

# Data4Safety Partnership for Data Driven Aviation Safety Analysis

Supported by EASA

**COSCAP-SEA** 

Introduction to Data4Safety (D4S)

**Geert Kinders, D4S IT lead** 13<sup>th</sup> of March 2025





## Data4Safety explained in one paragraph

The Data4Safety Programme (D4S) is a **strategic initiative, objective and priority** of the Agency (ref. EASA Single Programming Document).

D4S is a **voluntary partnership** of the **EASA Members States** and the **Industry** that aims at **inferring unprecedented aviation intelligence**, e.g. to **identify and manage safety risks** or **support data driven change** in both the fields of **safety** and **sustainability**.

D4S leverages on the advent of big data and digital technologies to organize a massive collection of aviation data sources and, equally important, organising the analytical capacity amongst all EASA aviation partners (both EASA MSs and Industry).

This will take the **collaborative work of EASA with the Industry and the EASA MSs** at a scale never achieved before in Europe.

D4S is led by EASA and powered by its Members





# Out there!



# Objective Deliverables

## **Expert Knowledge**













Metrics



Know where to look

See it coming

Act!

**Directed Studies** 



**Blind Benchmarking** 



**Vulnerability Discoveries** 





# **Programme key Principles**

#### Collaborativeness

The success of the *Data4Safety* programme is reliant on a cooperative effort involving the entire aviation community, the European Union institutions, oversight authorities, industry and unions. The programme members contribute the programme in a cooperative manner.

#### **Voluntariness**

The programme is a partnership that is joined or left by the members on a voluntary basis.

#### Confidentiality

The programme members are obliged to confidentiality in relation to all data and intelligence derived from the programme. A member may voluntarily choose to allow access to the identified data it supplies under the conditions specified in the rules and procedures document.

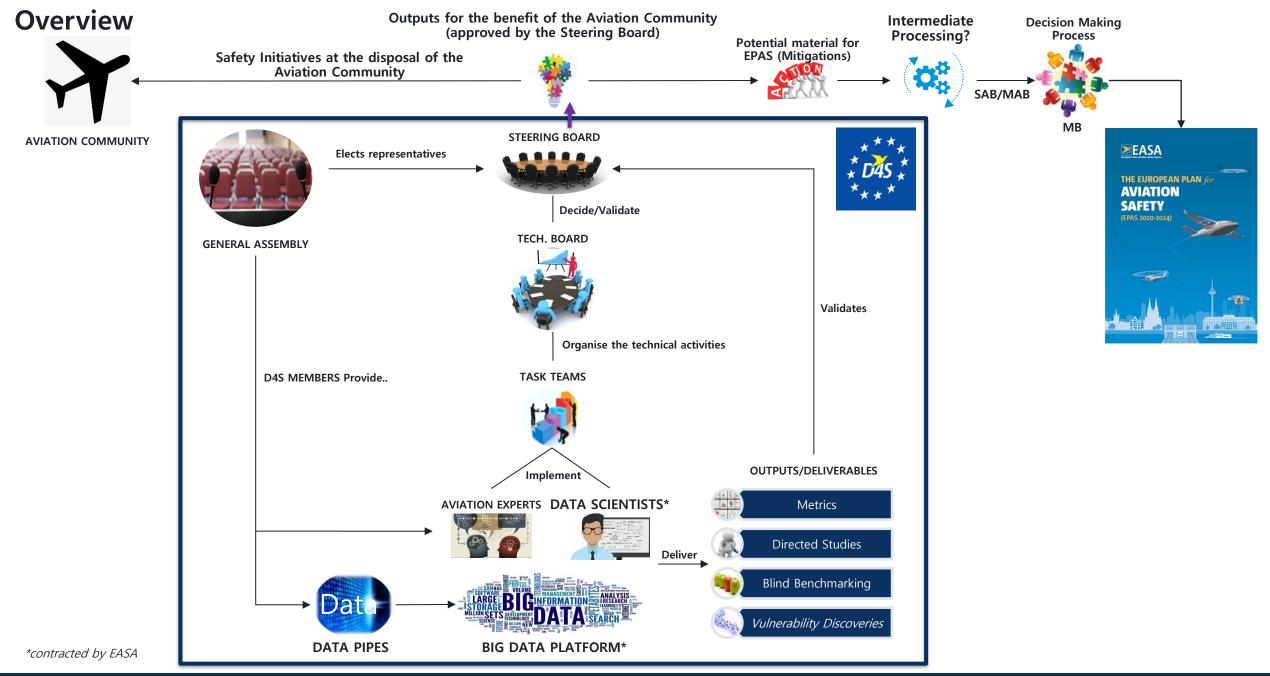
#### **Just Culture**

The programme is aligned with the Just Culture principle as defined in European Union regulation 376/2014 and the European Corporate Just Culture Declaration.

#### Safety first

The primary goal of the programme is safety and as such the programme aims at supporting the identification and assessment of the systemic safety risks at European level as well as the measurement of safety performance. The programme also supports the members in enhancing their own safety performance. The programme has also the ability to support **sustainable aviation**, **security and cybersecurity** when they impact safety. The programme will not allow any other purpose contrary to its spirit such as seeking mercantile purposes or for a targeted oversight on a given organisation or individual







### **Summary Data Governance & Protection measures**



#### Governance

- Steering Board
- Technical Board
- Supervisory Panel

#### **Procurement**

- Data Pipe Provider (P#1)
- Big Data Platform Provider (P#2)
- Data Science and Analytics Provider (P#3)

#### IT architecture

Dedicated Data Storage

#### Legal

- **EU Law (EU Reg 376/2014, EU Reg 2018/1725, AirOps ORO.AOC.130)**
- German Law (Data stored in Frankfurt Germany)
- National Law (Different for each member)

#### **Internal Processes**

- User Governance (Charter, RnP and DaGo, incl DSPA's and TPA's)
- Data transfer (Encryption, Timing)
- Analysis Visualisation (Rule of three etc)



# **D4S ROADMAP**











#### Proof of Concept Phase

2017 to 2022

- Focusing on safety
- Limited to founding members

# **Current** phase





#### -- • Development Phase

2022 to 2025

- Membership expansion: all Member States, more Airlines, new Members (starting with ANSPs, Airports)
- Safety, Sustainable Aviation, (Cyber) Security
- Definition of a public/private partnership for the Operational phase



#### Operational Phase

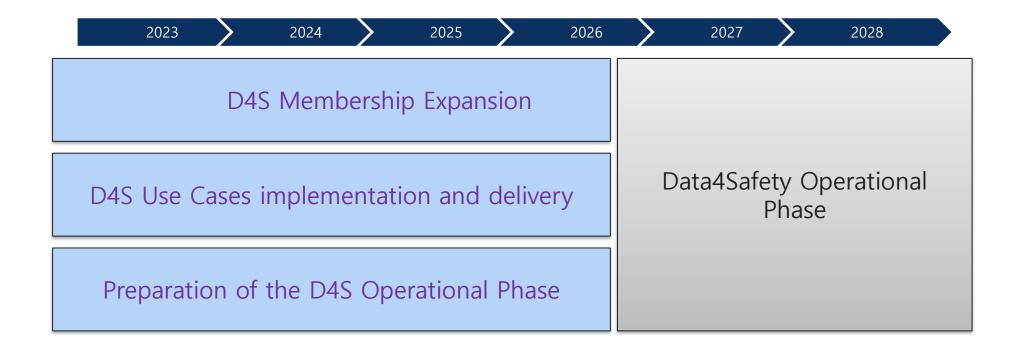
2026 onwards





# **Data4Safety Development Phase (DEV)**

# **⇒** Overview roadmap

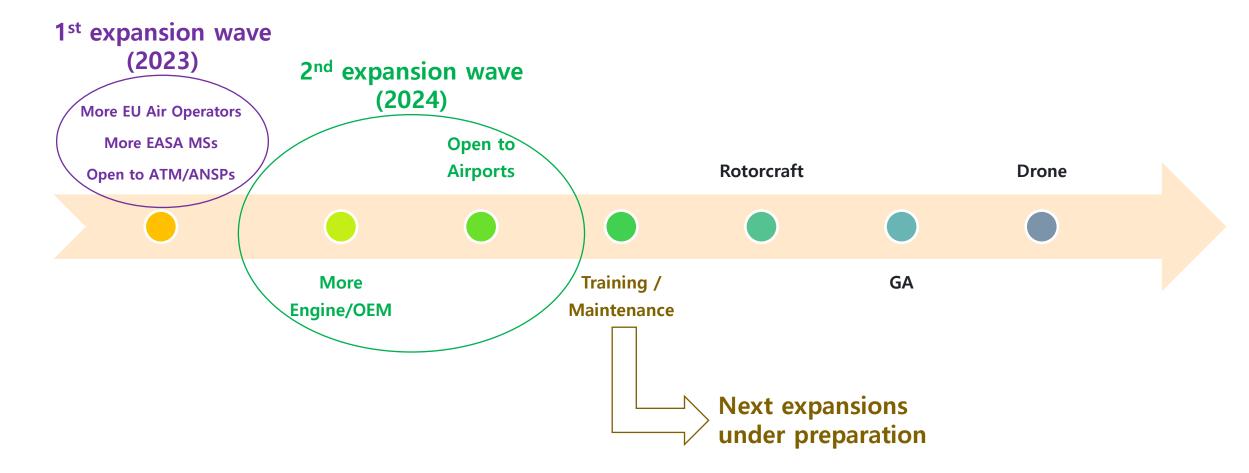






# **Data4Safety Development Phase (DEV)**

# ⇒ Overview roadmap for membership expansion

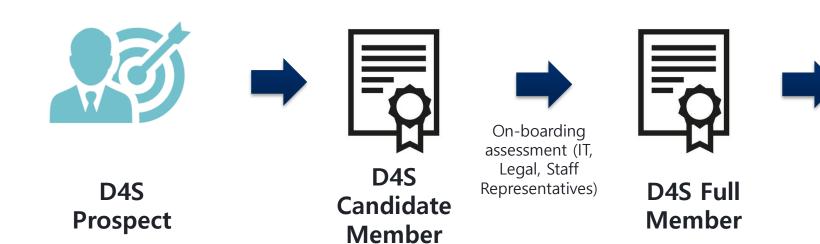






# **Data4Safety Development Phase (DEV)**

**⇒** On-boarding process







## D4S DEV - Membership status (Mar 2025)

- ☐ First expansion performed at the occasion of the first D4S General Assembly in Oct 2023 in EASA, Cologne
- Expansion wave n°2 performed in Sept 2024 at the occasion of the D4S General Assembly n°2 in Cologne



#### **Air Operators**

British Airways\*
EasyJet\*
Iberia\*
KLM\*
Ryanair\*
Vueling\*
Aer Lingus
Norwegian
TAP (Portugal)
Wizz Air
Edelweiss Air
Luxair
TUI Fly (Belgium)

HOP!



## **EASA + EASA MSs**

**Austria** 

**Cyprus** 

**Estonia** 

Greece

Latvia

Malta

**Poland** 

Sweden

**Swiss** 

Ireland\*
France\*
Spain\*
Belgium
Bulgaria
Croatia
Denmark
Finland
Italy
Luxembourg
Netherlands
Norway
Portugal
Romania
Slovenia



#### **ATM**

Airnav Ireland Austro Control Eurocontrol MUAC DFS DSNA ENAIRE ENAV SKYGUIDE



#### **OEMs**

Airbus\*
Boeing\*



## **Airports**

Brussels Airport
Budapest Airport
(Vinci Group)
Copenhagen Airport
Fraport AG
Munich Airport
Oslo (Avinor Group)
Prague Airport
SEA Milano Airports



# **Aviation Professional Representatives**

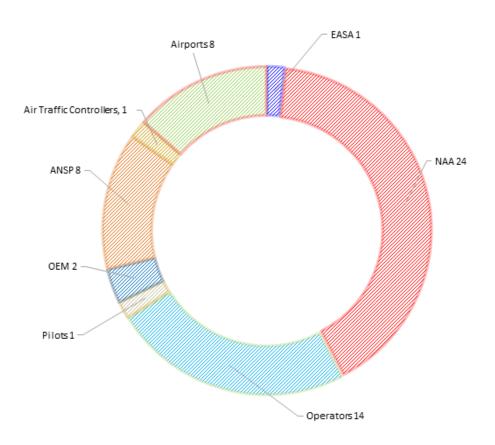
ECA\*
IFATCA

\*D4S Founding Members
D4S Member at the D4S Gov
D4S Member (wave n°1)
D4S Member (wave n°2)





## D4S DEV - Membership and governance overview (Mar 2025)



**D4S Membership** 



**D4S Governance** 





# D4S DEV – Expansion Wave n°1 (New Air Operators)

## ⇒ Anticipated impact on representativeness of the CAT operations within the EASA MSs

Founding Members Air Operators British Airways EasyJet Ryanair Iberia KLM Vueling	ERJ	E-Jet	<b>A320</b>	<b>B737</b>	<b>A330</b>	<b>A350</b> X	<b>A380</b> X	<b>в777</b>	<b>B787</b>
Expansion wave n°1 Air Operators	ERJ	E-Jet	A320	B737	A330	A350	A380	B777	B787
Air Operators Aer Lingus Norwegian TAP Wizz Air Edelweiss Air Luxair TUY Fly (Belgium) HOP!	X	X	X	X	X	A330	7,300	STIT	X
Founding Members + Wave n°1 Air Operators	X	Х	Х	Х	Х	Х	Х	Х	Х

⇒ Total 1475 CAT aircraft (approx.)

⇒ Total 460 CAT aircraft (approx.)

- ⇒ Total 1935 CAT aircraft (approx.)
- ⇒ i.e. ~1/3 of all CAT aircraft registered in the EASA MSs\*

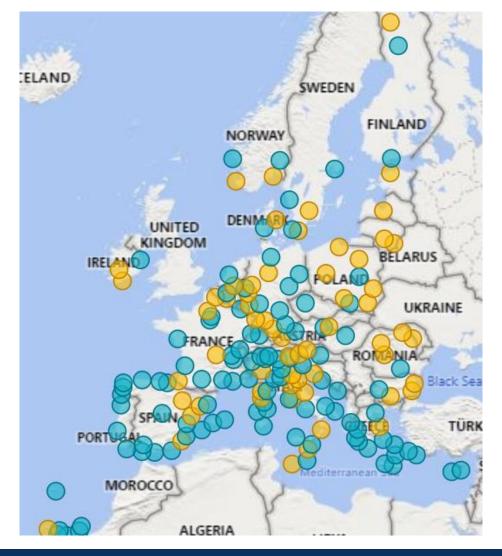
\*6623 CAT aircraft operated in the EASA MSs in 2022 (Source: EASA ASR 2023)





# **D4S DEV – Expansion Wave n°1 (New Air Operators)**

⇒ Anticipated impact on the D4S Rule of 3\*



R3 Airports
Founding Members +
Wave n°1
Air Operators

R3 Airports
Founding Member
Air Operators

\*Impact analysis based on OAG scheduling data for year 2023





**D4S Dev phase provider –** A single trusted 3<sup>rd</sup> Party Provider contracted by EASA for the benefit of the Data4Safety Programme and the D4S Members





- Transportation consultancy
- Aviation Business and operations, including Safety management and analysis
- Data science team specialised in aviation

- Technological consultancy
- Cloud native; digital transformation, IA & Big data
- Already working with other key aviation projects



# **Primary objectives** – Five core principles underpin the technical architecture, considering the used technology and the nature of the D4S programme

# Single cloud-hosting technology

A single cloud-hosting technology, Microsoft Azure, is to be used for all services across the 2 lots

# D4S DaGo compliance (data protection & Security)

Comply with the D4S Data Governance requirements, ensuring that the data collected and processed follows the necessary data governance and security policies











#### **Open Standards**

Open or industry-standard solutions for hardware, software, or data science solutions

#### **HandOver**

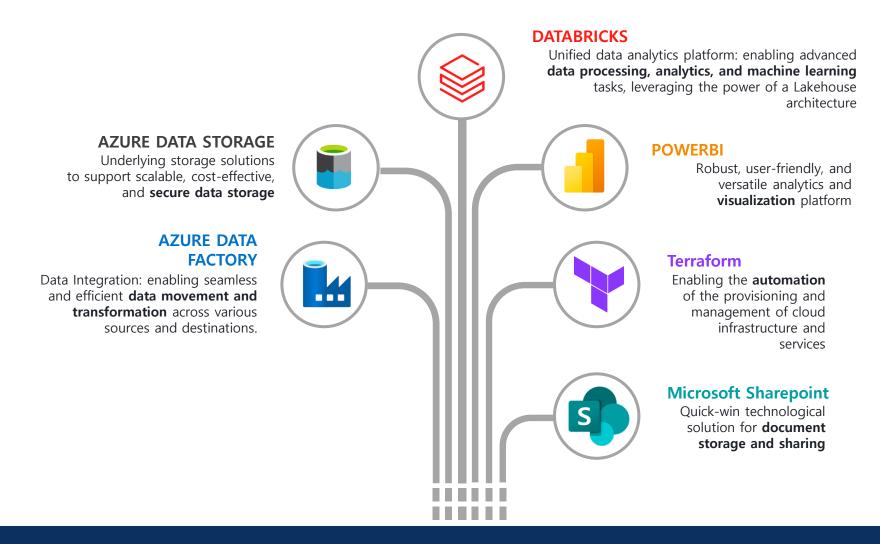
Ensure a smooth handover process that maintains business continuity without any delays or disruptions, considering the transfer of all assets

#### **Scalability Flexibility**

Scalability and flexibility are key aspects for the program, since the needs may evolve over time

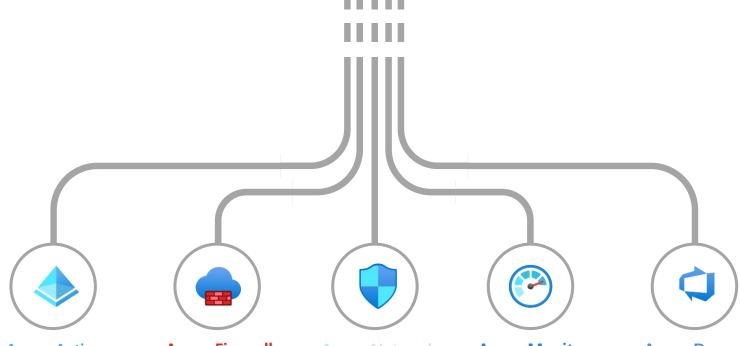


# **Enabling technologies -** A simpler yet robust target architecture to ensure both present and future success fulfilling at any time the primary objectives





**Enabling technologies -** A simpler yet robust target architecture to ensure both present and future success fulfilling at any time the primary objectives



# Azure Active Directory

Allowing organizations to centralize user management, enforce access control policies, and implement multifactor authentication (MFA)

#### **Azure Firewall**

Cloud-native and intelligent network firewall security service that provides the best of breed threat protection for your cloud workloads running in Azure

#### Azure Network Security Groups

Filter network traffic between Azure resources in an Azure virtual network. Security rules can control ingress and egress network traffic

#### **Azure Monitor**

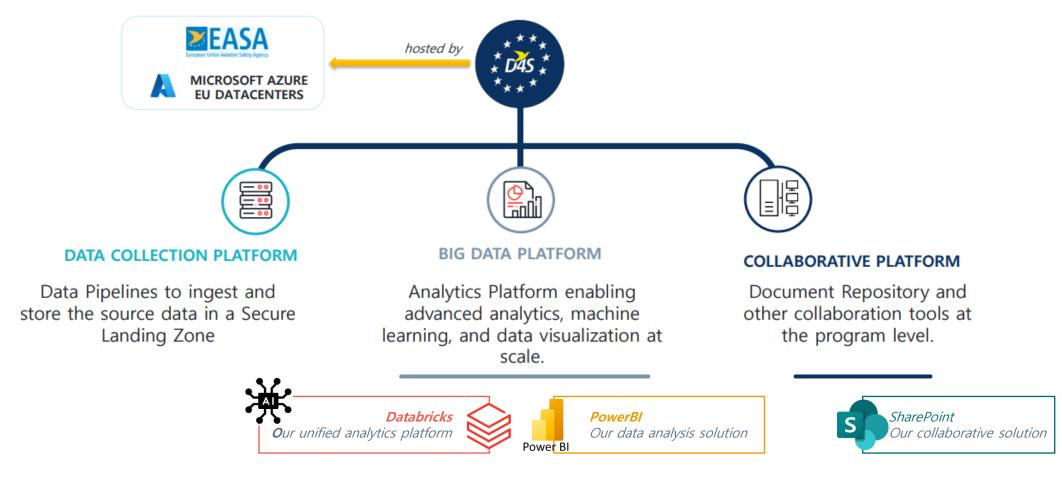
Enterprise-grade observability, including encryption or GDPR compliance providing operational capabilities across the entire stack

#### **Azure Devops**

A comprehensive suite to cover continuous integration, artifact store and source code storage



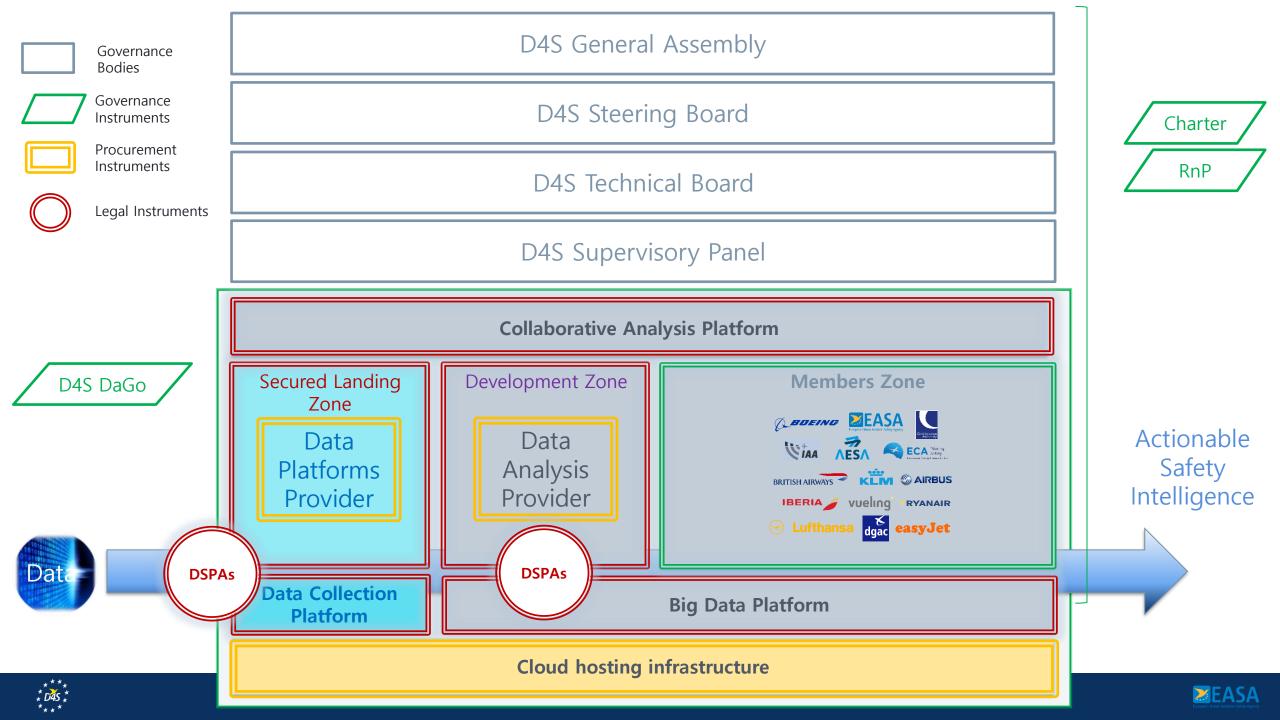
#### Platforms Overview, Set-up, Staging and Entry into Service

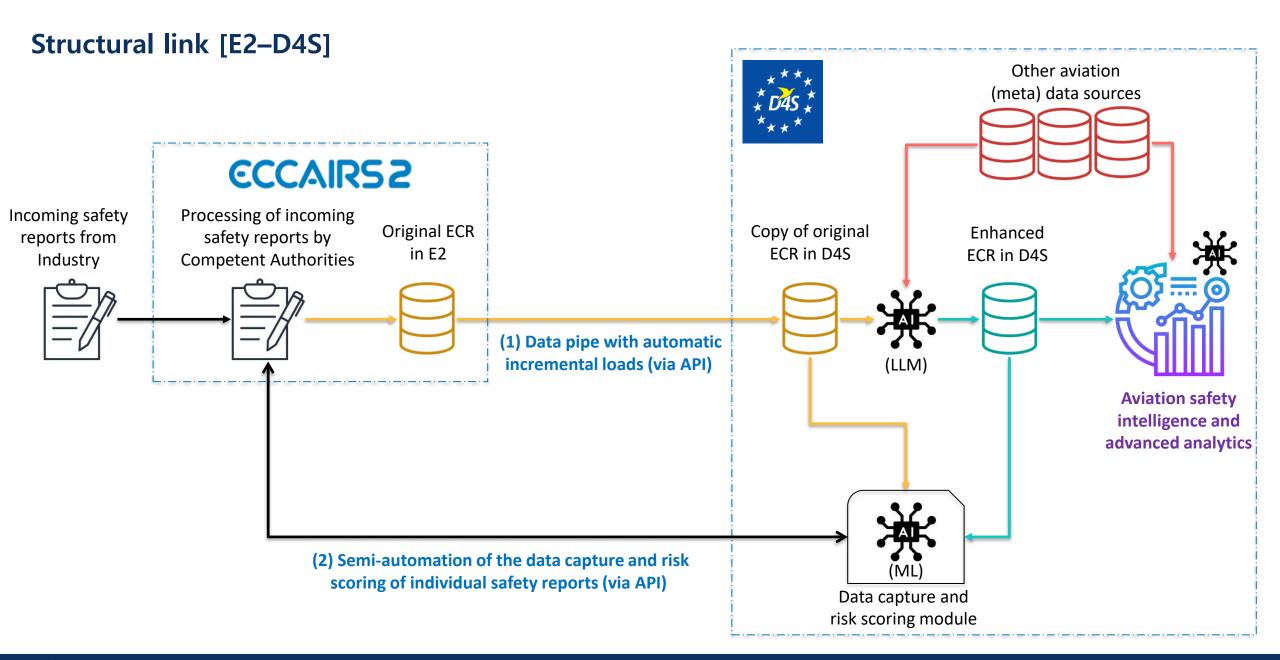


- ⇒ Entry into Service of the new D4S Platforms performed in June 2024
- ⇒ 80+ EASA users by Feb 2025
- ⇒ 300+ External users (from EASA Member States and Industry) by Feb 2025













# International cooperation: the example of ASIAS and D4S









# Data4Safety Partnership for Data Driven Aviation Safety Analysis

Supported by EASA

