EUROPE FOR AVIATION

Data-link Services (DLS) Recovery Plan

Implementation status and next steps

Agenda

Tuesday 12th March
11:45 – 13:25

1. ***Introduction and Scene Setting***
   Nicolas Warinsko, General Manager, SDM
2. ***DLS Recovery Plan Implementation – Status and Next Steps***
   Davide Corinaldesi, DLS implementation Programme Manager, SDM
3. ***Data-link Regulatory updates***
   Bryan Jolly, ATM/ANS Senior Expert, EASA
4. ***Monitoring the Data-link Performances***
   Nikos Fistas, Senior COM Expert, Network Manager
5. ***Data Link Services***
   Christian Schleifer, Secretary General, EUROCAE
6. ***DLS, Military View***
   Denis Bouvier, SES Policy Project Officer, EDA
7. ***Q&A***
8. ***Closing Remarks***
   Mariagrazia La Piscopia, Head of Strategy Technical and Operations, SDM

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Introduction and Scene Setting

by

Nicolas Warinsko

General Manager SESAR Deployment Manager

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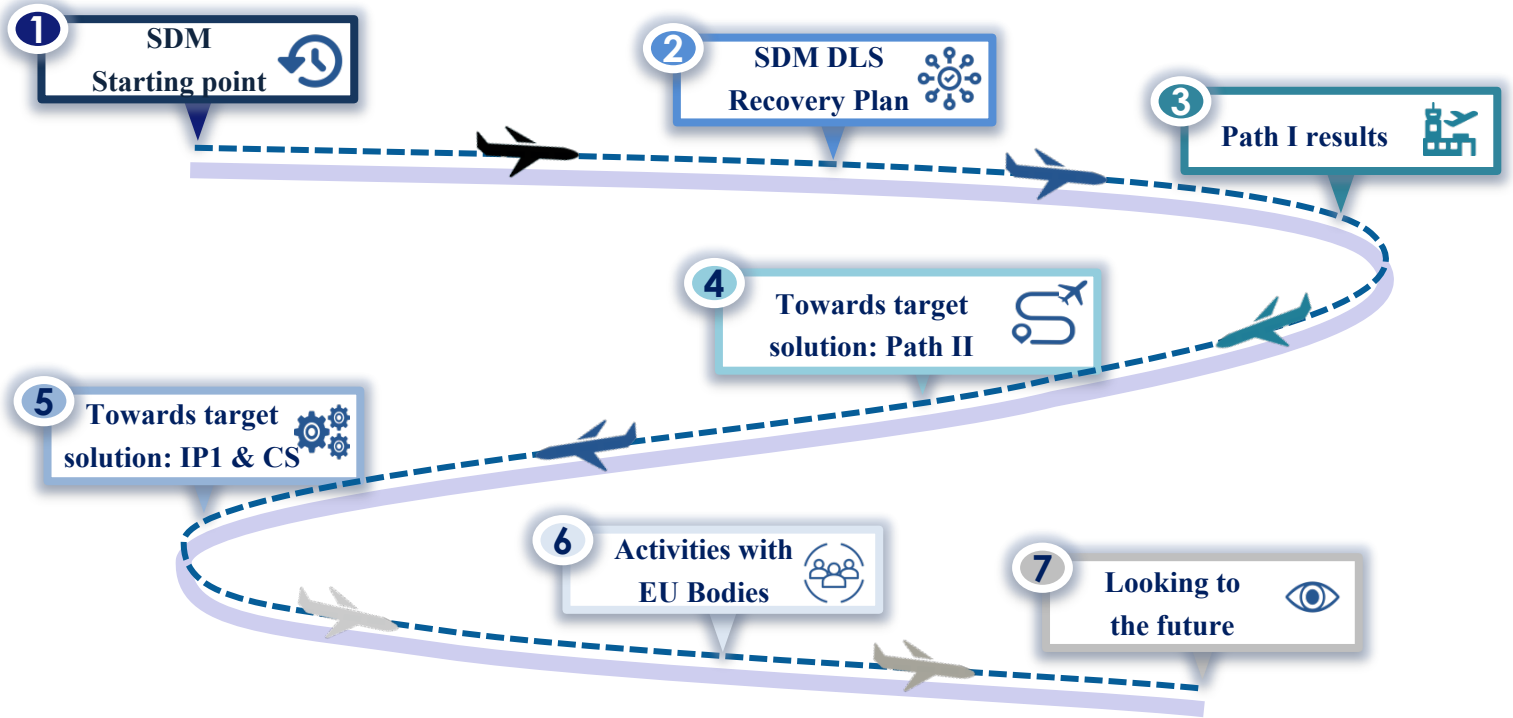
DLS Recovery Plan Implementation

Our journey



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DLS Recovery Plan Implementation

SDM starting point

Regulatory Framework

- *Specific EC requests*
- *IR (EU) No 29/2009 and IR (EU) No 310/2015*
- *PCP AF6 framework*

SESAR Deployment Framework

- *SDM Role*
- *CEF Framework*
- *Initial DLS Implementation Status*

Other relevant studies

- *VDL Mode 2 Measurement, Analysis and Simulation Campaign (ELSA Study)*
- *EASA Report*

EC mandated the SDM **to assume the role of DLS implementation project manager responsible for organizing, implementing and monitoring the activities identified in the DLS recovery plan** — *Oct 2016*

EC mandated the SDM **to focus its attention and resources in the DLS Recovery on Model D implementation** — *Jan 2017*

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DLS Recovery Plan Implementation

SDM DLS Recovery Plan

First step

Path I – Implementation of the DLS transitional solution

It focused on the Multi-Frequency (MF) implementation and on the deployment of Best-in-Class avionics (both ELSA's recommendations) permitting **to meet EU (IR) 310/2015**

- **Path I included 1 multi-stakeholder project led by ENAIRE/ENAV for the ground domain and 7 projects for the airborne domain**

Path II – Preparatory activities towards the target solution

It aims at **identifying next steps towards the target solution,** in order to continue to grant the required level of performance and the achievement of full AF6 implementation

- **Path II Framework included 2 multi-stakeholder projects led by ENAV/ENAIRE, to prepare the implementation of the EU target solution, fixing all technical and non technical open points**

Final step

DLS Recovery Plan Implementation

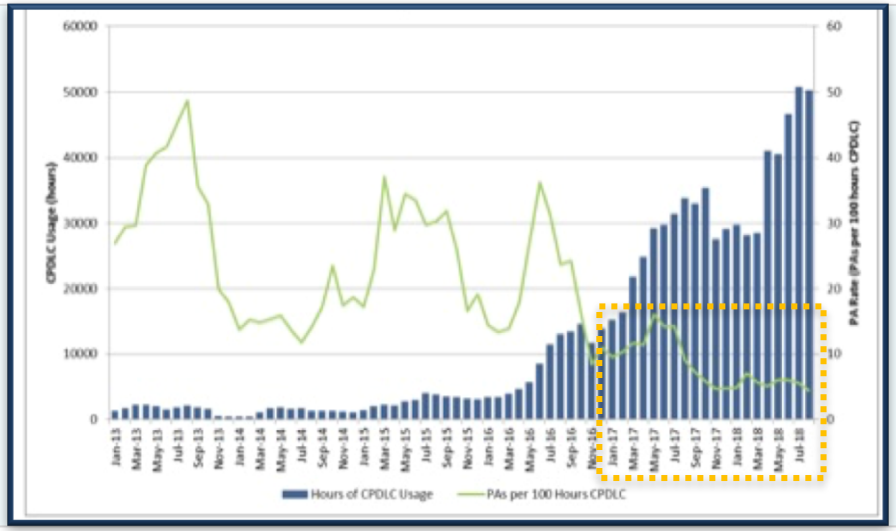
Path I results – Performance Boosting: we are on the right way! (1/2)

The MF upgrade showed substantial **increases in DLS operational (PAs - Provider Aborts) and technical (Technical Round Trip Delay) performance**, confirming that we are going on the right direction!

Provider Aborts (Pas) Rate

Drastic decrease in PAs (45 PAs on average in July 2013 compared to 4 in July 2018) – even if the target has not been met (1 PA per 100 hours CPDLC)

- ✓ **The most relevant decrease in PAs occurred in 2017-2018, when the MF implementation took place**
- ✓ A considerable increase of CPDLC usage was observed simultaneously to the decrease in PAs



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Path I results – Performance Boosting: we are on the right way! (2/2)

Technical Round Trip Delay

For the first time in DLS history, in August 2018 **the DL system met the performance requirements on technical round trip delay** for 99% of the transactions

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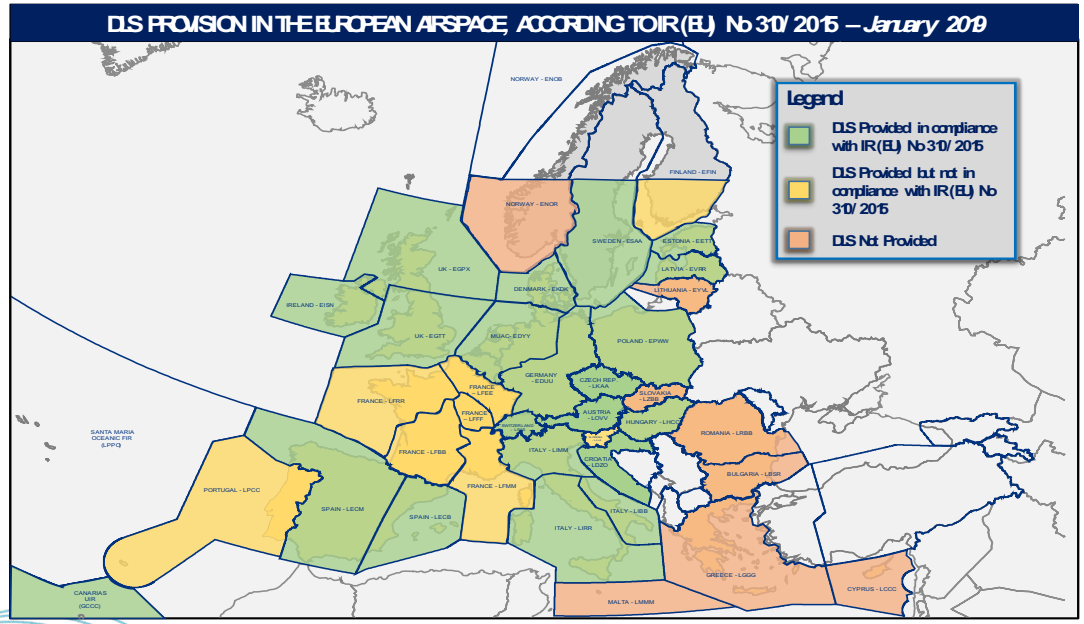
Path I results – Ground domain: January 2019 status

In accordance with IR (EU) No 2015/310, some Member States already implemented DLS by the February 2018 deadline. Others have declared proofed plans to implement DLS by February or December 2020.



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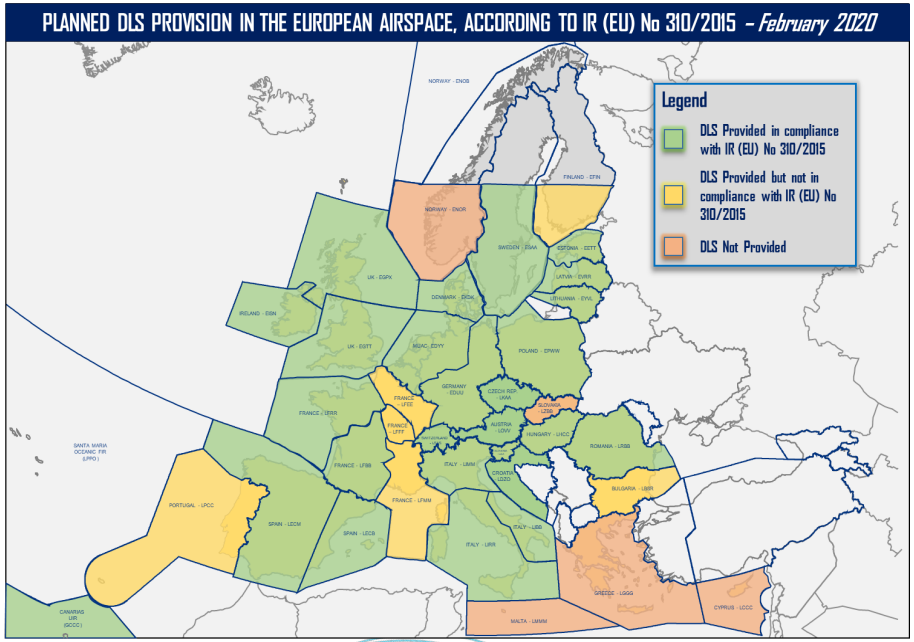
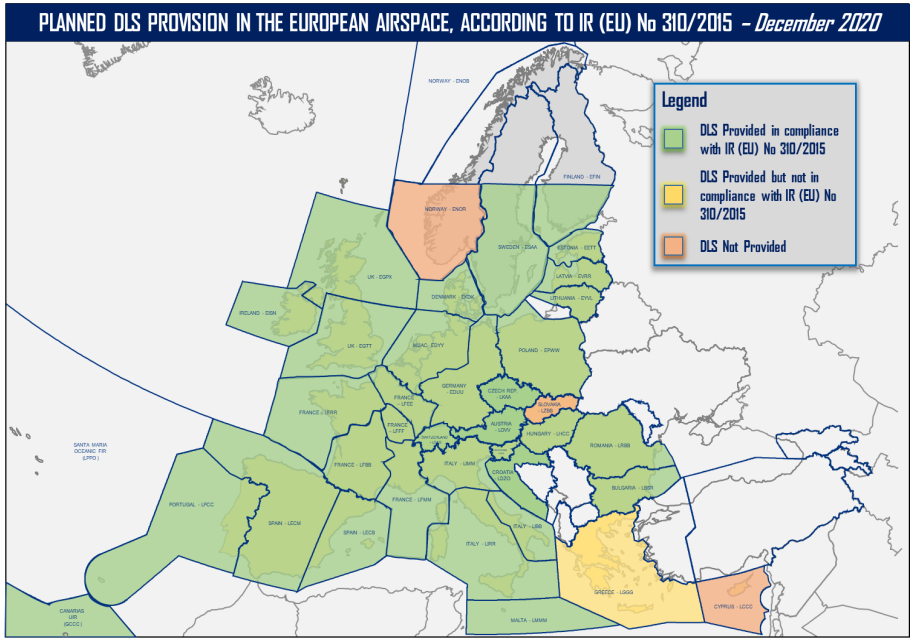
Path I results – Ground domain: February and December 2020 status

The following maps show **the status on DLS Provision planned by February 2020 and December 2020:**





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Path I results – Airborne implementation: July 2018 status

Data gathered from the SDM survey completed in July 2018 by Airspace Users headquartered in EU/ECAC area (feedback from 44 AUs) shows the **current percentage of DLS-compliant fleet** with IR (EU) No 310/2015:

Equipped aircraft*

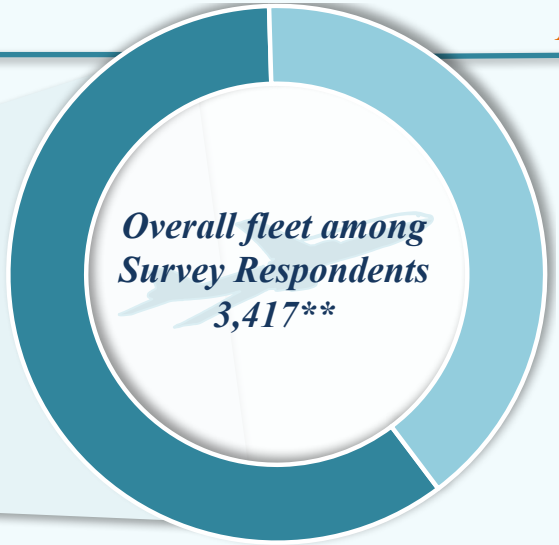
1,955 aircraft

59.8%

Not-Equipped aircraft

1.313 aircraft

40.2%



BEST-IN-CLASS

***36.2%** of the total aircraft is **VDL Mode 2 Multi-Frequency (MF) aircraft capable** according to Best-in-class (BIC) list*

BIC avionics

***36.2%** (1,183)*

Not BIC avionics

***23.6%** (772)*

* Single, MF and BIC equipped avionics in line with DLS regulation

**181 Business Airlines aircraft excluded - sample not significant for the analysis

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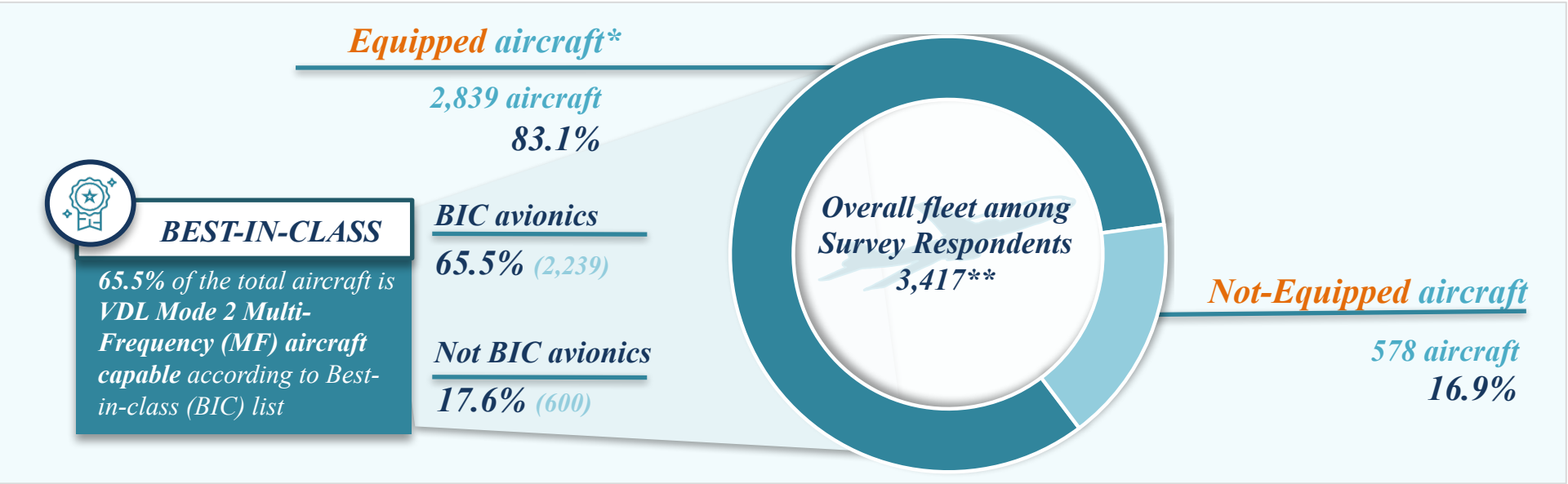
Path I results – Airborne implementation: February 2020 planned status

Data from the SDM survey also showed the **percentage of aircraft planning** to be DLS-compliant by **February 2020 (IR (EU) No 310/2015 for AUs deadline):**



* Single, MF and BIC equipped avionics in line with DLS regulation

**181 Business Airlines aircraft excluded - sample not significant for the analysis

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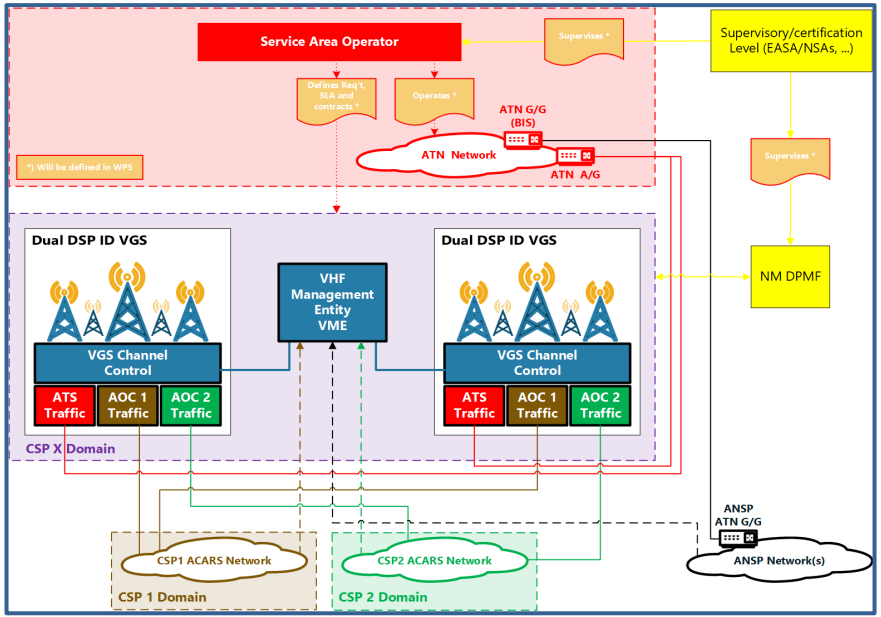
DLS Recovery Plan Implementation

Towards target solution: Path II Project– Architecture Proposal 1

Architecture proposal 1

- **Single Ground-Ground ATN backbone** and **single RF network** with Dual language **(Model D)**
- Service provision point of view: it envisages a **single DSP** offering connectivity **for ATS** (over ATN) **and AOC** (only transport at RF level)
- **No changes** on avionics required (fully transparent for Airspace Users)
- Interfaces for **future complementary technologies** are considered
- Able to adopt **new additional VDL M2 frequencies**, when needed and available



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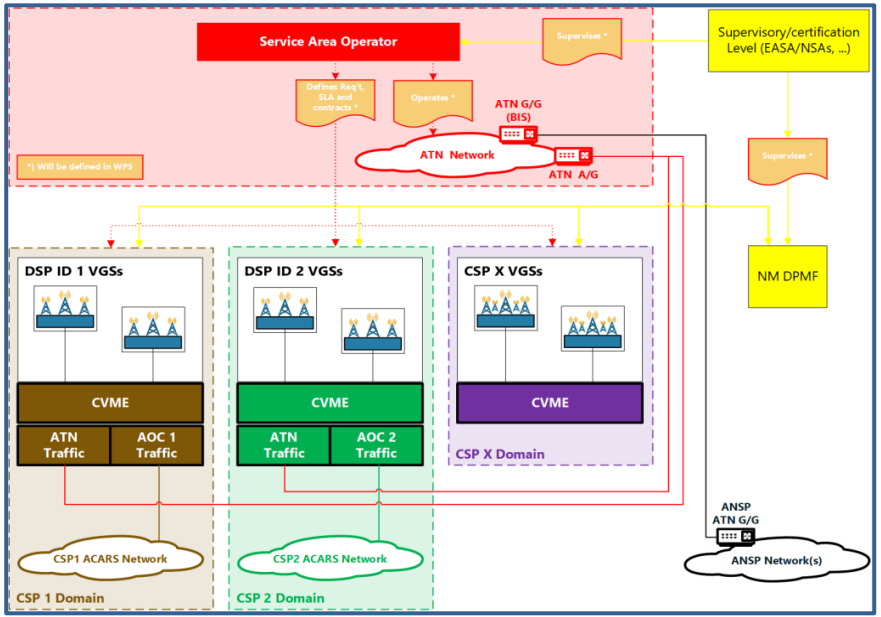
Towards target solution: Path II Project– Architecture Proposal 2

Architecture proposal 2

- **Single Ground-Ground ATN backbone** and multiple **RF networks (same as today: Model B +C)**
- Service provision point of view: it envisages a single DSP offering connectivity for **only ATS** (over ATN), while the AOC service provision will not be affected
- **No changes** on avionics required (fully transparent for Airspace Users)
- Interfaces for **future complementary technologies** are considered
- Able to adopt **new additional VDL M2 frequencies**, when needed and available



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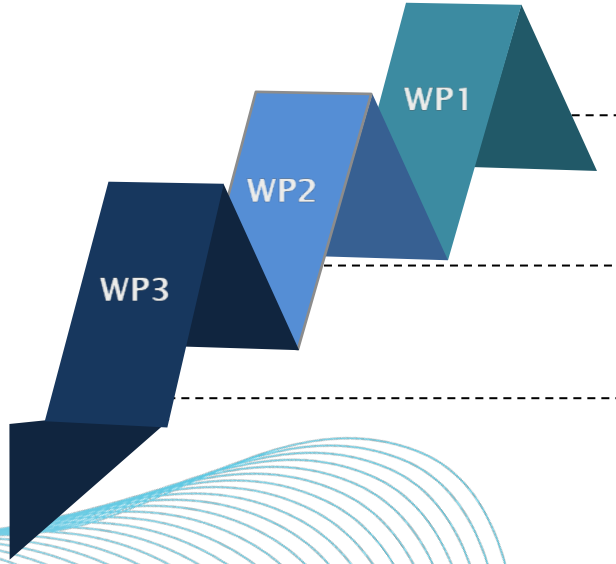
Towards target solution: IP 1 Project

IP 1 Project

SDM has supported the submission of a ***multi-stakeholder initiative*** in the 2017 CEF Transport Calls, aimed at **designing a common European ATN Ground Network** and **solving the remaining open points in the definition of the target solution**, highlighting the need of a independent capacity assessment to complement their resolution.



WP1 - Design for a Common European ATN Ground Network

WP2 - Further analysis and definition of the technical open points identified in Path II project

WP3 - Further analysis and definition of the non-technical open points identified in WP3 of the Path II

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Towards target solution: Capacity Study

DLS Capacity Study

Why: Update the VDL Mode 2 Capacity Assessment performed by SJU considering the new scenario (5 frequencies and updated data-traffic profiles considering the relevant increase of data traffic)

What: the Capacity Assessment (CA) of Model D and Model B is considered a crucial step to better **support the resolution of the open points identified within the WP2 of the "2016_159_AF6" - Path 2 Project**

Where: The CA, carried out through simulations in the overall EU Airspace, will **provide meaningful information to support the DLS target solution** implementation, assessing also **the performance and lifespan of VDL Mode 2**

How: A call for tender was launched by SDM in May 2018
The Contracted Party is the University of Salzburg
The activities are ongoing and the **results will be available by April 2019**

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DLS Recovery Plan Implementation

Activities with relevant European Bodies

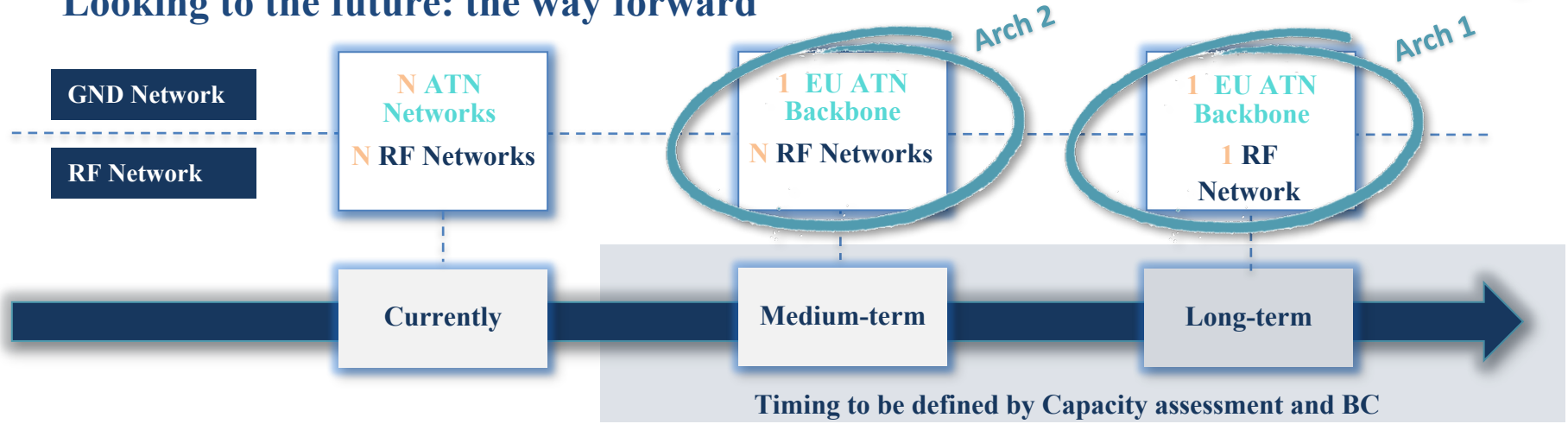
SDM works together with relevant European Bodies through:

- **Coordination Meetings**: dedicated meetings among SDM, EASA, Network Manager, EUROCAE, ETSI, organized on a monthly basis with the aim of sharing results and arranging proper initiatives for the achievement of expected goals;
- The elaboration of **shared roadmaps** to address common DLS aspects.

Moreover, SDM maintains bilateral contacts with SJU, EDA and the Manufactory Industry.

DLS Recovery Plan Implementation

Looking to the future: the way forward



Arch tech definition + *Arch cost analysis* + *Transition plans* = *Overall picture definition*

Capacity Assessment = *Arch 1 & 2 performances* + *VDL M2 lifetime*

Work with relevant Bodies = *A/G IoP improvement* + *Legal aspects improvement*

DLS Governance Definition (Path II - WP5)

All outcomes will be submitted to EC for their evaluations/decisions

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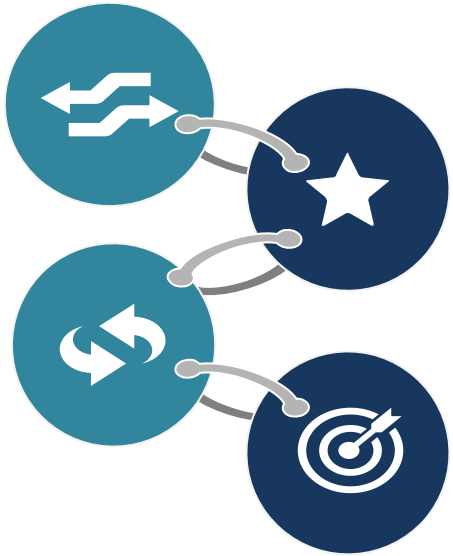
Looking to the future: Complementary Technologies

The adoption of **complementary technologies** appears as necessary to **offload the VDL M2 network** and **extend its lifespan**

The adoption of **complementary technologies** will **enhance the flexibility of future DL systems** (different services with different performance requirements could be offered on different links)



The ELSA study (Ground-07 recommendation) suggests to **favour alternative communications means** for AOC, giving **priority to the airport domain**

A smooth transition among DL systems based on multiple technologies has to be carefully considered

According to the **DLS Recovery plan,** the implementation of **complementary technologies** is currently envisaged as from **2025**

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EASA
European Aviation Safety Agency

Datalink
Regulatory updates

Bryan Jolly
Senior Expert - ATM/ANS

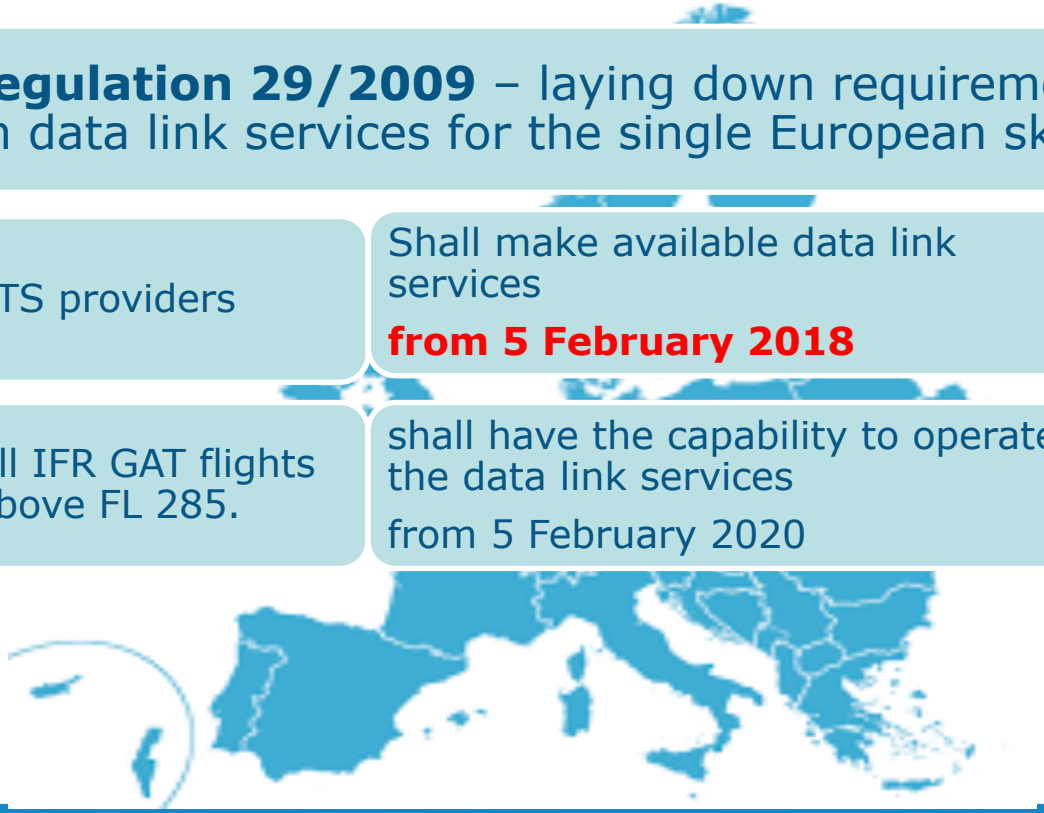
Your safety is our mission.

EASA is an agency of the European Union

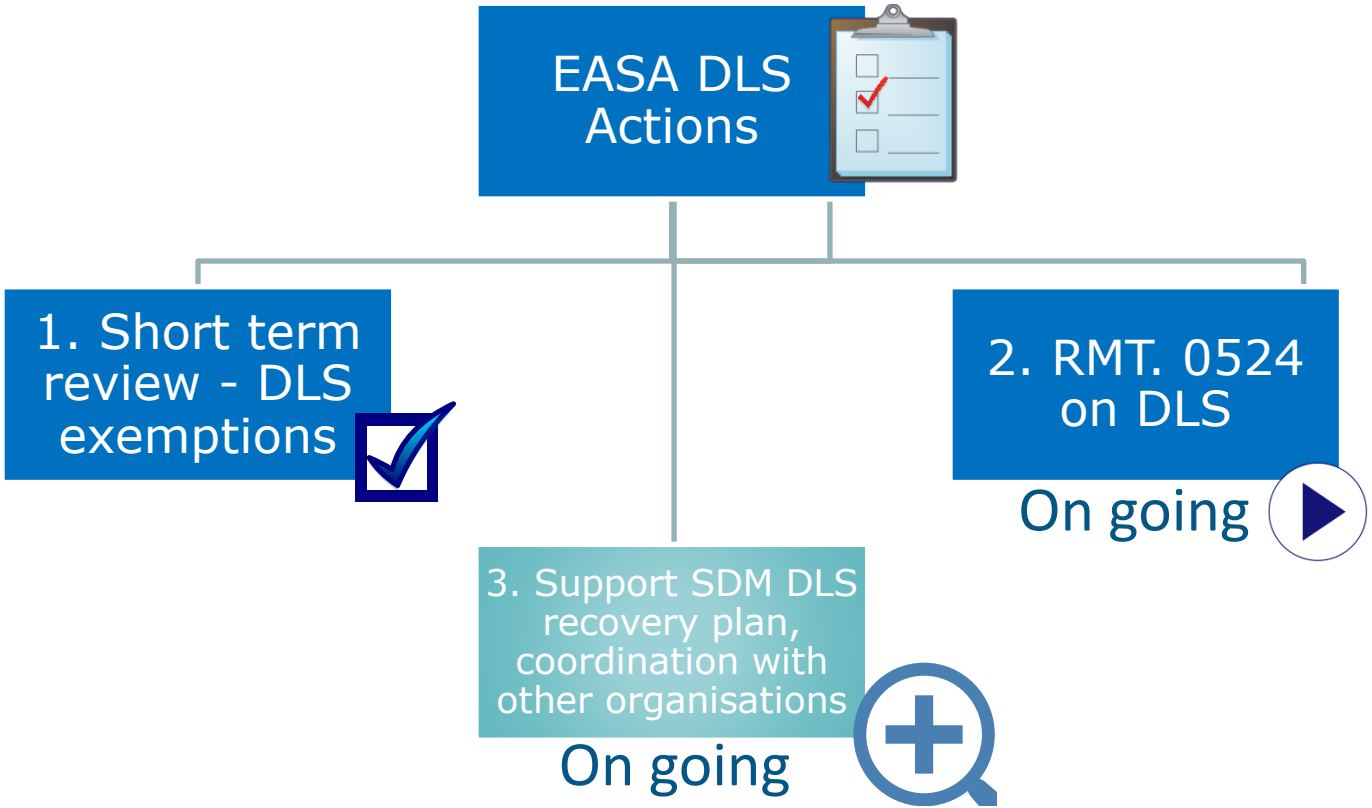
Regulation 29/2009 - DLS IR

Regulation 29/2009 – laying down requirements on data link services for the single European sky.

ATS providers	Shall make available data link services **from 5 February 2018**
All IFR GAT flights above FL 285.	shall have the capability to operate the data link services from 5 February 2020



EASA DLS actions



Exemptions

Current exemptions

Exemption criteria and Decisions

Article 3(3)

Operators - DLS Capability by 5 Feb 2020, except:

- aircraft C of A first issued before 1 January 2014 and fitted with data link equipment (FANS)
- aircraft C of A first issued before 31 December 2003 ceasing operation before 31 December 2022
- state aircraft
- Testing/delivery/maintenance.

Article 14

Exemptions Criteria eligibility

- aircraft types reaching the end of their production life and being produced in limited numbers; and
- aircraft types for which re-engineering costs required would be disproportionate due to old design.

2 Decisions have been adopted on the basis of Article 14

- C(2011) 2611 final dated 20.5.2011
- C(2011) 9074 final dated 9.12.2011

Future exemptions amended DLS IR

EASA delivered the DLS exemptions report October 2017.

Amendment to the DLS IR (29/2009) published for public scrutiny

https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2019-708652_en#isc-2017-09419

Consolidated decision on aircraft type/model DLS exemptions – to follow

Article 1

Regulation (EC) No 29/2009 is amended as follows:

(1) In **Article 3**, paragraph 3 is replaced by the following:

3. Paragraph 2 shall not apply to:

(a) aircraft with an individual certificate of airworthiness first issued before **1 January 2018** and fitted prior to this date with data link equipment compliant with the requirements of one of the Eurocae documents specified in point 10 of Annex III;

(b) aircraft with an **individual certificate of airworthiness first issued before 1 January 1995;**

(c) aircraft which have an individual certificate of airworthiness first issued before 31 December 2003 and which will **cease operation in the airspace referred to in paragraph 3 of Article 1 before 31 December 2022**;

(d) aircraft which have a certified maximum **seating capacity of 19 passengers or less and a MTOM of 45359 Kg (100000 lbs) or less**, with a first individual certificate of airworthiness issued before 5 February 2020;

(e) State aircraft;

(f) aircraft flying in the airspace referred to in paragraph 3 of Article 1 for testing, delivery or for maintenance purposes or with data link constituents temporarily inoperative under conditions specified in the applicable minimum equipment list required by point 1 of Annex III.

(2) in paragraphs 1, 2 and 3 of Article 8, references to Article 3(5) are replaced by references to Article 3(4);

(3) in **Article 14**, paragraph 3 is replaced by the following:

'3. The criteria referred to in paragraph 1 shall be the following:

aircraft types/models combinations, reaching the end of their production life and being produced in limited numbers;

aircraft types/models combinations for which re-engineering costs required would be disproportionate due to old design.';

(4) Annex III is replaced by the text in the Annex to this Regulation.

DLS Rulemaking task

RMT.0524 Work in progress

High level objectives:

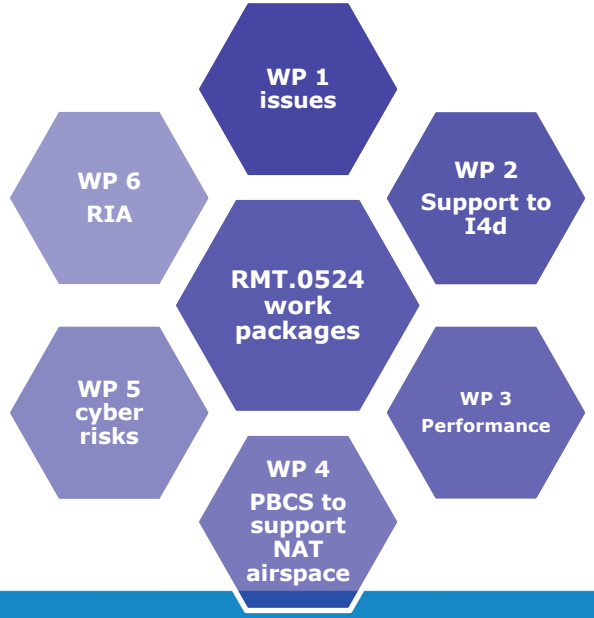
- To address Regulation (EC) No 29/2009 (the 'DLS Regulation') various implementation issues.
- To provide regulatory support for the 'Initial Trajectory Information Sharing' solution (introduction of EPP)
- To support the PBCS implementation, initially in the NAT airspace.

Progress:

- 7 RMG.0524 meetings
- Next meeting will follow in 20-21 March 2019.

Challenges:

- SDM Capacity study needed in support of the regulatory options.
- The outcome of the additional studies, validation exercises.
- New BR regulatory framework



RMT.0524 schedule

Dates subject to change

ToR published 29 Jan 2018

Target Q2 2020

Rule making Programme

Task initiation

ToR GC

Analyse issue and develop Draft RIA

RIA

Draft Rule

NPA (RIA)

Public Consultation

Analysis of comments and final review

Opinion

Decision

Target Q2 2019

Target Q2 2022

https://www.easa.europa.eu/easa-and-you/safety-management/european-plan-aviation-safety#group-easa-related-content

EASA
European Aviation Safety Agency

Any questions?
Thank you for your attention

Your safety is our mission.

EASA is an agency of the European Union

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Monitoring Data link Performance

The role of EUROCONTROL DPMF

Nikos Fistas / David Isaac
EUROCONTROL

WAC, Madrid
12th March 2019

Data link Performance Monitoring Function

- What do we do?
- Who for?
- What do we deliver?
- What's the recent performance like?

What does the DPMF do?

- Publish Regular Performance Reports
- Ad-hoc performance analysis
- Forecasting
- Performance Investigations
- Maintain an avionics database

Who for?

EC, SDM, EASA,

ANSPs

Aircraft Operators

BOEING

EMBRAER

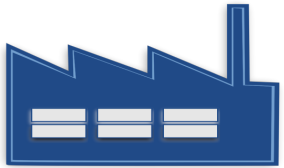
AIRBUS

Aircraft manufacturers

ACSPs

National Regulators

Military



Industry

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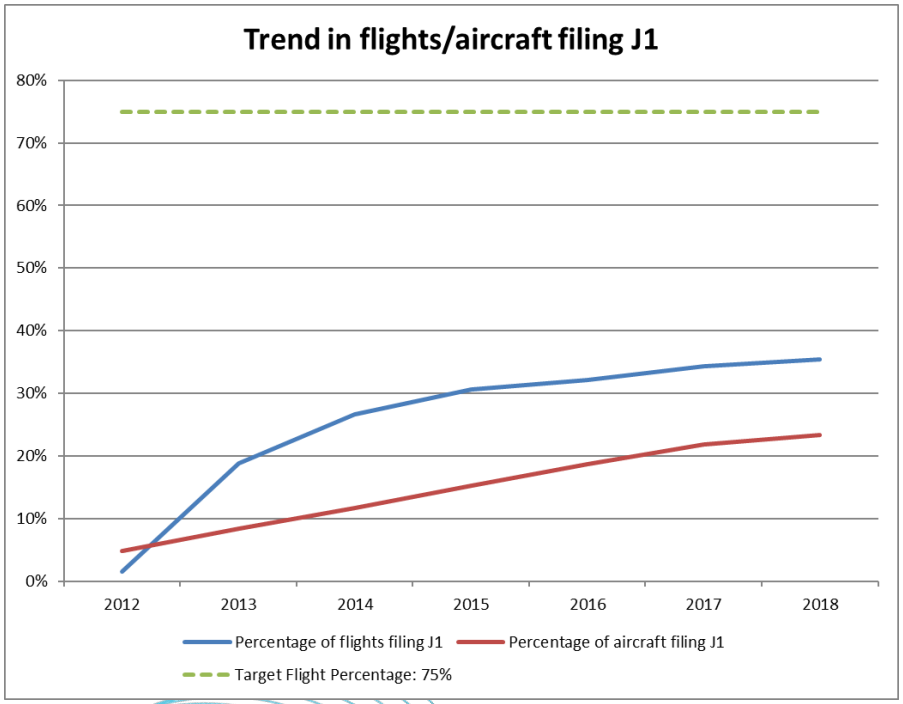
DPMF Main Deliverables

- Regular performance reports
  - Monthly Network Operational Status Report
  - Data link Performance Monitoring Flight Report (2 x a year)
- DPMF Report Catalogue
  - Defines what metrics can be created
  - Defines what regular performance reports will be created
- Ad-hoc performance reports
- Dashboards to allow stakeholders (ANSPs and AOs) access to tailored performance data
- Avionics database

Flight plan data for flights above FL285



In 2018:

- 4604 aircraft filed J1
  - 24% of Aircraft
- 2.9 million flights filed J1
  - 35.2% of flights

(J1= CPDLC ATN VDL2 capability)

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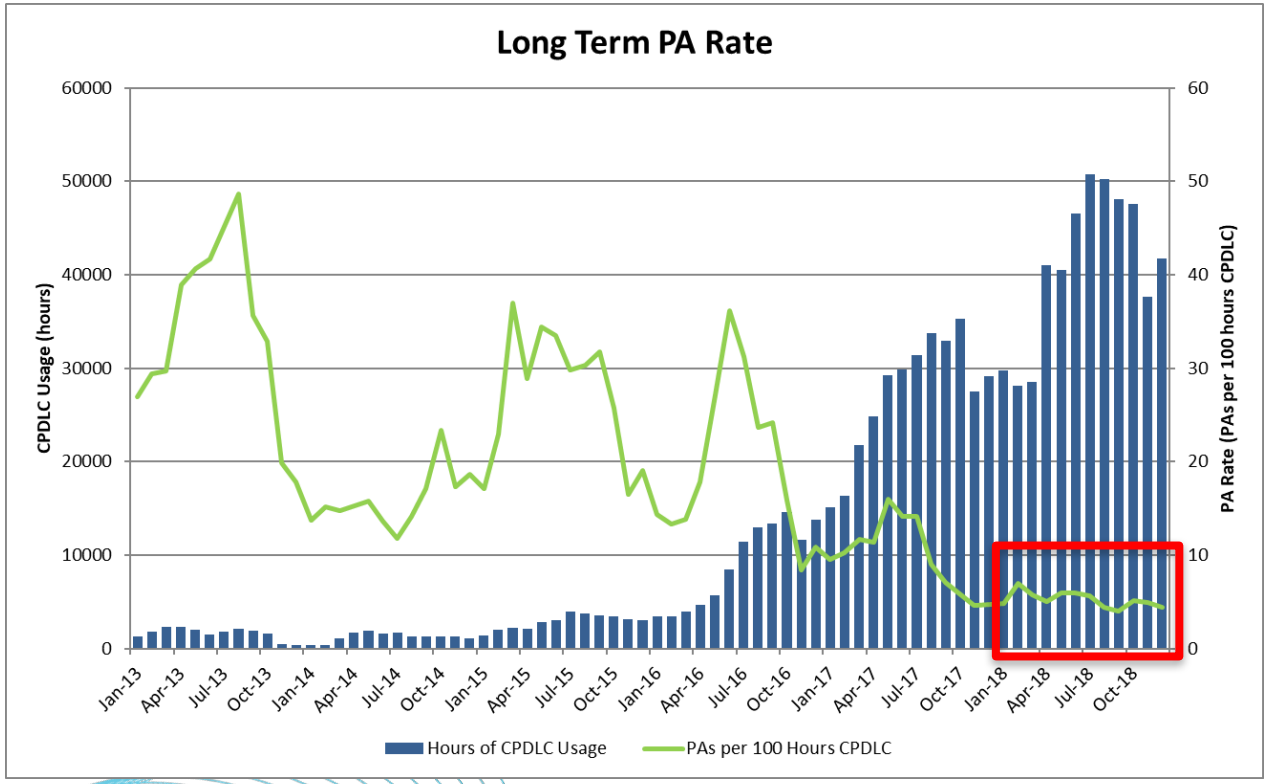
PA Rate over the past 6 years



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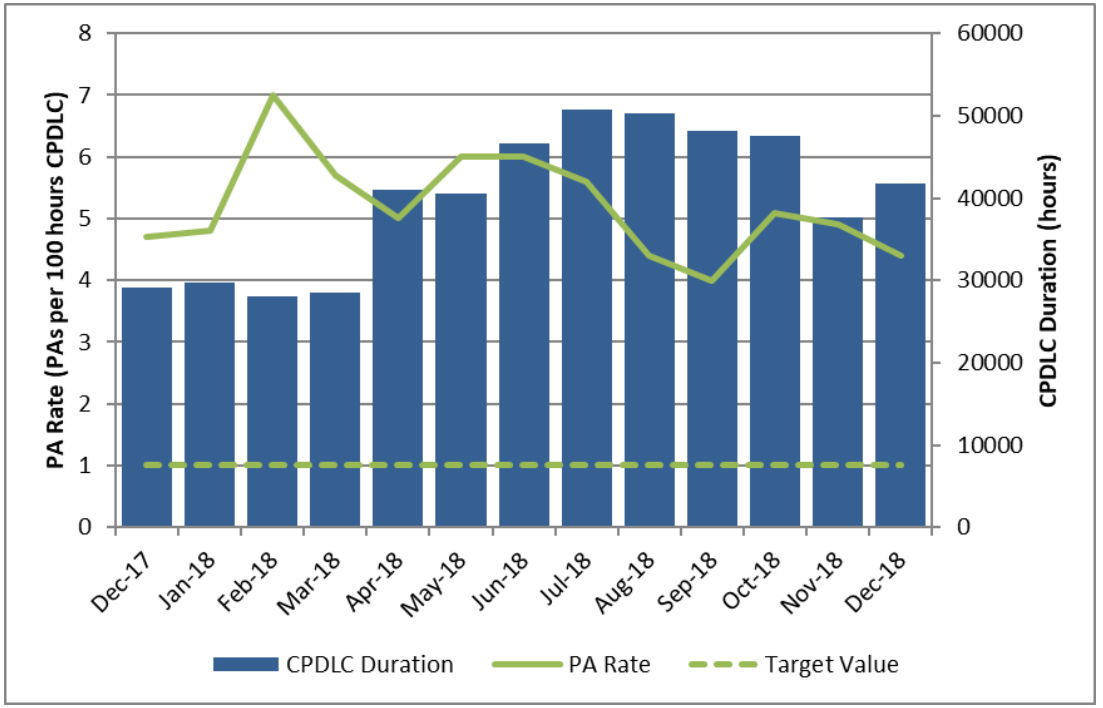
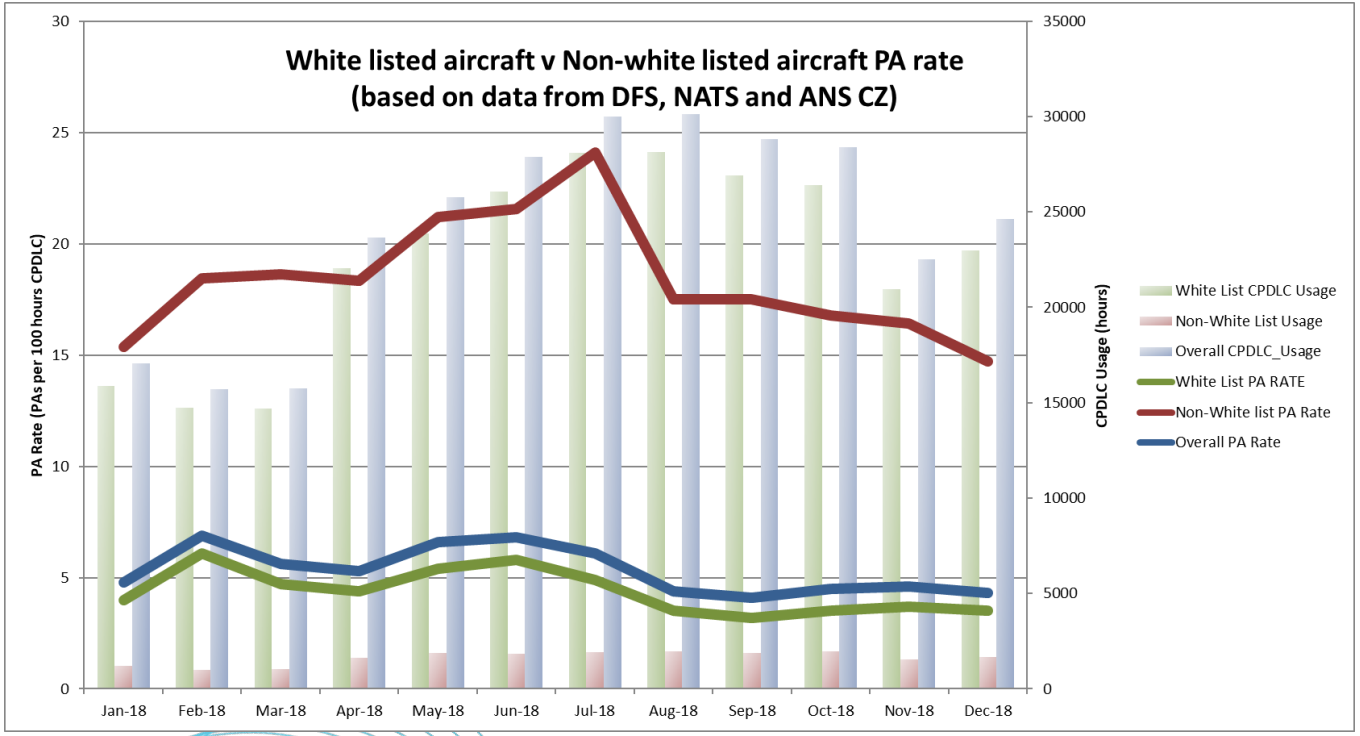
PA Rate – 2018

Graph covers:
- MUAC
- Skyguide
- NATS
- DFS
- ANS CZ



Note: Some ANSPs report much higher PA Rates (30-40 PAs per 100 hours)

Avionics are important…



White List (about 3500 a/c) used in :

- MUAC
- Skyguide
- DSNA

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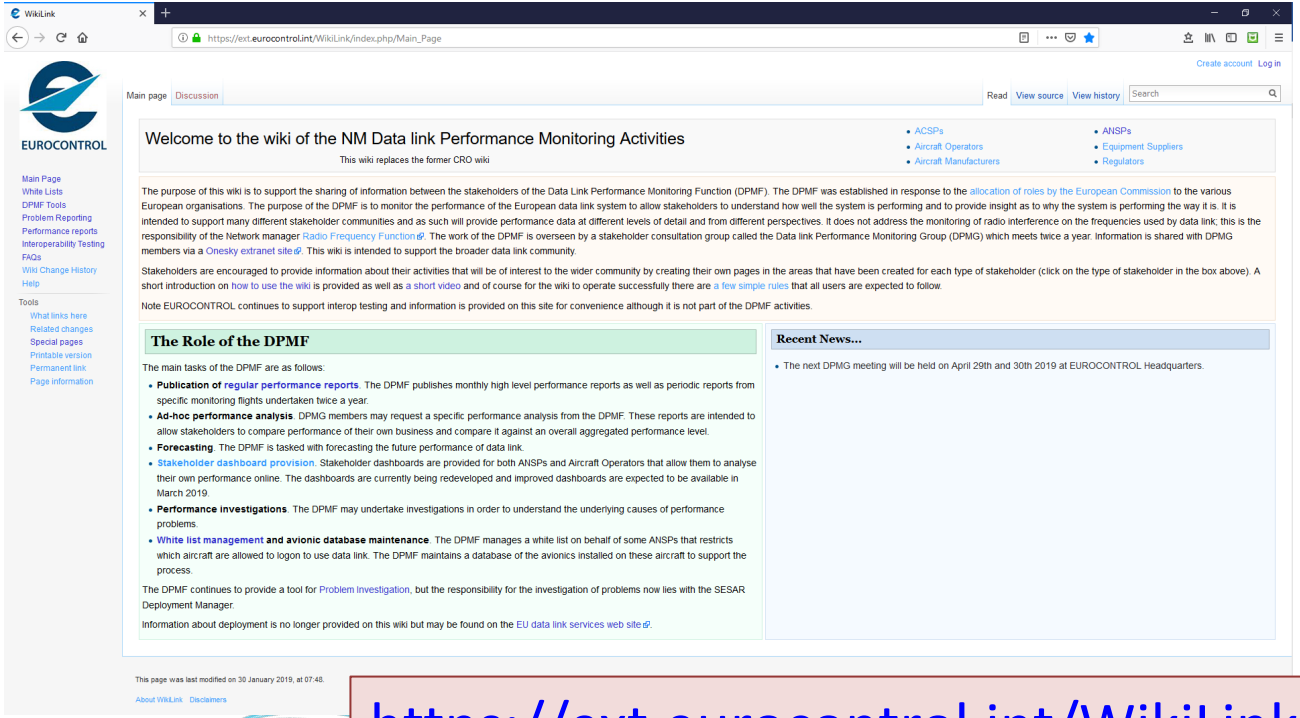
Performance reports available online: WikiLink



https://ext.eurocontrol.int/WikiLink

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Questions?

Email:
dpmf@eurocontrol.int

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Data Link Services DLS

EUROCAE activities in WG-92

Christian Schleifer
Secretary General EUROCAE

EUROCAE contribution to the DLS recovery plan

- Contribution to the DLS recovery plan in the two following domains:
  - Improvement of the existing VDL mode 2 standards in answer to ELSA recommendations
  - Contribution to the end to end certification consideration with the development of potential complementary standards

- Participation to the coordination of the DLS recovery activities within the framework set up by SDM along with the NM and EASA

Existing standards

- EUROCAE had developed a set of standards covering
  - Data Link Services and their associated performances
    - ED-120 - Safety and Performance Requirements Standard For Initial Air Traffic Data Link Services In Continental Airspace (SPR IC) (May 2004)
    - ED-228A - Safety and Performance Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 SPR Standard) (March 2016)
  - Avionic component of VDL mode 2
    - ED-92B - MOPS for an Airborne VDL Mode-2 System Operating in the Frequency Range 118-136.975 MHz (Oct 2012)

Update of existing standards: ED-92

- ED-92B revised to address the relevant recommendation from ELSA
  - No significant changes were introduced in this revision (except one new requirement dealing with multiple frame concatenation)
  - Majority of the changes were focusing on clarifications and additions

  ED-92C issued Sept 2018

- Further revision initiated (ED-92D) to address connection-less mode
  - Publication expected end 2020
  - Joint activity with RTCA

Development of new standard

- Additional document initiated
  - respective expected behaviour of the various components (ground network and airborne component) for the most complex AVLC protocol interactions
- The topics identified today are:
  - DISC & DM usage, X25 packet size, grouped frames, assumptions on ground deployment, number of VGS within a given area, coordination mechanisms between CSPs, ..
- Activity ongoing within WG-92
  - Publication expected mid 2019
  - Joint activity with RTCA

Potential future activities

- Discussions initiated on potential future activities addressing the end to end validation aspects from an airborne VDL mode 2 perspective
  - No decision for the time being

End-to-End Certification

- EUROCAE support to RMG in EASA framework
- EUROCAE supports the concept of extended end to end validation instead of end to end certification
- EUROCAE considers that achieving end to end data link performance is the ultimate objective
- The demonstration of this achievement can only be done through a step wise validation approach
    1. avionic package compliance to existing standards is the first validation layer (manufacturer responsibility)
    2. avionic package integrated on board an aircraft type compliance is the second validation layer (aircraft manufacturer or aircraft operator responsibility)
    3. avionic package compliance monitoring during flight operation is the third validation layer (responsibility to clarify including the current duty of the CSP)

Thank you very much for your attention!

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Agenda

1. *Introduction and Scene Setting*
2. *DLS Recovery Plan Implementation – Status and Next Steps*
3. *Data-link Regulatory updates*
4. *Monitoring the Data-link Performances*
5. *Data Link Services*
6. *DLS, Military View*
7. *Q&A*
8. *Closing Remarks*

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DLS Recovery Plan - Military

The MILITARY in Single European Sky - Partnering for Excellence in global aviation

LCL Denis Bouvier
EDA Project Officer SES Policy

EDA'S REINFORCED MISSION

In May 2017, after EDA's LONG TERM REVIEW,
Defence ministers agreed to reinforce the Agency's role and mission

- as the **main instrument**
  for intergovernmental capability planning & prioritisation in Europe
- as the **prime forum and coordinator**
  for the whole lifecycle of capability development
- as Member States' **central interface & gateway**
  towards EU institutions & stakeholders

EUROPEAN DEFENCE AGENCY

www.eda.europa.eu

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The Fleet – The Stakeholder

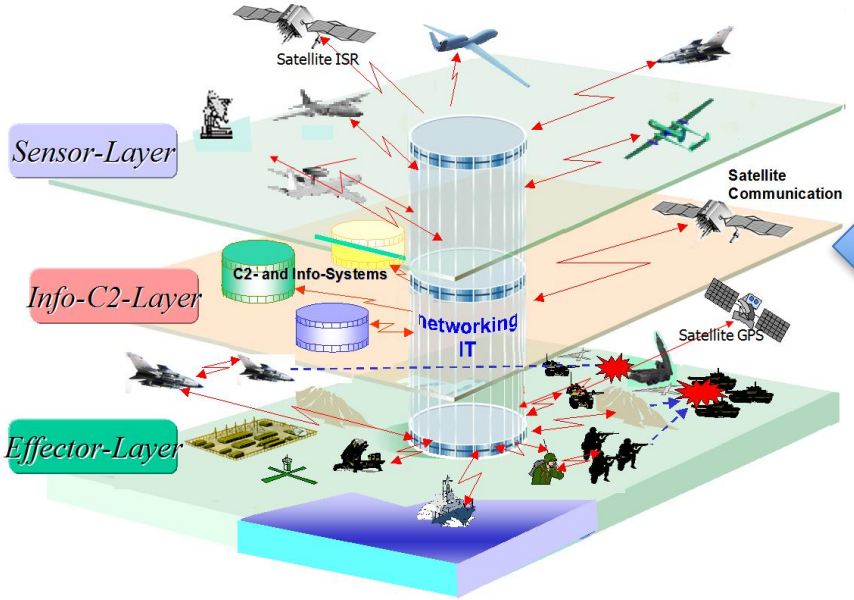


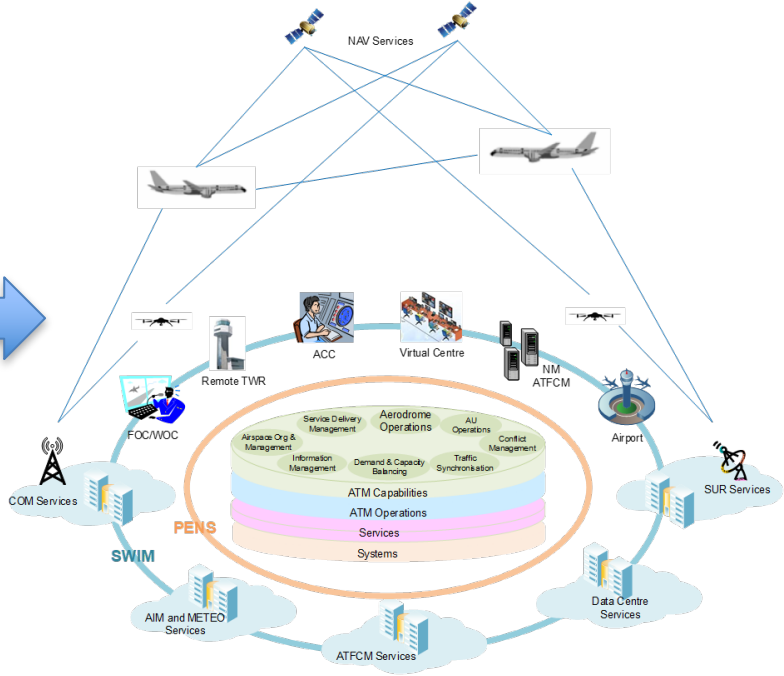





Type of assets	Number
Combat Aircraft	3365
Helicopters	3733
Light Transport Aircraft	1390
Heavy Transport Aircraft	949
RPAS (All types)	420 *10% HALE/MALE*
Airfield	220

Civil-military interoperability is a must





TODAY: Military crisis/Operations environment

"core mission"

TOMORROW: SES peace Time environment

"Train as you fight"

DLS Status - Military

- Current IR are fine for the military: "*Equip on a voluntary basis the new transport type state aircraft (forward fit) entering into service after the 1/1/2019*"
- DLS transitional airborne solution implementation decided by some Military authorities (*Ref.: INEA Calls*) for transport type aircraft
- DLS is not specific to military operational requirements
- AOC usage is low for the military

DLS Recovery Plan - Challenges

- Interoperability among the ground infrastructure systems at reasonable costs
- Access to airspace for non-equipped State aircraft
- Cyber-security and confidentiality, which are crucial for civil and military aviation
- Efficient governance structure involving the military
- Spectrum challenges

Conclusion

- Let’s move forward together
- Civil-Military collaboration is key and interoperability is a must
- SES shall accommodate the needs of all stakeholders
- Defence and Security is a common responsibility

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Q&A

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Closing remarks

Results so far

Since the EC mandate to SDM, the DLS implementation is a successful reality, with **huge improvements** in terms of **DLS performances and the definition of a clear plan to meet the IR (EU) No 310/2015**

Next Steps

The SDM will continue the **ongoing work and cooperation with the relevant stakeholders for the implementation of the European target architecture** and, looking at the future, will consider the **adoption of A/G complementary technologies** to continuously ensure the DLS performance with a flexible DL system

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