of incoming travellers, kiosks massively reduce the workload of personnel tasked with performing these controls. Language barriers can be overcome by conveniently conducting the entry interview at the kiosk in the native language of the traveller and the direct translation of the answers for the official. With integrated security mechanisms, kiosks guarantee consistent data quality in the border control process. Kiosks ensure that facial images are of consistent quality in accordance with ISO 19794-5:2011 and that fingerprints are equally so in accordance with NFIQ 2.0. State-of-the-art liveness detection, monitoring functions and reliable detection of spoofing attacks for face and fingerprint scans ensure the highest level of security. By continuously monitoring passenger behaviour, kiosks also enable risk assessments of subsequent process steps. This provides additional information for the border control officer to use and also enables optimisation of passenger flow management, for example with instructions to proceed to the border control desk or the ABC gate. With the help of kiosks, border control officers will ultimately be able to perform their

Kiosks guarantee biometric data collection of the highest quality in accordance with EES standards

Kiosks offer maximum protection against attacks and identity abuse

inspection and verification duties just as effectively as before the launch of the EES.

Kiosks cost less than an expansion of stationary border control desk capacities

Due to the pending launch of the EES, it is necessary to adapt existing infrastructure to the changed requirements, which necessitates an expansion of border crossing capacity. To offset the additional expense that this entails, the responsible public authorities can either increase the number of stationary border control desks with a corresponding increase in the number of trained staff and/or use automated systems such as kiosks. It would be advisable at this point to consider the necessary investments and the scalability of potential solutions.

Kiosks are easier to set up than additional border control desks.

Experience has shown that kiosks can be installed and integrated into existing infrastructures more quickly than stationary border control desks. Self-service systems frequently guarantee a fast roll-out phase with live operation. In addition to fast installation, flexibility also often plays a key role. The number of kiosks can be adapted as necessary and adjusted to match variations in passenger numbers in arrivals. While kiosks do not require investments in personnel, such investments cannot be avoided when setting up additional border control desks. Manning these desks with qualified personnel at short notice is usually difficult given the challenging recruitment situation. From this perspective, kiosks are much more cost-effective in the long run when considering total cost of ownership than expanding and operating stationary desks with trained border control officers. Ultimately, kiosks are a future-proof, cost-effective and flexible solution for the purposes of the EES.

Kiosks can be optimally adapted to changes in traveller numbers

Kiosks can make optimum use of existing space at air, land and sea borders

Severe space shortages often mean that existing air, land and sea border infrastructure cannot be substantially adapted

and certainly not at short notice. Despite this, longer queues are to be expected at border control points after the launch of the EES due to the more extensive controls it entails. This need for more time to control travellers and the limited available space for inbound and outbound travellers means that a flexible solution is preferred.

Kiosks provide a great deal of flexibility

The procurement of kiosks provides a great deal of flexibility as the waiting areas of self-service systems and stationary desks can be kept separate from each another – kiosks can also make flexible use of available space further away. Also, due to their integrated monitoring functions, they do not necessarily need to be within view of the border control desks. As shown in Figure 2, self-service systems are very flexible when it comes to placement and positioning, and can therefore be optimally adapted to local conditions. Depending on needs, kiosks can be placed next to each other in a row, for example on a wall, at an angle in the middle of the room, back to back, or in a circle. This allows kiosks to be adapted flexibly to the given needs and purpose. For example, they can even be relocated elsewhere without the need for extensive construction work.

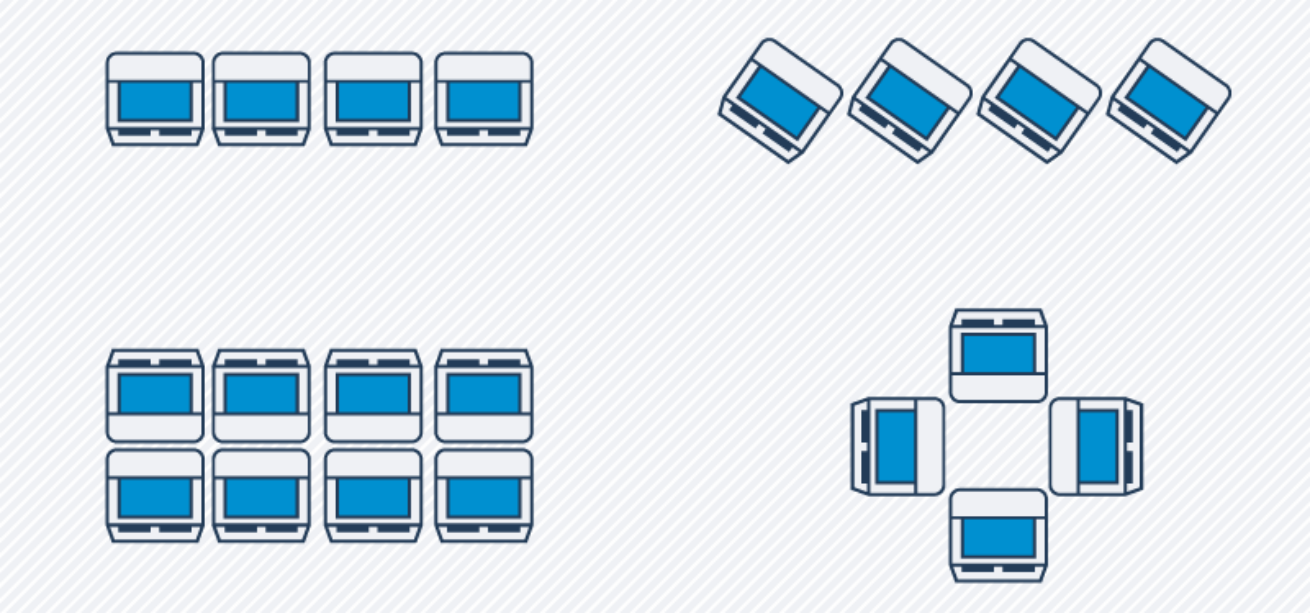


Figure 2: Flexible positioning of kiosks

The construction limitations of existing infrastructure mean that it is often faster to install kiosks than more stationary border control desks. Ultimately, experience has shown that kiosks can be flexibly integrated into existing border control infrastructure, regardless of whether at air, land or sea borders.

Kiosks can be integrated without any problems into existing border control infrastructure

Kiosks must have special features in order to be used optimally in EES border control

To enable kiosks to be used as described for prior EES data collection, they must possess certain key features. Not only do they need to be designed specifically for border control applications and satisfy all requirements of the EES Regulation, but also perform their functions quickly, securely and reliably. Kiosk systems that only offer the required scanning devices fitted in a housing often present a risk of the collected data being of poor quality or needing to be re-scanned at the desk due to doubts about the authenticity of the data collected. Poor-quality biometric data can also result in searches of the central EES system returning a large number of false-positive identities. The border control officer then needs to spend a large amount of time reviewing and

evaluating these, which eliminates any of the advantages that a kiosk offers.

Adaptive camera height adjustment guarantees fast, high-quality facial scans

EES kiosks must ensure that facial images and fingerprints are captured with the highest quality possible. In particular, facial images must be taken in accordance with ISO 19794-5:2011 while fingerprints must be captured in accordance with NFIQ 2.0. Only an integrated camera that automatically adapts its capture position to the passenger's height by means of height adjustments can guarantee optimum, fast and high-quality capturing of facial images of all travellers, regardless of how tall they are.

PAD sensors protect against attacks using photos, masks and other items

When using kiosks at border crossings, anti-circumvention security plays a key role. Kiosks must be capable of reliably recognising forged and falsified identity documents, spoofed faces or fake fingerprints, as well as other types of attack on the system. Particularly for biometric scans, novel attack methods present a greater risk that travellers could potentially falsify their identity, thus illegally entering or leaving the country. To prevent spoofing attacks, for example using forged photos and/or fingerprints, automated systems should rely on a robust "presentation attack detection" system (PAD) for facial scans and fingerprints. Biometric data scans must be 100% trustworthy to prevent multiple or illegal identities. This is why kiosks used in the EES context should be equipped with state-of-the-art PAD technology to provide protection against attempts to circumvent the system.

Other monitoring functions automatically detect unauthorised usage or suspicious situations

Article 8a (7) of EU Regulation 2017/2225 also states that self-service systems shall be operated under the supervision of a border control officer, whose duty it is to detect any inappropriate, fraudulent or abnormal use of the self-service system. In particular, it is important to ensure that there is no change of travellers while using the kiosk According to the article, kiosks that do not have sufficient monitoring functions would require the border control officer standing right next to the kiosk and watch the traveller enter their data in order to satisfy the requirement. For this reason, the kiosk system in use should feature additional surveillance cameras and smart security functions that detect inadmissible or suspicious situations so that passengers can be monitored conveniently from a distance.

Accordingly, when procuring kiosks, particular value should be placed on ensuring that they can take high-quality scans of biometric data, that they offer superior anti-circumvention technology using PAD, and that they feature integrated security functions. Not every kiosk automatically satisfies EES requirements under EU Regulation 2017/2226.

Summary

The introduction of the European Entry/Exit System presents major challenges for border control. High-quality capturing of facial images and fingerprints and the associated communication with the EES central system will require additional steps, which will lead to a significant increase in the time needed for border control of each individual traveller. This will also have a direct impact on processes outside the border control, such as timetables, flight schedules and baggage handling.

However, the intelligent use of kiosks as process accelerators for automation, self-service and data pre-registration can largely compensate for these effects. Kiosks can be used simply, cost-effectively and quickly, and their numbers can be adapted to best match traveller numbers. They ensure that the collection of routine EES data, including biometrics, is consistently secure and of high-quality before the traveller moves on to the border control officer for inspection. This keeps inspection times at the desk roughly consistent with that prior to the launch of the EES. The border control officer can continue concentrating entirely on the traveller and is not distracted by the need to operate scanning technology. By providing maximum protection against attacks and identity abuse, kiosks also offer maximum security. Kiosks can therefore significantly minimize the overall impact of the introduction of EES on travel.

Kiosks are therefore a crucial element of a sustainable and smart border control infrastructure in Europe. Their use benefits not only the immediate border control, but also all other parties involved, from transport companies and infrastructure operators to the travellers themselves.

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