



Operational Benefits of ADS-C and CPDLC

for Modern Air Navigation Services

NACC/WG/11 | Technical contribution

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Why complement voice communications?



VOICE REMAINS ESSENTIAL

Especially for urgent, tactical and non-routine situations.

The objective is not to eliminate voice. It is to use the right channel for the right operational exchange.



Audio quality

Noise, interference and variable signal quality can affect intelligibility.



Language & phraseology

Accents, pace and language proficiency can increase the risk of misunderstanding.



Frequency congestion

A busy channel limits access and can delay routine exchanges.



Read-back / hear-back

Spoken clearances rely on accurate hearing, interpretation and confirmation.



Controller workload

Repeated calls, blocked transmissions and routine exchanges compete for attention.



No persistent display

A voice instruction is not continuously visible for later review.

CPDLC adds structured, reviewable messaging; ADS-C adds automatic surveillance reporting.

Why digital air-ground communications matter

Voice remains essential. Datalink complements it with structured, persistent and performance-monitored exchanges.



Safety

Standardized message sets reduce ambiguity and preserve the clearance or request for review.



Efficiency

Routine exchanges move from congested voice channels to asynchronous digital communications.

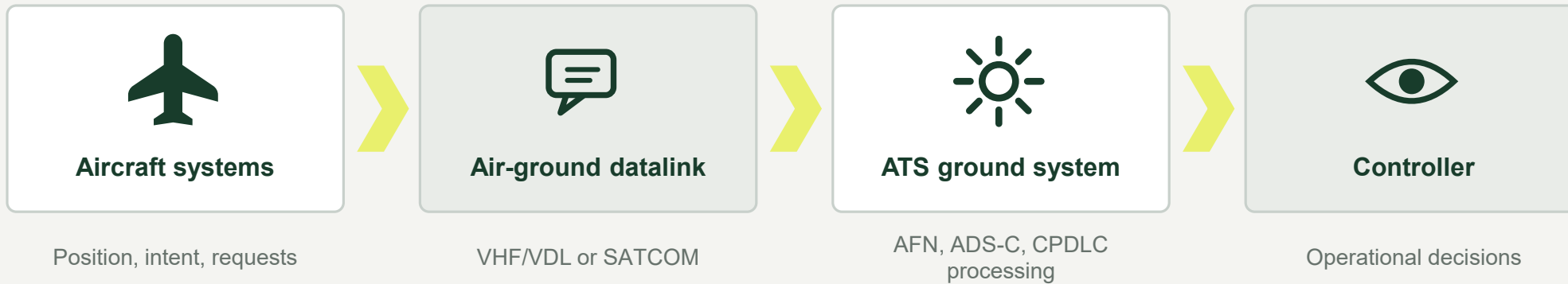


Capacity

Predictable communication and surveillance performance can support more efficient airspace procedures.

The objective is operational improvement, enabled by standards, procedures, people and technology.

ADS-C and CPDLC: complementary capabilities



CPDLC

Two-way, structured controller-pilot messages for clearances, requests and reports.

ADS-C

Contract-based automatic reports of position, intent and other aircraft-derived data.

CPDLC: operational value in the communication channel



CLIMB TO FL370

WILCO

Structured exchange
Persistent record
Voice available for time-critical use



Clarity

Standardized text reduces ambiguity and read-back/hear-back exposure.



Frequency relief

Routine exchanges can be handled without occupying the voice channel.



Workload management

Asynchronous exchanges help sequence routine communication tasks.

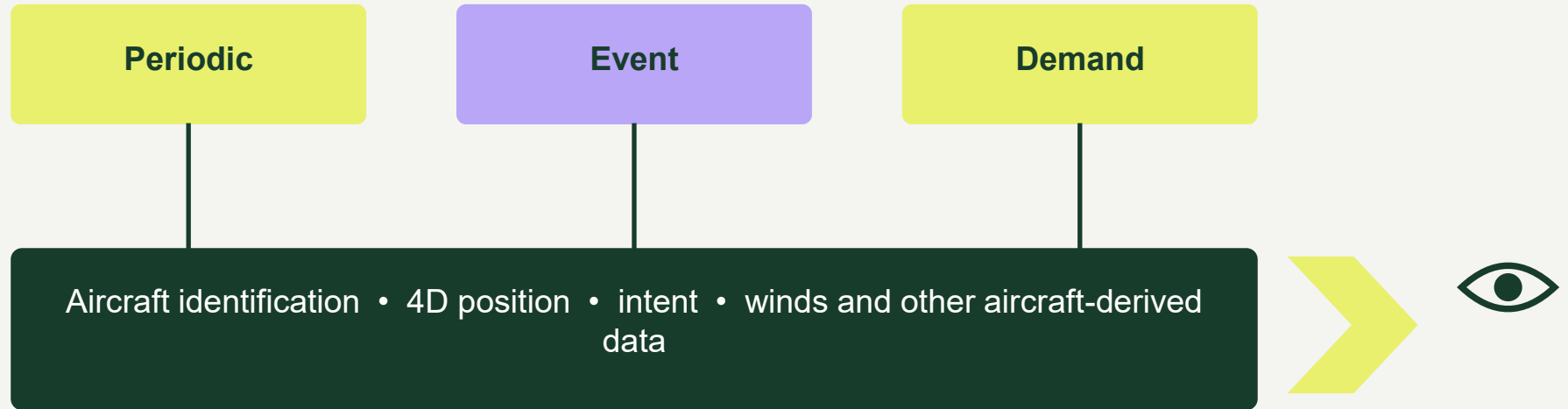
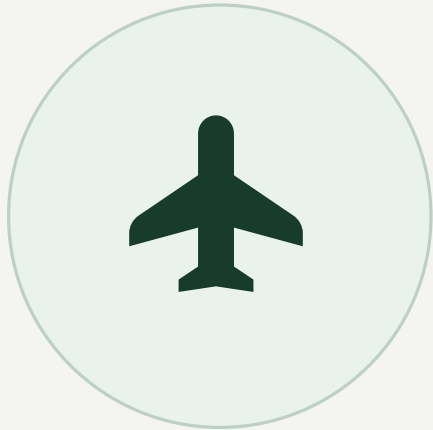


Operational flexibility

Supports clearances, requests and reports in remote and oceanic operations.

Key principle: CPDLC is integrated into procedures, training and human factors. It is not simply “text instead of voice.”

ADS-C: surveillance where contracts define the data



Operational value

Enhanced surveillance in oceanic and remote airspace
Flexible reporting based on operational need
Better traffic-flow awareness and procedural control

From capability to operational outcomes



Safety

Clear, standardized exchanges; improved surveillance continuity; fewer communication misunderstandings.



Efficiency

Less routine voice traffic; improved route and level coordination; better use of controller and flight-crew attention.



Capacity

Predictable communications and surveillance can enable optimized procedures and separation applications.



Resilience

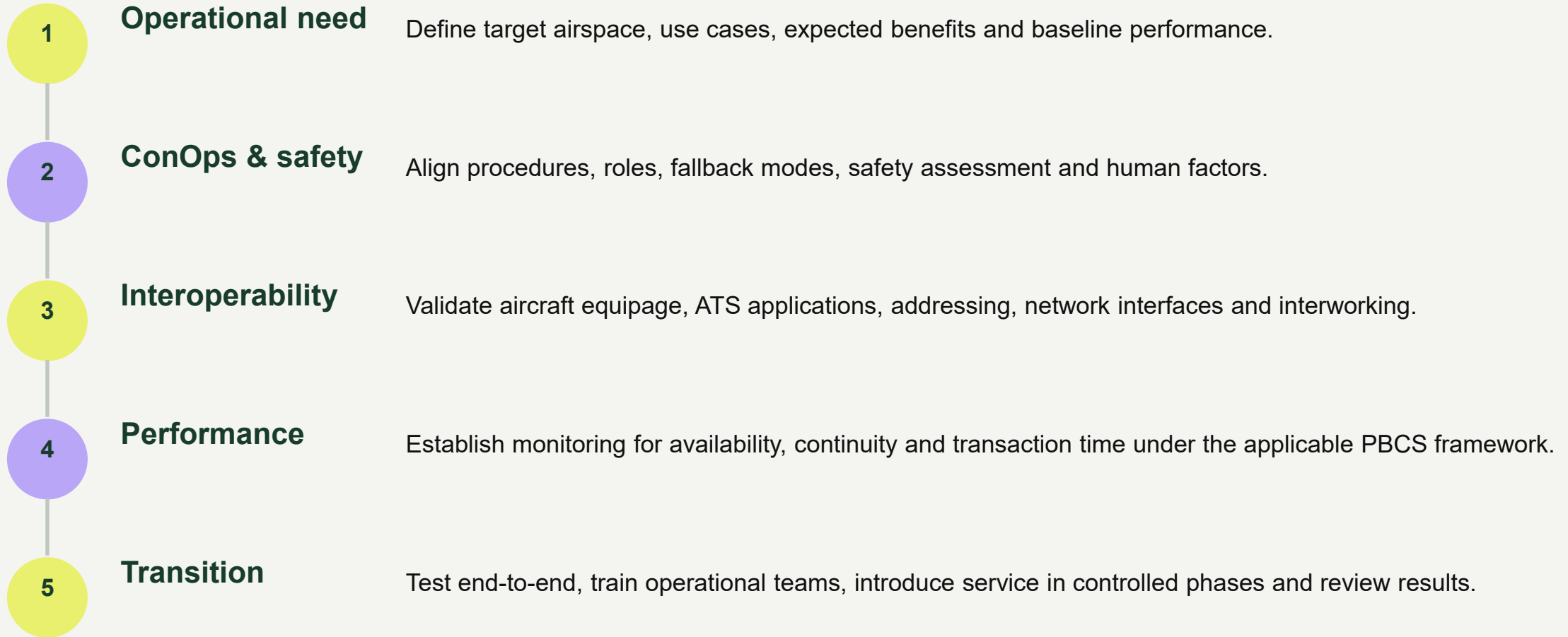
Complementary communication paths and persistent messages improve continuity in remote or challenging environments.



Interoperability

Standards-based integration across aircraft, ATS systems and datalink service providers.

Implementation success factors



Three messages to take away

1

CPDLC and ADS-C are complementary

Communication and surveillance together provide a stronger operational picture.

2

Benefits are operational, not only technical

Safety, efficiency and capacity depend on procedures, performance, training and human factors.

3

Implementation is an ecosystem effort

Interoperability and end-to-end coordination are essential for regional success.



Discussion

What operational objective should your State prioritize first?