360 Aviation 5G: Opportunities and Challenges

For more information during MWC, please visit the Airbus stand in Hall 2, stand #2J30

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Why aviation needs connectivity

Aircraft

- **Passenger connectivity**
- Cabin **crew operations**
- **Cockpit operations**
- A/C **maintenance**
- A/C enhanced **autonomy**
- Airport **operations**

Helicopters

- VIP **Passenger connectivity**
- **First responder missions**
- **Autonomous** flight
- Platform health and usage **monitoring**
- **Maintenance**

Drones & VTOLs

- **Command and Control** & **remote piloting**
- Autonomous flight **supervision**
- Health and Usage **monitoring**
- **Maintenance**

Aviation's appetite for ubiquitous connectivity

Anywhere

Anytime (in flight and on ground)

With more and more capacity

Supporting all operations domains

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Airbus connectivity: 5G use cases in action

1. In flight air to ground connectivity for commercial aviation

2. Connectivity for low-level flights (drone - urban air vehicles - helicopter)

3. Aircraft data off-loading and on ground data streaming

4. 5G wireless connectivity backbone at airports

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Use case #1: In-flight air to ground connectivity for commercial aviation

5G ATG China – Favorable forecast

500

DOMESTIC PASSENGER MARKET

M900 PAX / year

SMARTPHONE USERS

M Global Share: 30%

GROUND STATIONS

~ **500** deployed by one operator

UNIQUE 5G FREQUENCY

4.9 GHz

CHINA FLEET IN SERVICE

3,800+

PERFORMANCE

100+ Mbps DL per aircraft

< **40** ms latency

The 5G challenge in China: update or deviate from the standard?

5G Standard release 15:
- covers speed up to 500 km/h
- cell size up to 15-20 km

5G ATG needs
- speed >800 km/h
- with cell size >200 km

Challenges

- High speed **doppler compensation**

- **Large cells**

- **Handover** process

- **Interference** with ground 5G network

- Global frequency **alignment**

Core network

Base band unit

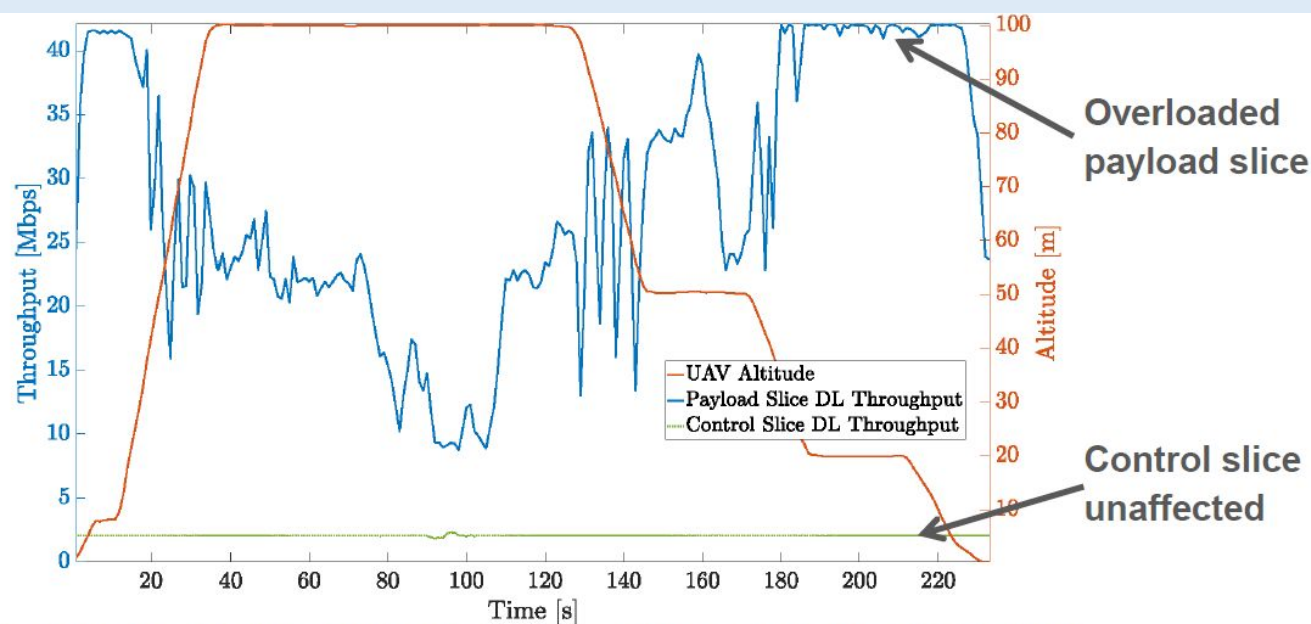push for 5G release 18? or create market-specific variant?

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Use case #2: Connectivity for low-level VTOL flights

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5G testbed - Drone communication demonstration area

Testbed performance results of Network Slicing on drone payload

5G for VTOLs

Demonstration of **Highly reliable and secure communications**

Example 5G Connected mobility: Aerial Coverage 5G Slicing

Drone Flight Tests at 5G connected mobility testbed

- Aerial coverage
- 5G slicing

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Use case #3: Aircraft data off-loading and on ground data streaming

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Aircraft sensors

PAX services

aircraft data

RMAX

5G / LTE private

Live data for
Ground Services

Data to
airline cloud

Apps for ground ops
& airport personnel

Airbus Ground
Data collector

At airport at some stage we may want
to deploy 5G wireless backbone

Architecture design based on 5G equipment

RMAX features
- Cellular 5G configuration with modem
- WiFI / BLE & cellular onboard antennas
- **Private LTE / 5G infrastructure**
- Deploy 1 / 2 RMAX modem

RMAX equipment services
- Connect to the Airbus Skywise data lake
- Live data-to-ground using cellular
- Access available on airport professional mobile phone
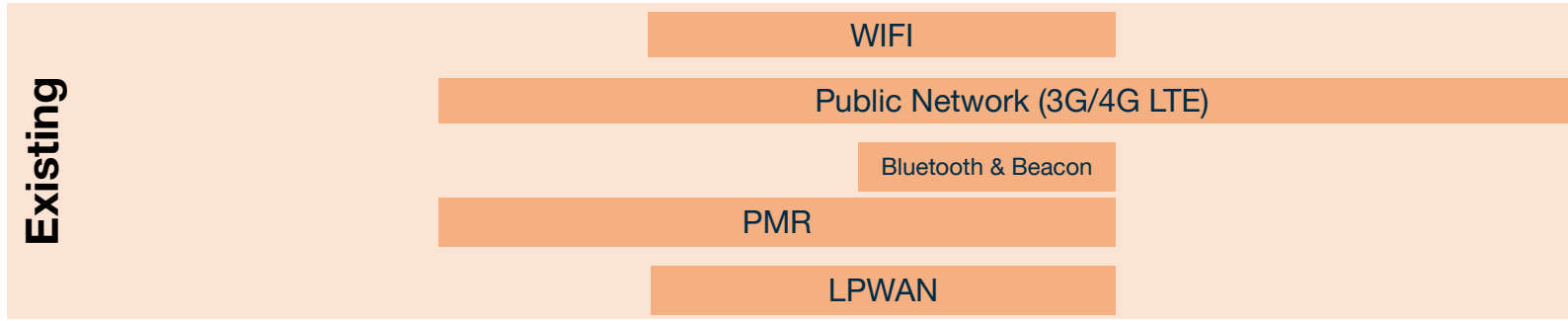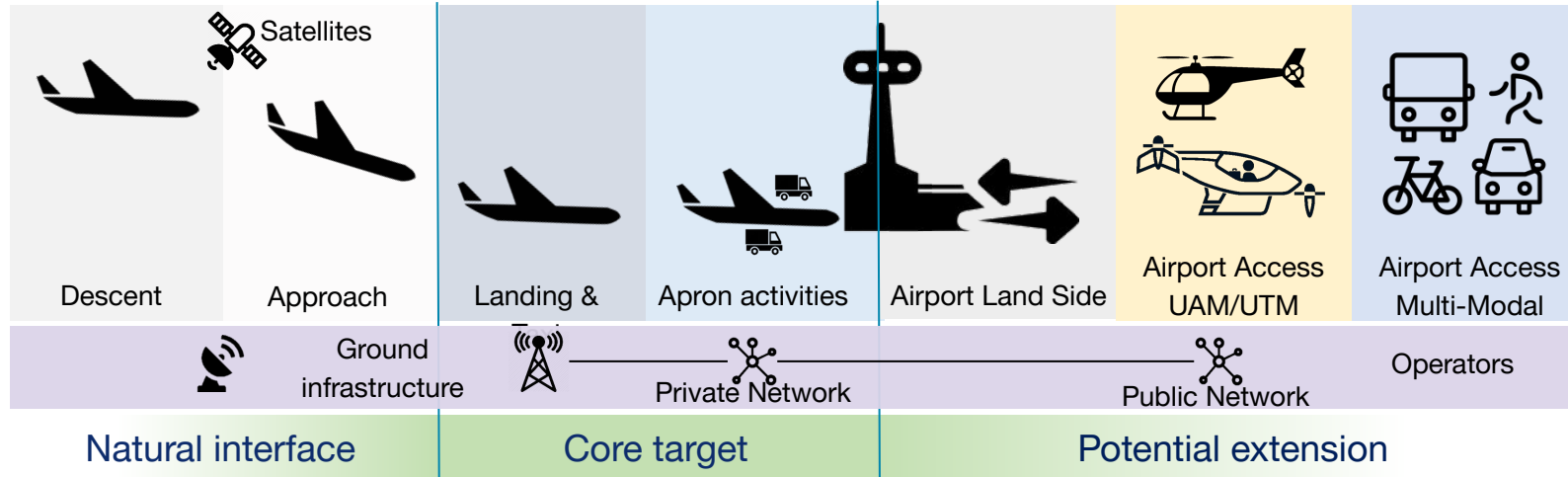- Access using API

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Use case #4: 5G Wireless backbone at the airport

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Descent | Approach | Landing & | Apron activities | Airport Land Side | Airport Access UAM/UTM | Airport Access Multi-Modal

Satellites

Ground infrastructure

Private Network

Public Network

Operators

Natural interface | Core target | Potential extension

Existing

- WIFI
- Public Network (3G/4G LTE)
- Bluetooth & Beacon
- PMR
- LPWAN

LTE / 5G

Airport connectivity: Today & beyond

Multiple airport activities linked by common connectivity technology:

- Airlines personal (flight and ground)
- Catering logistics
- Baggage handling
- Ground support (refueling, de-icing, tugging, power supply…)
- Shuttle
- Police & security

Available today: Airbus AGNET 500 over heterogeneous wireless backbone

Today's scattered technologies will converge under 3GPP to address all airport processes & phases

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AND THERE IS MUCH MORE

Industry 4.0 to cover all manufacturing sites

5G coverage overlay via Low Earth Orbiting satellite constellation

Satellite positioning / navigation and timing augmentation via 5G terrestrial network

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Thank you

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