IoT Augmented Airfield Service System (AS2)
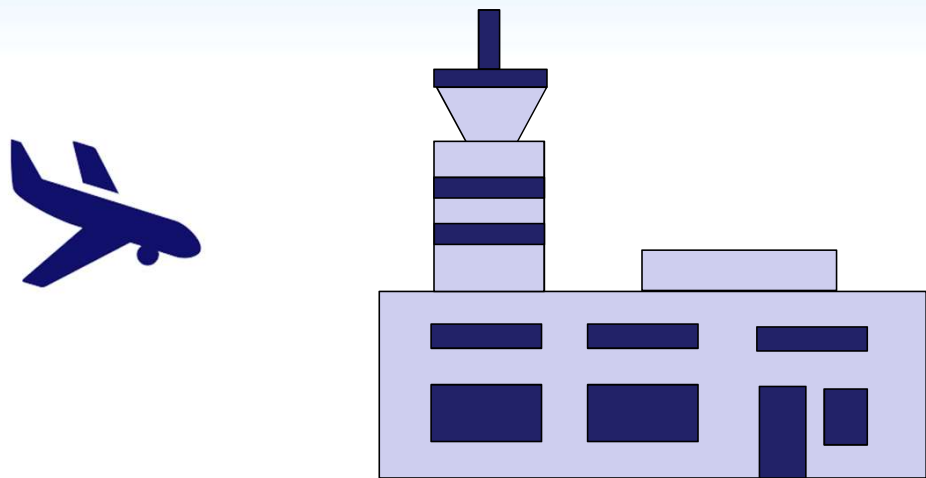
WITSA 2019

Airport Authority Hong Kong
Center of Cyber Logistics, CUHK
ubiZense

Aircraft turnaround process at the airport

HKIA 2018

- Top 20 by OTP - 71.51%
- 427,725 air traffic movements
- 5.1 mln tonnes air cargo
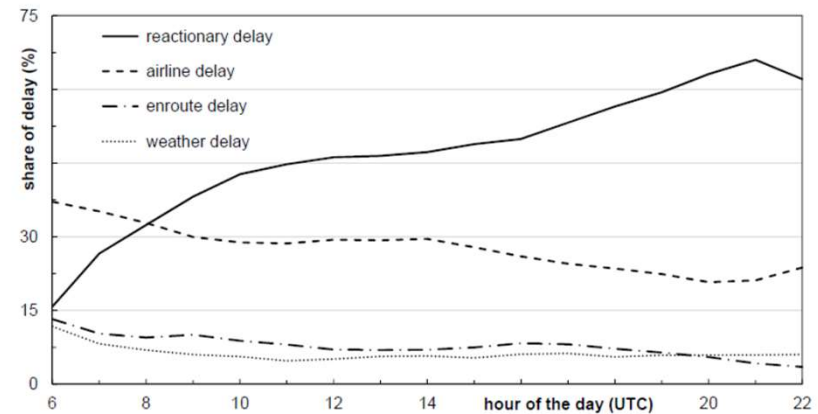- 74.7mln air passengers

Source: AAHK & OAG

Aircraft turnaround at the airport

- ✓ Check for debris
- ✓ Chock on
- ✓ Connect auxiliary power
- ✓ Connect air conditioning
- ✓ Place Safety cones
- ✓ Unload baggage and cargo
- ✓ De-board passenger

- ✓ Clean aircraft
- ✓ Empty toilets
- ✓ Top up water supply
- ✓ Replenish catering
- ✓ Refuel aircraft
- ✓ Load baggage and cargo
- ✓ Board passengers
- ✓ Push back

Source: Eurocontrol (2016)

香港 國際機場 HONG KONG INTERNATIONAL AIRPORT

CUHK BUSINESS SCHOOL

ubiZense

IoT initiative in HKIA

- **Align & synchronize numerous turnaround processes**

- **GPS/RFID/Bluetooth on 5000+ motorized vehicles**

- **IoT Data and beyond**

Organizational data consists up to 80% of unstructured data (Gartner, 2018)

AS2 – Airfield Service System

On-demand service engine
(2 patents pending)

IoT Data Mash
(HK RFID Awards & APICTA)

Structured organizational data & Unstructured IoT data

Big Data

Flight

IoT

Flight data
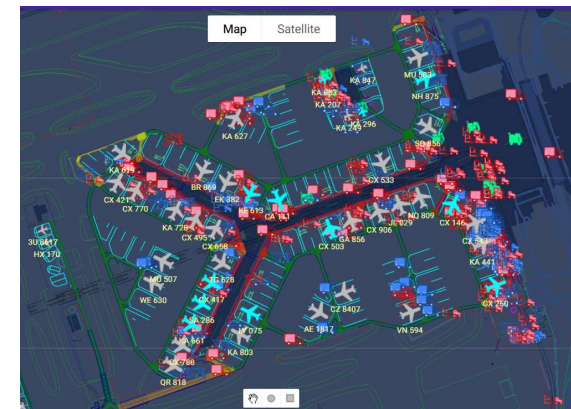
IoT data

Instant service activation

AI-enabled Analytics

Personalized Analytics

AS2 Solution

- One of the **first integrated IoT network solutions** for airfield operations

- Cloud based application
  - **No extra resources** required
  - Rapid provision to **new users**
  - **Zero downtime** since October 2018

- **Interoperability** with existing systems and IoT technologies

- **IoT network design Framework**, 2 patents pending
  2 HK RFID Awards,1 APICTA, and HK ICT Awards

- **Real-time visibility** & performance **dashboard**

- Interoperable with the international **A-CDM standard**

AS2 in action with IoT network
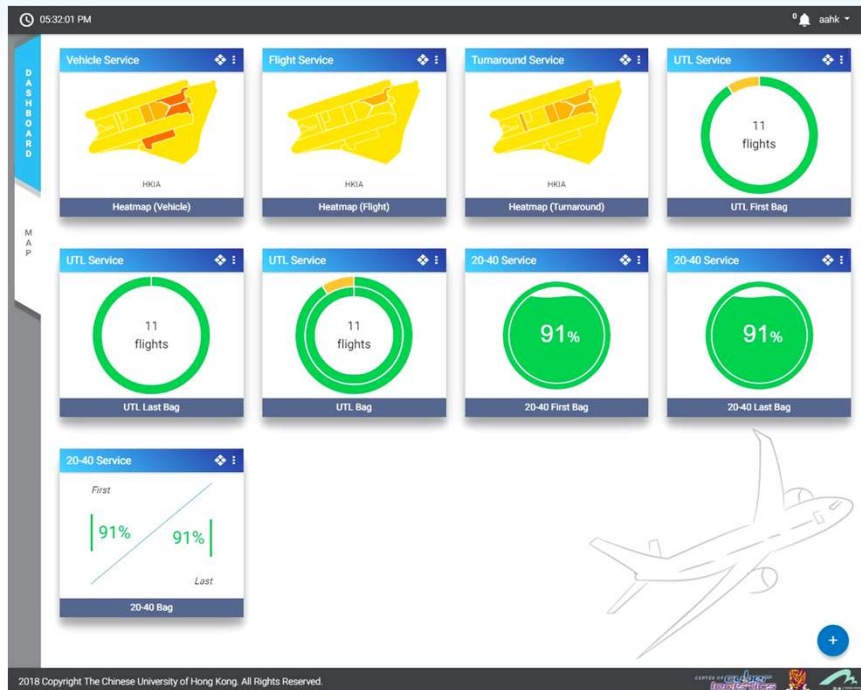
Real-time management dashboard to view turnaround visibility in an eye glance

Augment IoT data with flight data to measure and predict turnaround processes

AS2 in action with CCTV network

Event detection ≠ object detection

Real-time turnaround event detection

AI-enabled prediction based on detected events

Transforming unstructured data to structured data

- **Benefits**
  - Real-time aircraft **turnaround visibility**
    - Self-reporting is not necessary anymore to monitor aircraft turnaround
    - Deploy manpower to look over CCTV
  - **Pro-active** manage aircraft turnaround
  - Operate with **less staff** to visually monitor CCTV
  - **Remote manage** airport operations
  - **Single Source of Truth** - IoT data accuracy
    - **Data source** for airport community stakeholders

AS2 potential

- Continuous operational efficiency improvement
  - Number of air passengers is rapidly increasing
  - Better use of the limited space for expansion
  - Ultimate goal: On-Time Performance leader

- Community - Single Source of Truth for airport community (air lines & RHOs)
- Airports - HKIA is a technological forefront pioneer (Toronto & Zhuhai)
- Industry - AS2 is designed to be deployed in other industries (hotels & cargo terminals)

Thank you