Full Situational Awareness and Accurate Data to Ensure Aviation Safety and Operational Readiness

Adrien Tay, Industry Solutions Director, APAC
Huawei Enterprise Business Group
Aviation Solutions
Adrien.Tay@huawei.com

Adrien Tay

Aviation Industry Solutions
Director, Asia Pacific

Degree in Economics

Chartered Manager
Chartered Fellow

Diploma in
Airport Operations

22 Years of Experience in ICT supporting Aviation, Enterprise and Government Clients

Solution Consulting	Training	Management
• 22+ years in designing industry solutions to help clients visualize how technology can help them achieve their business goals	• Trainer for technology vendors, system integrator and consulting firms • Trainer for company sales and technical employees	• Set up and lead project teams for clients to execute the projects • Manage global teams to set up business units and create solutions

<u>Relevant Transport Projects:</u>

- Common Use, baggage handling and innovation with airports
- Electronic Toll Collection with land transport ministries
- Automatic Fare Collection with rail transport ministries
- Automatic Vehicle Tracking with automotive manufacturers
- IT database, network and application monitoring with airlines

<u>Technology Experience:</u>

- Connectivity, RFID, Enterprise Software, Mobile App & Smart Devices
- Big Data, Analytics & Artificial Intelligence

Leading Global Provider of Connectivity, ICT Infra and Smart Devices

Vision & mission

Bring digital to every person, home and organization for a Fully Connected Intelligent World

170+
countries and regions

207,000
employees

55.4%
of employees work in R&D

No. 4
in global R&D investment

120,000+
active patents held globally
*Huawei has one of the world's largest patent portfolios

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Huawei uses ICT to Support Consumers, Carriers & Enterprises

Bring digital to every person, home and organization for a fully connected, intelligent world

Consumers

Government and enterprise customers

Government | Finance | Transportation | Energy | Manufacturing

Carriers

Information transmission

Information processing & storage

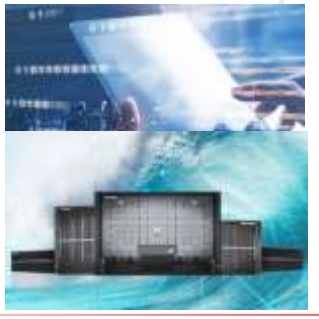
Information distribution & interaction

Devices

Intelligent Automotive

Connectivity

Computing



Cloud

Digital Power

+ Intelligence

Information learning & inference

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3 Tech labs in Singapore Encouraging Openness, Innovation & Collaboration to Discover, Develop and Test Solutions

AI Lab
Discover solutions

To create a conducive environment for CxOs to experience Huawei's solutions

OpenLab
Develop, test & integrate

To collaborate with local partners to create customer-centric and innovative scenario-based solutions

DIGIX Lab
Develop mobile apps

To support developers of all levels throughout their app development journey to create mobile apps

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Huawei Is Committed to Helping Global Airport Customers Go Digital

40+
countries and regions

130+
aviation clients

20+
airports that transport more than 30 million passengers per year

China

- Beijing
- Shanghai
- Guangzhou
- Shenzhen
- Chengdu
- Kunming
- Xi'an
- Hong Kong
- Macau
- Lanzhou
- Qingdao
- Dalian
- Changsha
- Changchun
- Chongqing
- Zhenzhou
- Tianjin
- Nanjing
- Wuhan
- Hangzhou
- … …

Europe, Oceania & Latin America

- Australia
- Spain
- Mexico
- Brazil

Middle East & Africa

- United Arab Emirates
- Saudi Arabia
- Qatar
- Bahrain
- Angola

Asia

- Singapore
- Malaysia
- Thailand

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Digital Transformation in the Civil Aviation Industry Has Started

European Union

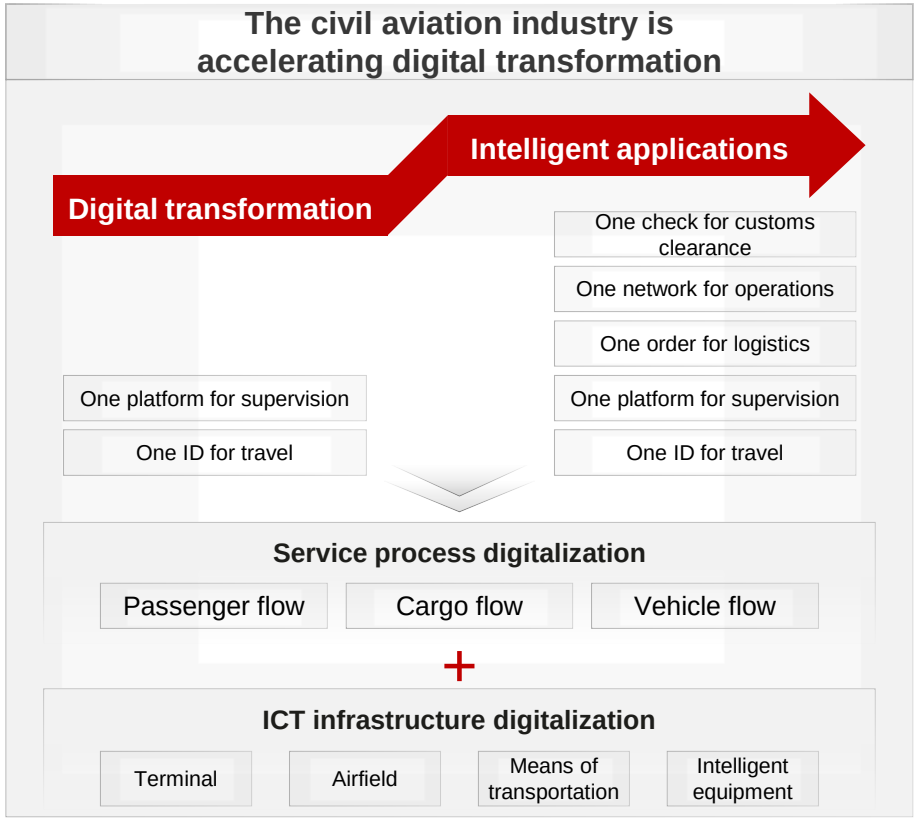
Efficient passenger experience + Low cost + Climate neutral

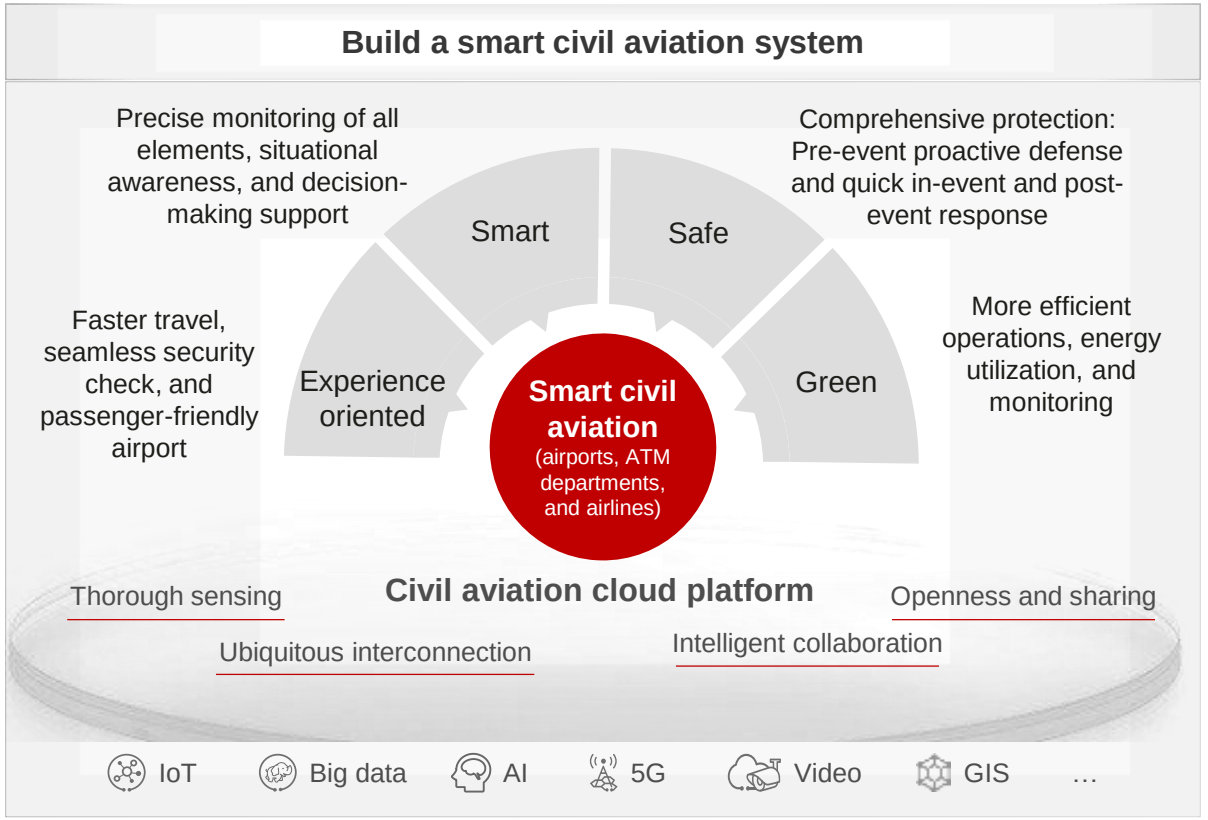
Flightpath 2050: Europe's Vision for Aviation

China

Digital, networked, and intelligent

Smart Civil Aviation Construction Roadmap





GIS refers to Geographical Information Systems

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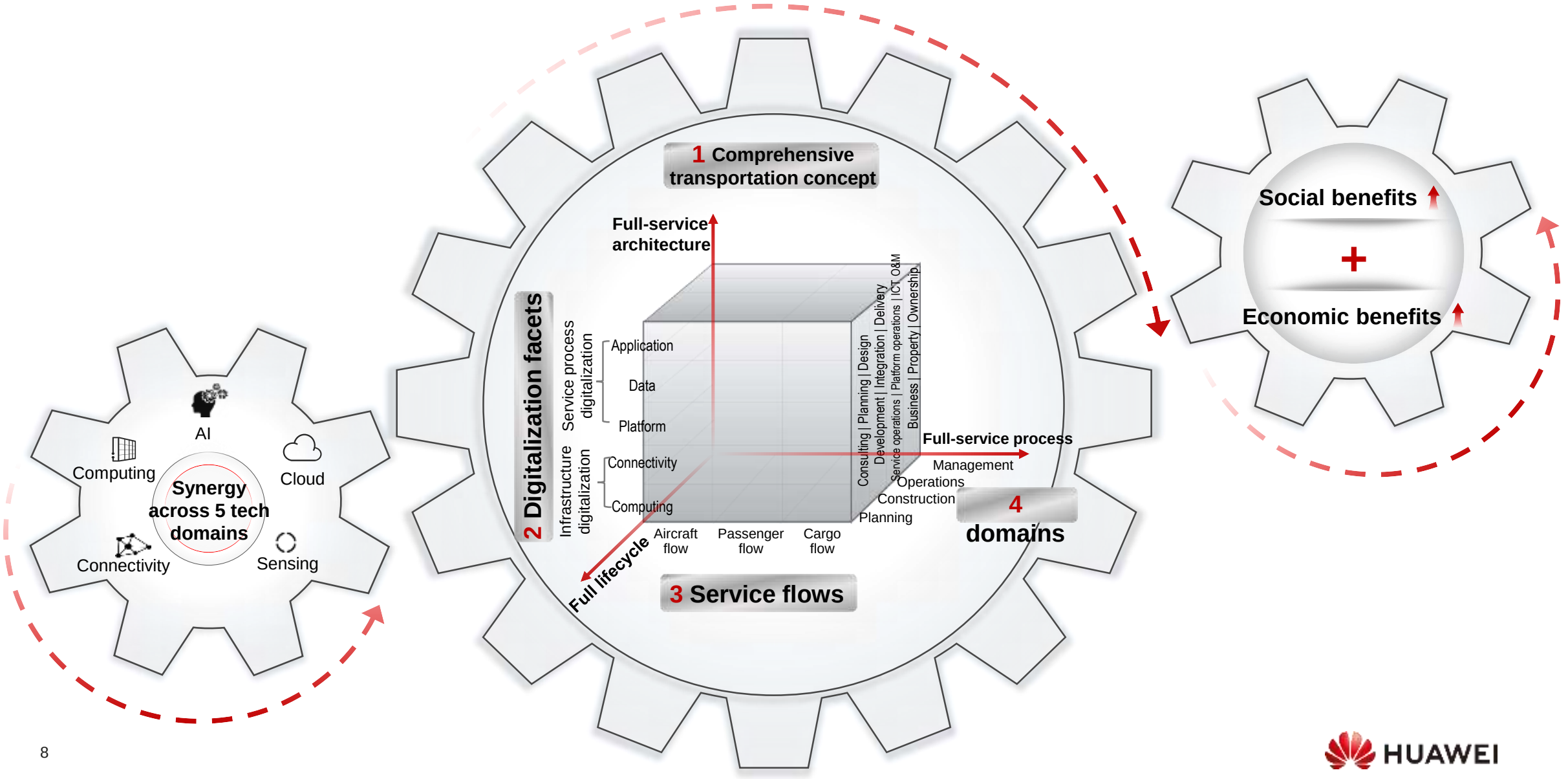
Adopting a Holistic Approach to Civil Aviation Digital Transformation



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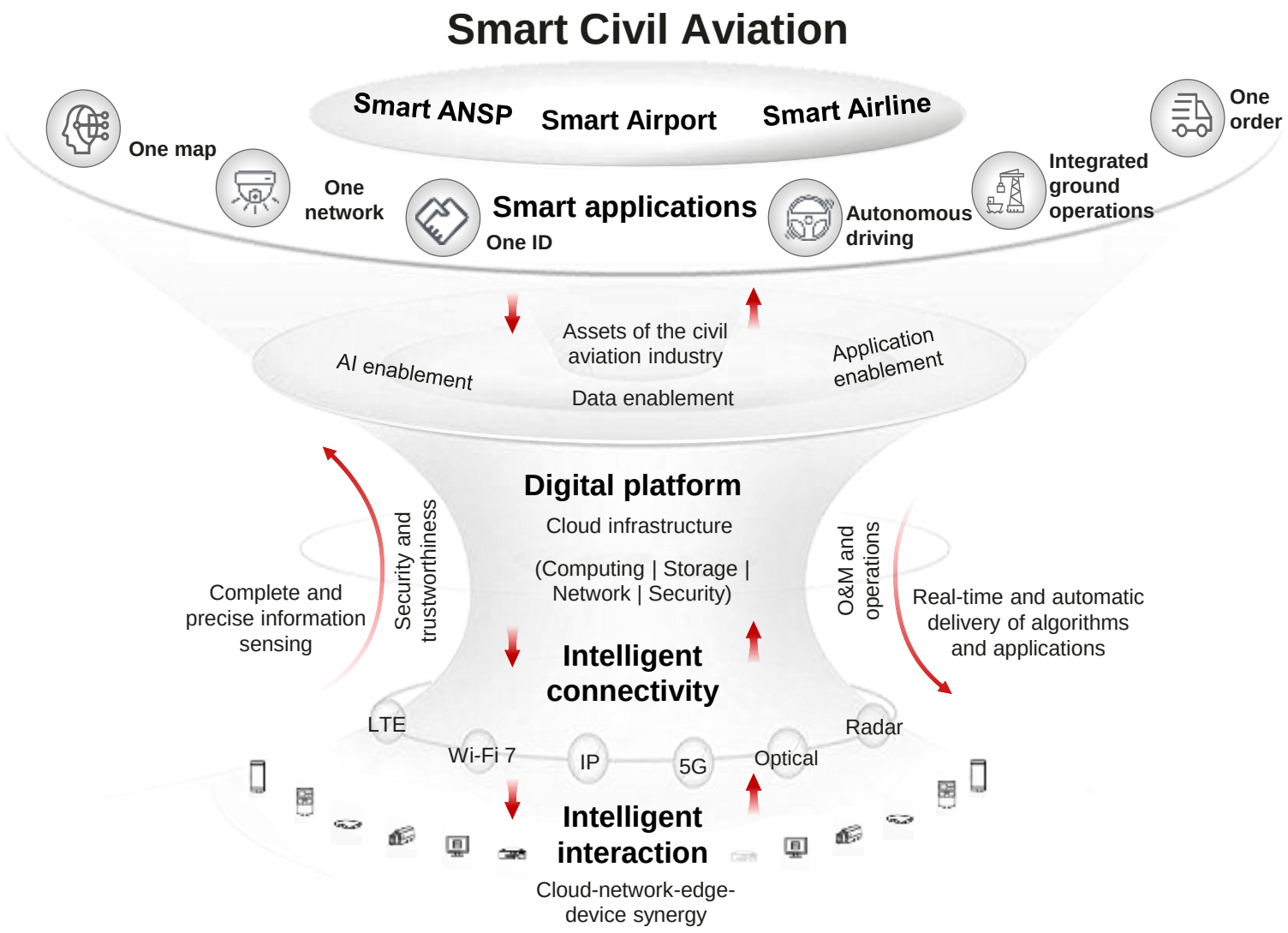
Building a Solid Foundation to Support Civil Aviation Digital Transformation



Enable Intelligence

Smooth service evolution

Connects to 80 systems using the Huawei ROMA platform.

Reconstruct Platforms

Data/Service convergence

Big data, AI, video, and cloud
200+ industry data models, 300+ service indicators, and 9 algorithms

Reshape Connections

Connectivity convergence

Fiber Optical backbone for ATN
WiFi 7 for normal access
5G for special applications

O&M refers to Operations & Management

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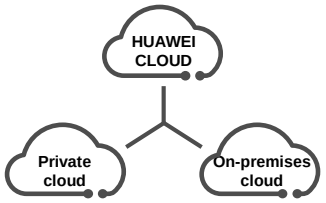
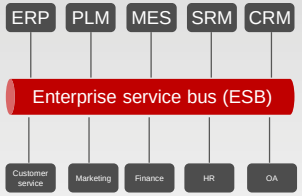
Huawei Combines 5 Key Technologies to Build the Digital Platform for the Aviation Community

Cloud



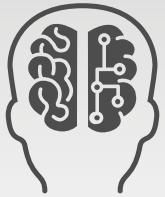
HCS: multi-cloud collaboration and multi-service convergence for fast service rollout; **task-based computing resource scheduling.**

Big Data



ROMA: Integrates messages and supports access of different mainstream message middleware. **Front-end and back-end applications are middleware-insensitive.**

AI



AI: Uses advanced AI algorithms to deliver **≤ 60s** deviation, **≥ 98%** precision, and **≥ 92%** accuracy.

Computing

TaiShan Atlas IVS

Kunpeng + Ascend computing platform **30% increased performance.**

AI Camera

AI camera: 4K HD cameras **that are adaptive to various scenarios** and support big data learning.

Horizon Digital Platform for Aviation

Data enablement **Integration enablement** **Application enablement** **Development enablement**

Video **IoT** **AI** **Big data** **ICP** **GIS**

Huawei Cloud Services

ICP refers to Integrated Communications Platform

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AI Cameras: Breaking Photosensitivity Limitations to Deliver Consistent Imaging Quality, Resulting in Accurate Data

AI-assisted adaptive imaging in various scenarios

Industry	Huawei
Manual repeated training	Intelligent scenario identification (backlight, rain/fog, and motion)
Manual parameter configuration	AI-enabled image optimization

Learned scenario and object characteristics through big data training on **over 100 million** images

Adaptation to all-weather scenarios by Huawei AI cameras

Adaptation to sports scenarios by Huawei AI cameras

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5G: Enhanced Security, High Bandwidth, and Low Latency Facilitate Airport Service Innovations

5G Private Network can provide high security and reliability

5G broadband video trunking

4K/8K HD video

5G- and AR-assisted maintenance

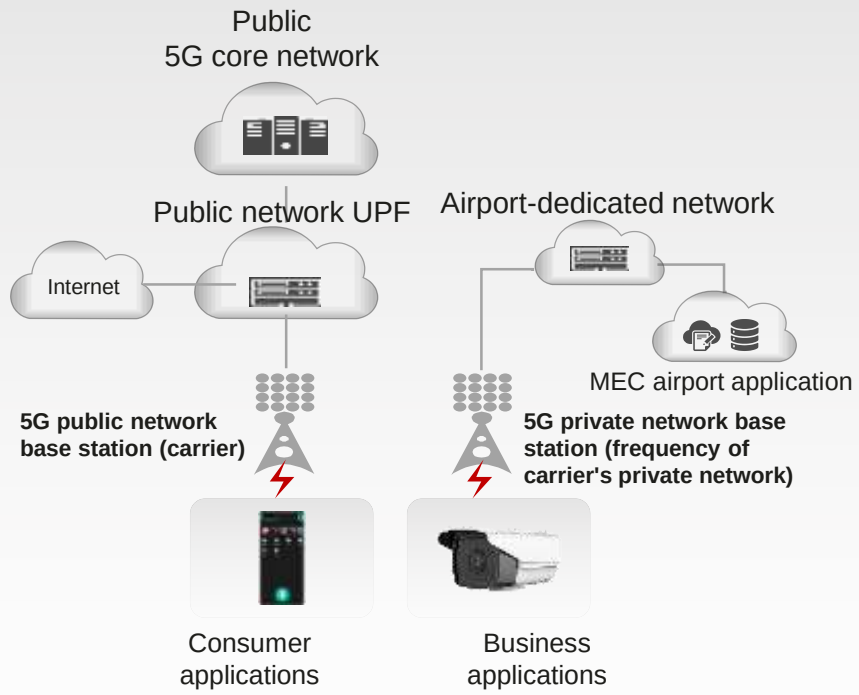
5G IoT

5G voice interconnection

Automated Guided Vehlcle

Road inspection robot

Intelligent parking robot



UPF refers to User Plane Function and MEC is Multi-access Edge Connection

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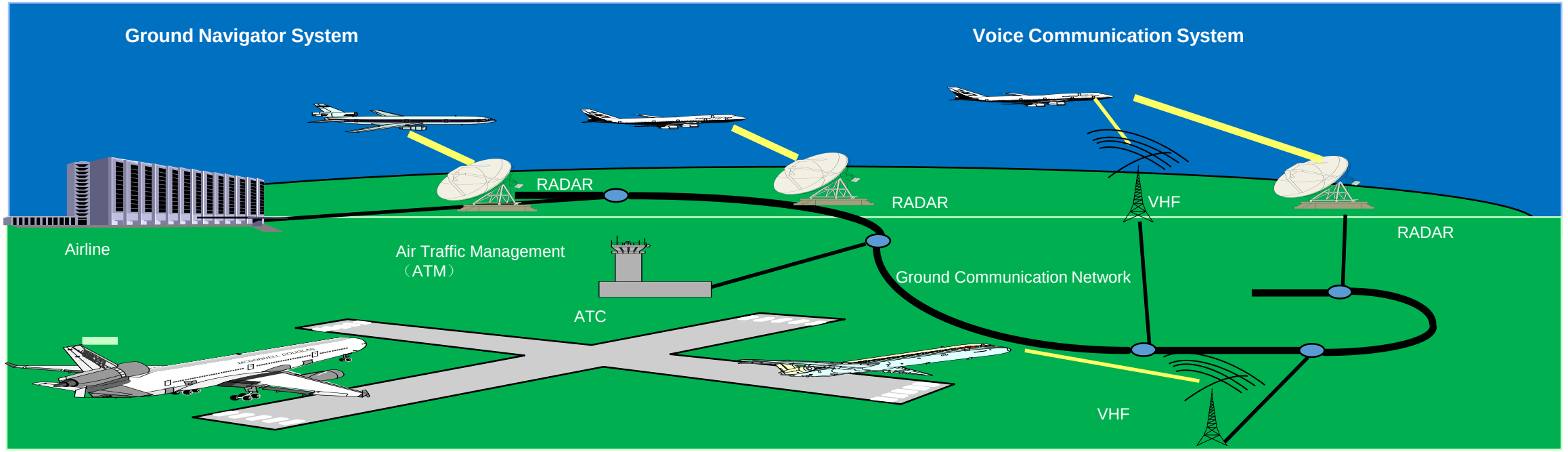
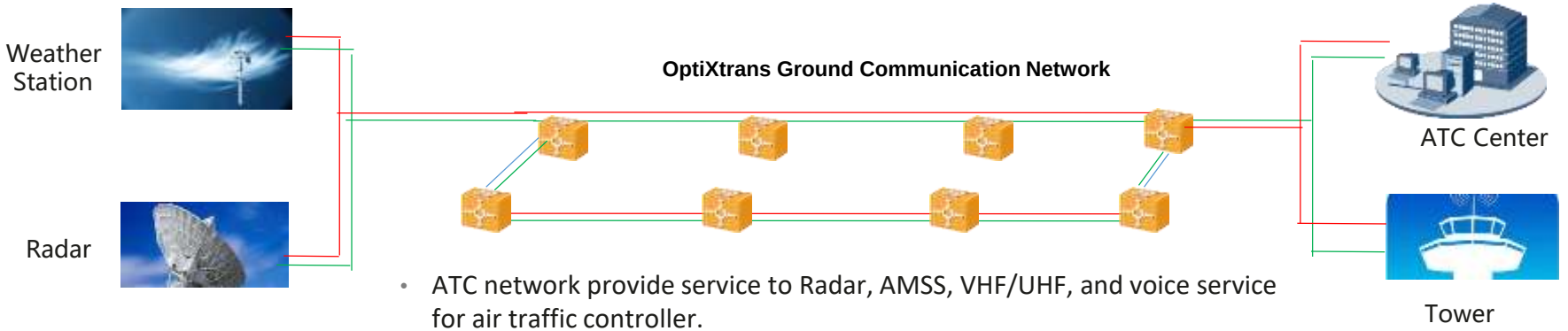
Optical Liquid OTN for Universal Transmission for ANSPs





- ATC network provide service to Radar, AMSS, VHF/UHF, and voice service for air traffic controller.
- Safety and reliability are the key requirements of Aeronautical Telecommunications Network.

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Optical: ATN Data Backbone to Meet Future Expansion Needs

3 Networks

Airport

Airline

ANSP/
Civil Aviation
Authority

Core Location

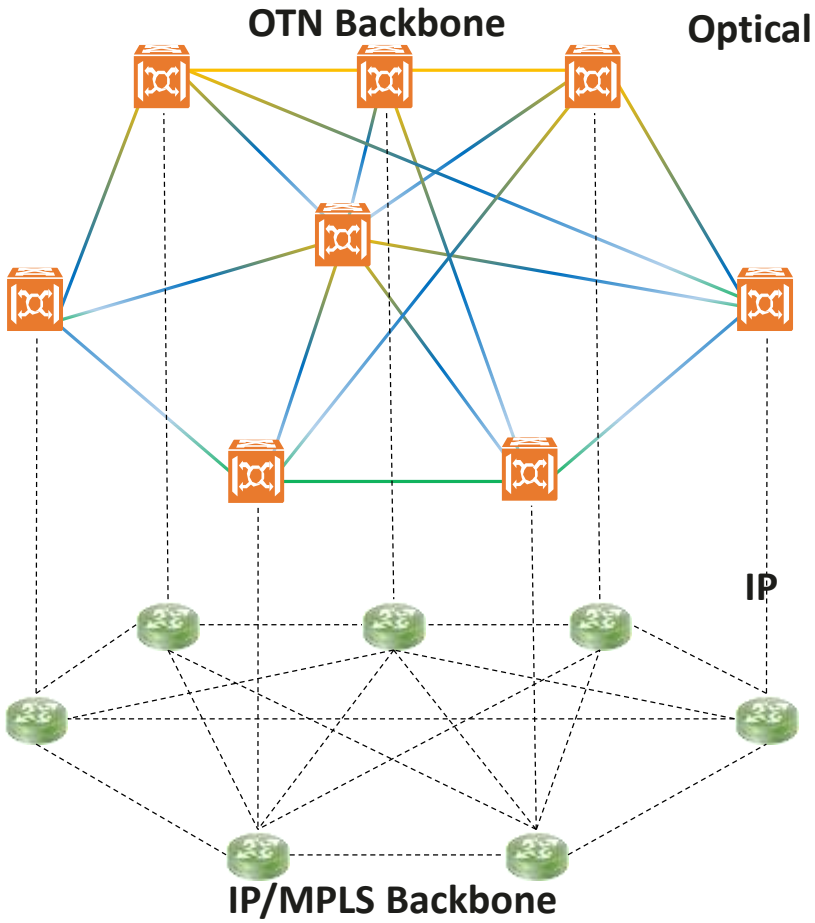
Datacenter

HQ

Branch

Tower/Building

Backbone Network



Solution Highlights

Huge Bandwidth & Multi-standard compatible

100G/200G/600G per λ
48Tbps per fiber
Support for MSTP, SDH, Ethernet, OTN

Low Latency & High Performance

High-Performance 100G
7000km Without Electrical REG.

High Reliability

Meshed network, anti multiple times fiber-cut, carrier-class reliability at 99.999%.
Switch over in less than 50ms

Intelligent Maintenance

Huawei network management platform NCE-T enables intelligent maintenance, fast deployment and easy troubleshooting

ATN refers to Aeronautical Telecommunications Network

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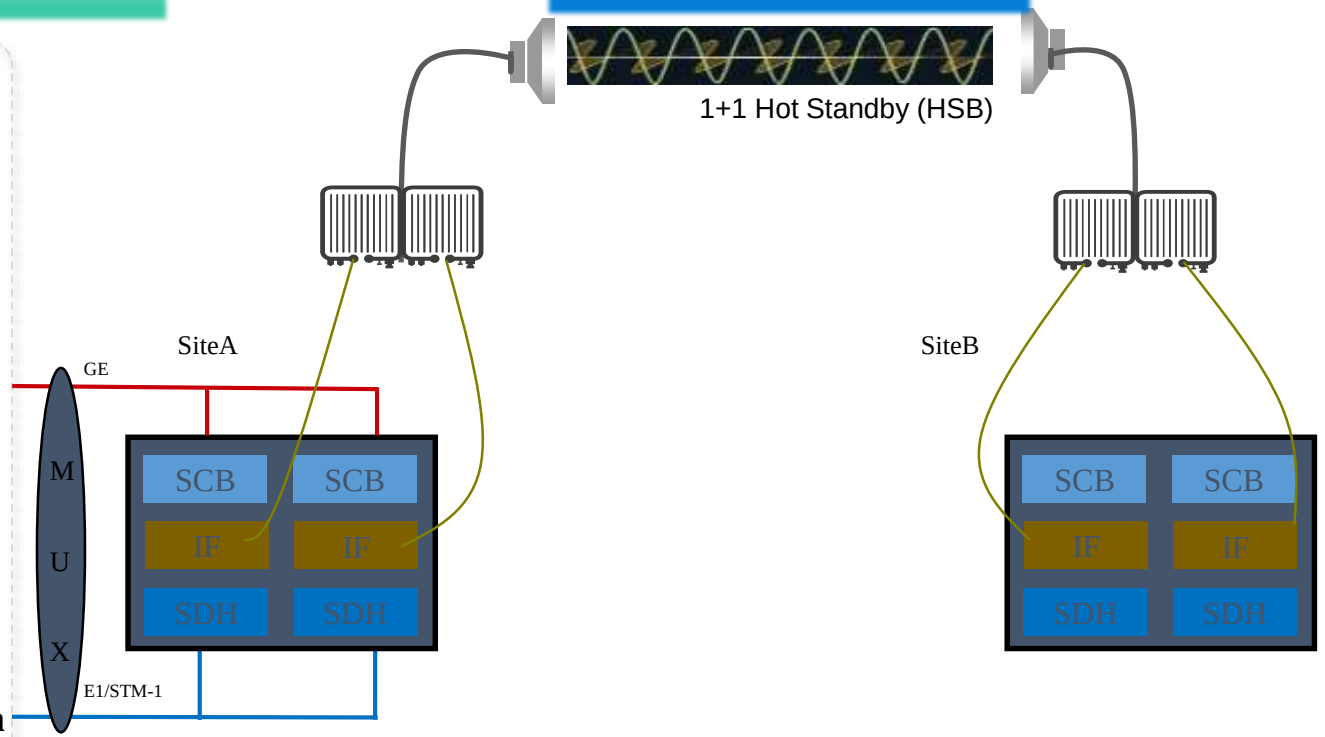
Microwave: Using Microwave for ATN Transmission in Tough Terrains

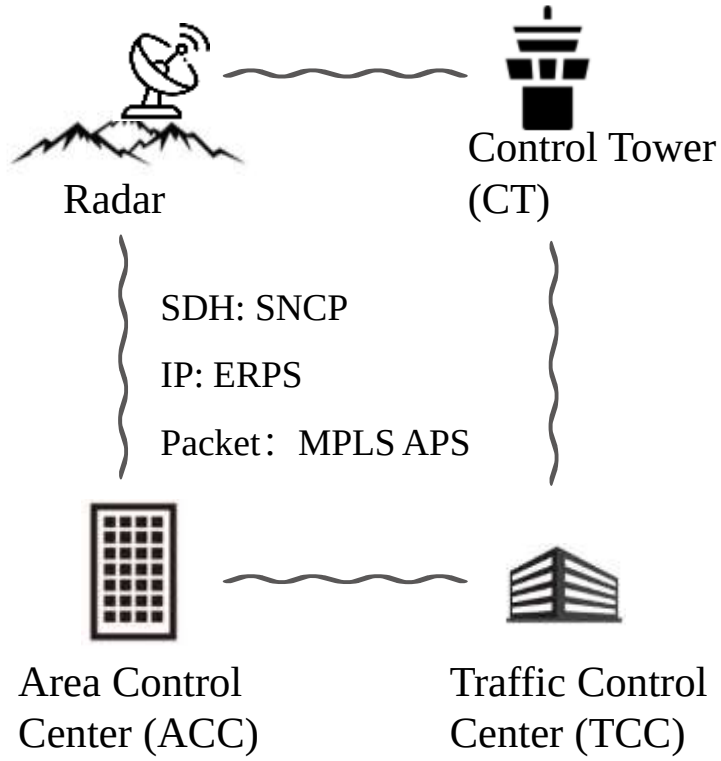
Multi Service

- VHF
- Radar
- Phone
- Clock
- Video
- QA
- Meeting
- ATC automation
- … …

Multi Protection



Loop Protection



- **Link availability 99.999%, Large Capacity >1Gbps**
- **Active-standby protection of active components**
- **Automatic switchover of ring network**

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Campus OptiX Solution Flash Demo

Huawei Technologies Makes Digital Smart Aviation Possible

Connect
Collaborate
Control

Cloud | Big Data | IoT | AI | 5G

Aircraft Turnaround: Accurate Data, Connectivity and AI to ensure that Aircraft Turnaround is Safe, Predictable and Efficient


Moving into/out of a stand


Cabin door


Passenger Boarding Stairs


Catering vehicle


Refueling vehicle


Boarding Bridge docking/undocking


Potable water vehicle/Sewage disposal vehicle


Cleaning

Automatic data collection of 18 aircraft turnaround status

Aircraft Arrival → Takeoff from the preceding airport → Moving into the stand → Docking with the jet bridge → PBS connected → Cargo hold door opens → Cabin door opens → Start/End of refueling → Catering vehicle connected → Catering vehicle disconnected → Start/End of cleaning → Start/End of water injection → Start/End of sewage disposal → Baggage arrival → Start/End of boarding → Cabin door closes → Airside transfer bus arrival → Cargo hold door closes → PBS disconnected → Pushback → Takeoff → Aircraft Departure

Horizon Digital Platform for Airports

Data enablement | Integration enablement | Application enablement | Development enablement

IoT | **Big data** | **AI** | **Video** | ICP | GIS | …

Huawei Cloud Services

Security | O&M | Operations

Network connection: WLAN | Mobile network (4G, 5G, eLTE) | Sensor

Device: Camera | Camera | Camera

ICP refers to Integrated Communications Platform

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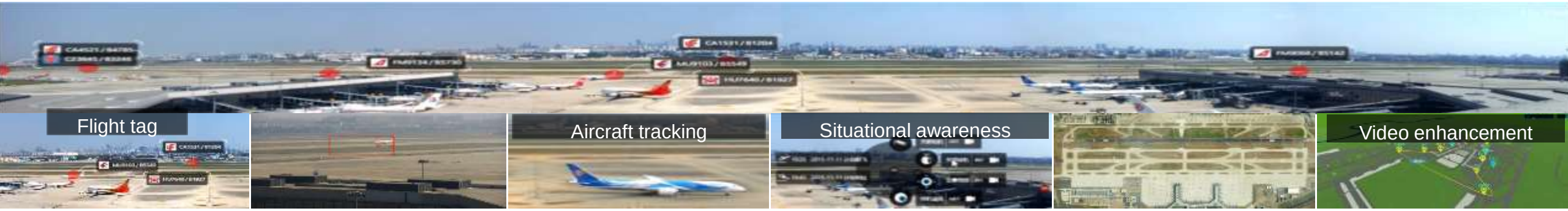
Panoramic Visualization System Solution: Supports SDC 4K Panoramic Stitching, Implementing Real-Time Monitoring for Situational Awareness



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Monitoring the 5 Key Areas of Control for Aviation at Airports to Monitor for Performance KPIs, Safety and Operational Efficiency Issues

Area Control (en-route)

Approach Control

Tower Control

Apron Control

Airport Landside

Key Metrics Tracking

Takeoff Tracking

Flight Status
Air routes, Traffic, Weather

Arrival Tracking

Key Metrics Tracking

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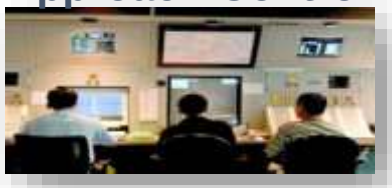
Consolidating Data from Tower Control, APP and Area Control to form the Centralized View for Full Situational Awareness

Operations View

Tower Control

Approach Control



Area Control

Management View

Dept Head/Mgmt

Duty manager

Controller

ANSP IOC (Management、Monitoring layer)

Control Tower Automation

ATC Automation (Business Operations layer)

Huawei Digital Platform

(complying with SWIM deep architecture, data exchange, data sharing & interoperability)

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Apron Control : Monitoring the Stand, Gate and Terminal Situation for Safety and Operational Efficiency Issues

- Real-time display of stand status and surveillance videos based on the 3D map.
- Displays flight information, flight status, and flight support process of each stand.
- Displays future ground handling resources for flight support.

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Airport Landside: Monitoring the Terminal Operations to Close the Loop to Ensure Safety, Security and Efficiency in Terminal Operations

Real-time display of check-in counters

Real-time display of boarding gates

Real-time display of security checkpoints

Real-time display of baggage carousel

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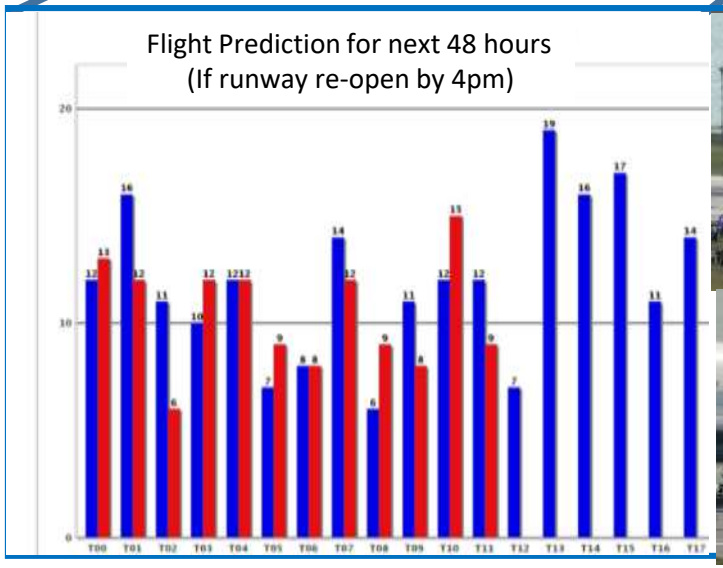
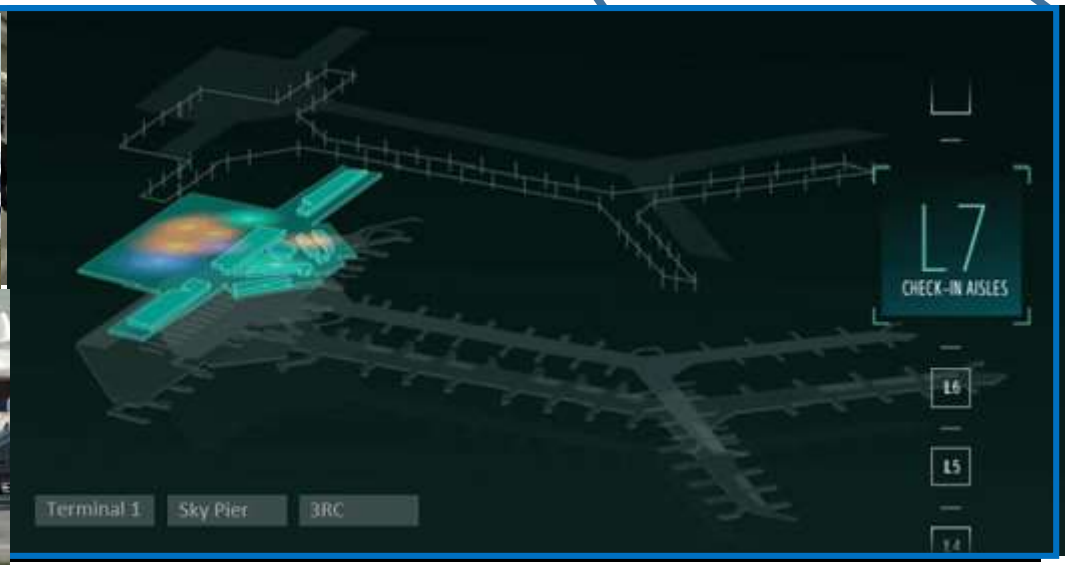
Incident Handling in the Airside to Flag Out Safety/Efficiency Issues

Focus Panels for Incidents





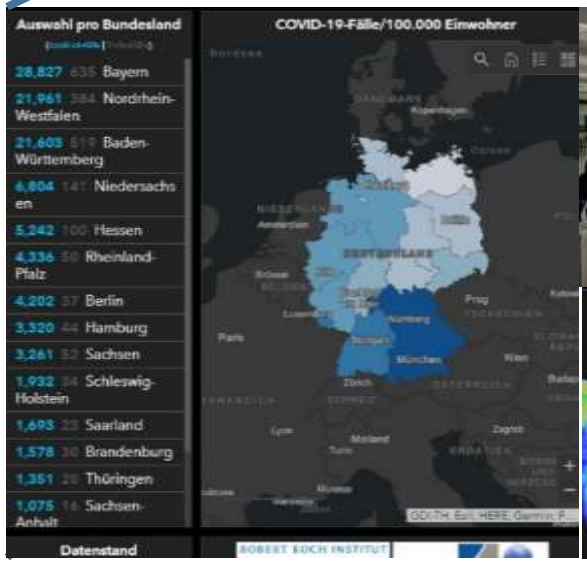
Prediction of Flight Movements

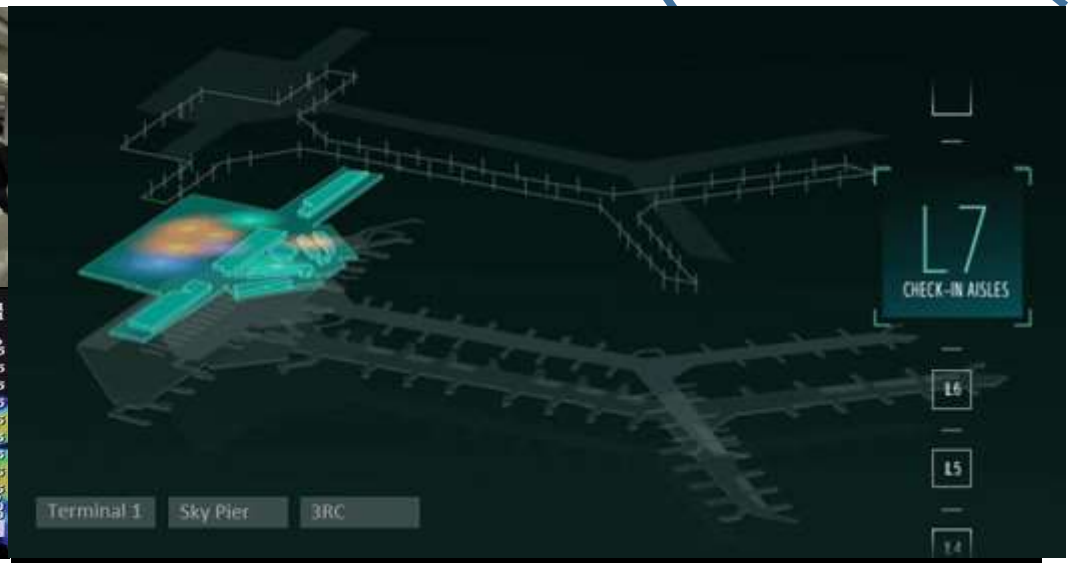
Auto switch to relevant CCTVs

Crowds heatmap, apron capacity, operations bottlenecks

Incident Handling in the Landside to Flag Out Safety/Efficiency Issues

Focus Panels for Incidents





Prediction of Passenger Issues

Auto switch to relevant CCTVs

Apron issues on stands, gates and ground support equipment etc

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Huawei Enables Full Situational Awareness for Safety & Operational Efficiency for Civil Aviation/ANSP, Airports and other Stakeholders

ANSP Air Control

ANSP Ground Control

Flight Status + Digital Apron

Flight Operations KPI

Baggage

Airside Vehicles

Apron Collaboration

Terminal Collaboration

Transportation Collaboration


ENJOY A SMART
JOURNEY
Shenzhen Airport's Innovative Practices

For more information, please contact us at

Adrien.Tay@huawei.com