



**ITU WORKSHOP on  
SHORT RANGE DEVICES (SRDs)  
AND ULTRA WIDE BAND (UWB)  
(Geneva, 3 June 2014\*)**

## **Global SRD solutions for the aviation industry**

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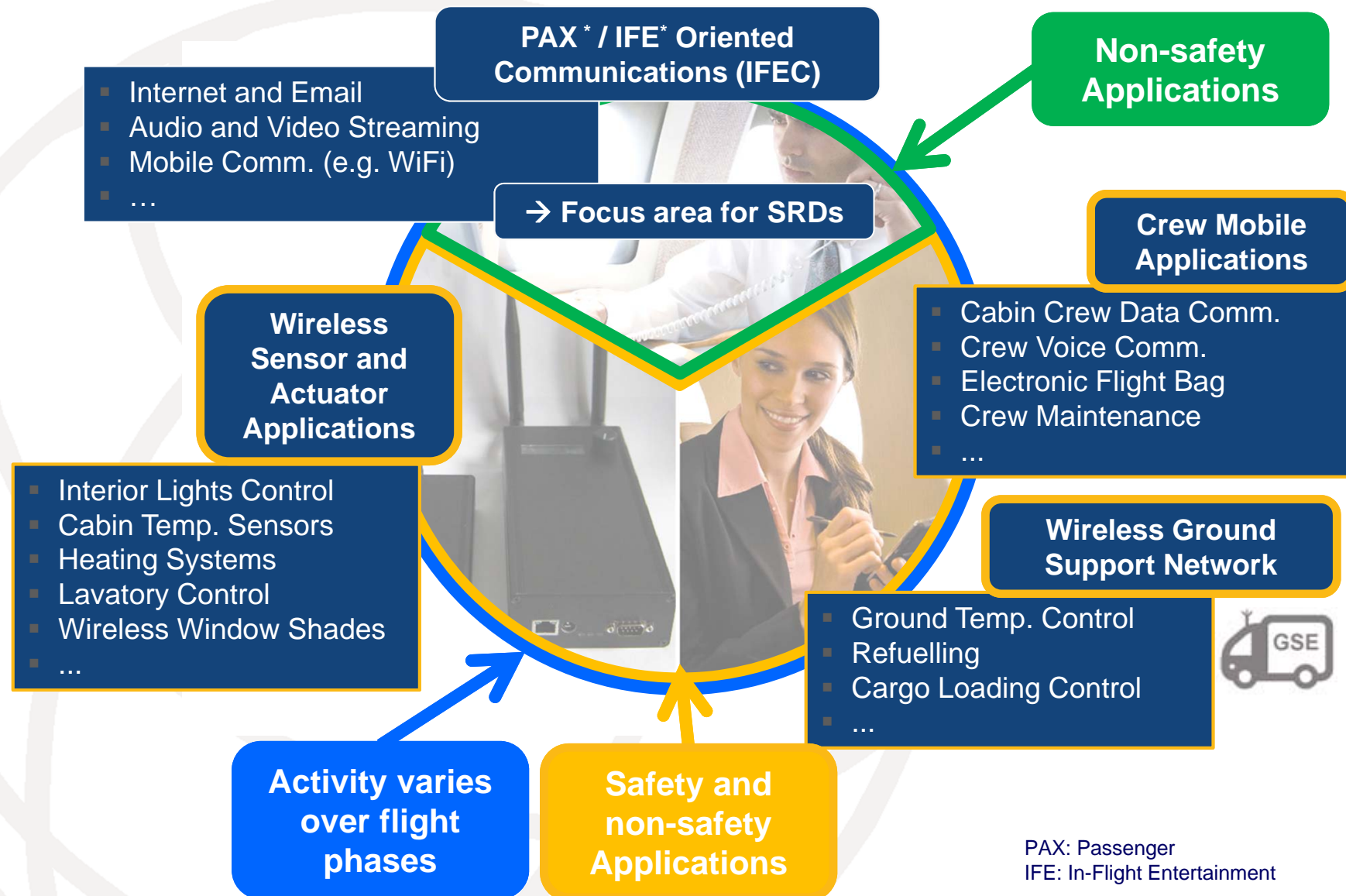
*\* in conjunction with the June 2014 block of  
meetings of ITU-R Study Group 1*



- **Categories of wireless communications on-board civil aircraft**
  - Safety vs. non-safety
  - phases of activity
- **Use Cases**
  - Cargo Tracking and Monitoring
  - Wing-Tip Anti-Collision System
  - Wideband data transmission
- **Summary**



# Categories of wireless communications (1/2)





## Categories of wireless communications (2/2)



### Safety vs. Non-safety Wireless Applications

#### Examples for safety wireless applications

- Emergency lighting
- Smoke and fire detection
- Passenger address
- Cabin Temperature and pressure monitoring
- Door status monitoring
- Landing gear status and tire pressure indication
- Cockpit and cabin crew comm.
- ...

#### Examples for Non-safety wireless applications

- Passenger comfort functions, e.g.
  - reading lights, seat functions, IFE functions control
- Baggage and cargo tracking and monitoring
- Maintenance functions
- Supplementary functions enhancing situational awareness of crew, e.g. anti-collision aids
- ...

→ Focus area for SRDs



# Use Case 1: Cargo Tracking and Monitoring





# Use Case 1: Cargo Tracking and Monitoring (1/4)



## Connected Bag

- **64% of airlines**  
plan to use self bag tagging until 2014
- **62% of passengers**  
would tag their own bag if they could at the beginning of their journey with trend indication growing
- **49% of airlines**  
plan to use self-service bag drop off by end 2014
- **65% of passengers**  
would be interested to use self-service bag drop-off kiosk



## Secure Cargo

- **Integrity monitoring:**  
detection of unauthorised modifications / intrusions
- **Ambient condition monitoring:**  
detection of damage / deterioration of goods / event notification
- **Improved handling process for airfreight:**  
paperless processes / automatic generation of documents
- **Support of correct aircraft loading:**  
automatic verification of correct loading at cargo door

## Combined active RFID- and WLAN-based communications

- enables efficient baggage and cargo handling functions
- provides the RFID-based interface between baggage and cargo items and the aircraft
- enables gathering and processing of load handling related information



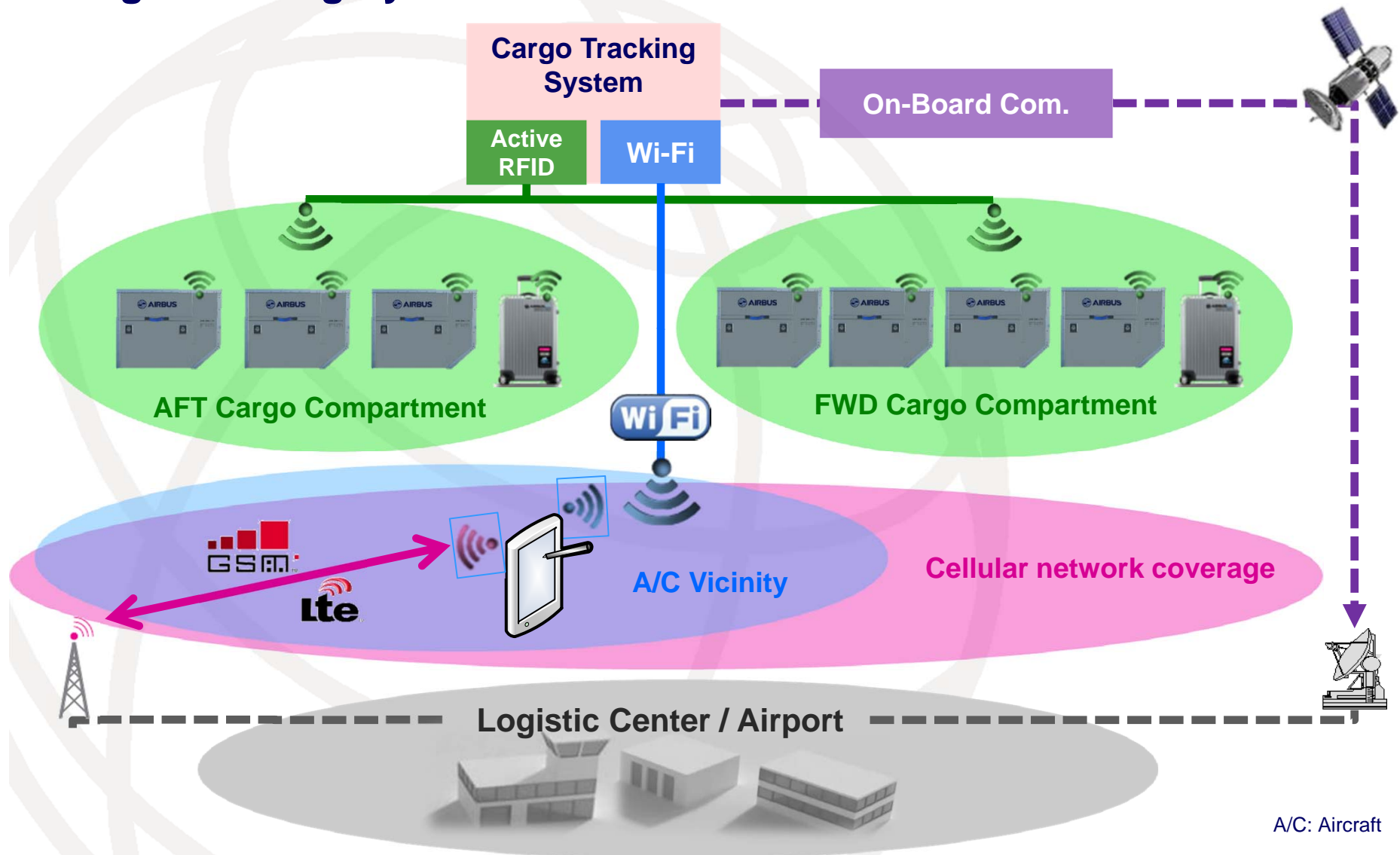
ULD: Unit Load Device, RFID: Radio Frequency Identification, WLAN: Wireless Local Area Network



# Use Case 1: Cargo Tracking and Monitoring (3/4)



## Cargo Tracking System Architecture



A/C: Aircraft



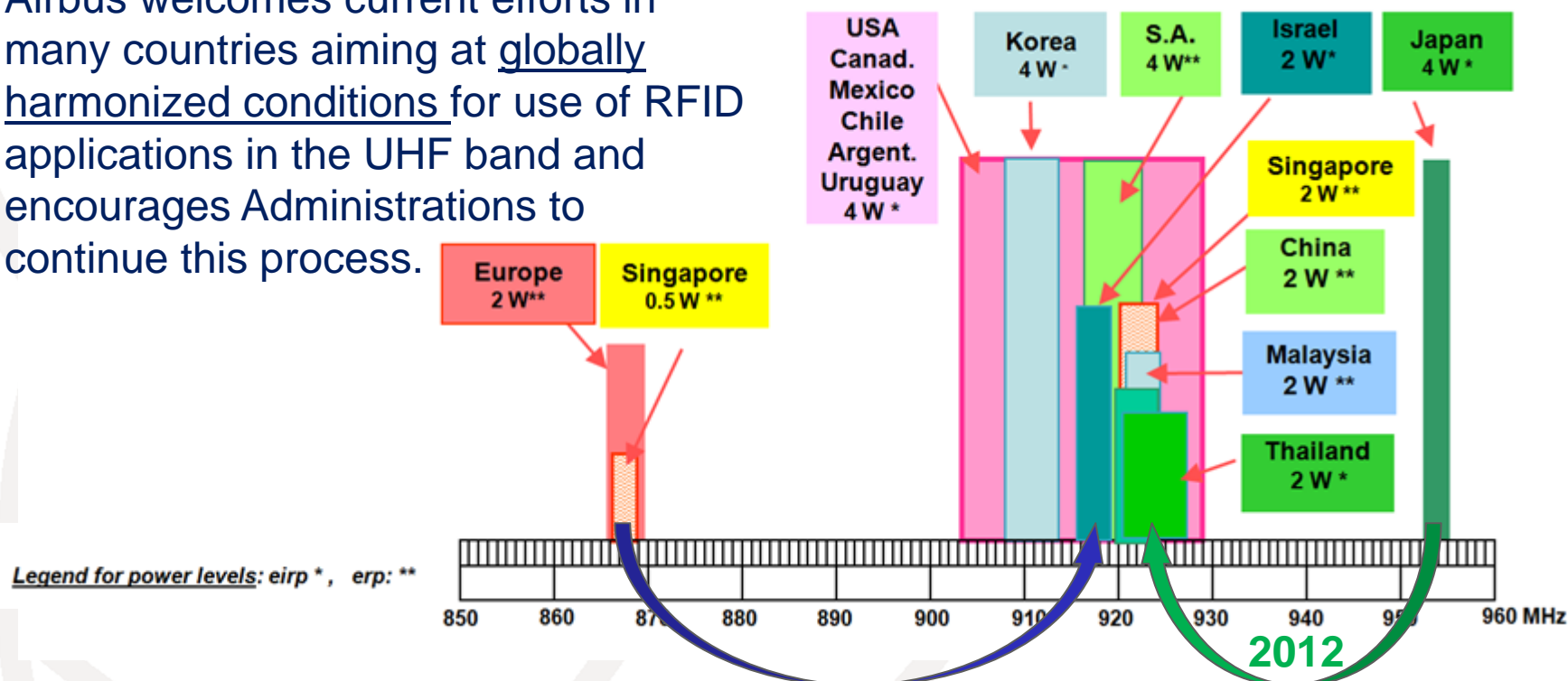


# Use Case 1: Cargo Tracking and Monitoring (4/4)



## Global harmonization for use of RFIDs in the UHF Band

- Japan changed its regulations in 2012, now allowing RFID applications to operate in the frequency band 916.8 to 923.4 MHz.
- Recent activities within ETSI and CEPT led to proposed amendments for ECC Recommendation 70-03 allowing the use of RFID applications in the frequency band 915 – 921 MHz.
- Airbus welcomes current efforts in many countries aiming at globally harmonized conditions for use of RFID applications in the UHF band and encourages Administrations to continue this process.





# Use Case 2: Wing-Tip Anti- Collision System



## Use Case 2: Wing-Tip Anti-Collision System (1/5)



### Background

***The US National Transportation Safety Board (NTSB) has recommended the US FAA require large aircraft be equipped with an ground anti-collision aid.***

***The recommendation follows three recent ground collision accidents in which large aircraft collided with another aircraft while taxiing.***

***The anti-collision aids should be installed on newly manufactured and certificated airplanes and that existing large airplanes should be retrofitted with the equipment.***

***NTSB said it made the same recommendation to the European Aviation Safety Agency (EASA).***

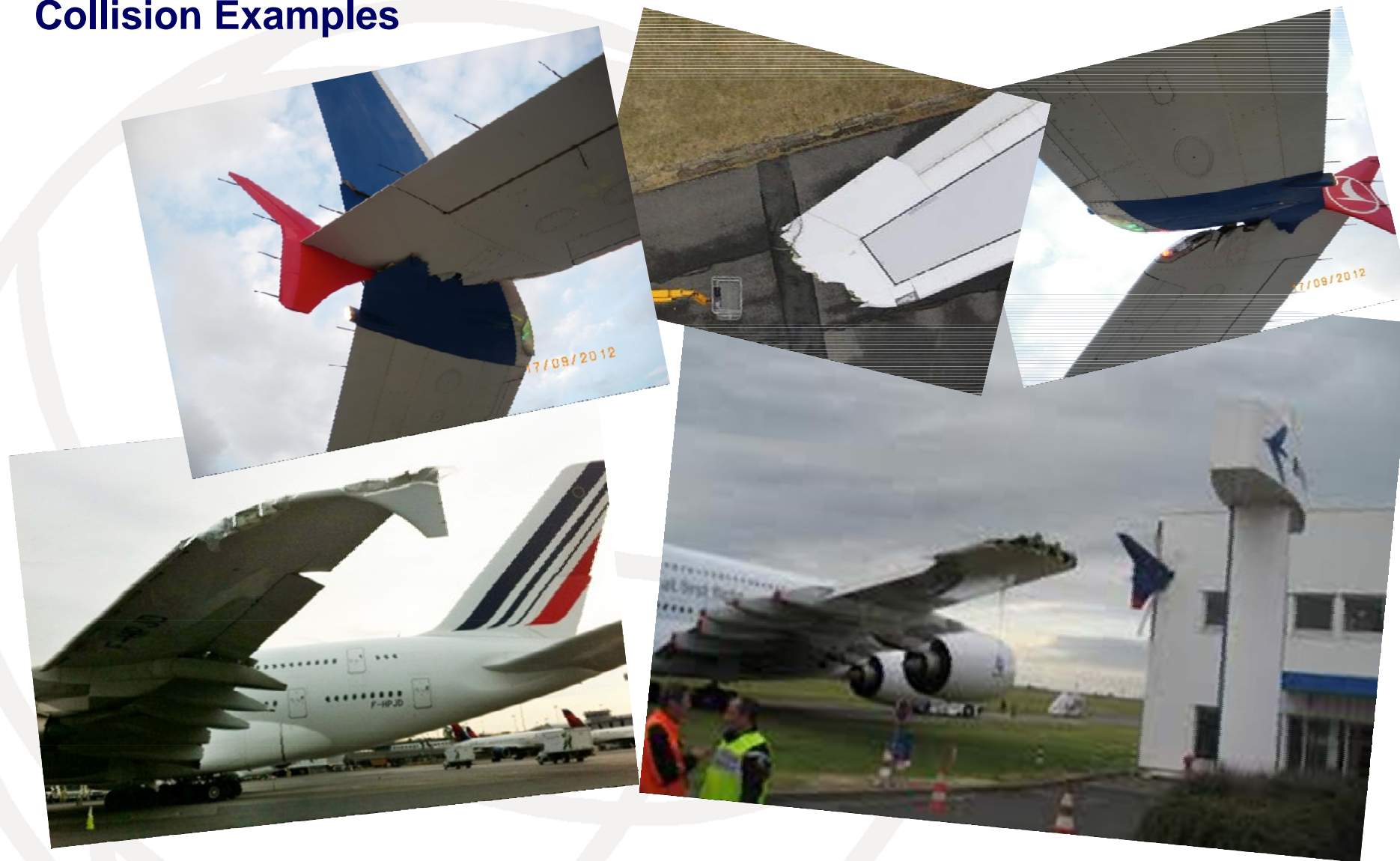
- **More than 80 incidents occur per year (Europe only)**
- **More and more airlines make requests for anti-collision aids**



## Use Case 2: Wing-Tip Anti-Collision System (2/5)



### Collision Examples







## Use Case 2: Wing-Tip Anti-Collision System (3/5)



- **High-Level Requirements for a Wing-Tip Anti-Collision System**
  - Obstacle detection, recognition and avoidance system to prevent impact damage to aircraft structures during ground operations
  - System must work reliably in all weather/day&night conditions for providing advanced warnings to allow aircraft to be stopped safely.
  - System is an advisory system, intended for enhancing situational awareness of flight crew
- **Technology**
  - Automotive radar technology is available and well suited for aeronautical applications (low cost and mature technology, no moving parts, all weather operations, easy to install, small size, low weight and power consumption)

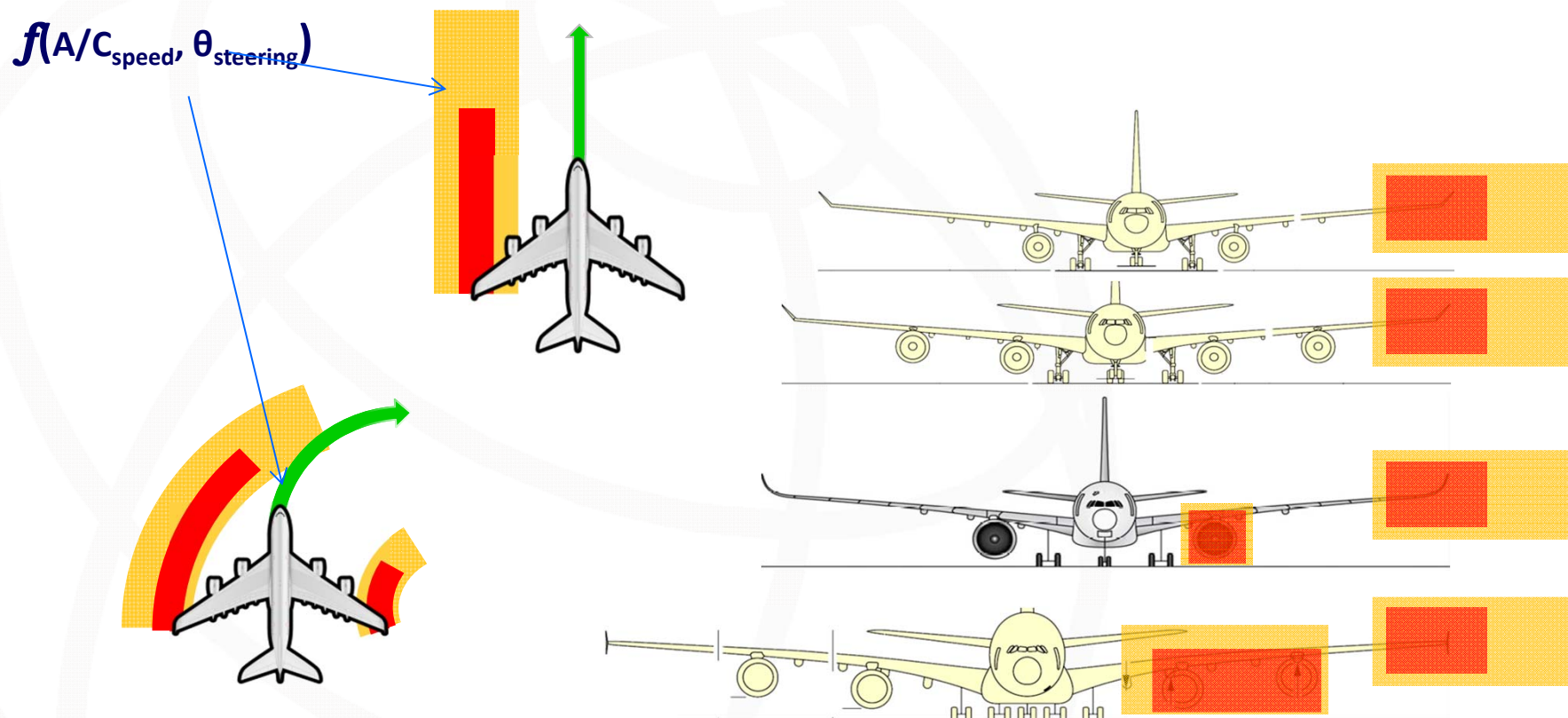




## Use Case 2: Wing-Tip Anti-Collision System (4/5)



### Predictive and Reactive Areas Definition





## Use Case 2: Wing-Tip Anti-Collision System (5/5)



- **Regulatory Status**

- The frequency bands 76-77.5 GHz and 78-81 GHz are globally allocated to the RLS and can be used for Long and Short Range Radar applications
- Bands are used for automotive applications and intelligent transport systems
- Aircraft ground maneuvering scenario is considered comparable to the general automotive use case

- **Airbus View**

- Airbus is of the view that the Wing-Tip Anti-Collision System used to support the flight crew only for aircraft ground maneuvering can be considered as an automotive application under the existing regulatory provisions and no additional studies are required.



# Use Case 3: Wideband data transmission



## Use Case 3: Ground Service Network (1/2)



**Emerging needs for high bandwidth / airport infrastructure  
independent wireless services for improved aircraft ground handling**



Aircraft Health Monitoring Records

Engine Health Monitoring Records

Post Flight Reports

Aircraft Security Surveillance

Software Loading

Electronic Library Upload

IFE Content Upload

Data Security Batch Upload

System Performance Data Logs

Flight/Cabin/Services Log Books

Cargo Loading Monitoring

Ground Services Perform. Mon.

Damage incl. Origination Detection



### 60 GHz broadband wireless for bulk data upload

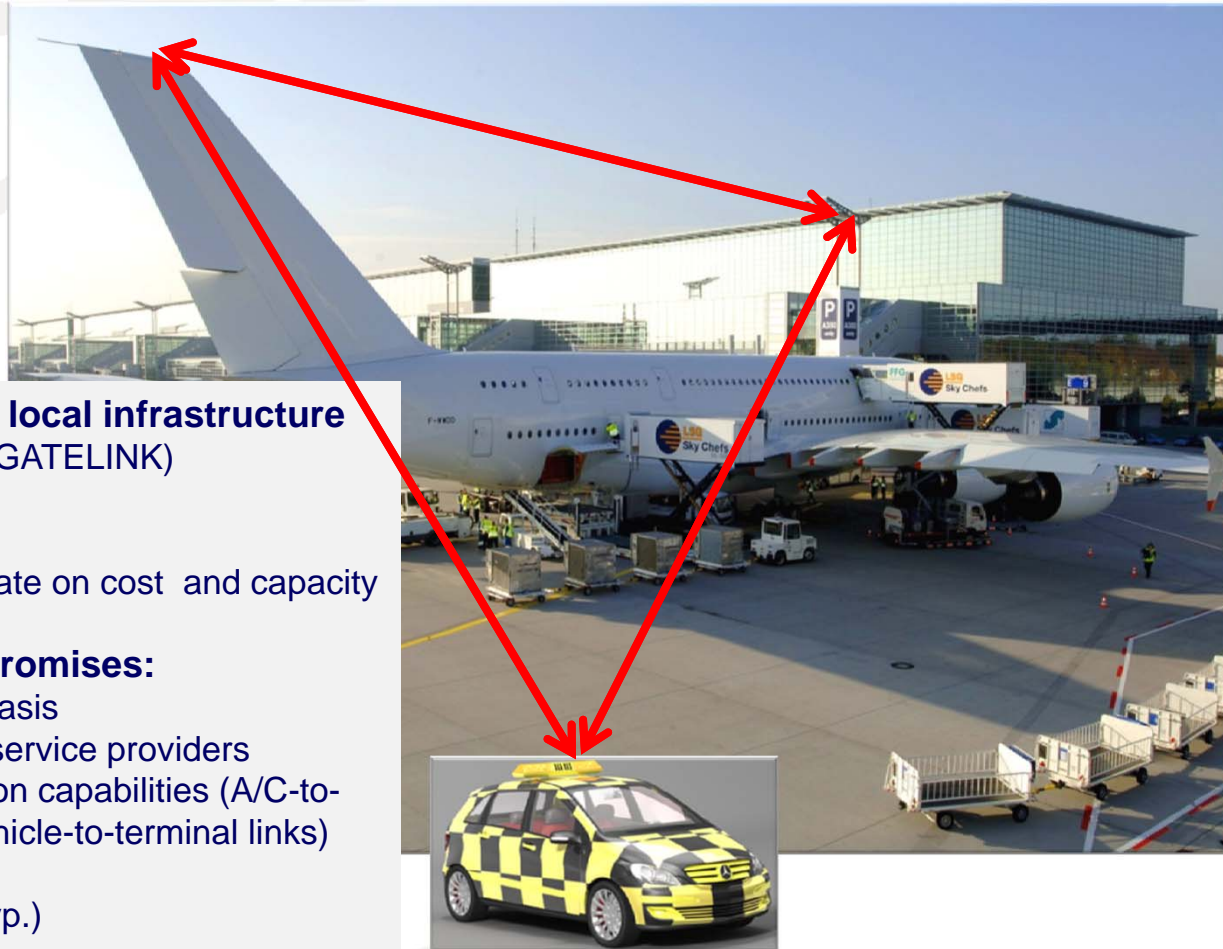


#### Today strong dependency on local infrastructure

- overburdened Wi-Fi networks (GATELINK)
- high connection fees
- low availability
- SAT services mostly not adequate on cost and capacity

#### 60 GHz (WiGig) Technology promises:

- license-exempt use on global basis
- independency on local comm. service providers
- multiple point-to-point connection capabilities (A/C-to-terminal, A/C-to-vehicle and vehicle-to-terminal links)
- several Gbit/s per beam
- range up to 1 km (@ 1 Gbit/s typ.)



**Airbus View:** Airbus supports every effort leading to globally harmonized conditions for the use of 60 GHz Wideband Data Transmission Systems used to improve aircraft ground handling.





## Summary



### **Airbus supports the establishment of ..**

- **harmonized conditions for global operation of active RFID systems, preferably in the UHF band, to simplify system design and harmonize logistics processes.**
- **globally harmonized conditions for the use of short & long range radar technology in the frequency range 78-81GHz for providing anti-collision aids to the flight crew during aircraft ground manoeuvring on the airport surface (e.g. taxiing) based on existing studies for automotive use case.**
- **globally harmonized conditions for the use of 60 GHz Wideband Data Transmission Systems used to improve aircraft ground handling procedures.**



**Thank you very much for your attention ...**

**... any questions?**