Part 2

Advanced Efforts to Improve the Customer Experience at U.S. and European Airports

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The 151st Transport Policy Colloquium
Washington Report XV
June 22, 2022

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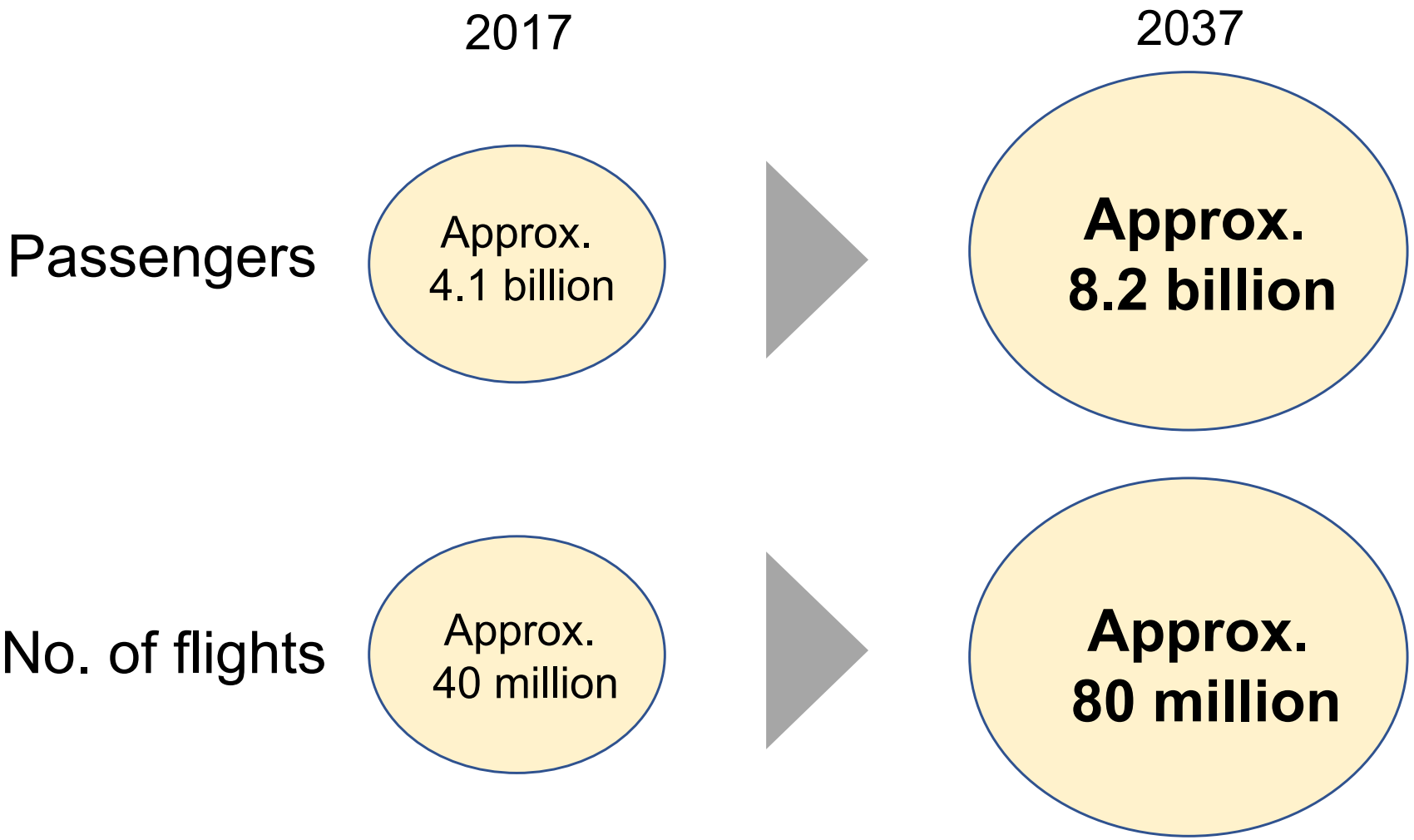
Introduction

Projected Global Aviation Demand



*Based on 2018 IATA projections

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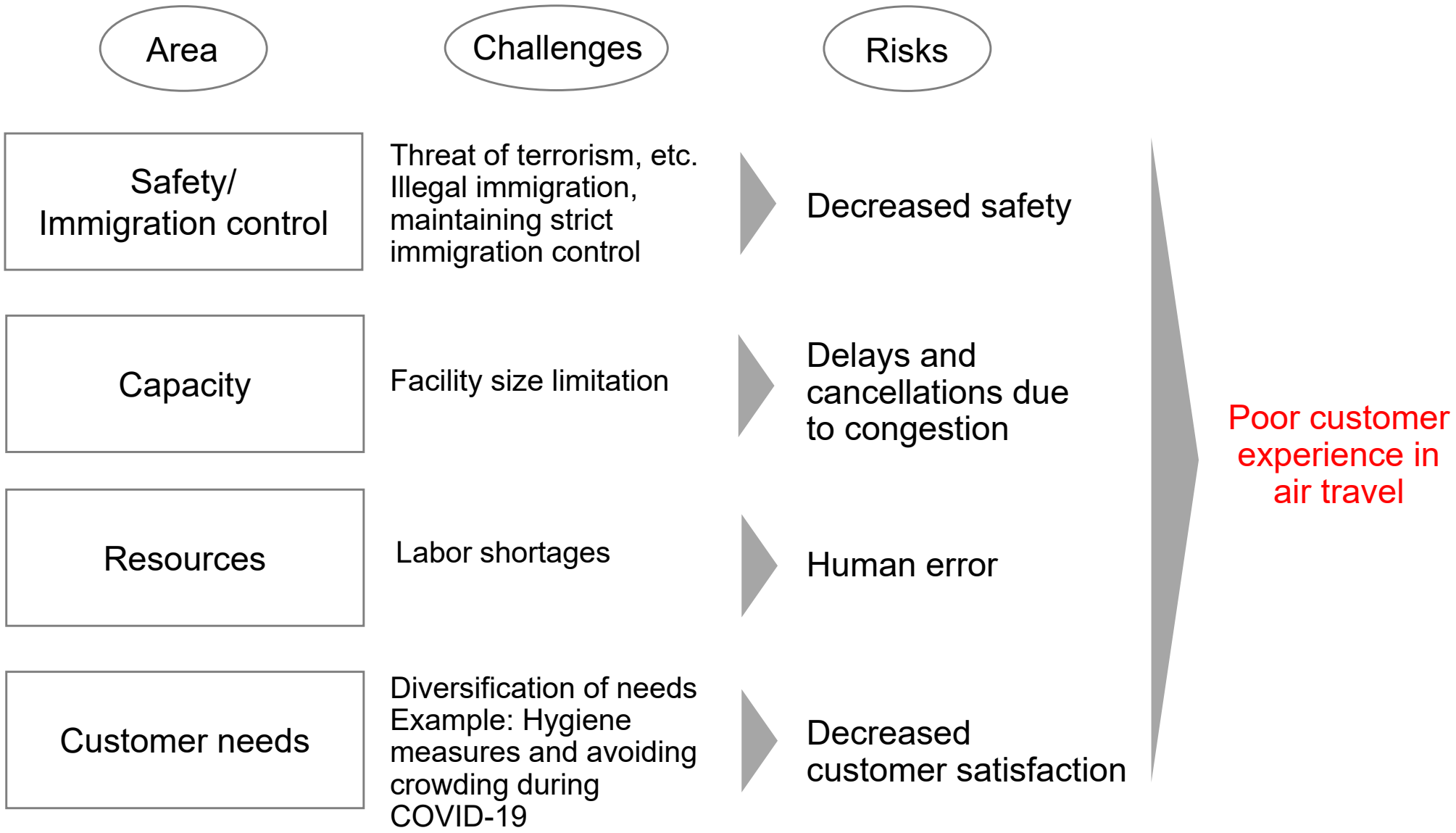
Challenges Facing Airports as Demand Increases



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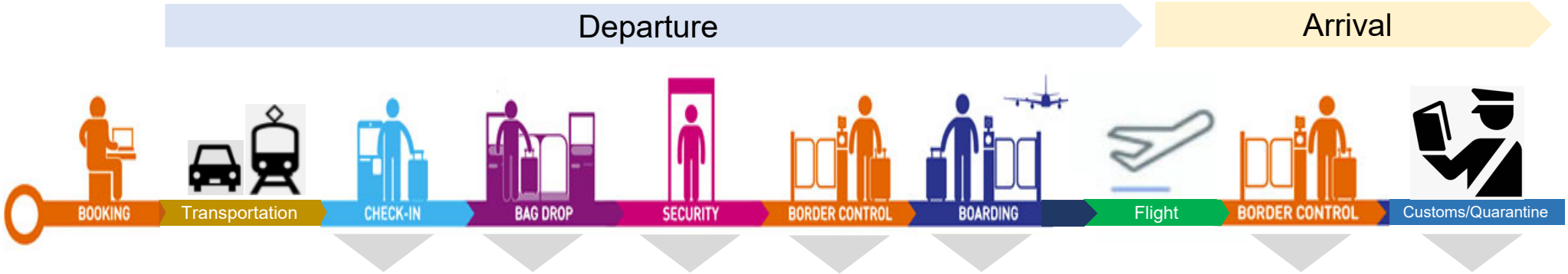
What is Customer Experience (CX)?

"The value or experience that users receive when using a product or service."

CX refers to all of the experiences that a customer has while interacting with a product or service, including before use, during use, and after use. It also includes the opinion that customers have of a company as a result of their experience.

<Touchpoints for air travel>



Check-in	Security check	CIQ (Departure)	Boarding	CIQ (Entry)	CIQ (Customs/ Quarantine)

Customs
Immigration control
Quarantine

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Basic Division of Responsibilities at Airports

		Check-in	Security check	CIQ (Departure)	Boarding	CIQ (Entry)	CIQ (Customs/ Quarantine)
U.S.	Public sector		TSA *1	CBP *2		CBP	
	Private sector	Airline			Airline		
Europe	Public sector			Immigration authorities *3		Immigration authorities	Customs / Quarantine authorities
	Private sector	Airline	Airport company (Outsourced to security companies)		Airline		
Japan	Public sector			Ministry of Justice		Ministry of Justice	Ministry of Finance/ Ministry of Health, Labour and Welfare
	Private sector	Airline	Airline (Outsourced to security companies)		Airline		

*1 Transportation Security Administration: In charge of safety management for public transportation
*2 Customs and Border Protection: Combines customs, immigration, quarantine, and other functions

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Discussion Objectives

- In anticipation of future increases in demand, airports will need to further enhance safety, improve operational efficiency, optimize resources, etc.
- In addition, passengers' needs are changing, such as hygiene measures and social distancing amid the COVID-19 pandemic, and there is a pressing need for touchless (non-contact, non-face-to-face) services and congestion avoidance efforts.
- These efforts are important for the recovery of international travel in the post-COVID era.

To improve the passenger experience, we will present advanced examples from airports in Europe and the U.S., focusing on the **use of facial recognition technology** in the following processes and **advances in the field of security checks**.

Check-in	Security check	CIQ (Departure/Entry)	Boarding

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History of the Adoption of Facial Recognition Technology in the U.S.

- Stricter border controls are introduced in the U.S. after the 9/11 terrorist attacks in 2001.

- Congress mandates that the Department of Homeland Security (DHS) and its component Customs and Border Protection (CBP) obtain biometric data for immigration purposes.
- In 2004, CBP begins taking face photos and fingerprints at immigration checkpoints.

- In recent years, among biometric authentication methods, the adoption of facial recognition technology has been gaining momentum due to technological advances that have improved accuracy and speed of scanning.

Advantages of facial recognition

- Facial information is included in integrated-circuit passports without fail
- Highly accurate and instantaneous verification
- Non-contact, reduced workload

- Facial recognition technology is introduced at various points within airports around 2017.

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Towards “Face Pass” Enabled by Facial Recognition Technology

Facial recognition = matching faces with ID documents

- Although facial recognition is being used to automate and improve the efficiency of identity verification, each body at different points in the airport is working on it separately.
- After the security check, it is also necessary to present a passport again at departure passport control.

“Face pass” = facial recognition without the need for ID documents

- From a passenger perspective, there seems to be room for further improvement.
- Efforts being promoted by global airline and airport industry organizations such as the IATA*1 and ACI*2 to implement **“face pass,”** which allows passengers to seamlessly pass through each point of the airport without presenting their passports or boarding passes after check-in, are vital.

*1 IATA: International Air Transport Association. A worldwide association of companies involved in air transportation, founded in 1945.
*2 ACI: Airports Council International. An international organization made up of managers and owners of airports and airport buildings around the world.

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Development of Facial Recognition Matching Systems by the CBP

[Fact] There are no departure passport control (booths) in the U.S.
[Reason] Largely due to facility-related factors. When airports were initially being developed, there were no separate departure and arrival lines, international or domestic traffic lines, nor departure passport control booths.
[Issue] Departure control, which has been required by law for some time, has not been implemented.

- Over the years, efforts have been made to pursue methods that are acceptable to airports and airlines without adding to the existing departure process.
- Facial recognition matching system that achieves identity verification and operational efficiency was developed. (2016)

Facial recognition matching system (Traveler Verification Service)

[Description] CBP's database and live photo matching system

[Objectives] Enhancing identity verification and speeding up procedures

[Features]
- Japanese (NEC) facial recognition technology with over 98% accuracy
- Automated identity verification by matching live photos with CBP-held facial information, such as visa and passport photos

(Image source: CBP website)

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(1) Example of "Face Pass" at Boarding That Also Serves as Departure Passport Control

CIQ (Departure) | Boarding

[Issue] How to implement departure control using a facial recognition matching system.

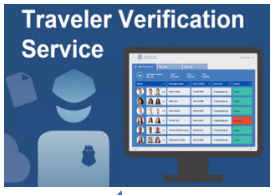
■ Customs and Border Protection (CBP) and airports/airline companies collaborate to launch "face pass" identity verification that also serves as departure passport control at boarding gates. (Expanded gradually from 2017 and currently in place at 32 airports)

CBP × airports/airlines　Biometric Exit Program

[Description] Document-free "face pass" boarding program that combines identification and departure passport control using facial recognition matching of live photos with CBP's database.

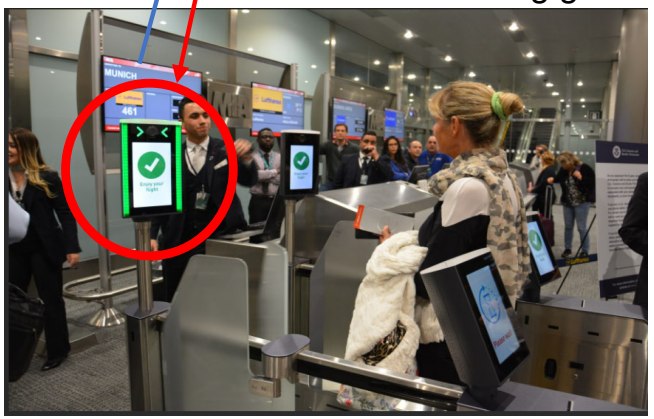
[Objectives] Departure passport control (biometric data acquisition), speeding up procedures

[Features]
- Linked with CBP's system, passengers complete the "face pass" process by simply presenting their faces to the camera at the boarding gate.
- Example of facial recognition (public sector) x terminal development (private sector) public-private partnership



Facial recognition matching System (TVS)

Matching　Decision　<Boarding gate>



(Image source: MIA website)

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(2) Example of Facial Recognition and "Face Pass" at Security Checkpoints

Security check

[Issue] The need to reduce waiting times and congestion at security checkpoints had become a social issue.

■ The Transportation Security Administration (TSA) has also begun using facial recognition to verify identity at security checkpoints. (from 2021)

Identification by facial recognition at security checkpoint entrances

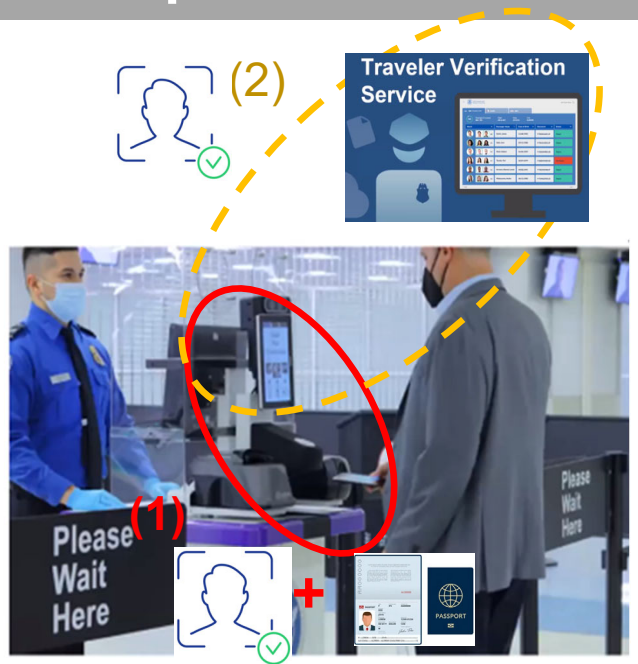
[Description]

Promoting the introduction of facial recognition technology in two stages

(1) Automated identification by using facial recognition to match ID documents and live photos (from 2021)

*Passport or other ID documents must be presented

(2) Introduction of "face pass" linked to CBP systems (from 2022)



(Image source: TSA website)

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(3) “Face Pass” at All Points of Departure

Check -in | Security check | CIQ (Departure) | Boarding

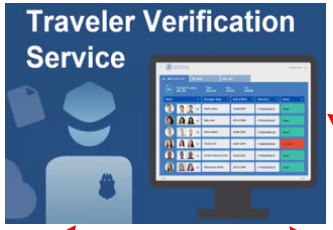
TSA/CBP × Delta Air Lines

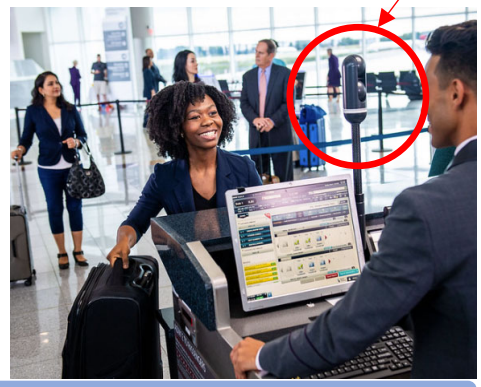
From December 2018

- First document-free “face pass” process at all points after check-in (baggage check-in, security check, boarding (departure)) in the U.S.*
- Example of identity verification using facial recognition (public sector) x facility and terminal development (private sector) public-private partnership

*Pilot program at Atlanta Airport (ATL), currently involving only Delta and its partners (5 companies)
*Initial passport scan required at the automatic check-in machine

Facial recognition matching system (TVS)





Check-in | Security check | CIQ (Departure) | Boarding

(Image source: Delta Air Lines, TSA website)

U.S. example

(4) Introduction of Facial Recognition at Immigration Check

CIQ (Entry)

[Issue] The need to reduce congestion and waiting times at immigration checkpoints had become an issue.

- Customs and Border Protection (CBP) has also introduced identification using facial recognition at immigration check. (from 2018)
- Adoption accelerated due to the COVID-19 pandemic, and all passengers at all airports will be able to use the system by June 2022.

Simplified Arrival Program

[Description] A program that matches live photos with CBP's database using facial recognition to automate identity verification.

[Objectives] Enhancing identity verification, streamlining and speeding up procedures, etc.

[Features]
- Facial recognition matching system enables instantaneous identification (Conventional screening is conducted for passengers without any data, such as first-time arrivals)
- Fingerprinting not required on second and subsequent arrivals

Facial recognition matching system (TVS)

Matching Decision

(Image source: CBP website)

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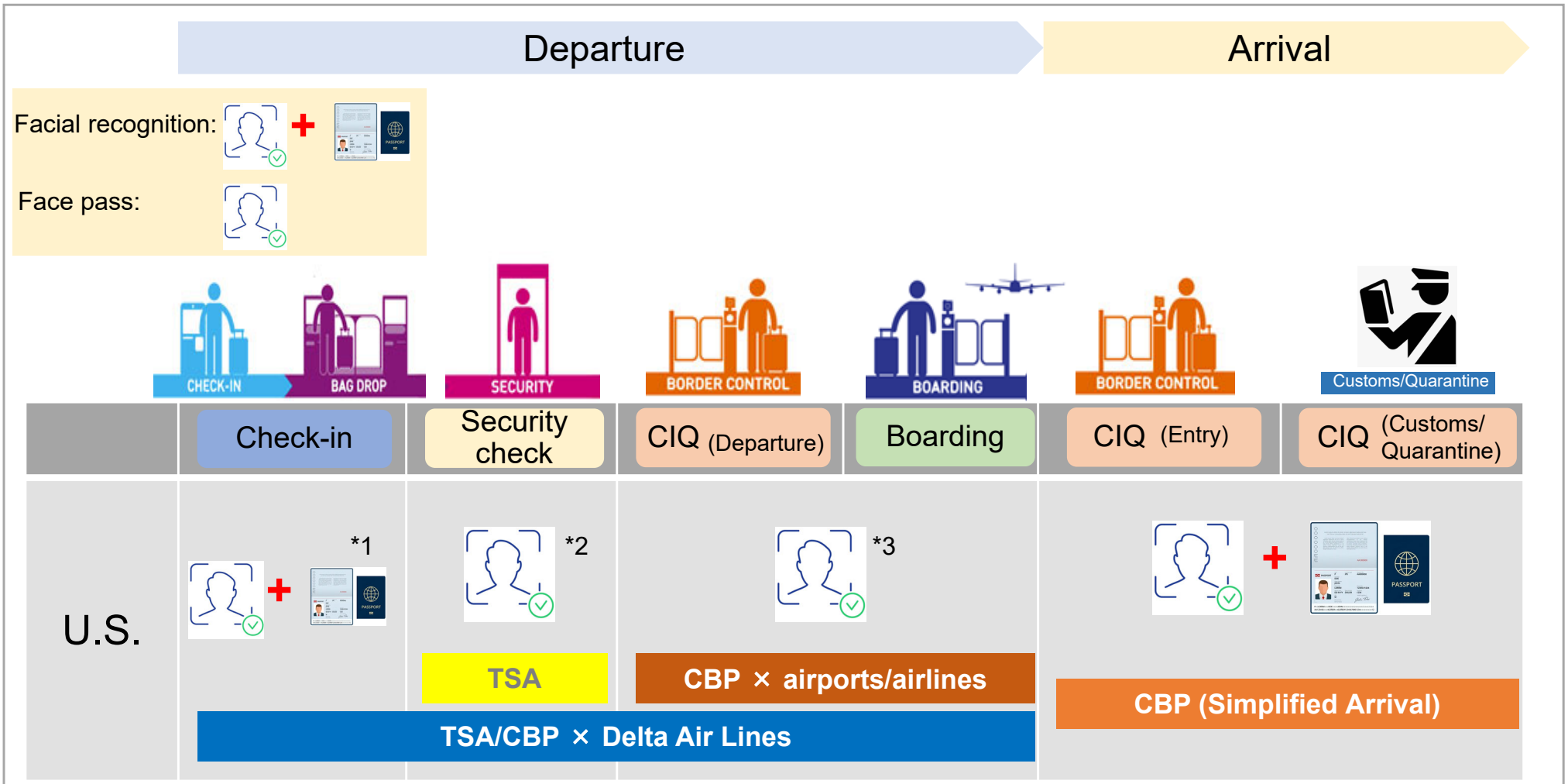
Status of Facial Recognition Technology (Facial Recognition and Face Pass) Adoption in the U.S.



*1 Implemented at some airports including Atlanta, Detroit, Houston, etc.
*2 Currently, only Atlanta Airport uses face pass, while other airports use facial recognition
*3 Implemented at 32 airports in the U.S. (including 25 of the top 30 U.S. airports in terms of passenger volume)

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Example of Facial Recognition at Immigration Check

CIQ
(Departure/Entry)

- In Europe, starting with the UK in 2008, immigration authorities have introduced facial recognition (automated gates) mainly at immigration checkpoints for the purpose of facilitating travel within the EU.
- In recent years, the use of automated gates has been expanded to include non-EU citizens, and there has also been a growing trend toward automation using facial recognition at departure passport control.

UK

(Image source: LHR website)

- Facial recognition automated gates at immigration check (from 2008)
- Installed at Heathrow and other airports

  * The UK has no departure passport control

Germany

(Image source: Wikipedia)

- Facial recognition automated gates at both departure passport control and arrival immigration check (from 2014)
- Installed at Frankfurt Airport and other airports

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Example of “Face Pass” at Departure

Check-in | Security check | Boarding

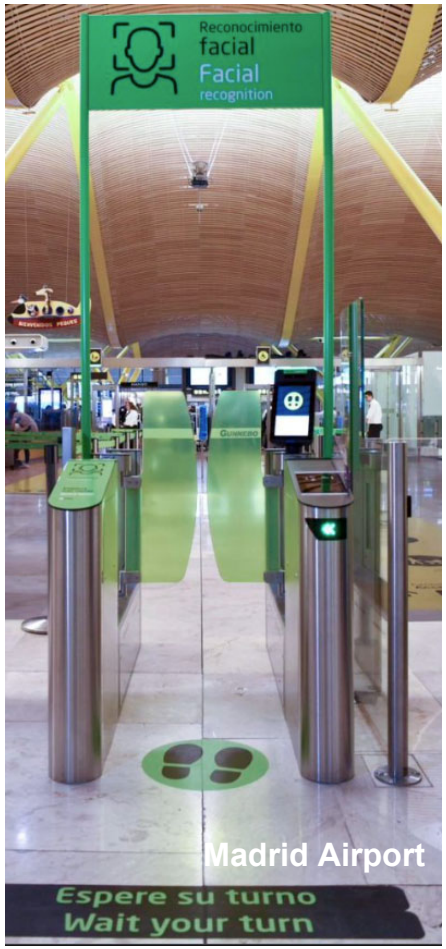
- Major European airports have partially introduced document-free “face pass” processes for baggage drop-off after check-in, security checks, and boarding, with the exception of departure passport control.

[Germany]	Frankfurt, Munich, Hamburg Airports
[France]	Paris-Orly, Lyon Airports, etc.
[UK]	Heathrow, Gatwick Airports (boarding only)
[Spain]	Barcelona, Madrid Airports, etc.
[Netherlands]	Schiphol Airport (boarding only)

and others

(Image source: Star Alliance website)

(Image source: VINCI website)



(Image source: AENA website)

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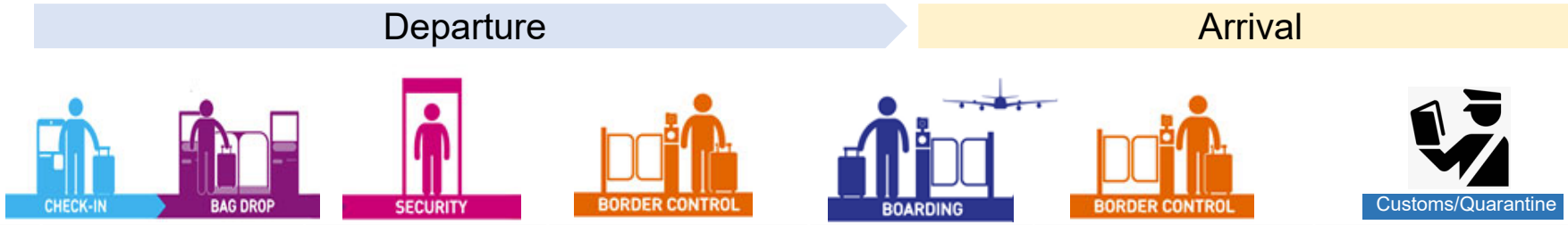
Status of Facial Recognition Technology (Facial Recognition and Face Pass) Adoption in Europe



	Check-in	Security check	CIQ (Departure)	Boarding	CIQ (Entry)	CIQ (Customs/ Quarantine)
Germany	*1	*1		*1		×
France	*2	*2		*2		×
UK	×	×	- *No departure passport control	*3		×
Netherlands	×	×		*4		×

*1 Available only for Lufthansa Group flights at three domestic airports as “Star Alliance Biometrics”
*2 Currently being tested for some airline flights/routes at airports such as Paris-Orly and Lyon.
*3 Currently being tested for some airline flights/routes at airports such as London Heathrow and Gatwick.
*4 Currently being tested for some airline flights at Schiphol Airport.

Facial recognition:
Face pass:

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[Reference] Facial Recognition Initiatives in Japan

Automated gate (Facial recognition) at immigration checkpoints

Phased in from October 2017*

CIQ (Departure/Entry)

- Matching of ID and live photos using facial recognition at automated gates.
- From 2019, also available for foreign nationals on departure.
- In preparation for 60 million foreign visitors to Japan, more inspectors will be assigned to immigration checks for foreign nationals, with the aim of maintaining rigor and streamlining procedures.

*As of June 2022, in operation at seven airports: Narita, Haneda, Chubu, Kansai, Fukuoka, Shin-Chitose, and Naha.

The Electronic Customs Declaration Gates (facial recognition) at customs checkpoints

Phased in from April 2019*

CIQ (Customs)

- (1) Electronic declaration via app, etc. (2) Matching ID and live photo using facial recognition (3) Passing through the gate with a face pass.
- Also available for use by foreign nationals.
- Intended to shorten waiting times for the increasing number of passengers entering the country, streamline procedures, and alleviate congestion.

* As of June 2022, in operation at seven airports: Narita, Haneda, Chubu, Kansai, Fukuoka, Shin-Chitose, and Naha.

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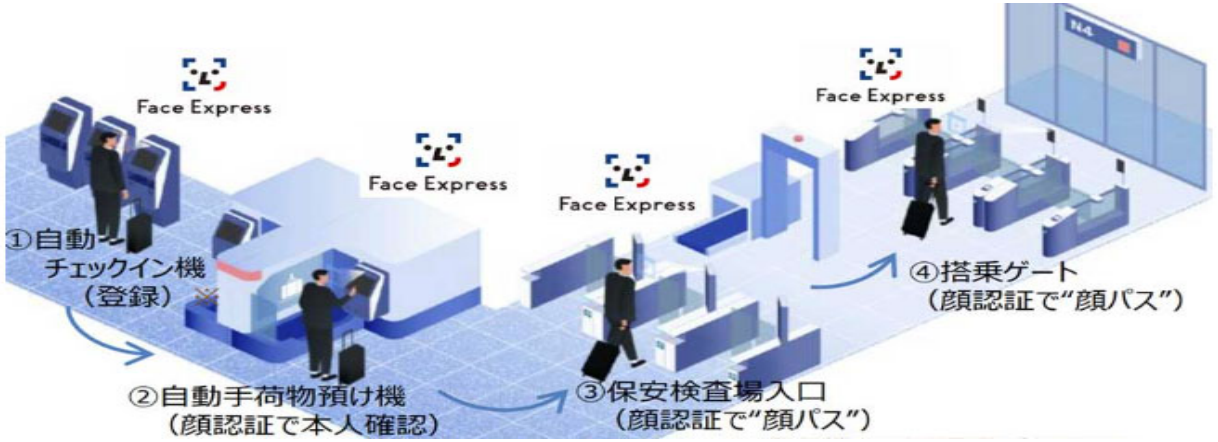
[Reference] “Face Pass” Initiatives in Japan

Check-in | Security check | Boarding

“Face Express” at Haneda and Narita Airports

From July 2021*1

- Document-free “face pass” processes at each point of departure*2.
- At the first checkpoint at the airport (e.g., automatic check-in machines), the passenger's boarding information, passport information, and facial information are linked.
  - ⇒ Passengers then pass through baggage drop-off, security checkpoints, and boarding gates with a “face pass.”



(Image source: Narita Airport)

*1 Available only for passengers on JAL and ANA flights (as of June 2022)
*2 Excludes departure passport control

At Japanese airports, efforts are underway at both public and private sector checkpoints to improve operational efficiency and facilitate movement through the use of facial recognition technology.

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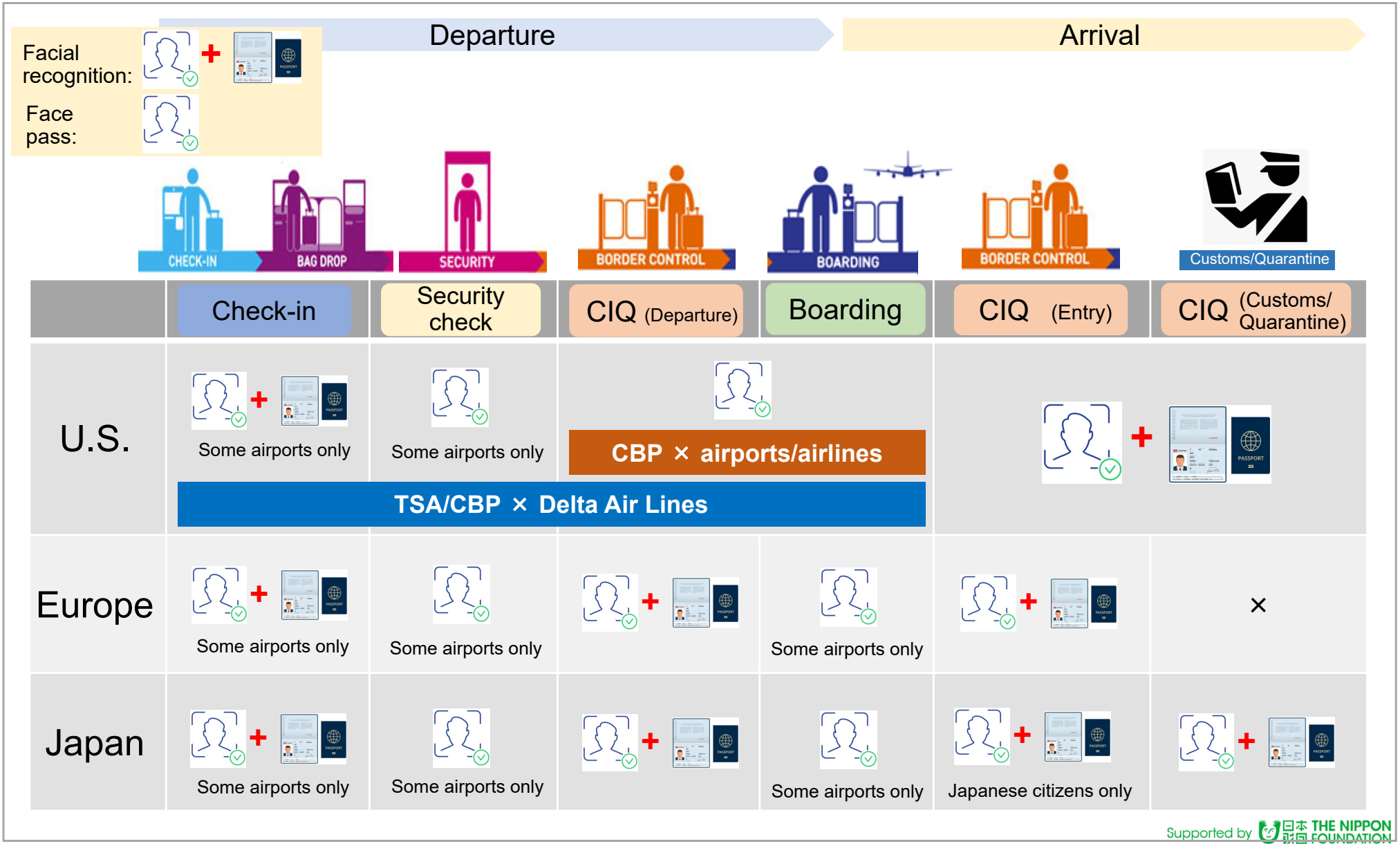
Summary (Status of Introduction of Facial Recognition and Face Pass in the U.S., Europe, and Japan)



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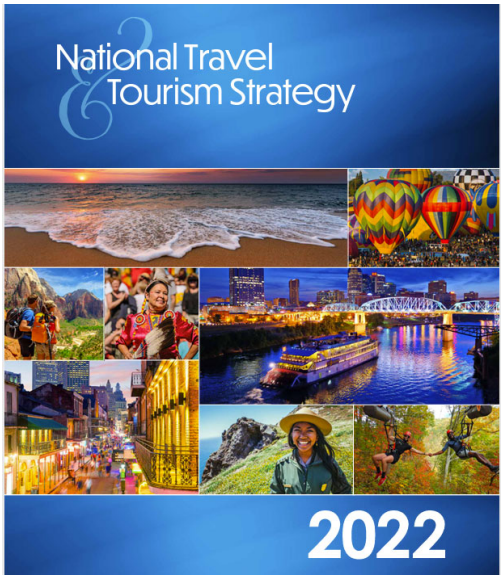
New U.S. Government Travel and Tourism Strategy

- In June 2022, the U.S. Department of Commerce released the 2022 National Travel and Tourism Strategy.



(Image source: U.S. DoC website)

[Targets] By 2027:
Annual travelers: 90 million
Economic benefits: 279 billion USD (approx. 37 trillion JPY)
(Reference: 79.4 million people and 239.4 billion USD in 2019)

[Measures] (1) Strengthen promotion in the U.S.
(2) Streamline travel to and within the United States
(3) Ensure a diverse, inclusive, and accessible tourism experience
(4) Promote resilient and sustainable travel and tourism

Action guidelines for (2) Streamline travel to and within the United States

- To improve the passengers' experience of air travel, the strategy includes promoting the introduction of facial recognition and digital IDs, promoting remote processing of visas, etc., developing a strategy for the recognition of digital health certificates, and strengthening cooperation between nations in sharing passenger data.

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Airport Security Check

(Image source: ACI website)

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U.S. Government Policy on Airport Security Checks

Security check

Executive Order on Transforming Federal Customer Experience and Service Delivery to Rebuild Trust in Government (December 13, 2021)

- This aims to harness technological innovation to modernize administrative services, minimize time costs for the public, and improve passenger experience.

[Department of Homeland Security (DHS) Secretary's Action Guidelines (Airport-Related) in the Executive Order]

Test the use of innovative technologies at airport security checkpoints to reduce passenger wait times.

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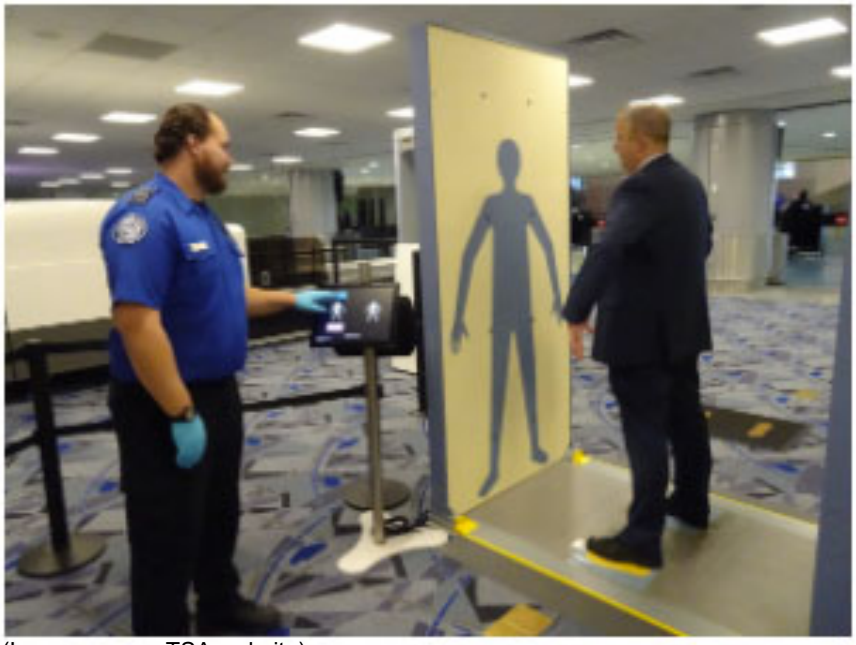
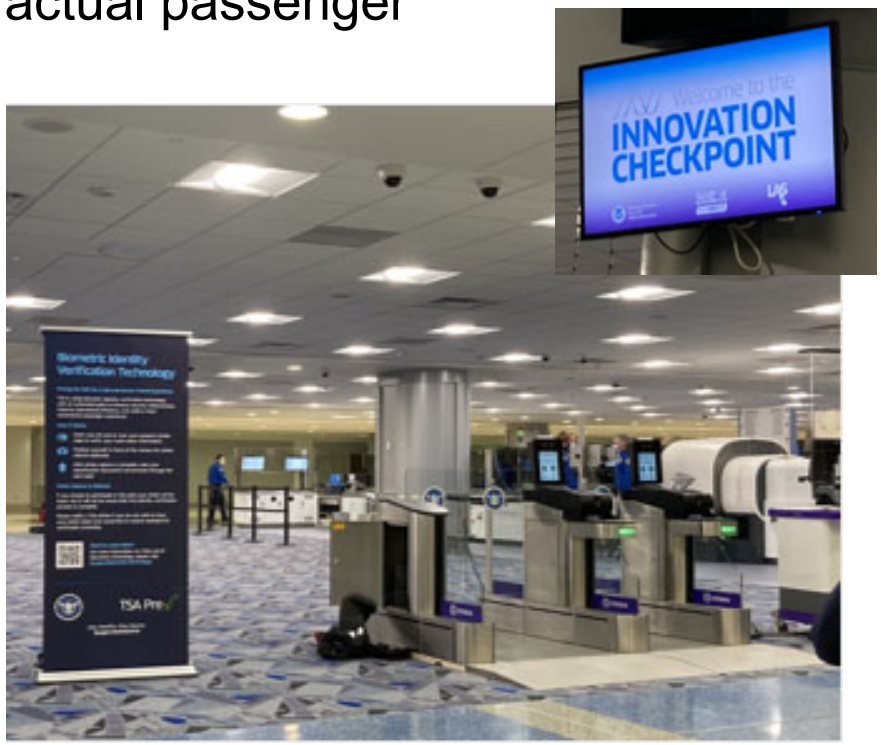
(1) TSA Innovation Checkpoint

Security check

- Test site for latest technology for security checks at Las Vegas Airport. (from 2019)
- Compares products from multiple vendors and acquires/evaluates/verifies data in real-time while conducting actual passenger security checks.



(Image source: TSA website)



(Photo by presenter)

In addition to testing innovative technologies, it also aims to promote understanding and interest on the part of stakeholders.

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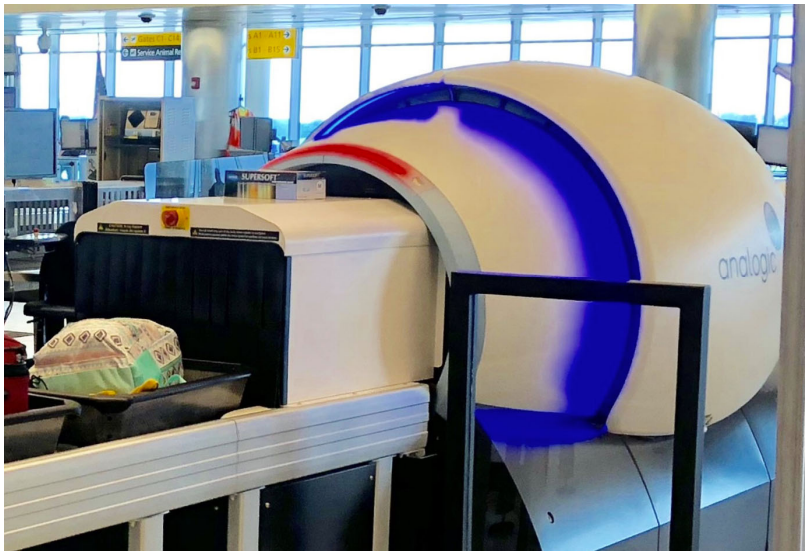
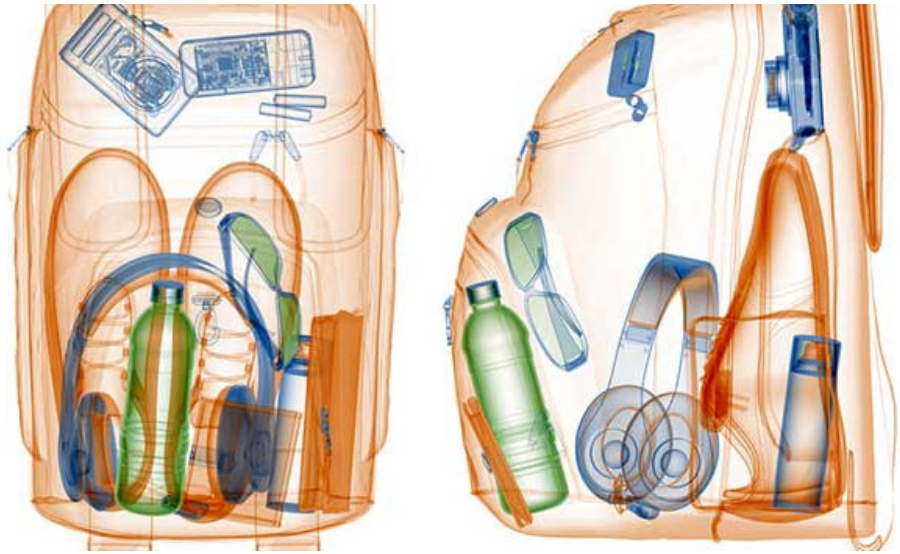
(2) Computed Tomography (CT) Scanners

Security check

- Utilizes CT technology from the field of medicine. (3D images that can be rotated 360 degrees)
- AI machine learning features have also been added to enhance hazardous material detection capabilities.
- Allows computers, liquids, etc. to be carried in without removing them from carry-on baggage.



(Image source: TSA website)



(Illustration)

In the U.S., the TSA has concluded a large contract with Analogic (U.S.) for more than 1,000 units at a total cost of approximately 1 billion USD (approx. 130 billion JPY) for 2021 to 2022, and the equipment is gradually being phased in.

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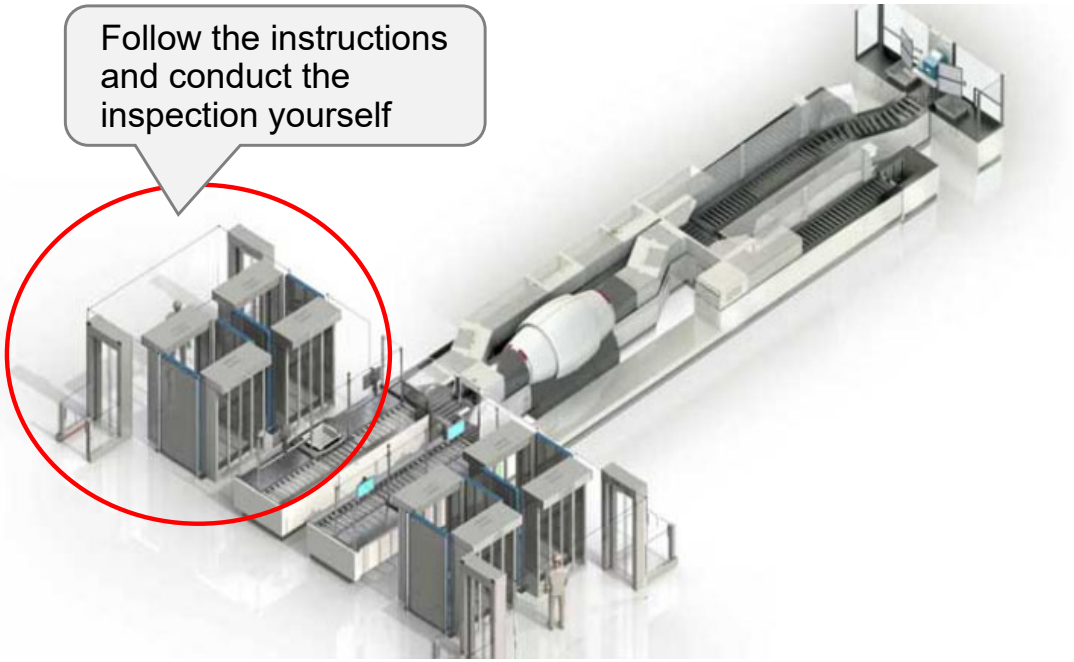
(3) Apex Screening at Speed Program

Security check

- A collaborative technical research program between industry, government, and academia for DHS security checks.
- Promote technological innovations such as further automation of security checks and AI machine learning.

<Self-screening inspection device (illustration)>



(Image source: U.S. DHS website)

<Walk-through inspection device (illustration)>

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Virtual Queueing

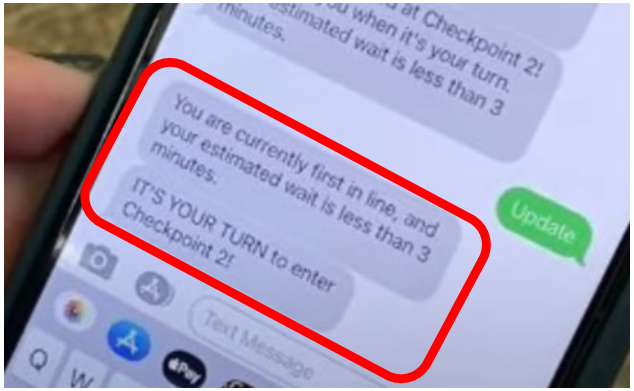
Security check

- “Wait your turn without standing in line” services as seen at theme parks/restaurants, etc.
- Passengers wait their turn in the virtual system and go through a dedicated lane at a time allocated by the AI.
- Highly evaluated for its contribution to avoiding congestion and reducing waiting times during the COVID-19 pandemic.

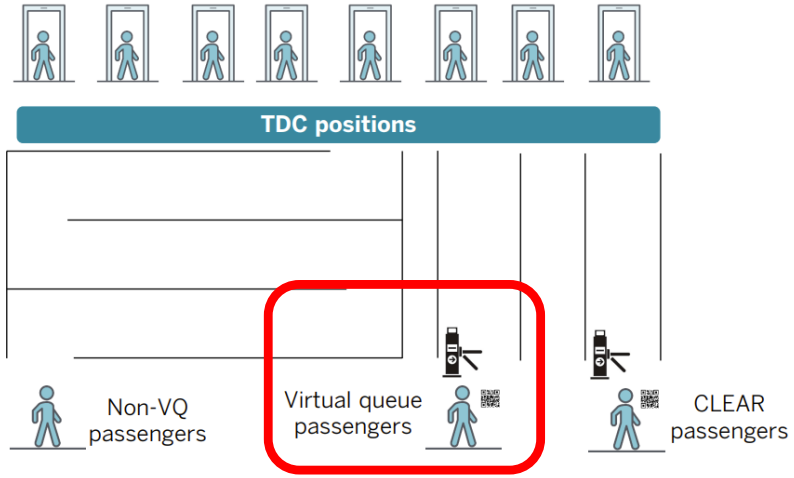
(1) Log in to a dedicated page using a QR code

(Image source: SEA website (SEA Spot Saver))

(2) Smartphone notification when your turn comes



(3) Go through the security checkpoint in the dedicated lane



(Image source: Copenhagen Optimization website)

Full-scale operations began at Seattle-Tacoma International Airport in September 2021, and the service is now in operation at eight airports in the U.S., including New York (JFK/EWR), Los Angeles, and others. (As of June 2022)

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Initiatives to Enhance Security Checks in Europe

Security check

- Efforts are also underway in Europe to enhance security checks by introducing the latest technology.

Examples of advanced security checks in Europe

[Netherlands] Schiphol Airport
2020 — First introduction of CT scanners at major European airport
(21 units installed)

[UK] Heathrow Airport, etc.
Project to introduce CT scanners at major domestic airports by December 2022 is underway.

[Italy] Milan Linate, Milan Malpensa Airports, etc.
2020 — CT scanners installed (38 units installed at two airports)

[Ireland] Shannon Airport
2021 — CT scanners installed (4 units installed)

and others


Schiphol Airport

(Image source: AMS website)

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Conclusion

- It is hoped that efforts such as **the use of facial recognition technology** and **the enhancement of security checks through the use of AI/CT technology, etc.** will promote further efforts to not only help meet future increases in demand, but also to restore travel in the current post-COVID era.
- In the U.S. in particular, there are examples of **government agencies and private operators working to improve operational efficiency and customer experience through active collaboration** based on laws, regulations, and presidential executive orders, and further development is expected under the new travel and tourism strategy.
- With momentum building for recovery of demand for air travel following the pandemic, we will continue to monitor the expansion of efforts to streamline movement and improve the passengers' experience at airports in Europe and the U.S.

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[Reference] Example of Full “Face Pass” Implementation on Domestic Flights

Check-in | Security check | Boarding

TSA/CBP × Delta Air Lines

From February 2021

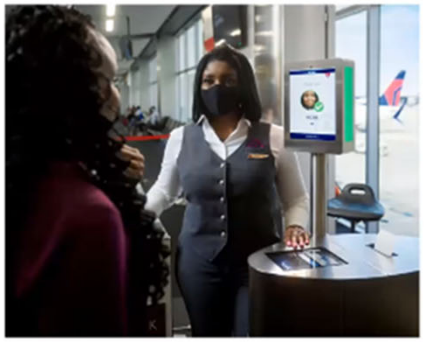
- First “face-pass” process for domestic flights in the U.S., with no need to present documents at the airport*
- After check-in via mobile, “face pass” at all points (baggage drop-off, security check, boarding)
- Example of identity verification using facial recognition (public sector) x equipment (hardware) development (private sector) public-private partnership

* Currently being tested at Atlanta (ATL) and Detroit (DTW)
* Available only on Delta flights for TSA PreCheck members who have registered their biometric information (face + fingerprints) in advance.
* Simply enter ID information and TSA membership number at mobile check-in and pass through each point with a "face pass" without ever having to present any documents at the airport

Delta + TSA PreCheck Digital ID Touchpoints

Move from “curb to gate” without needing physical ID or boarding pass

Check-in | Security check | Boarding



(Image source: Delta Air Lines website)

[Reference] Examples of “Face Pass” Overseas (Other)

Singapore

Boarding procedures | Security check | CIQ (Departure and arrival)

Changi Airport

(Image source: SIN website)

- Introduced the world’s first biometric authentication (face + fingerprint) process, requiring no documents from check-in to boarding. (2017)
  - ⇒ Converted to “face pass” requiring no fingerprint in 2020
- Immigration check using facial recognition + iris also launched. (2020)

UAE

Boarding procedures | Security check | CIQ (Departure and arrival)

Dubai International Airport

(Image source: DXB website)

- Introduction of the world’s first “face pass” Smart Tunnel, which enables immigration check by simply passing through. (2018)
- Implementation of “face pass” without the need for documents, also for departures (from check-in to boarding).(2020)

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[Reference] Examples of Biometric Identification and “Face Pass” Overseas (Other)

South Korea

Security check

14 domestic airports including Gimpo and Jeju

(Image source: FUJITSU website)

- Introduction of the world’s first identification using palm vein recognition at security checkpoint entrances. (2020)
  *When using domestic flights
- Biometric technology from Japan (Fujitsu).

China

Boarding procedures | Security check | CIQ (Departure)

Beijing Capital International Airport

(Image source: SITA website)

- Implementation of “face pass” processes from check-in to boarding, without the need for documents. (2020)
- Payment using “face pass” at duty-free shops also available.

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