Viasat + Inmarsat

Satellite Safety Data Link Services

FIT Asia, 26 June, 2025
Bangkok, Thailand

Lisa Bee
Director of Air Traffic Services


Viasat
+ inmarsat
a global partner to ANSPs
and airlines

Agenda

- Satellite, fleet arrangement, and coverage
- Network enhancements
- L-band data link safety services
  - FANS 1/A services for oceanic/remote operations
  - SB-S Iris ATN services for domestic operations

L-band satellite fleet arrangement

I-6 F1
- I-6 F1 in service over the Indian Ocean
- 70% more power, 50% more capacity per beam than I-4s

I-4 FA
- I4 Alphasat in service over Europe/Middle East/Africa

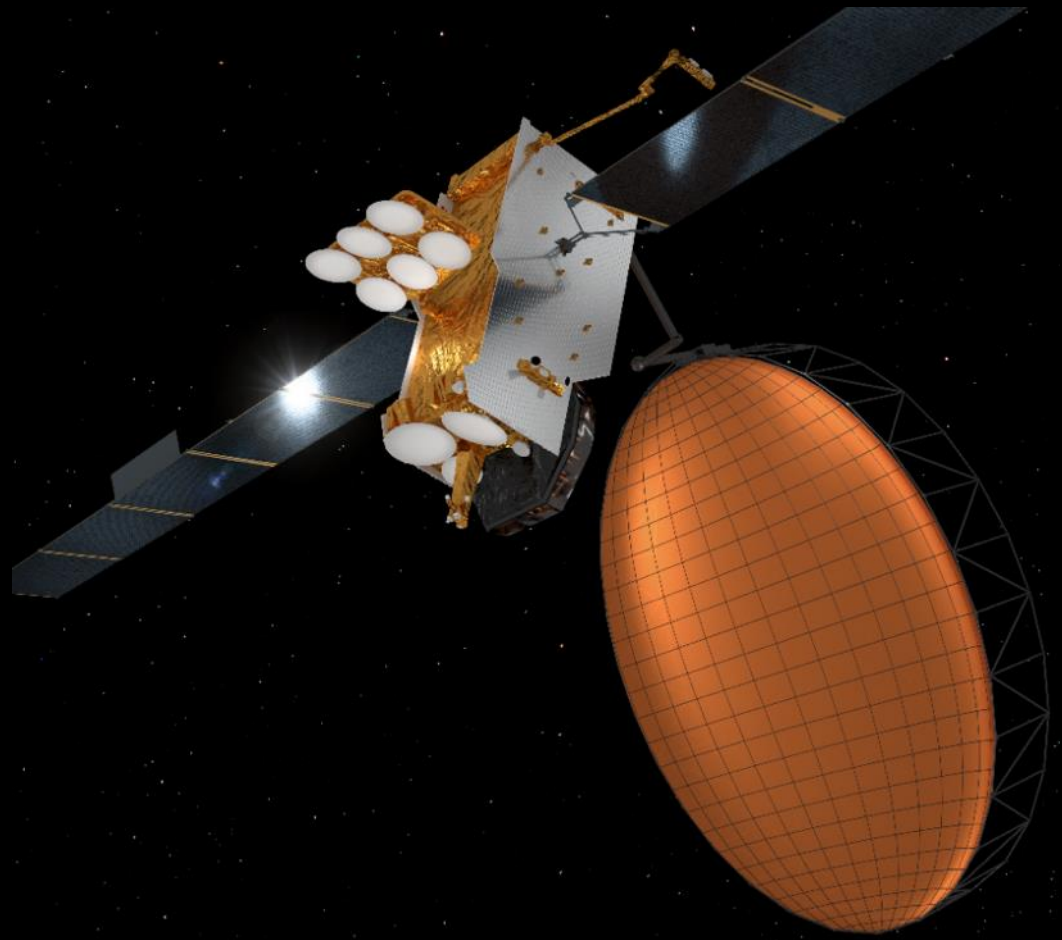
I-4 F3
- I4 F3 in service over Americas

I-4 F2
- I4 F2 in service over Asia Pacific

I-3 F5
- I3 F5 in service over Atlantic Ocean

I-4 F1
- Moved to new location for contingency

Three I-8 satellites planned for launch in 2026
- Anticipated Service Entry Date 2028
  (All future service dates are projections and are subject to change)
- Crucial safety services and added network resilience
- Service life extension beyond 2040



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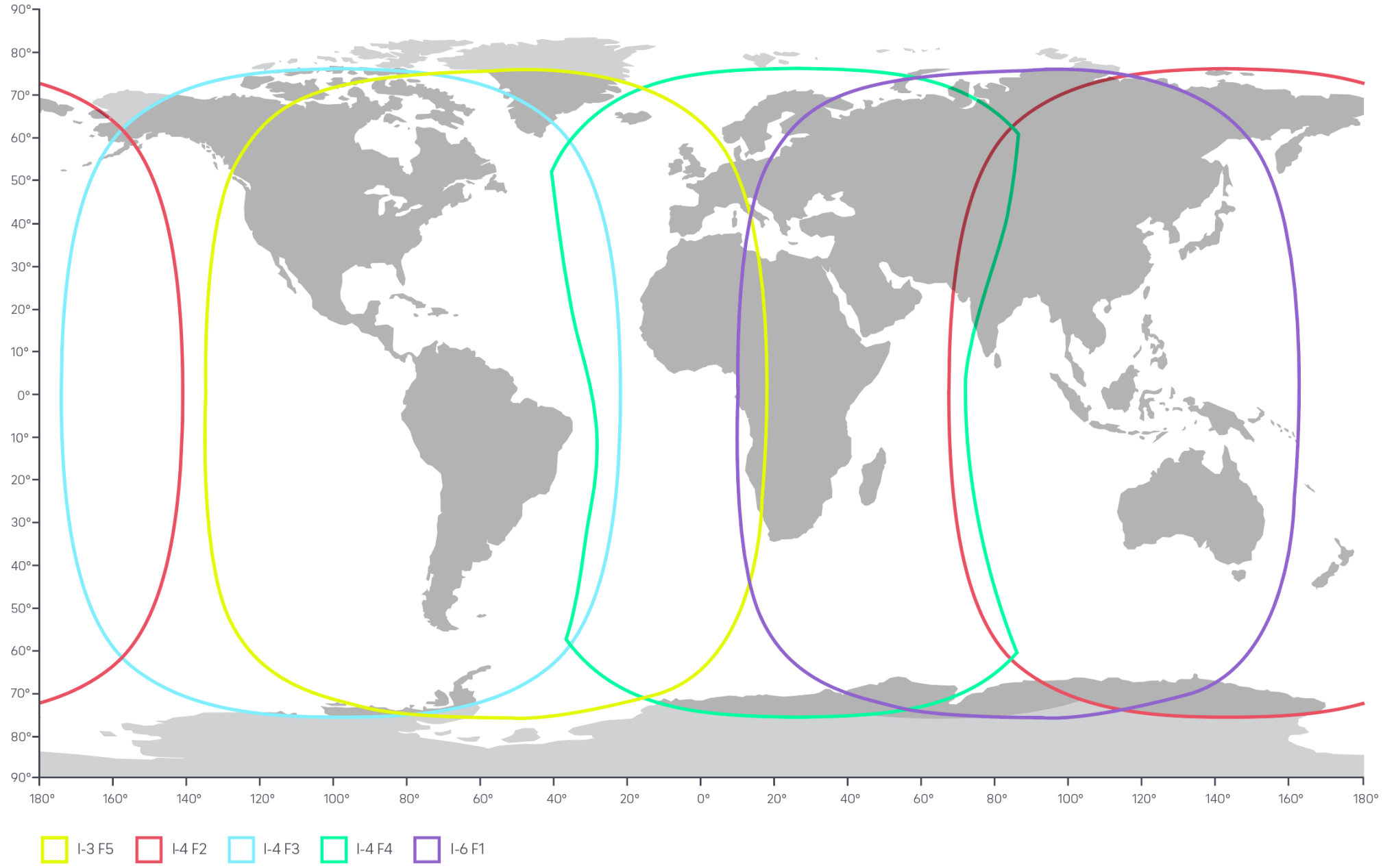
L-band Satellite Coverage



- Subject to change
- Coverage map for illustration purposes only

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Satcom Network Path Identifiers*

Satellite Service Provider (SSP)	Satellite	Service	Ground Station Location	ARINC ACARS Identifiers	SITA ACARS Identifiers	ADCC ACARS Identifiers
Iridium	NEXT (66 LEO's Globally)	Short Burst Data	Primary: Tempe, Arizona, US Secondary: None	IG1	IGW1	N/A
		Certus IP	Primary: Tempe, Arizona, US Secondary: None	IG2		
Inmarsat	AORE (3F5 at 54°W)	Classic Aero	Laurentides, Canada	XXN	AOE6	B3E
		Swift Broadband-Safety 1.0	N/A	N/A	N/A	N/A
		Swift Broadband-Safety 2.0	N/A	N/A	N/A	N/A
	EMEA (AF1 at 25°E)	Classic Aero over I-4	Fucino, Italy	XXF	EUA1	B4E
		Swift Broadband-Safety 1.0	Primary: Fucino, Italy Secondary: Thermopylae, Greece	X4E, X5E	EUA9	B1E
		Swift Broadband-Safety 2.0		X0E, X3E (Paumalu gateway) X1E, X2E (Burum gateway)	EUA7 (Paumalu gateway) EUA8 (Burum gateway)	TBD TBD
	APAC (4F2 at 143.5°E)	Classic Aero over I-4	Paumalu, Hawaii, US	XXA	APK1	B4P
		Classic Aero over I-4 (virtual I-3 POR)	Warkworth, New Zealand	XXP	APK2	B3P
		Swift Broadband-Safety 1.0	Primary: Paumalu, Hawaii, US Secondary: Auckland, New Zealand	X4P, X5P	APK9	B1P
		Swift Broadband-Safety 2.0		X2P, X3P (Paumalu gateway) X0P, X1P (Burum gateway)	APK7 (Paumalu gateway) APK8 (Burum gateway)	TBD TBD
	AMER (4F3 at 98°W)	Classic Aero over I-4	Primary: Paumalu, Hawaii, US Secondary: Laurentides, Canada	XXH	AME1	B4A
		Classic Aero over I-4 (virtual I-3 AORW)	Laurentides, Canada	XXW	AME2	B3W
		Swift Broadband-Safety 1.0	Primary: Paumalu, Hawaii, US Secondary: Laurentides, Canada	X4A, X5A	AME9	B1A
		Swift Broadband-Safety 2.0		X2A, X3A (Paumalu gateway) X0A, X1A (Burum gateway)	AME7 (Paumalu gateway) AME8 (Burum gateway)	TBD TBD
	IOR/IOE (6F1 at 83.5°E)	Classic Aero over I-6 (virtual I-3 IOR)	Primary: Perth, Australia Secondary (and rainfade): Merredin, Australia	XXI	IOR5	B3I
		Swift Broadband-Safety 1.0 (IOE)	Primary: Perth, Australia Secondary: Merredin, Australia	X4I, X5I	IOR9	B1I
		Swift Broadband-Safety 2.0 (IOE)		X2I, X3I (Paumalu gateway) X0I, X1I (Burum gateway)	IOR7 (Paumalu gateway) IOR8 (Burum gateway)	TBD TBD

* As of June 2025. Network paths subject to change

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Viasat Aviation Safety Services

Over 30 years providing data link services

Oceanic and remote: FANS 1/A

- CPDLC meeting RCP240
- ADS-C meeting RSP180
- Dual voice

Flight deck IP connectivity

- Real time weather apps, e.g., turbulence avoidance
- SWIM

Domestic: ATS B2 FANS 3/C

- CPDLC meeting RCP130
- ADS-C meeting RSP160
- Dual voice

Ready for 4D TBO

- Extended CPDLC message set for trajectory negotiation
- ADS-C Extended Projected Profile (EPP)
- Enhanced security

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Network Enhancements

- Enhanced remote database access for Distribution Partners (DPs), with the ability for DPs to login and view detailed logs for Classic Aero, SB-S 1.0, and now SB-S 2.0
  - Enhances DP incident investigation and troubleshooting
- We are building a network of always-on monitoring and test terminals, to specifically monitor SB-S and Iris service availability in each ocean region – the Safety Availability Monitoring System (SAMS)
  - Increased capability to perform in-service operational tests on both data and voice
  - System extendable to connect to Classic Aero test terminals
  - More rapid response to service degradations
- Putting in place a new APAC backup location for Classic Aero at Warkworth, NZ

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FANS 1/A services for oceanic/remote operations

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Reduced separation in oceanic airspace

WITHOUT Satcom meeting PBCS: 50 - 80 NM or more…

WITH Satcom meeting PBCS requirements:

PANS ATM Chapter 5: ADS-C (RSP180) + CPDLC (RCP240) + RNP4

- 23 NM Lateral
- 12 NM Lateral (1 a/c climb/descend through)
- 20 NM Longitudinal
- 15 NM Longitudinal (Climb/Descend Procedure)

PANS ATM Chapter 8: ADS-B + CPDLC (RCP240) + RNP4

- 19 NM Lateral
- 15 NM Lateral (airspace w/ low traffic volume or rates of deviationsP off cleared track)
- 17 NM Longitudinal
- 14 NM Longitudinal (relative angle between tracks is less than 45 degrees)
- 15 NM Target-to-Target

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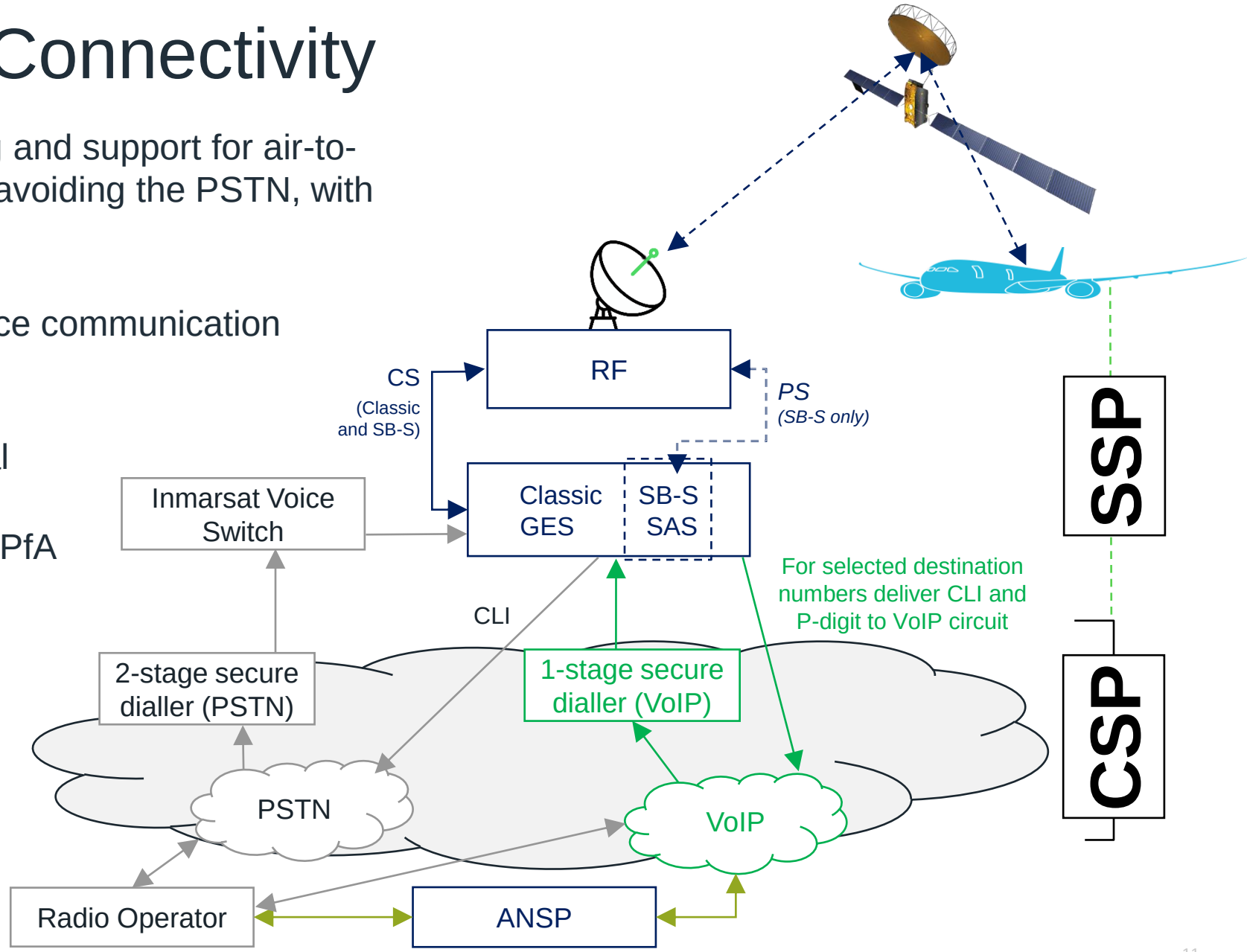
SATVOICE VoIP Connectivity

- 1-stage ground-to-air secure dialling and support for air-to-ground calling on private networks, avoiding the PSTN, with reliable carriage of priority and CLI
- Enabler for direct controller-pilot voice communication
- Implemented by SITA, Collins evaluating service in operational trial
- Aligned with ICAO Annex 10, Vol III PfA
- ICAO OPDLWG developing new voice RCP for direct controller-pilot comms



A world of opportunity from connected EFB

- Live weather for turbulence avoidance, avoid harm to passengers, crew and aircraft
- Reduce fuel burn and carbon emissions
- Minimise impact of Irregular Operations
- Enhanced AOC comms – chat apps, IP voice, connected crew apps
- eTechlogs

“Turbulence effects have increased due to climate change”

“Flight Profile Optimization can potentially reduce annual fuel burn by an average of 1% to 3%”

Viasat JEPPESEN A BOEING COMPANY SITA WSI SMARTAVIATION SKYPATH Lufthansa Systems TXT PACE

SB-S Iris for domestic airspace

What is Iris?

Iris enables next-generation air traffic management, and more:

Relieves pressure on congested VHF links
By using satcom as primary for ATS

Improves the coordination of operations
Through enhanced AOC communications

Helps manage increased flight volumes
By providing increased data link capacity to compliment VDL

Initial 4D Trajectory Based Operations
Supports ATN/OSI and the sharing of ADS-C Extended Projected Profile

Iris is the Viasat implementation of FANS 3/C, enabled by the SwiftBroadband-Safety service

The Iris service is built on top of SwiftBroadband-Safety

787*
2028

777X
2025

737 NG/MAX
2023

A350
2023

A330
2022

A320/neo
2022

6540

Over 588 SB-S equipped aircraft flying today!

C919
2023

ARJ21
TBC

BOEING AIRBUS COMAC

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*Availability subject to future plans

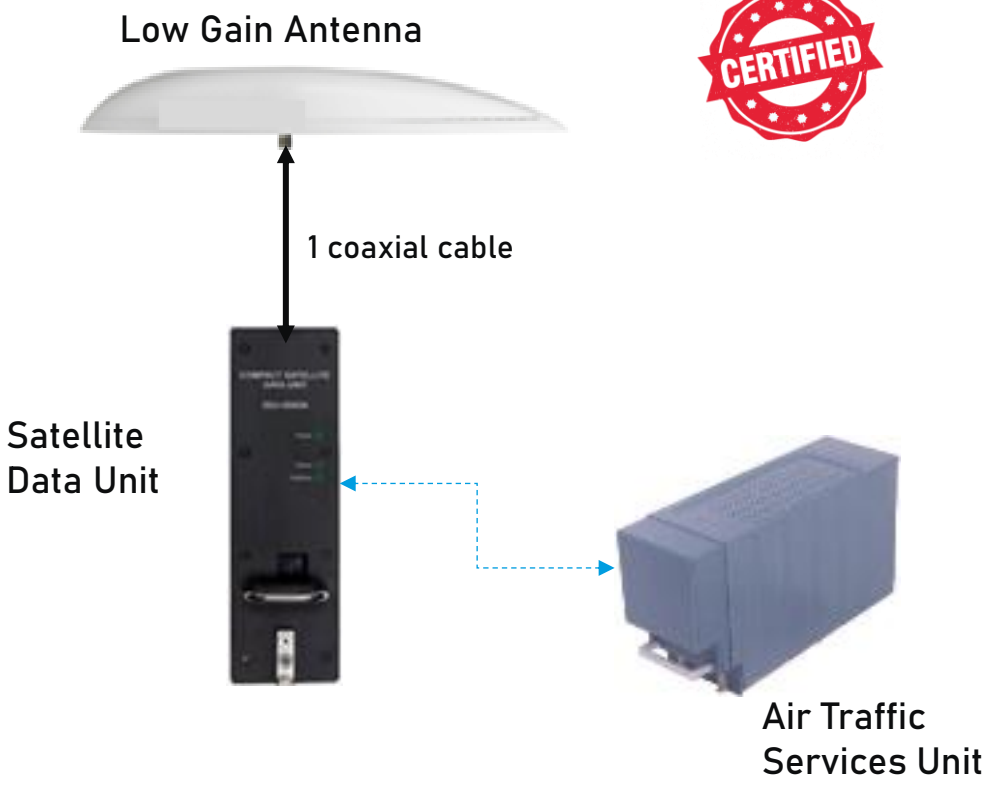
SB-S Iris Service

- Iris Service is an ICAO-compliant Aeronautical Mobile Satellite Service (AMSS) for:
  - ATN B1/ATS B2 CM and CPDLC
  - ATS B2 ADS-C
- Meets stringent performance requirements for domestic airspace
- Interoperable between domestic/oceanic airspace

AIRBUS

Light Cockpit Satcom

CERTIFIED



SB-S Iris Avionics Installation and Hardware

- FANS-C over Satcom
- ATS B2 CPDLC and ADS-C EPP (Extended Projected Profile)
- Software upgrade to ATSU
- ATN/OSI software compatible with ATN network.
  - ATN/IPS available through future software upgrade.

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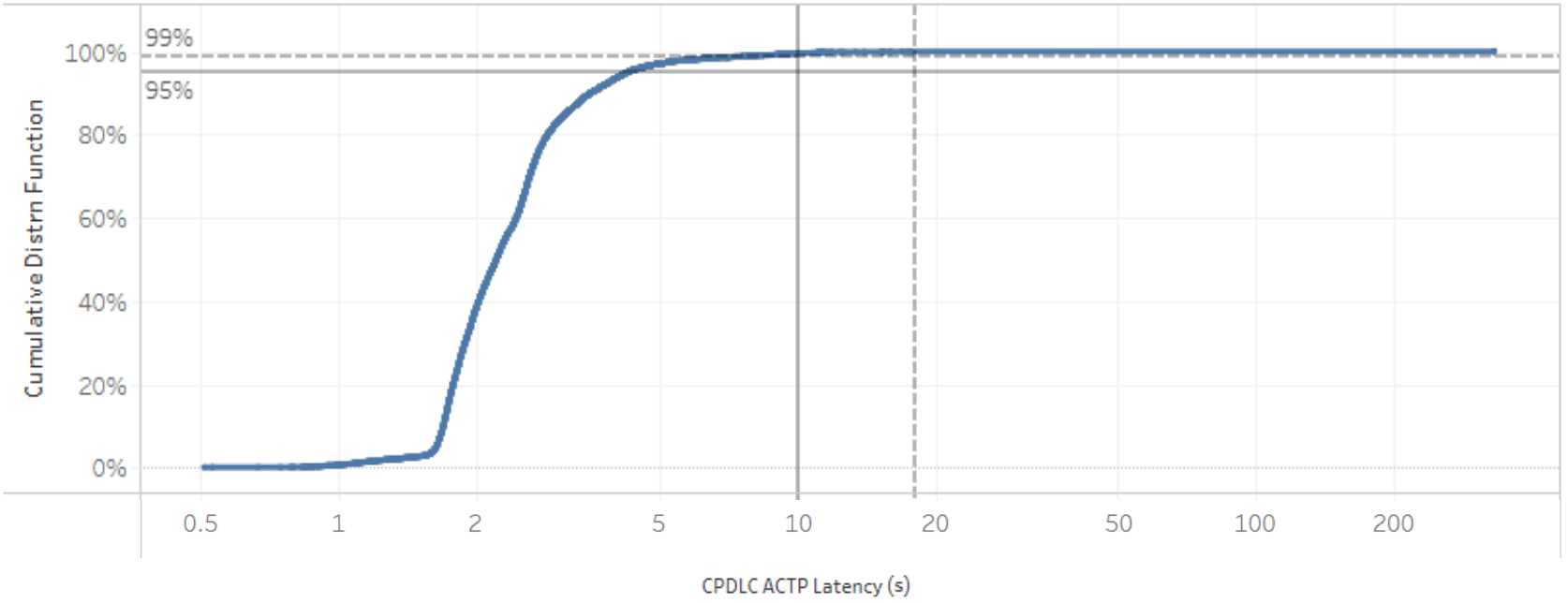
CPDLC Air-Ground Latency

- Excellent performance seen for in-service period
- Tableau chart shows satcom data latency on 1 year of Iris flights for February 2024 to January 2025
- 95th percentile at **4.25** seconds for **2-way** satcom air-ground data transfer
- Measurement points: Timestamps at the satellite terminal (SDU) and at the Viasat data link gateway (GDGW) – ground-ground latency not included
- ESSP provides monthly end-to-end Iris performance: https://satcom-dls-support.essp-sas.eu/

ATN/OSI CPDLC Latency (Aircraft Iris Satcom terminal to Satcom Ground Gateway)

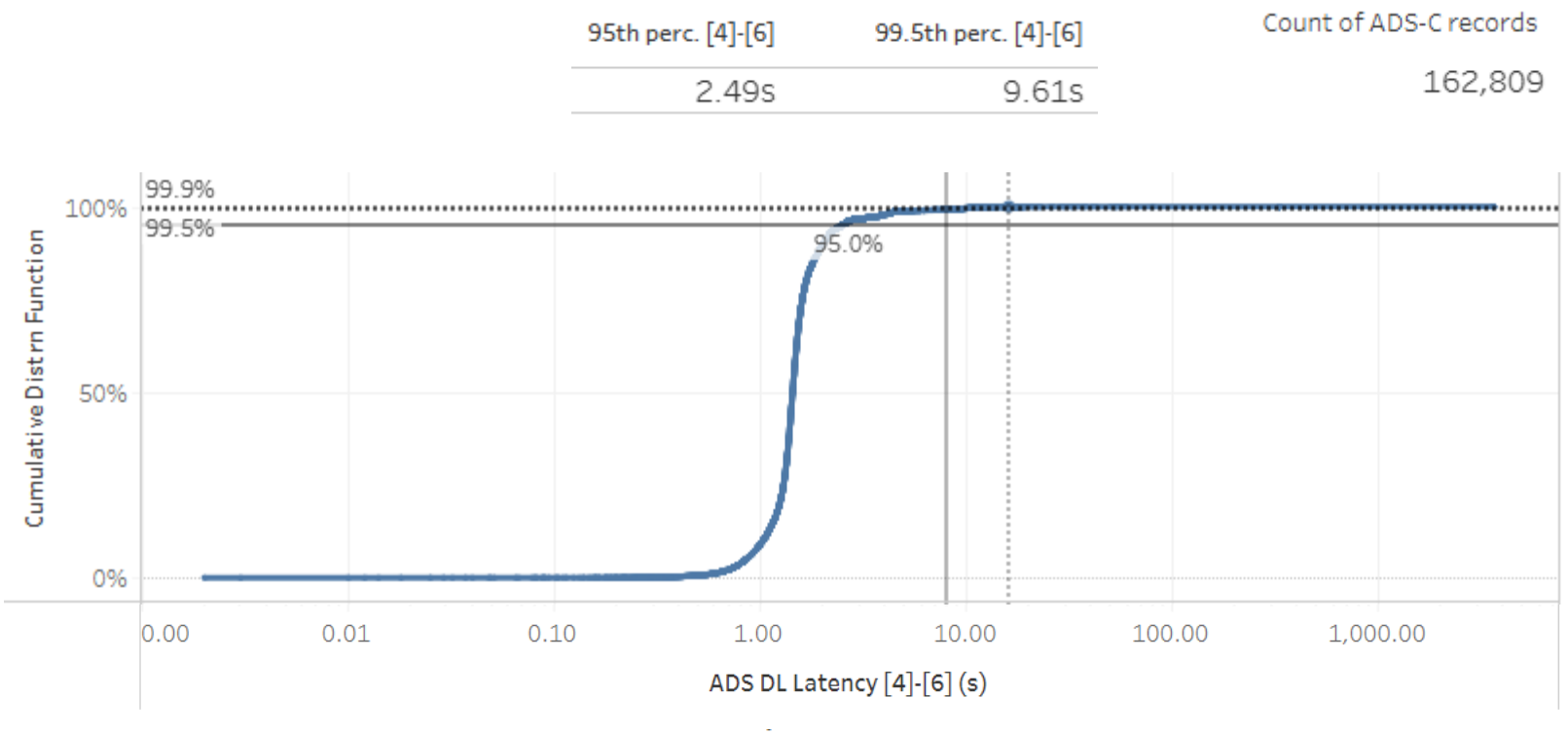
95th perc. ([5]-[1])+([4]-[6])	99th perc. ([5]-[1])+([4]-[6])	Number of CPDLC records (SL1)
4.25s	8.17s	12,061



ADS-C Air-Ground Latency

- Excellent performance seen for in-service period
- Tableau chart shows satcom data latency on 1 year of Iris flights for February 2024 to January 2025
- 95th percentile at **2.49** seconds for **1-way** satcom air-ground data transfer
- Measurement points: Timestamps at the satellite terminal (SDU) and at the Viasat data link gateway (GDGW) – ground-ground latency not included
- ESSP provides monthly end-to-end Iris performance: https://satcom-dls-support.essp-sas.eu/

ATN/OSI ADS-C Latency (Aircraft Iris Satcom terminal to Satcom Ground Gateway)



Operational flights with easyJet

- 1st easyJet aircraft operating since December 2024
- 11 easyJet aircraft now operating
- 6000+ Iris flights thru 28 February

Airlines about to start:

Jet2.com Friendly low fares

transavia

ITA AIRWAYS

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Iris – airspace modernization program

What is it?

- ESA backed air traffic modernization program enabled by ATS B2 satcom in multilink with VDL
- Embraced by Airbus and tightly integrated into cockpit
- Delivers technology and performance needed to increase airspace capacity and flight efficiency and to achieve goals for CO_2 reduction
- Increases datalink capacity by offloading enroute traffic from VDL to satcom to address issue of VDL reaching max capacity in congested domestic airspace

Benefits

- Increased ATM capacity with optimized flight routing
- Minimized delays from lack of ATC capacity
- Reduced environmental impact of air travel

EU Mandate: ATS B2, ADS-C EPP effective 31st December 2027

COMMISSION IMPLEMENTING REGULATION (EU) 2021/116

of 1 February 2021

Extract

System requirements

(a) Aircraft must be equipped with the capability to automatically down-link trajectory information using ADS-C EPP as part of the ATS B2 services. The trajectory data automatically down-linked from the airborne system must update the ATM system in accordance with the terms of the contract.

(b) Data link communications ground systems must support ADS-C (downlink of aircraft trajectory using EPP) as part of the ATS B2 services while keeping compatibility with controller – pilot data link communications ('CPDLC') services as required by Commission Regulation (EC) No 29/2009 (3), including provision of service to flights equipped only with the Aeronautical Telecommunication Network Baseline 1 ('ATN-B1').

Enables 4D Trajectory-Based Operations

Direct Routes

Optimum Flight Levels

Continuous Climbs

Continuous Descents

Queue Management

Speed Control

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Iris pre-commercial flights are supported by 19 ANSPs

Iris Service is currently fully operational and provided by ESSP who is certified and overseen by EASA since July 2023

19 ANSPs have contracted Iris Service

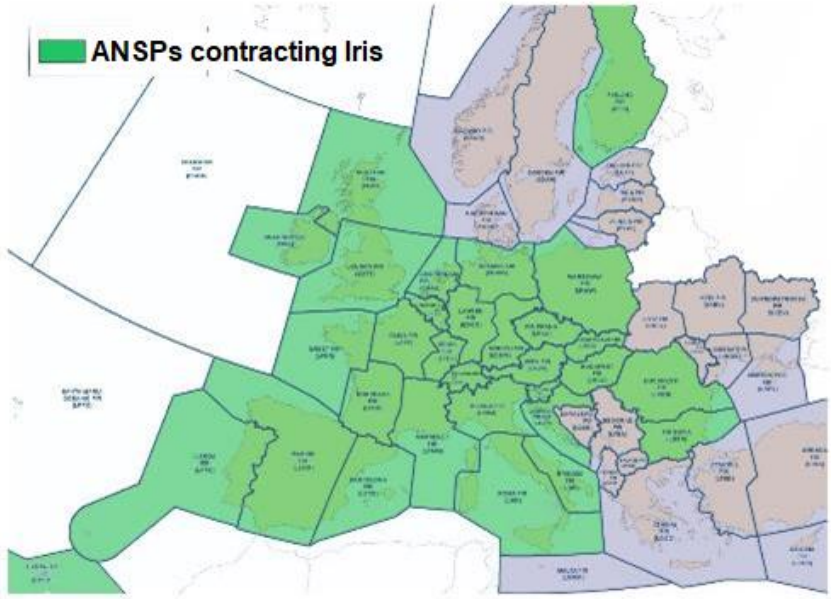
Full specification of Iris Service is provided in the Iris Service Definition Document published at [ESSP website]

EASA
European Union Aviation Safety Agency

LIST OF APPROVED ATM/ANS ORGANISATIONS UNDER THE OVERSIGHT OF EASA

CERTIFICATE REFERENCE	ORGANISATION NAME	COUNTRY	SCOPE	ISSUE DATE	STATUS
EASA.AOA.PAN.038	European Satellite Service Provider (ESSP SAS)	France	Aeronautical Mobile Satellite Service (AMSS)	20/07/2023	Valid

List of Approved ATM-ANS Organisations (public pdf at EASA website)



ANS CR
AIRNAV IRELAND
AUSTROCONTROL
BULATSA
CROATIACONTROL
DFS
DSNA
NAV PORTUGAL
ECTL/MUAC
ENAIRE
ENAV
FINTRAFFIC ANS
HUNGAROCONTROL
LPS SR
NATS
PANSA
ROMATSA
SLOVENIACONTROL
SKYGUIDE

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Benefits of Connected Airline Operations

MUAC's overview on ATS-B2 benefits

EUROCONTROL

Airborne side ADS-C + CPDLC

Airlines

- Optimized climb and descend profiles
- Optimized routes, less miles flown
- Fuel saving + Reduced CO_2 emissions → greener flights
- Future(possibly): less regulations through a more optimized network (use of EPP ETA, runway occupancy parameter, etc.)
- Already available in MUAC's airspace

Pilots

- Link of the ATSU to FMS for easier handling of messages (CPDLCv2)
- Less radio usage for routine information requested by controllers
- Reduced Flight crew workload

	ATN STD	UM	AVG(s)	PC50(s)	PC70(s)	PC95(s)	COUNT
PROCEED DIRECT TO X	B1	74	12,401	10	13	26	519548
PROCEED DIRECT TO X	B2	74R	10,5784	9	11	22	20206
CLEARED TO X VIA Y	B1	79	21,7196	16	23	55	5128
CLEARED TO X VIA Y	B2	79R	18,25	14	19	41	188

Response times to PROCEED DCT and CLEARED TO [...] VIA [...] CPDLC uplinks in B1/B2 airframes in 2022 at MUAC.
Note: Measured as time from uplink to WILCO sending time; there are more contributing factors.

ATS B2 capabilities (provided by SBS + FANS C):

- Extended CPDLC message set for trajectory negotiation
- ADS-C Extended Projected Profile (EPP)

MUAC = Maastricht Upper Area Control Centre

Operational in Europe, available globally

Development and deployment are accelerating

Iris Global – Opportunities for Co-operation

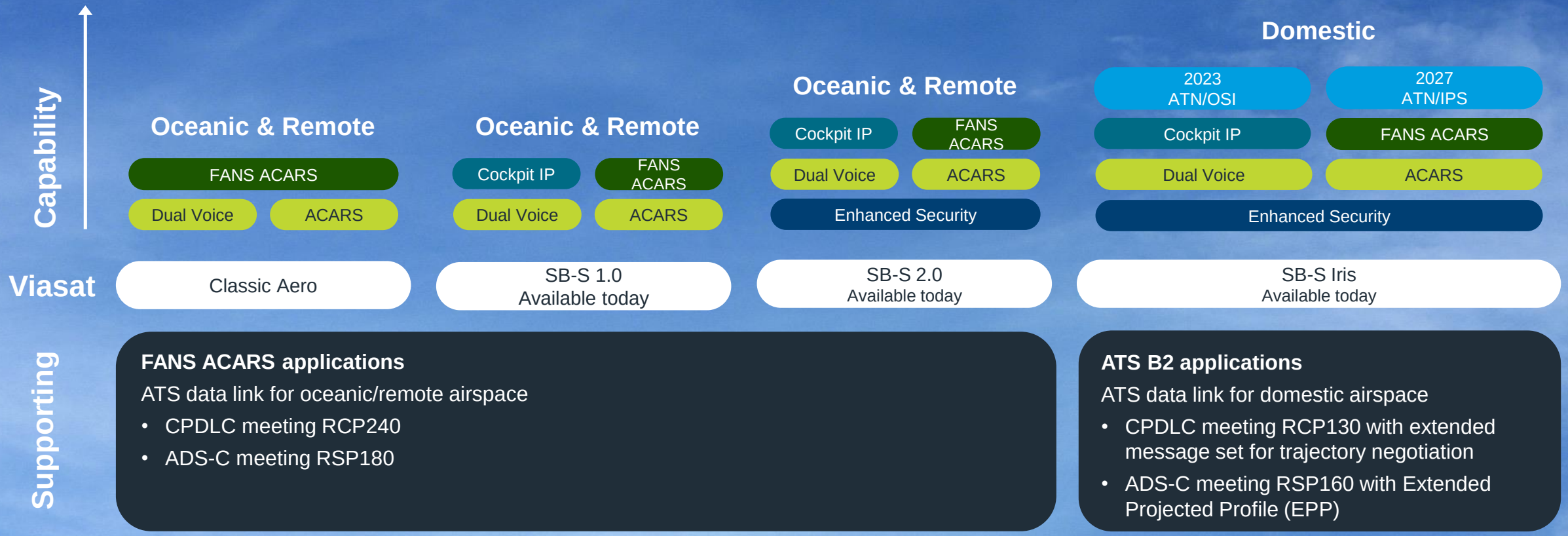
Iris Global, ESA project

- Launched in June 2022
- International development & demonstrations for Iris-based services work package
- Opportunity to be a pioneer/early adopter of Iris in the region
- Future-proof for global ATC and AOC services, as part of fleet renewal

Trajectory-based operations

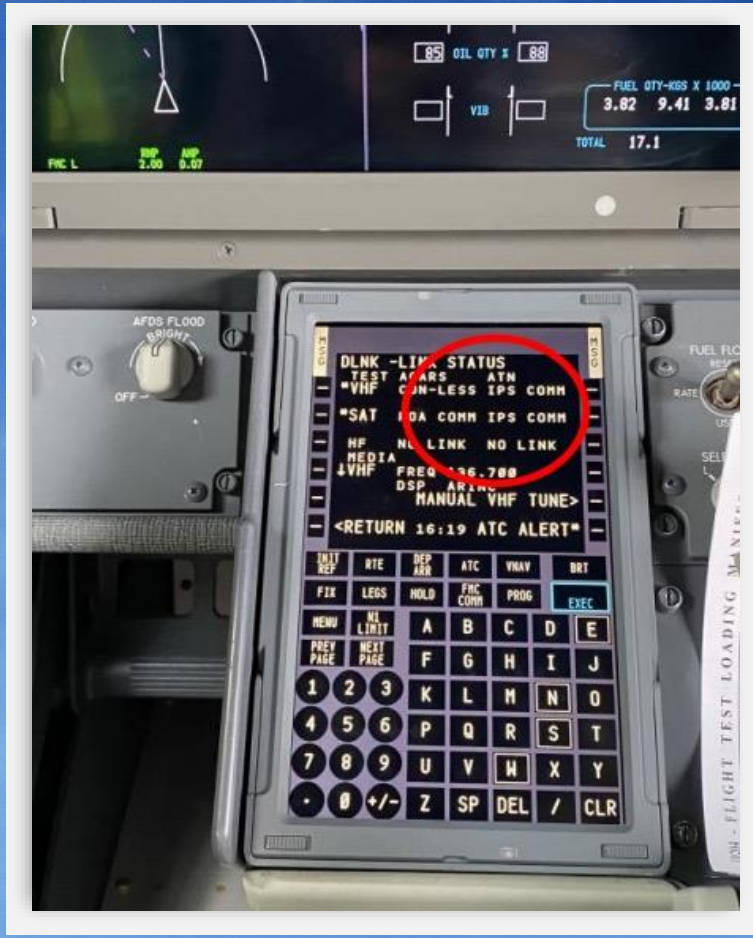
- Several ANSPs in APAC have demonstrated the use of TBO via EFB (Multi-Regional TBO)
- Opportunity to test/develop a prototype of the ATS B2 service over satcom
- APAC TBO Pathfinder Project - Trajectory-based demonstrations, flight trials between regions
- Jointly test/simulate use cases, leveraging Viasat's Iris Test Facility

A data link ready for the future



Robust Roadmap to support ATN/IPS standard

- We are building an ATN/OSI and ATN/IPS gateway that allows all aircraft, to transition seamlessly no matter which standard they operate on
- Boeing ecoDemonstrator flight in 2021
- OSI<>IPS interoperability trials 2024/2025




Questions?
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