

**NAM/CAR/SAM Air Traffic Services  
(ATS) Data Link Implementation  
Workshop, 18-21 Apr 2016**

**Air-ground data link  
deployment – A/C  
manufacturer perspective**

Presented by

Jerome CONDIS  
AIRBUS

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ATS Data Link context

2

AIRBUS Solutions

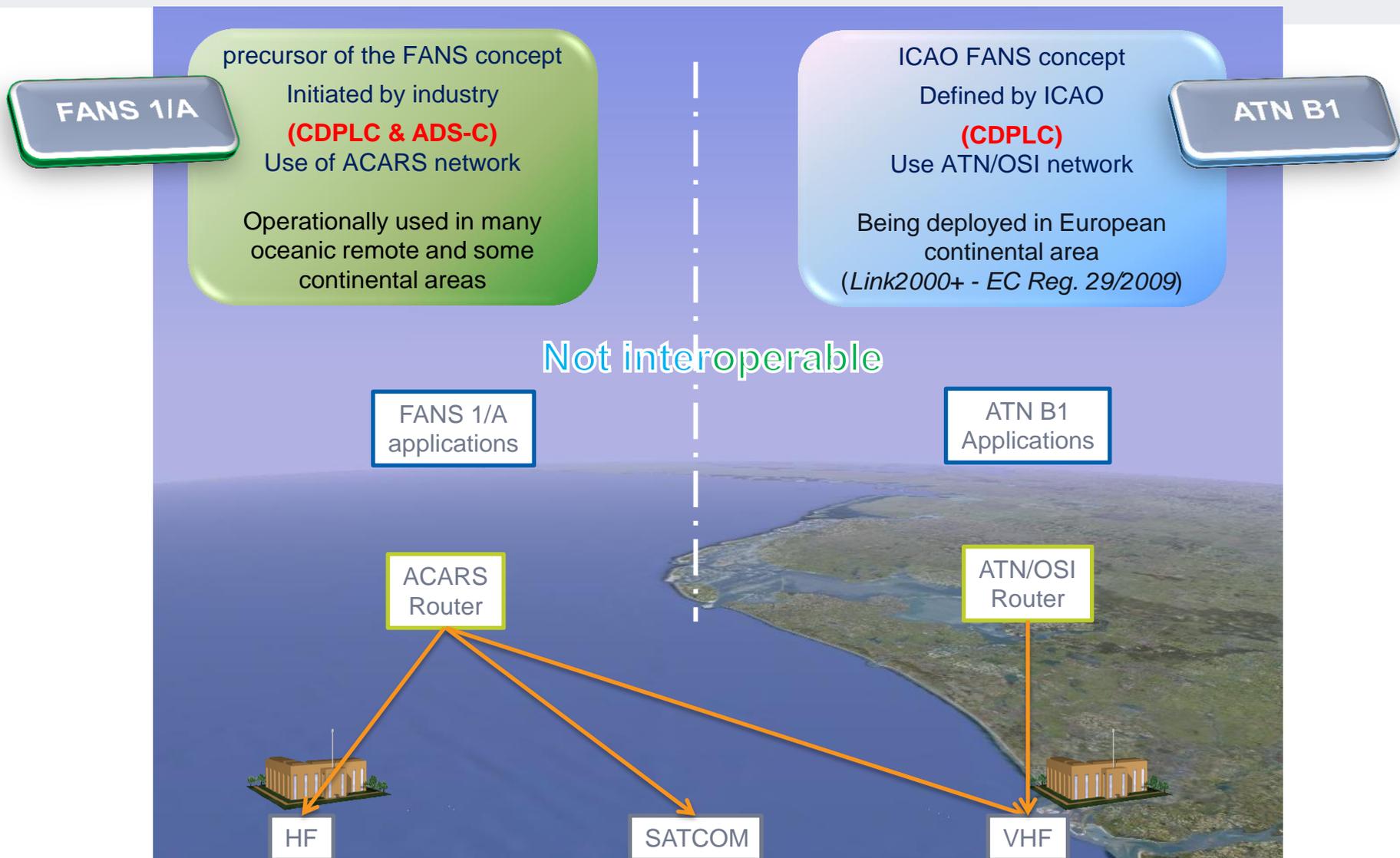
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Future Roadmap

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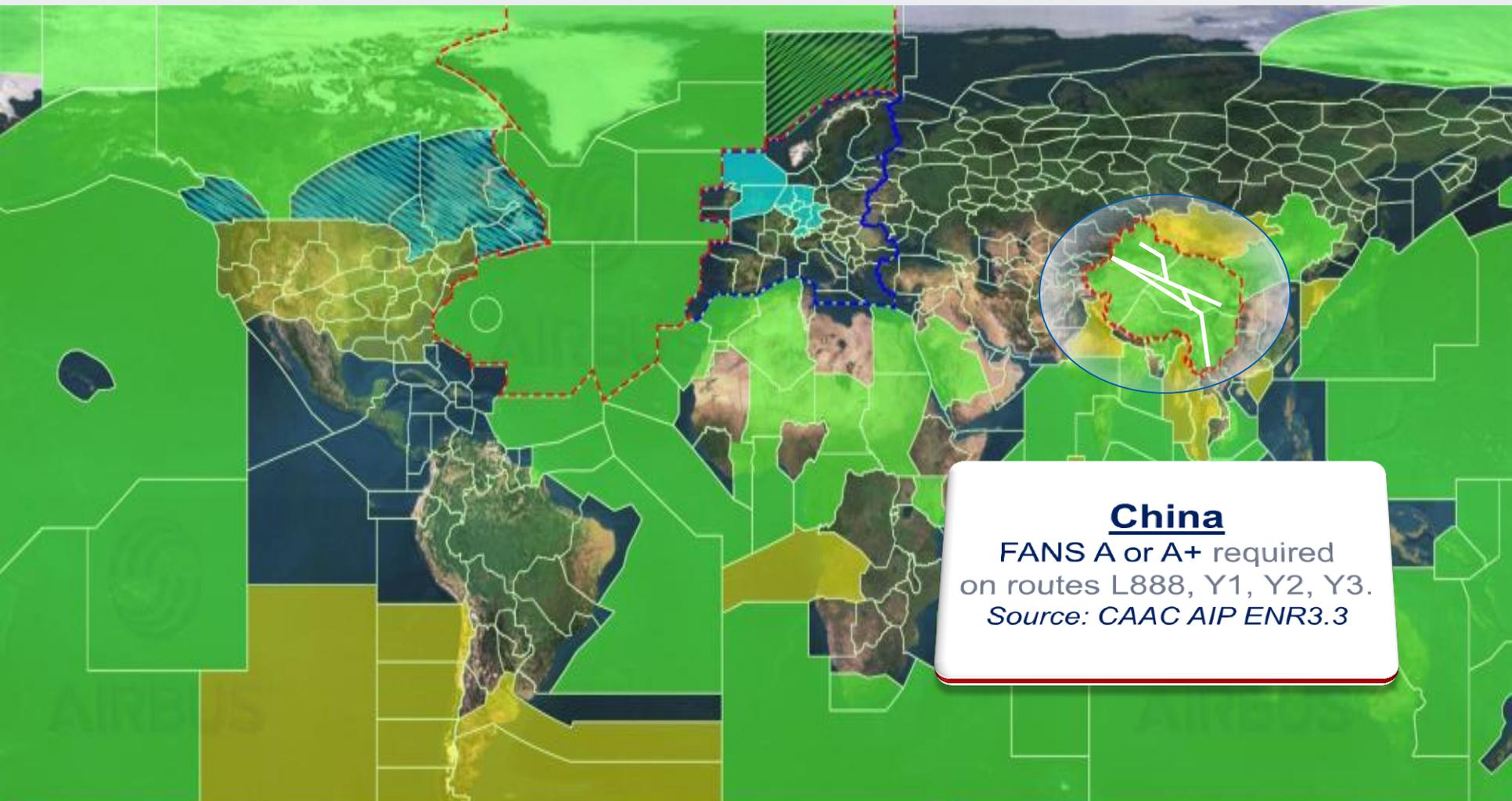
Air-ground interoperability

# ATS Data Link context





# CPDLC & ADS-C in the World



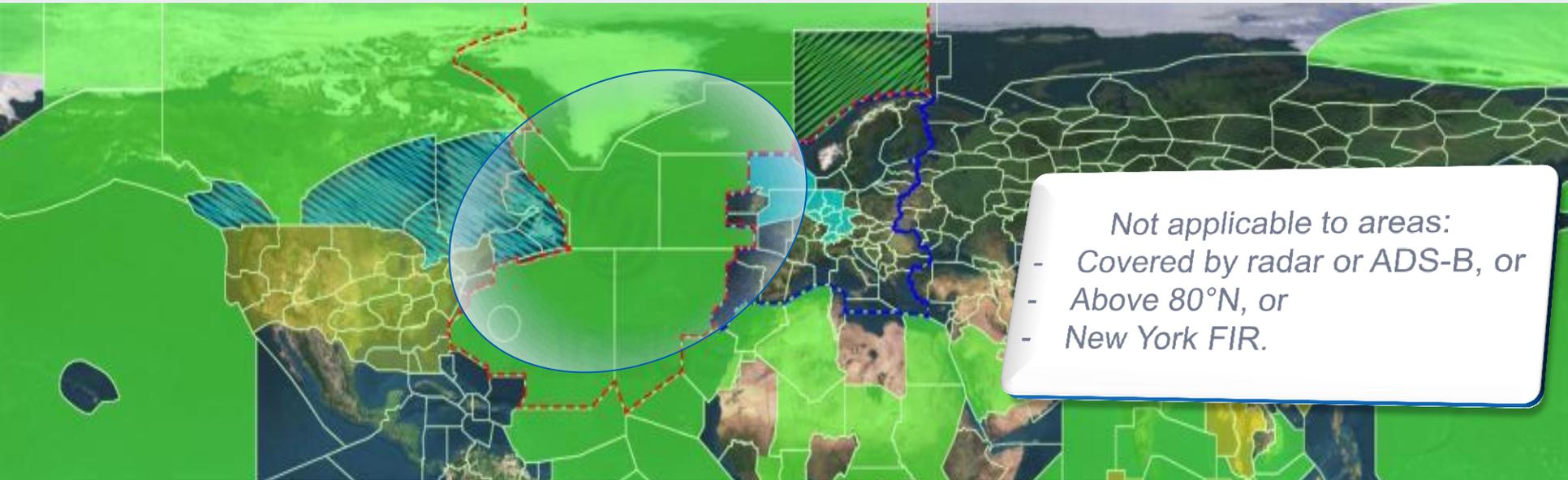
**China**  
 FANS A or A+ required  
 on routes L888, Y1, Y2, Y3.  
 Source: CAAC AIP ENR3.3

	CPDLC & ADS-C operational over ACARS		CPDLC over ATN
	CPDLC only operational over ACARS	<b>ATC Datalink Mandates:</b>	
	ADS-C only operational over ACARS		Over ACARS
	CPDLC & ADS-C trials over ACARS		Over ATN

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# CPDLC & ADS-C in the World



*Not applicable to areas:*

- Covered by radar or ADS-B, or
- Above 80°N, or
- New York FIR.

## North Atlantic

FANS A or A+ required

- *Phase 1:* From 07FEB2013, 2 tracks between FL 350 to FL 390
- *Phase 2A:* From 05FEB2015, all tracks between FL 350 to FL 390
- *Phase 2B:* From 07DEC2017, NAT region between FL 350 to FL 390
- *Phase 2C:* From 30JAN2020, NAT region above FL 290.

Source: Nav Canada AIC 2/14

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# CPDLC & ADS-C in the World



## US Domestic (NextGen)

Segment 1: FANS A or A+ under deployment

- Phase 1: From 2015, Departure Clearance in main NAS airports
- Phase 2: From 2019, En-route services in whole NAS

Segment 2: From 2023+, Baseline 2 services

*Source: NextGen Implementation Plan*

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-  CPDLC & ADS-C trials over ACARS

 CPDLC over ATN

ATC Datalink Mandates:

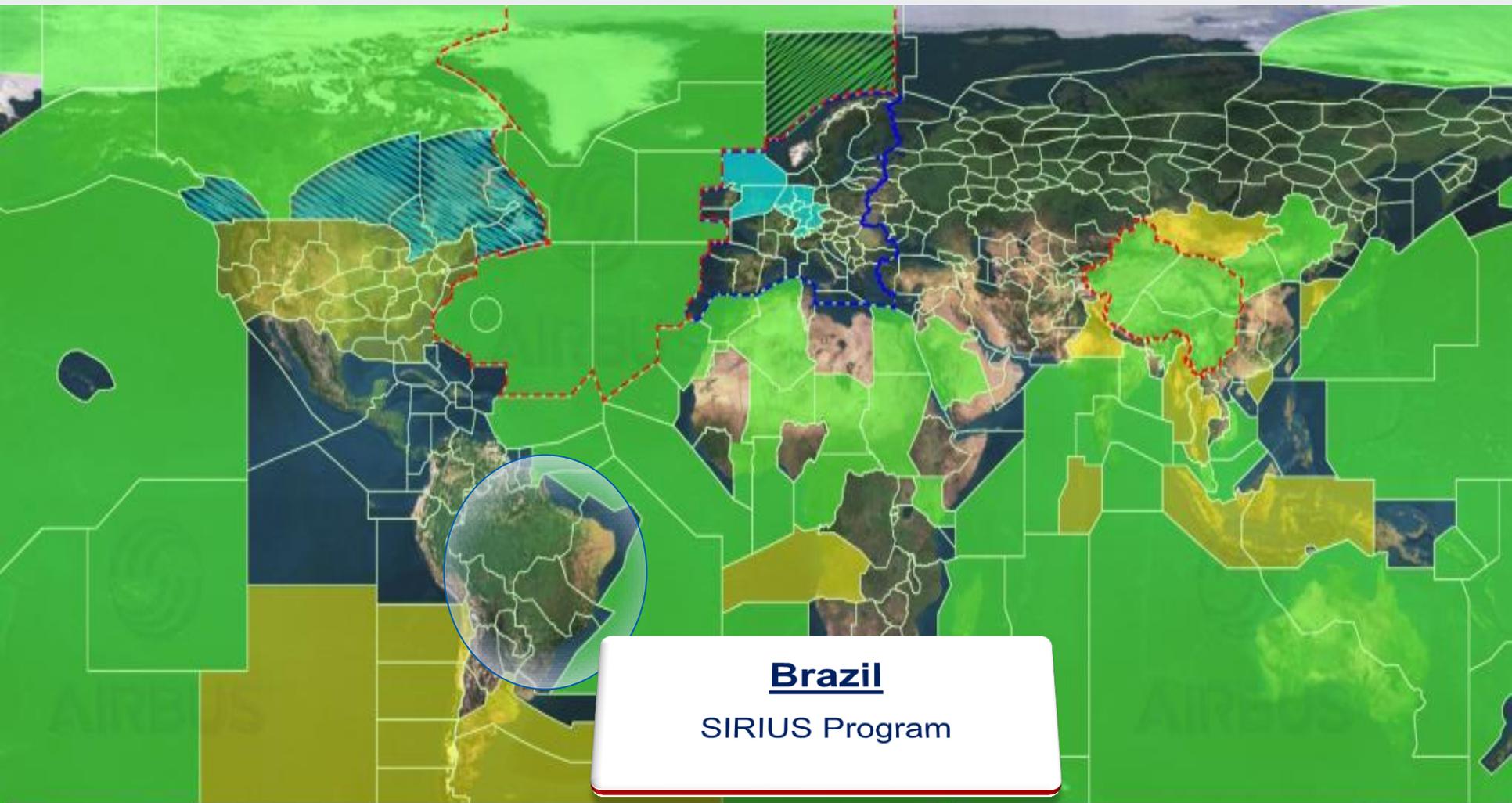
 Over ACARS

 Over ATN

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# CPDLC & ADS-C in the World



**Brazil**  
SIRIUS Program

<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: #00FF00; border: 1px solid black; margin-right: 5px;"></span> CPDLC &amp; ADS-C operational over ACARS</li> <li><span style="display: inline-block; width: 20px; height: 10px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, #00AEEF 2px, #00AEEF 4px); border: 1px solid black; margin-right: 5px;"></span> CPDLC only operational over ACARS</li> <li><span style="display: inline-block; width: 20px; height: 10px; background: repeating-linear-gradient(-45deg, transparent, transparent 2px, #00AEEF 2px, #00AEEF 4px); border: 1px solid black; margin-right: 5px;"></span> ADS-C only operational over ACARS</li> <li><span style="display: inline-block; width: 20px; height: 10px; background-color: #FFD700; border: 1px solid black; margin-right: 5px;"></span> CPDLC &amp; ADS-C trials over ACARS</li> </ul>	<p>CPDLC over ATN</p> <p>ATC Datalink Mandates:</p> <ul style="list-style-type: none"> <li><span style="display: inline-block; border-top: 2px dashed red; border-bottom: 2px dashed red; width: 20px; height: 10px; margin-right: 5px;"></span> Over ACARS</li> <li><span style="display: inline-block; border-top: 2px dashed blue; border-bottom: 2px dashed blue; width: 20px; height: 10px; margin-right: 5px;"></span> Over ATN</li> </ul>
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# CPDLC & ADS-C in the World



## Domestic Europe

**ATN B1** required above FL 290

New dates, following EC decision to postpone:

- All ground equipped before 5 Feb 2018
- All aircraft equipped before 5 Feb 2020

**ATN B2** planned from 2018 (IOC) to 2025 (full deployment)

Source: EC 29/2009 and EU 2015/310 (ATN B1)  
EC 716/2014 (PCP AF6)

-  CPDLC & ADS-C operational over ACARS
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 CPDLC over ATN

ATC Datalink Mandates:

-  Over ACARS
-  Over ATN

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# CPDLC & ADS-C in the World



## Datalink Recording Mandate

- **FAA:** Forwardfit and Retrofit from **06DEC2010**
- **EASA:** Forwardfit from **08APR2014**
- **AIRBUS** solutions available on all aircraft

 CPDLC & ADS-C operational over ACARS  
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 CPDLC & ADS-C trials over ACARS

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 ATC Datalink Mandates:  
 Over ACARS  
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ATS Data Link context

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AIRBUS Solutions

Future Roadmap

Air-ground interoperability

# ATS Data Link context

**AIRBUS FANS A+B**  
all areas



Basic  
Since 2014

Option  
Since 2015

**AIRBUS FANS A or A+**



**AIRBUS FANS B+**



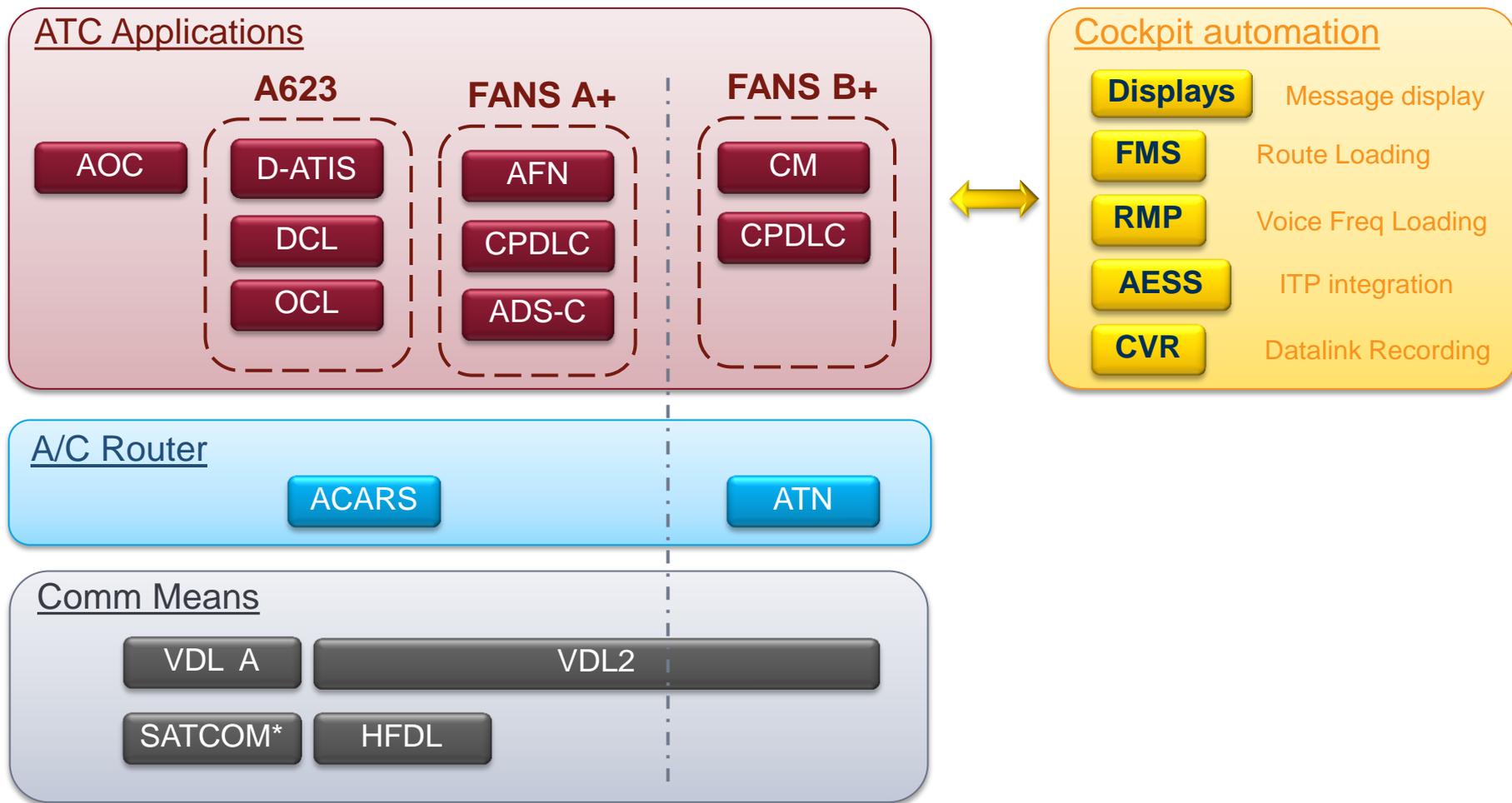
Option  
Since 2011

Basic  
Since 2008

Basic  
Since 2000

Option  
Since 2006

# FANS A+B Dual Functional Architecture



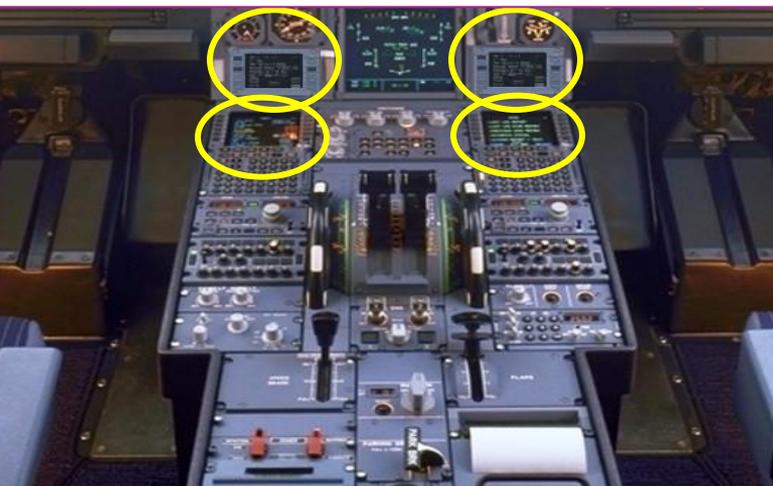
# AIRBUS FANS in A320/A330/A340 Cockpit

**DCDU: Datalink Control & Display Unit**

**Your mailbox**



Cockpit interfaces identical to FANS A/A+ and FANS B/B+

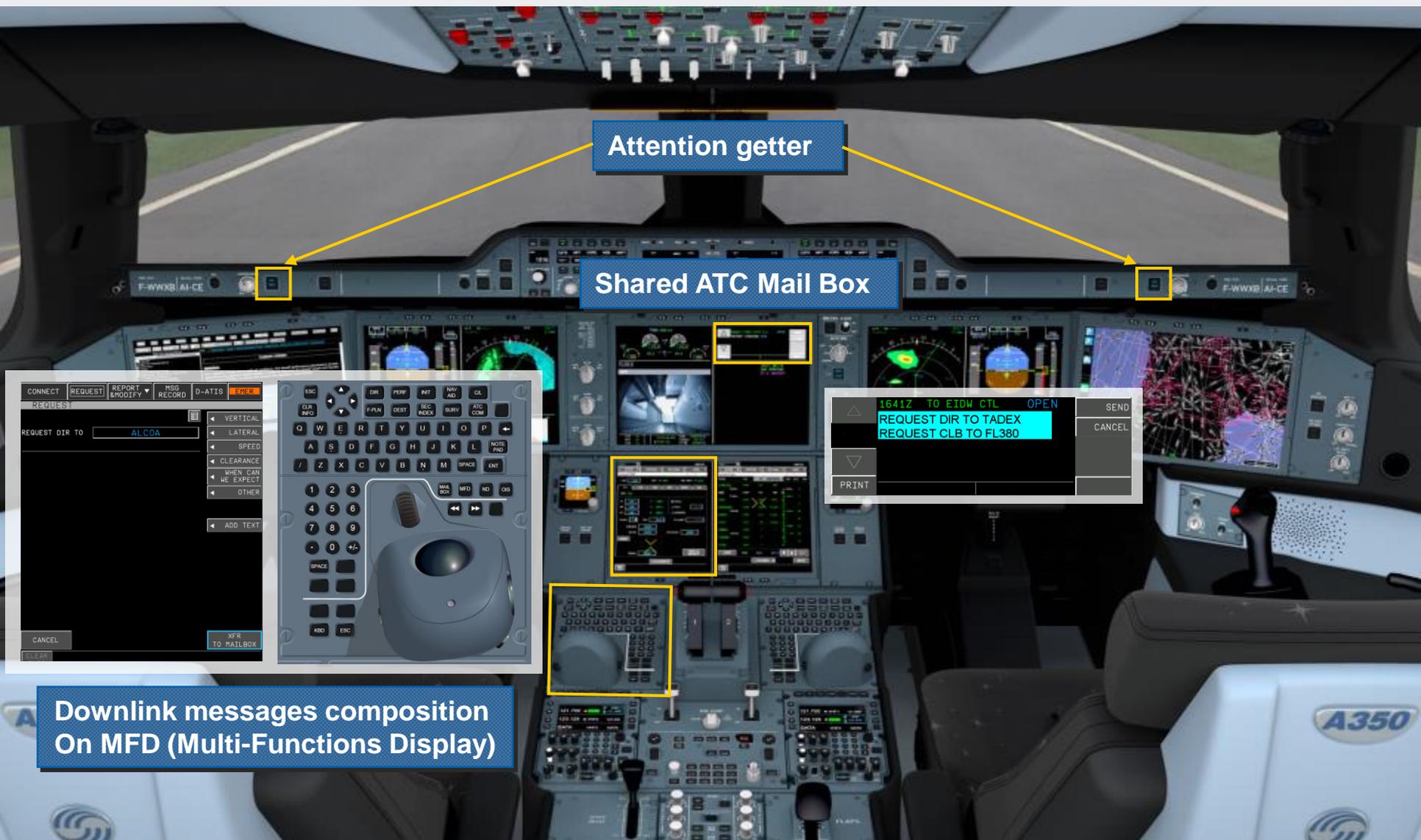


**MCDU: Multi-purpose Control & Display Unit**

**Your keyboard**



# Airbus FANS in A350 XWB and A380 cockpits



Attention getter

Shared ATC Mail Box

Downlink messages composition  
On MFD (Multi-Functions Display)

1641Z TO EIDW CTL OPEN  
REQUEST DIR TO TADEX  
REQUEST CLB TO FL380  
PRINT

# Receiving an Uplink Message



# Sending a Downlink Message



ATS Data Link context

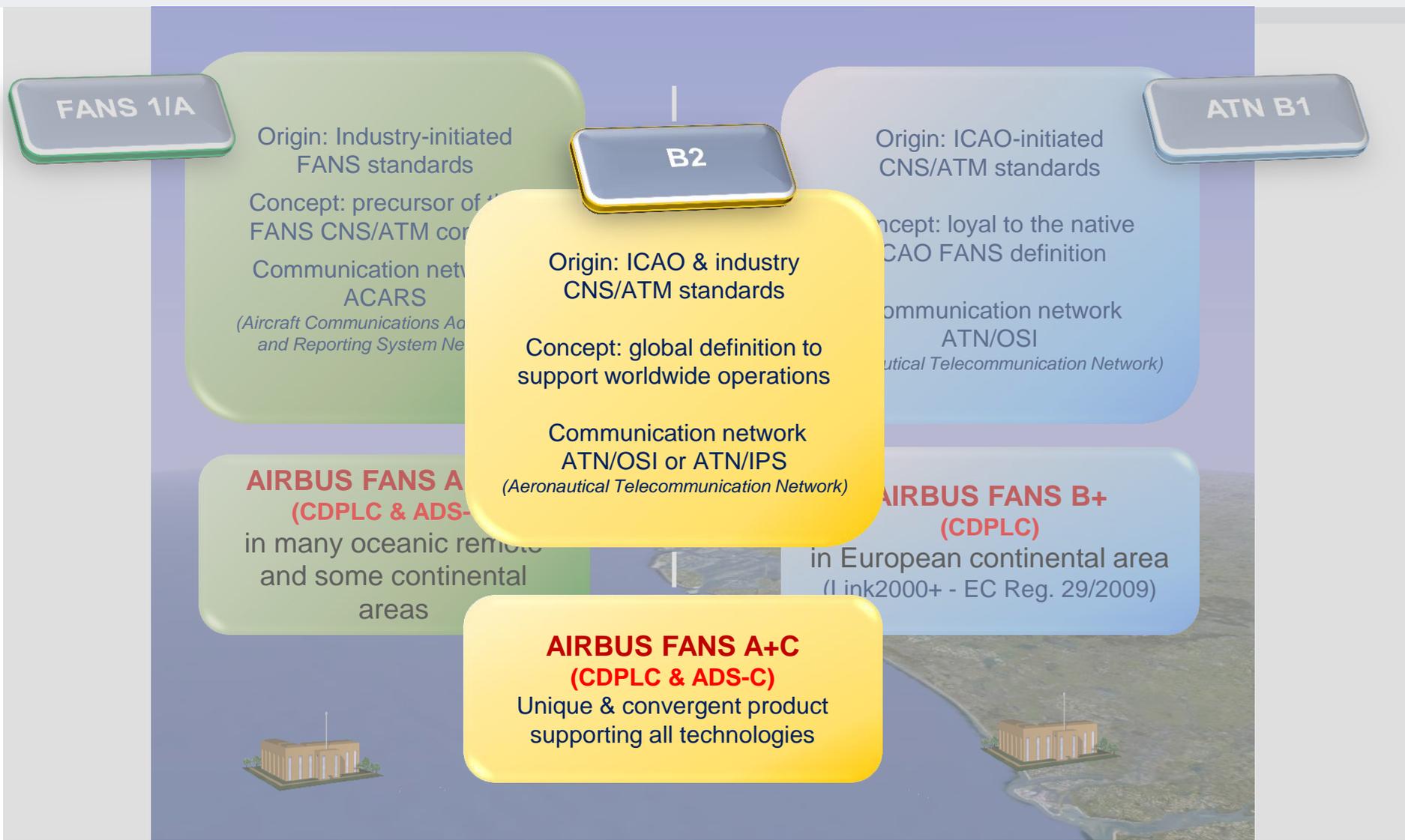
AIRBUS Solutions

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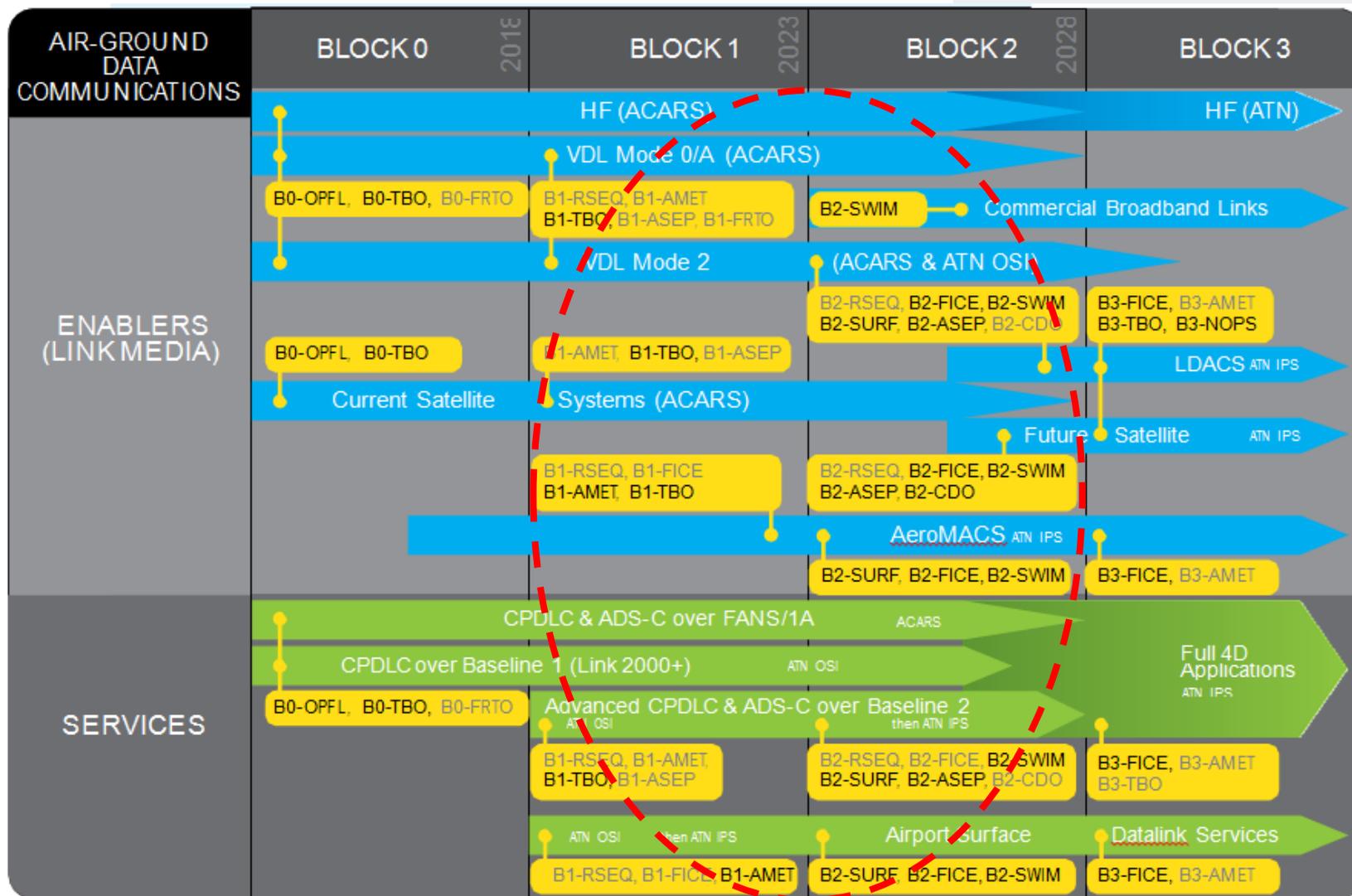
Future Roadmap

Air-ground interoperability

# Next generation ATS Data Link package : Baseline 2



# B2 in ICAO GANP



ATS Data Link context

AIRBUS Solutions

Future Roadmap

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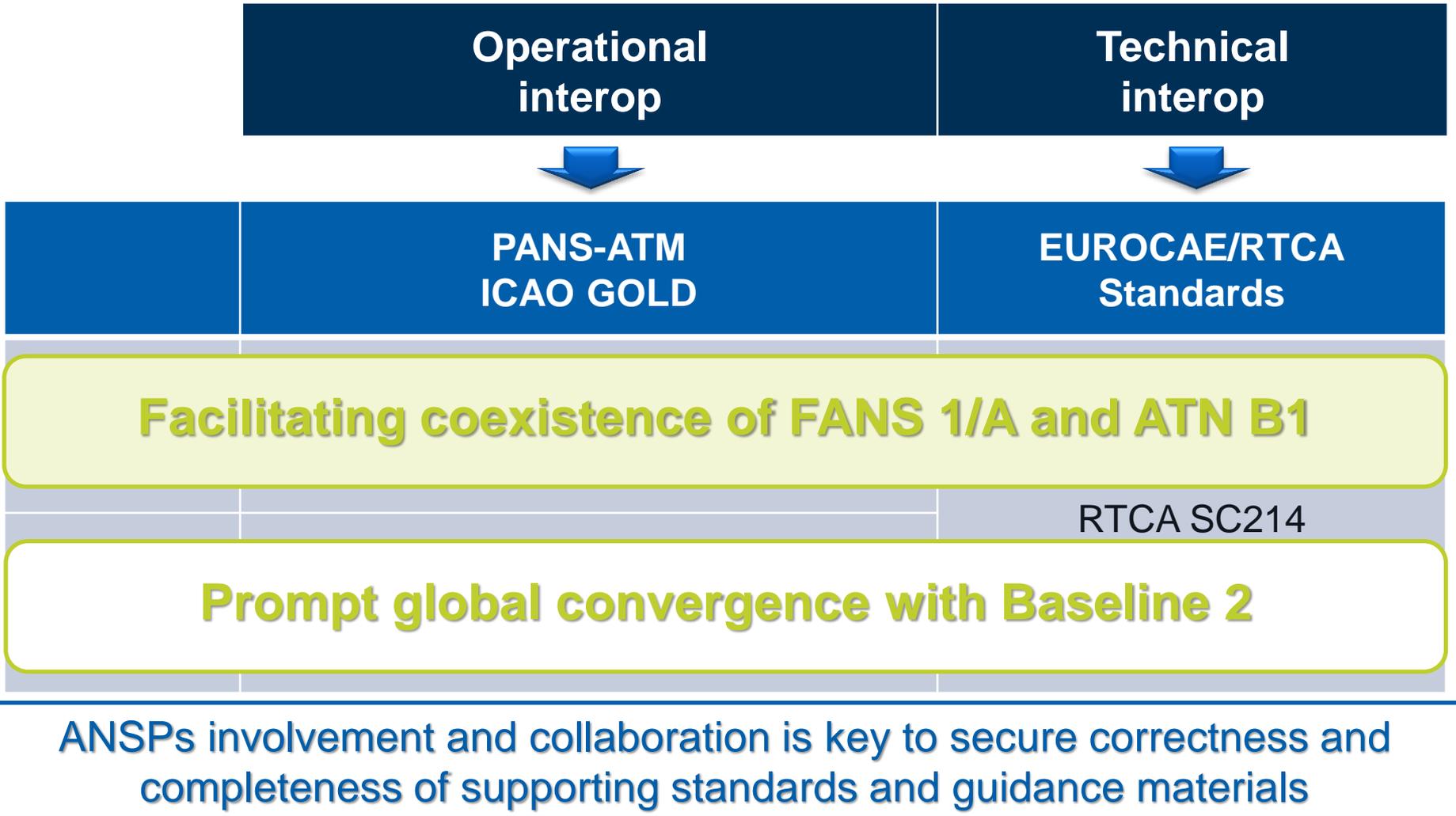
Air-ground interoperability

# A/C supporting worldwide operations

- Air-ground interoperability is key for Aircraft Manufacturers



# A/C supporting worldwide operations



# Mitigation of risks on air-ground interoperability

- Compliance with applicable standards and guidance
- Delivery of mature certified Airbus products
  - Thoroughly verified at test lab, during flight tests, in interoperation with many ANSPs
  - In Service Problems monitoring, analysis, and actions when required (new product releases for defects found on Airbus airborne systems implementation)
- Proactive interoperability tests campaigns with ground ATC Centers
  - At Airbus initiative in the scope of the certification of any new avionics product release
  - At ground ATC Centers initiative to validate new ground platform versions
- Airbus products particularities documented in ICAO GOLD

# How to organize interoperability tests with Airbus ?

- Send an e-mail to contact person [marine.glimois@airbus.com](mailto:marine.glimois@airbus.com)
- Interoperability tests can cover
  - A623, CPDLC, and ADS-C applications
  - A/G traffic exchanged through ARINC or SITA operational networks
- An Interoperability tests campaign generally implies
  - Some teleconferences to agree on tests dates, and tests scope
  - Exchange of tests procedures documents through e-mail
  - Tests execution session (generally over a half day)
  - A teleconference for debriefing on the tests results



# Conclusion

- Involvement and collaboration in standardization (in particular GOLD) is key
  - To ensure **any particular needs are considered, documented and shared with all stakeholders**
  - To make sure implementations **comply to the applicable standards and guidance materials (avoid misinterpretations)**
- Anticipate interoperability **tests campaigns with aircraft systems**
- Setup **large scale trials with multiple partner Airlines** for pre-operational validation of the datalink services when possible
- Participate to **in-service monitoring agencies**
  - Use CRA databases to report abnormal events and trigger analysis/fix
  - Share experience with other organisations and get awareness on reported issues and resolution status

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