Challenges in airport digital transformation

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INAIR   2018

Content

1. Airport management challenges

2. Airport 4.0

3. The basic steps of digital transformation

4. The axes of work for digitalization in the airport sector

5. International Henri Coandă Airport toward Airport 4.0

6. Management of Human Resources

1. Airport management challenges

- As **passenger volumes increase faster than new airports or terminals can be built**, demand is placed on airport management **for more complex and timely decision.**

- Cost must be controlled, **productivity must be improved and security enhanced.**

- And all of this must be done at the same time as meeting the **increased expectations of passengers** for smooth and efficient services which ensure hassle-free travel.

Center on Interactions Among Passengers, Baggage, and Customer Groups

Ground Handling

Cleaning, catering, cargo handling, aircraft maintenance, and fueling

Dispatch and Command

Touch-down

Taxiing

The designated stand

Cabin door opens

Collaborative Decision Making

Take-off

Taxiing

Cabin door closes

Pushback

Airfield

Departure

Arrival, check-in, baggage drop, security check, waiting, and boarding

Arrival

Deplane, customs clearance, baggage claim, transfer, and hotel

Terminal area

Public area

Travel plan

VIP services

Center of interactions

2. Airport 4.0
- digital airport -

- **A performant airport**
  - An airport focused to the customer
  - An airport innovative
- **An agile airport**
  - An airport connected by network(ACDM)
  - An airport flexible
- **A responsible airport**
  - A clean airport (using green energy)
  - An airport centered on human

Airport 4.0

- Digitalization
- Environment
- Intermodal transport
- Human resources

1. Airport environment assesment

– A multidimensional review of airport's characteristics

2. Airport plan and objectives

– Agreement on the priorities and actions of specific digital plans

3. Internal organisational review and requirements

– An assessment of current organization and competencies versus what is needed to remain flexible and agile through the digital transformations.
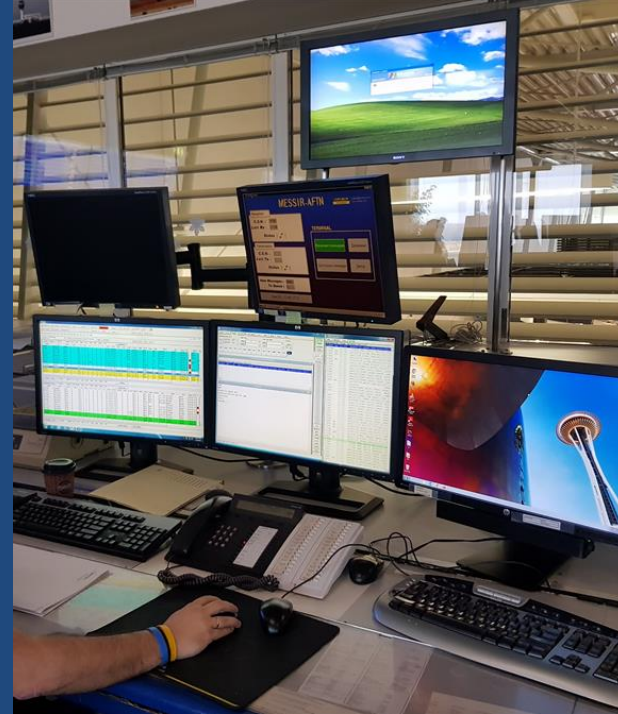
4. The axes of work for digitalization in the airport sector

4.1 Increasing connectivity

Smart airport services (ACDM 2)

Connected airport (ACDM)

Connect humans

Lead airport (APOC)

4.2 Development of software that communicates

Huawei

iAirport Operations

NIIT technologies

4.3 The virtual for supporting decisions

Development of appropriate models

Simulate the functionality of airport

Lead the airport

ibs
Inventing future

4. The axes of work in the airport sector (continuation)

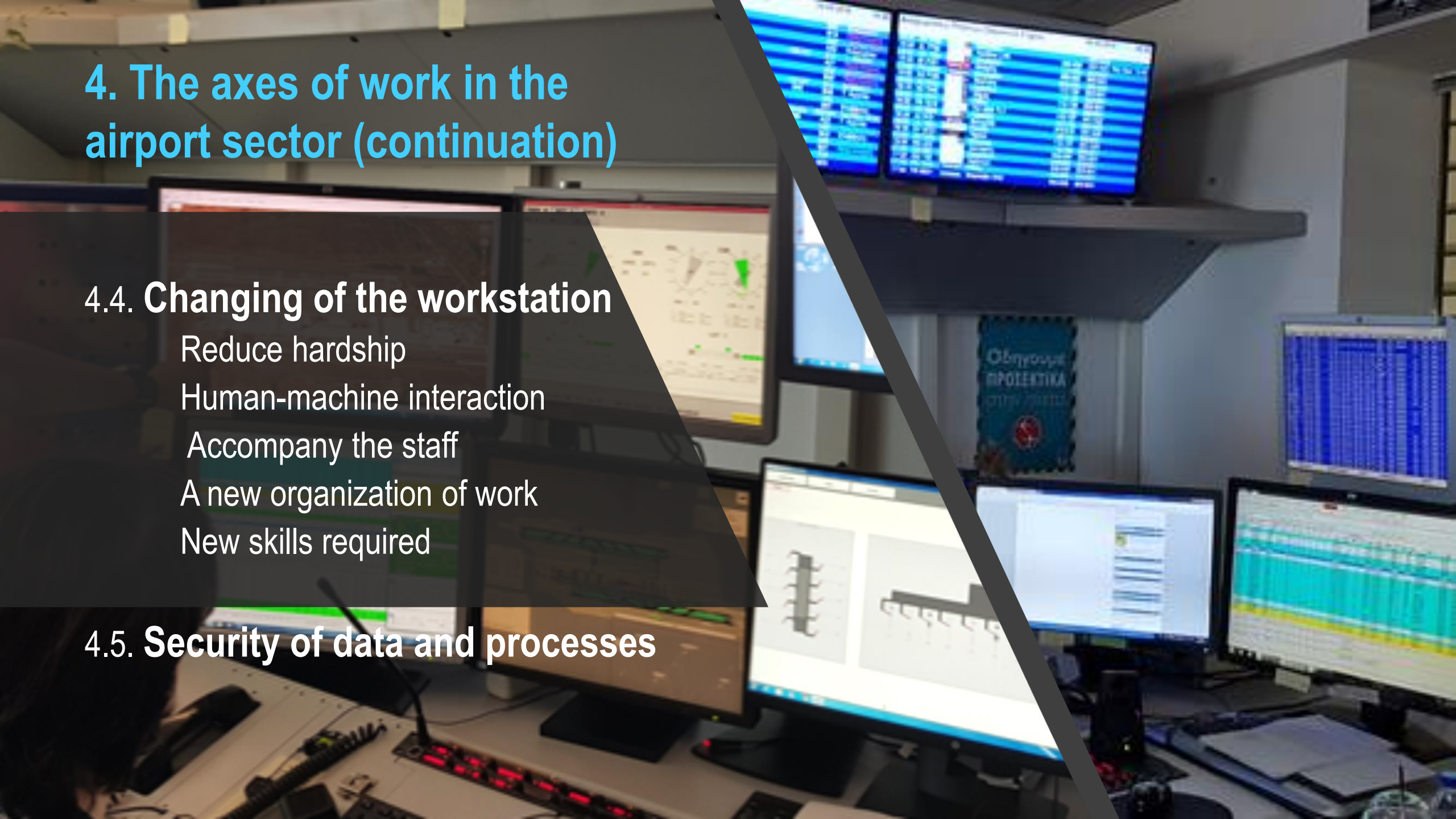## 4.4. Changing of the workstation

- Reduce hardship
- Human-machine interaction
- Accompany the staff
- A new organization of work
- New skills required

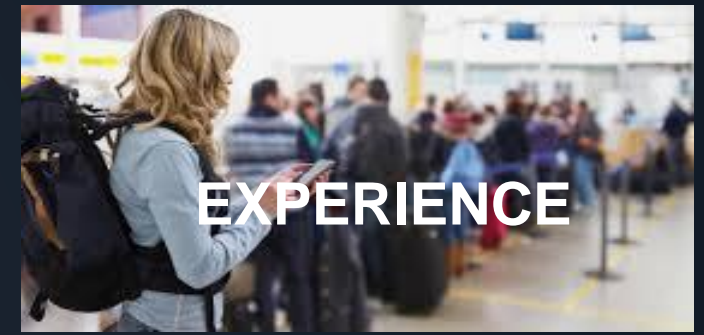## 4.5. Security of data and processes

Airport missions:
Ensure Safety First, Optimize Services, Achieve Normal Flight Operations

SAFETY
EVERY STEP OF THE WAY

EFFICIENCY

EXPERIENCE

Shorten incident response time and improve collaborative emergency response capabilities

Cut aircraft turnaround time

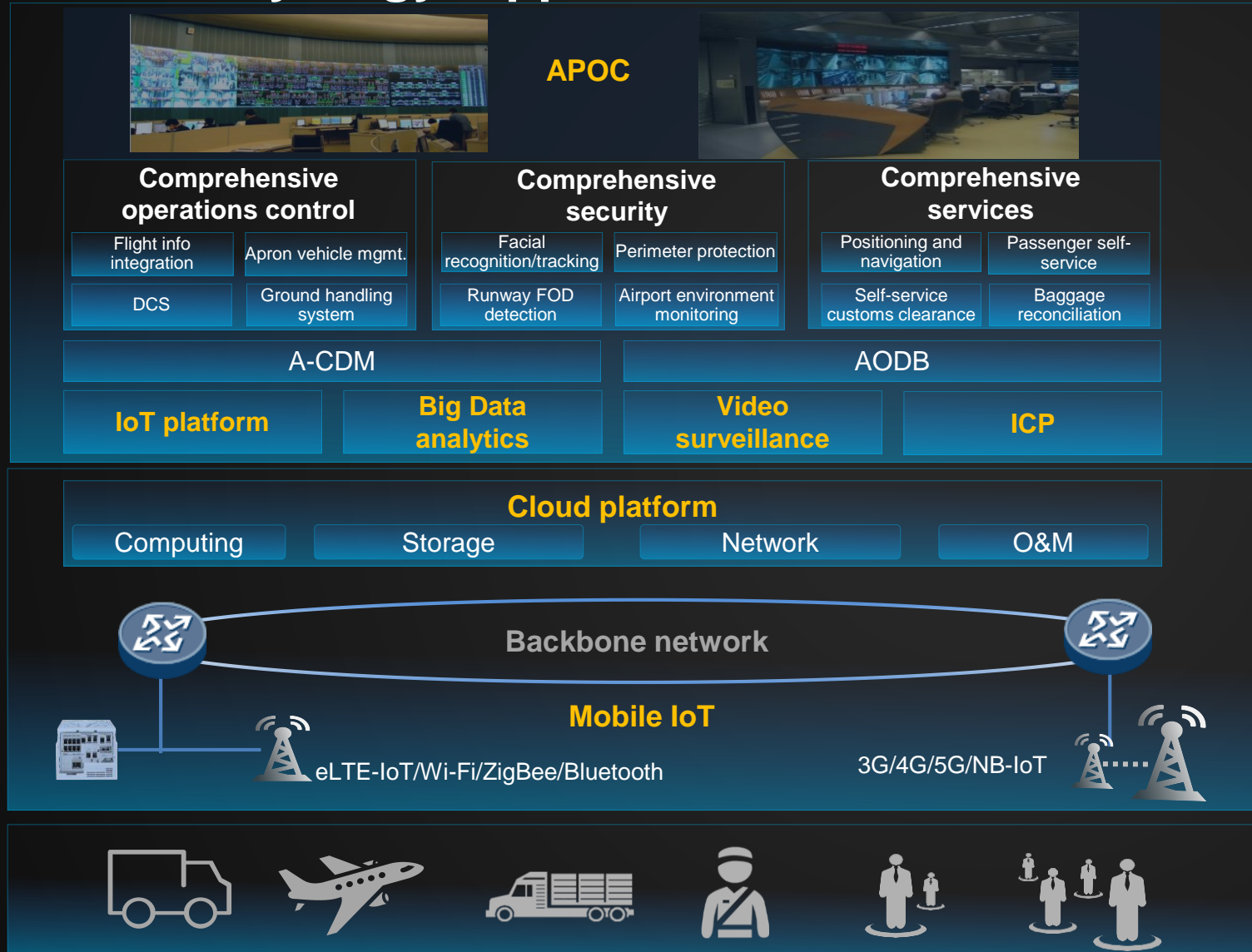Minimize passengers' time at customs and security checks to increase shopping/meal time

Big Data   **AI**   **Video**   **IoT**   **Cloud Computing**   **Mobility**

Continuous innovation in technology

Challenges in digital transformation

Smart Airport Solution: Situational Awareness, Cloud-and-Network Synergy, Application Enablement, and Visualized Businesses

APOC

Comprehensive operations control
- Flight info integration
- Apron vehicle mgmt.
- DCS
- Ground handling system

Comprehensive security
- Facial recognition/tracking
- Perimeter protection
- Runway FOD detection
- Airport environment monitoring

Comprehensive services
- Positioning and navigation
- Passenger self-service
- Self-service customs clearance
- Baggage reconciliation

A-CDM | AODB

IoT platform | **Big Data analytics** | **Video surveillance** | **ICP**

Cloud platform

Computing | Storage | Network | O&M

Backbone network

Mobile IoT

eLTE-IoT/Wi-Fi/ZigBee/Bluetooth | 3G/4G/5G/NB-IoT

E2E Visualization and Collaboration

Integration + Verification
(Comprehensive operations control, security, and services)

Data management

Cloud, Big Data, AI, Data mining

Integrate industry capabilities
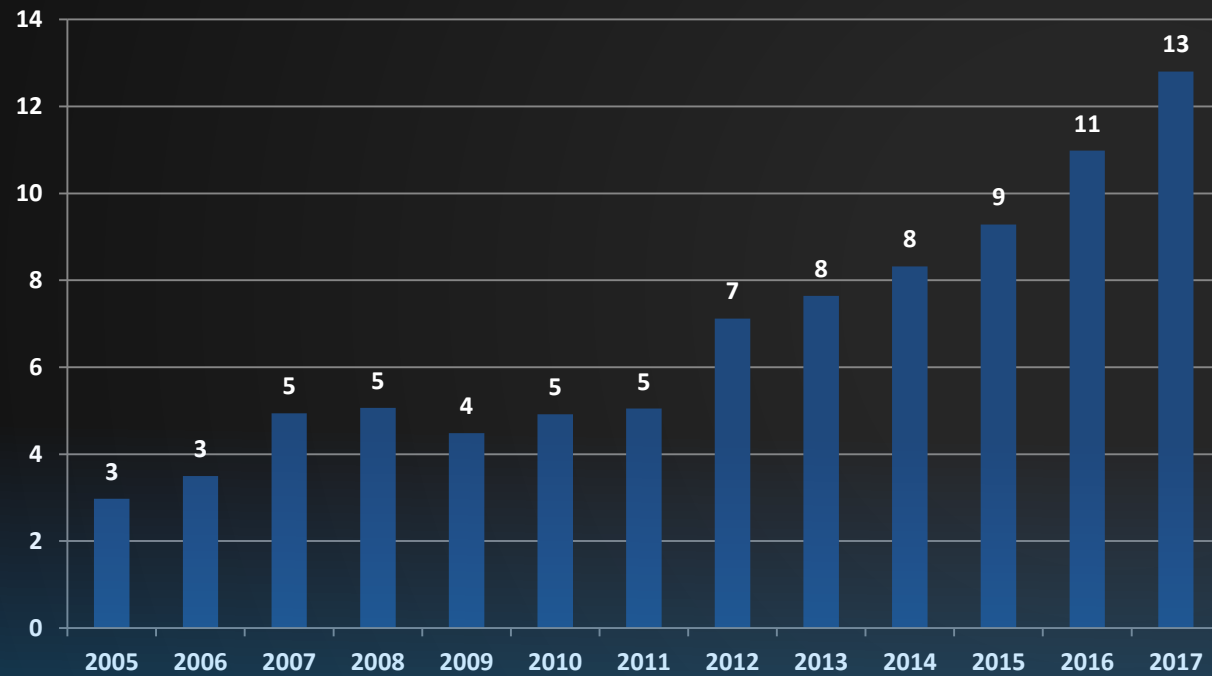**(Platform + Ecosystem)**

Cornerstone of Digital Transformation (Technologies for communications)

Mobility + IoT+ Smart processes
Virtual reality, Digital twin, Augmented reality
Video
(Wireless, wired, and chips)

Challenges in digital transformation

5. International Henri Coandă Airport toward Airport 4.0

Annual passenger traffic on HCIA (in million pax)

International Henri Coandă Airport toward Airport 4.0

Categories of problems identified and which could be solved by digitalization methods:

High volume of passengers vs. the airport capacity

Outdated infrastructure in the old departure terminal

Airport congestion

Benefits of applying digitalization methods on HCIA

- Airport operations management optimisation
- Passengers flow optimization
- Relation of the airport with stakeholders

Departure control system analysis at HCIA – capacity management

1. Implementation of another **13 self-service counters**

   - 41.9% increase in processing capacity from 2790 to 3960 pax/peak hour/flow

Passenger processing	Present processing time	Optimistic approach
Processing time/pax	2 min/pax	30 sec/pax

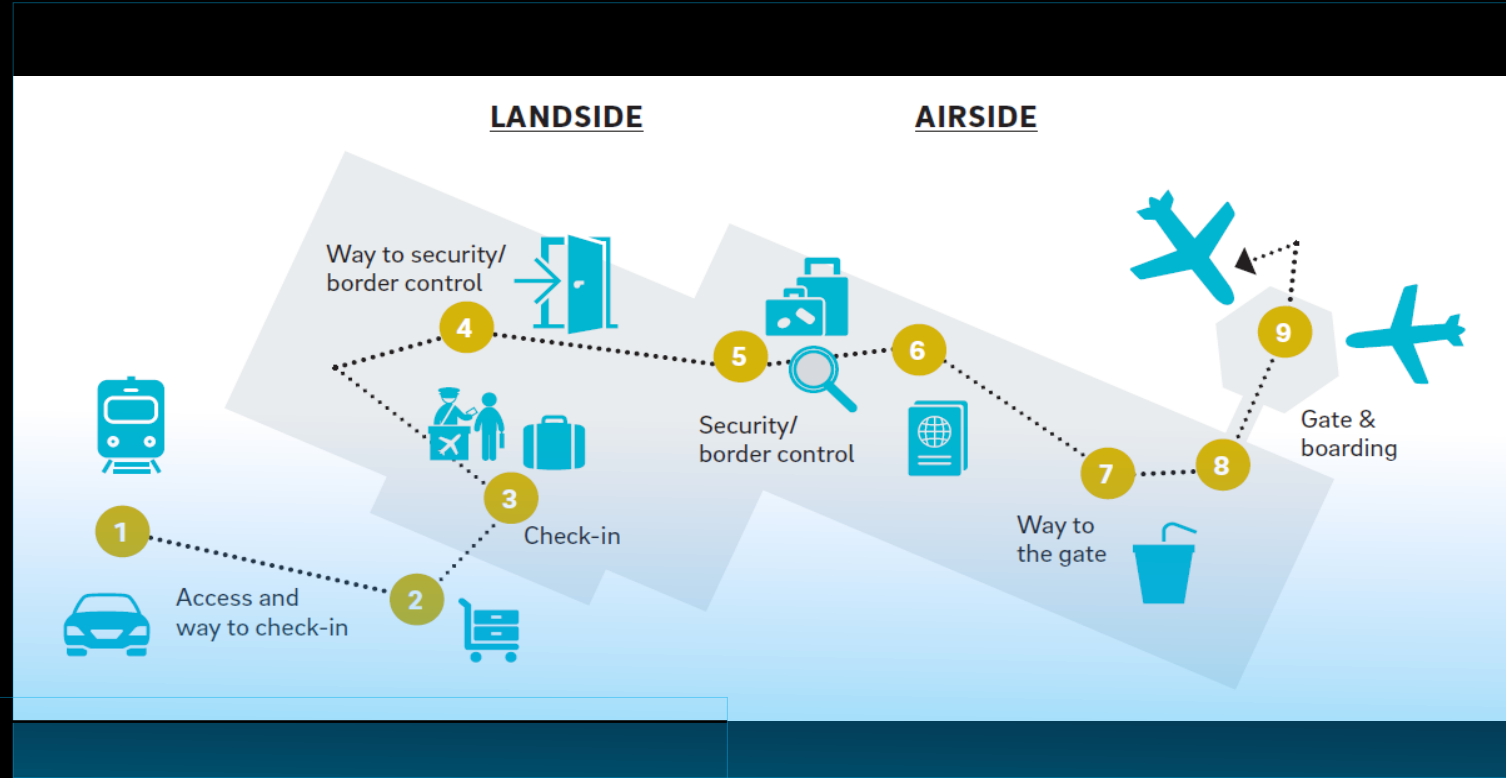| Passenger processing	Current processing	Optimistic processing
93 counters considered	2790 pax/peak hour/flow	3960 pax/peak hour/flow
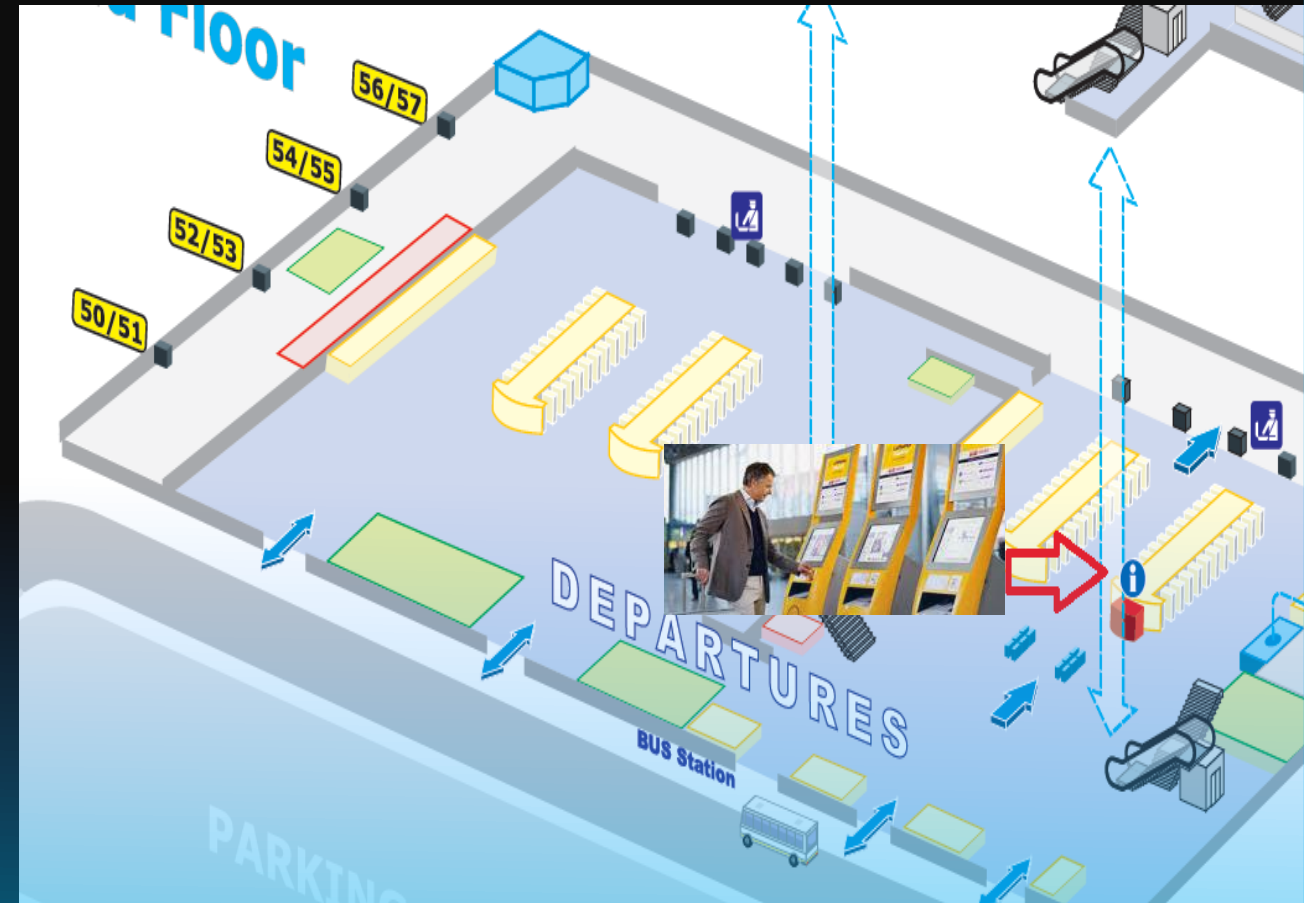
Departure control system analysis at HCIA

2. Security control

- automatic security control systems
  - 1811 pax/hour/control point

LANDSIDE

AIRSIDE

Way to security/ border control

Security/ border control

Gate & boarding

Check-in

Way to the gate

Access and way to check-in

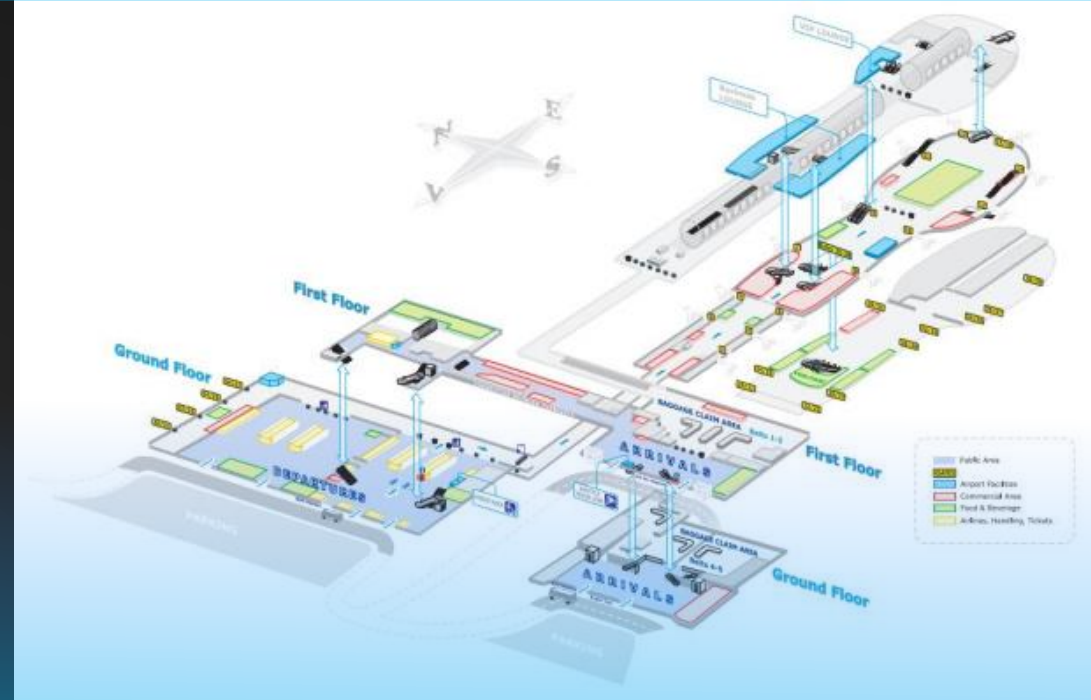| Passenger processing	Current processing	Optimistic processing
9 security checkpoint considered	1249 pax/ hour/control point	1811 pax/hour/control point

Departure control system analysis at HCIA

3. Border control
  - replacement of half of the control points with biometric passage gates

- an increase of apx 62.5% (i.e. 3380 pax/hour) of processing capacity

Passenger processing	Current processing	Optimistic processing
Considered hypothesis	2080 pax/hour	3380 pax/hour

Departure control system analysis at HCIA

4. Boarding
  - implementing an automatic boarding system

- 22 minutes for a flight (for an average of 150 pax/flight, 8.8 s / pax)

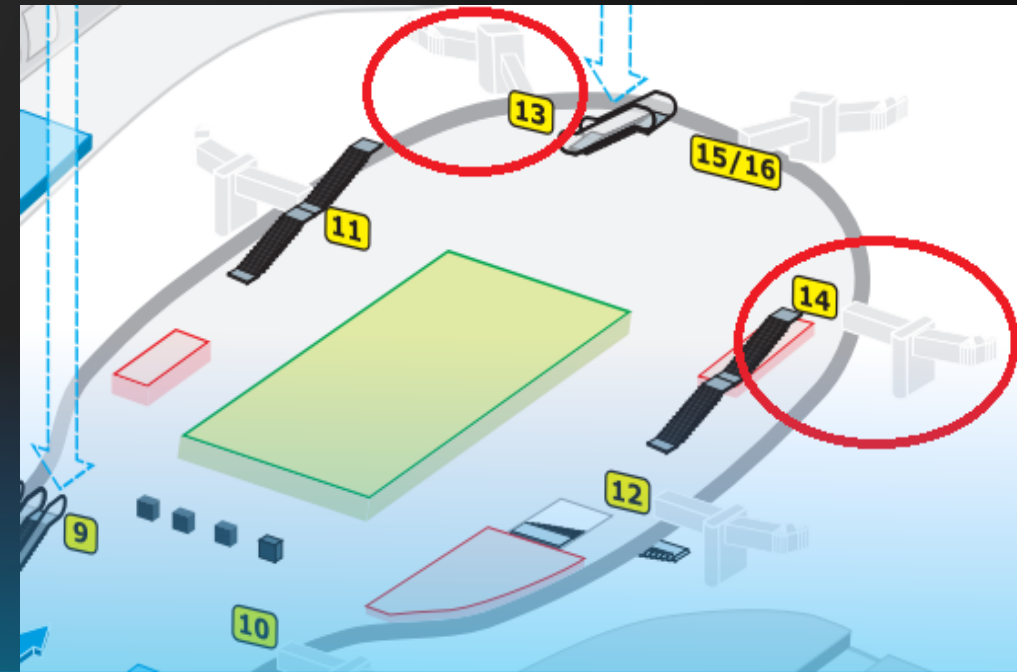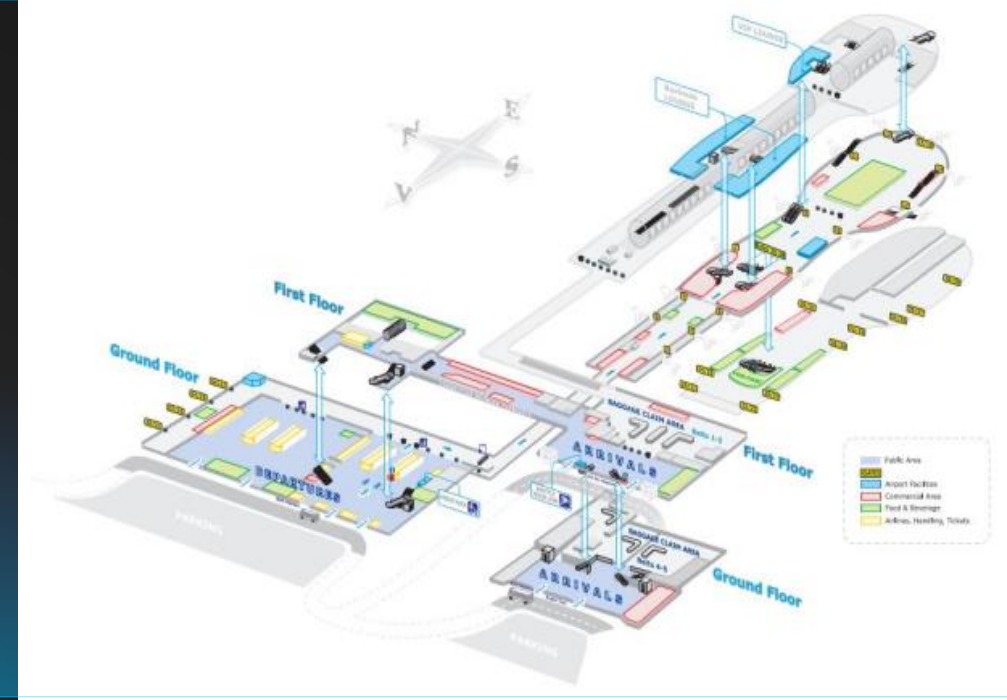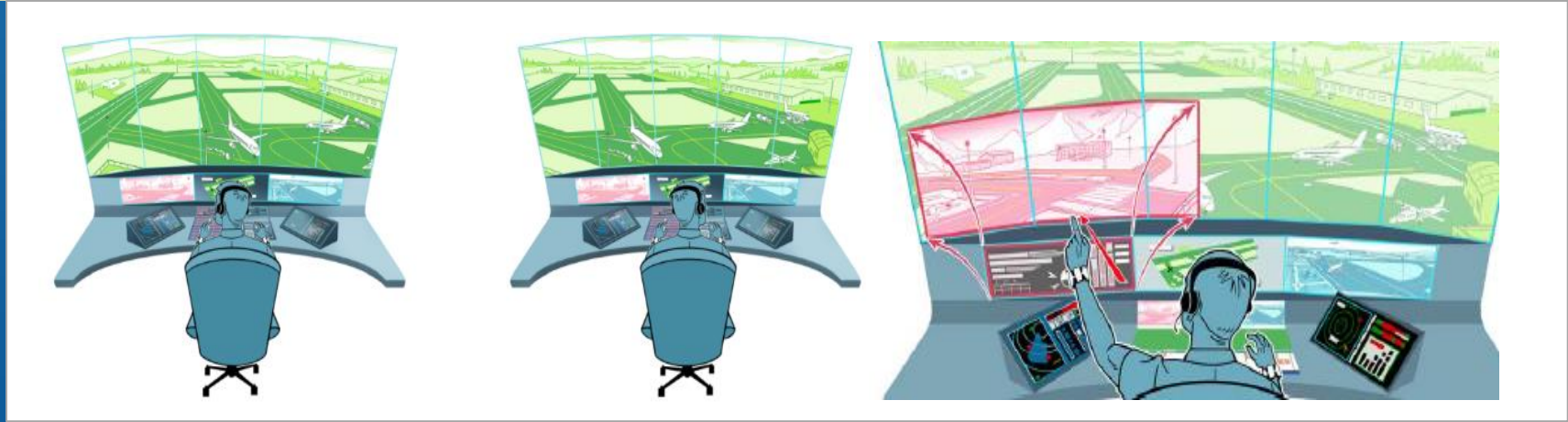| Passenger processing at boarding	Number of passengers/flight	Optimistic processing time/pax	Optimistic processing time/flight
150 pax	3.3 sec	8.25 min	

6. Management of Human Resources

The changing nature of work

BIG DATA & CONNECTED SYSTEMS

MULTI SENSORY INTERACTION

AUGMENTED REALITY

REQUEST APPROVED!

The changing nature of work
Emerging occupations (Examples)

ATC/ATM VIRTUALIZATION AND AUTOMATION	AUTONOMOUS SYSTEMS	SECURITY AND CYBER-SECURITY	ELECTRIC AND SUSTAINABLE AIRCRAFT

- Remote tower controllers
- AI engineers/VR experts
- Big data analysts
- Robotics engineering

- Drone operators
- Automated vehicle operators
- Designers of autonomous vehicles
- Safety officers for unmanned systems

- Software and AI engineers
- Big Data and analytics experts
- Security (& cyber security) experts
- Legal services personnel and ethics and privacy protection specialists

- Energy and maintenance engineer
- Electrical engineer/ Alternative Vehicle Developers
- Climate Change Reversal Specialist
- Consumer Energy Analysts
- Battery Technician
- Solar Flight Specialists

fppt.com

Interdisciplinary master "IT applied in aviation"

- **The purpose of this advanced Master's programm** is to provide students with a broad range and depth interdisciplinary knowledge.

- Will be organized by **modules, function of background of graduates.**

- Will use **new modes of delivery**:
  - **- distance,** through new forms of personalized learning
  - - strategic use of **open educational resources, virtual mobility**
  - **- European internships** in the main air transport employers.

" GREEN, SMART AND INTEGRATED TRANSPORT AND LOGISTICS"

United Nations
Educational, Scientific and
Cultural Organization

UNESCO Chair on Engineering for Society,
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Romania

Master taught in English
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- 20 with fees

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Thank you for you attention!