IoT Applications for Smart Airport

Airport Authority Hong Kong
Airport Authority Hong Kong (AAHK)

- **AAHK**: A statutory body wholly owned by the HKSAR Government

- **Mission**: To strengthen HK as a leading international and regional aviation centre
### Overview of HKIA

- **Open Since**: 6 July 1998
- **Total Site Area**: 1,255 hectares
- **No. of Runways**: Two
  - 3,800m (L) x 60m (W) each
- **Total Terminal Area**: 855,000 sq m
  - including Terminal 1, Terminal 2, North Satellite Concourse, SkyPier and Midfield Concourse
- **Total No. of Aircraft Parking Stands**: 182
  - Passenger apron: 106;
  - Cargo apron: 43;
  - Others: 33 for Long term parking and maintenance
Airport IT Technology Trends

The top 3 investment priorities in 2014 are passenger, security, and operations.

Most new technology initiatives are IoT related.

New technology initiatives by 2017:

- Cloud services: 30% major program, 41% evaluation program, 29% no plans
- Geo-location: 30% major program, 30% evaluation program, 40% no plans
- New Wi-Fi via Hotspot 2.0: 22% major program, 30% evaluation program, 48% no plans
- Near Field Communication: 7% major program, 39% evaluation program, 51% no plans
- Digital Tags: 3% major program, 45% evaluation program, 48% no plans
- iBeacons: 3% major program, 30% evaluation program, 67% no plans
- Wearables: 15% major program, 30% evaluation program, 84% no plans

Source: SITA Airport IT Trends Survey 2015
Traveller's Expectation

**Travellers' Frustrations**

- **At the airport - automatic transit**: 47% going through security, passport control and customs
- **Taking the stress out of travel**: 51% over 50s - going through customs or passport control
- **Finding your way**: 47% time to research options
- **Next generation of experience**: 51% not knowing where the best local restaurants, bars and venues are
- **Travel services**: 47% lack of good quality advice
- **Work life balance for business tourists**: 51% not having access to home music, video and data

**Travellers' Expectations**

- **Automated identity**: 53% happy to provide more personal information for efficient travel
- **Intelligent tickets**: 82% desire a device to monitor and reduce levels of stress while travelling
- **Intelligent recommendations**: 86% desire a personalised travel guide which aggregates recommendations
- **Augmented reality**: 61% desire a mobile application that overlays visual information about the physical world
- **Payment with memory**: 47% happy to provide personal data for a more personalised service
- **Cloud computing**: 59% business travellers desire complete access to everything they can get in their home

*Source: Amadeus North America*
HKIA Vision of Smart Airport

- Smart Operations
- Smart Services
- Smart Mobility
- Smart Infrastructure
- Data Analytics
- Advanced Technology
- Smart Security
- Smart Business
Technology Focus

Smart Mobility
- Self Service
- Personalization
- Mobile Enablement
- Collaboration
- Workflow Automation
- Work Anywhere
- O2O
- Mobile Payment

Data Analytics
- Data Integration
- Big Data Analytics
- Video Analytics
- Predictive Analytics
- Prescriptive Analytics

Smart Infrastructure
- Geo-Location Tracking/GIS
- Smart Sensors (IoT)
- Wireless
- Cloud Computing
- Next Generation Display
- BIM

Advanced Technology
- Robotics
- Eco-Friendly
- Biometrics
- Artificial Intelligence
- Machine Learning
- Virtual/Augmented Reality
RFID Baggage Handling System
HKIA Baggage Handling System

Total Conveyor Length: 34km (not including MFC)
HKIA RFID Baggage Handling

- HKIA is the pioneer in RFID application for Baggage Handling
- The world 1st airport to apply RFID technology on both baggage sortation and reconciliation
- Handling >100,000 bags per day (at peak)

**Timeline**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>2003</td>
<td>HKIA planned to apply RFID technology to enhance BHS operation</td>
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<tr>
<td>2005</td>
<td>Full RFID mode Gen-1 operation in service</td>
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<td>2008</td>
<td>Rollout the 21” RFID integrated bag tag to all airlines in HKIA and migrated to Gen-2 operation</td>
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<tr>
<td>2010</td>
<td>Rollout of RFID sortation readers for baggage capacity enhancement projects</td>
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RFID BHS System Characteristics

- **Systems Components**
  - 200+ Readers
  - 500+ Antennas (Read Points)
  - 250+ Dual Mode / Barcode Handheld Terminal
  - 650+ RFID Bag Tag Printers
  - Read/Write Gen-2 RFID label
  - 920 ~ 925MHz
  - >120 Wireless Access Points
Benefits of RFID BHS System

- Enhanced processing capacity
  - Improve sortation read rate from 80% to 97%
  - Improve baggage handling capacity (2015 annual throughput >31M bags)
- Reduce volume of mishandled bags
- Improve operation efficiency
  - Automatic Baggage Reconciliation System (ABRS)
Mobile App
HKG My Flight Mobile App

- Launched in 2013, 19 releases so far

- Key Functions:
  - Real Time Flight Information
  - Push Notification
  - Special Announcement
  - Passenger Guide
  - Cross Boundary Transportation
  - Car Park Availability
  - Shopping and Dining
  - Apple Watch support (Android Wear Planned)

- Local Users: 47.3%
- Overseas Users: 52.7%
- Total Downloads: 635K
- Peak Daily Downloads: 5,700
- Daily Push Notifications: 12-28K
HKG My Flight Mobile App – Planned Initiatives

- Car Parking
- Flight Status
- Way Finding
- Shopping
- Boarding Alerts
- Baggage Collection
- Transport Planning

- Car Park e-Service
- Way Finding
- Virtual Signage
- Boarding Alert
- Baggage Arrival Notification
- Transportation Planning

- Membership/Loyalty
- E-Shopping
- F&B Ordering
- Mobile Payment

Source: Some diagrams & icons are sourced from Internet.
Others
Other IoT Related Initiatives

**PAX Count/Queuing Sensors**
• Trials planned
• Provides data about passenger flow, queue wait time ...etc.

**Beacon Infrastructure**
• Implementation in 16/17
• Provides data about passenger location, passenger flow, walk path

**Trolley Availability Tracking using Video Analytics**
• Developed by LSCM working with HKCU
• Trials successfully conducted
• Full deployment planned

**GPS Tracking**
• Being deployed for vehicles in Airfield
• Provides data for resource management, driving behaviour ...etc.

Source: Some diagrams & icons are sourced from Internet
Other Potential IoT Use Cases

Energy Management

Smart Maintenance

Aircraft Turnaround Management

Source: Some diagrams & icons are sourced from Internet
Summary

- IoT Technology is a strategic focus area of HKIA Technology Roadmap
- HKIA will work with the industry to explore more use cases of IOT technology for Smart Airport
Thanks!

www.hongkongairport.com