

# CSD&M 2023 Complex Systems Design & Management (CSD&M2023) Conference

Oct. 30-31, 2023  
Beijing, China

## Digital Design Manufacturing and Services: Overview & Challenges

Pierre Vialettes

### ORGANIZERS



### PARTNERS



# Agenda

Airbus overview

DDMS program

Enabler: Skywise platform

Digital solutions achievements in China

Challenges

Q&A

# Airbus | WHO we ARE

Airbus is a global aerospace pioneer, operating in the commercial aircraft, helicopter, defence and space sectors. It has built on its strong European heritage to become truly international.



**180**

Locations worldwide

**134,000**

Employees

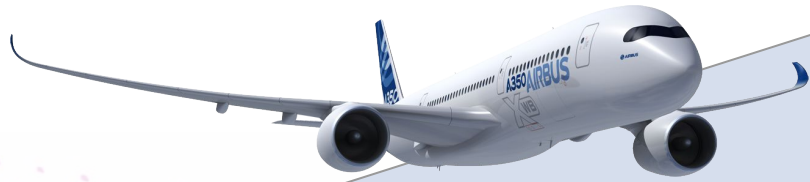
**€59 bn**

2022 revenues

# Airbus | Presence in CHINA



- **China market share 2022: 54%**
  - Single Aisle 56%
  - Wide Body 61%
- **Deliveries 2022: 112 aircrafts**
  - 17% of global deliveries
- **38 years** cooperation with China aviation industry
- Ecosystem of aircraft lifecycle
- Diverse **cooperation** in the portfolio of commercial and helicopter program
- **Bold** engagement in Single Aisle value chain to drive competitiveness
  - FALA 1&2, FEW, FE, ...
- Strategic engagement in A220



## AIRBUS Tianjin Site

**AIRBUS Tianjin Final Assembly Company Co. Ltd.  
Joint Venture:  
51% Airbus, 49% Tianjin Free Trade Zone & AVIC.**

- Assemble A319, A320, A321 & A350 type aircraft
- Paint A319, A320, A321 & A350 type aircraft
- Ground / Flight test Support & aircraft handling

**AIRBUS Tianjin Delivery Center Ltd.  
Foreign invested enterprise:  
100% AIRBUS owned.**

- Delivery of A319, A320, A321 & A350 type aircraft
- Executing AIRBUS contract functions
- Plant, Airworthiness, Engineering & Flight Test
- Equipping A320 sections 11-14 & 15-19

**Two Companies sharing one Site** adhering to the same worldwide AIRBUS process standards ensuring **AIRBUS Product Quality** under a **single EASA-POA** (Production Organization Approval)

# Airbus Tianjin | Project MILESTONES




▼ 2008	▼ 2009	▼ 2012	▼ 2013	▼ 2014	▼ 2016	▼ 2017	▼ 2018	▼ 2019	▼ 2021	▼ 2022
<b>1st A320-MCA Shipped</b>	<b>A320 1st Delivery</b>	<b>A320 100th Delivery</b>	<b>A320 Rate 4</b>	<b>A320 200th Delivery</b>	<b>FALC → FALA</b>	<b>A330 and A320NEO 1st Delivery</b>	<b>A320 400th Delivery</b>	<b>A320 Rate 6</b>	<b>A350 First Delivery</b>	<b>A321 Upgrade</b>



## 空中客车（天津）总装有限公司A320&A350厂区示意图 Airbus (Tianjin) Final Assembly Company Ltd. A320 & A350 Site Layout



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Trade Zone & AVIC.

FE XAT



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# Airbus Tianjin | A320 INDUSTRIAL FLOW

AIRBUS Tianjin  
Delivery Center  
(100% Airbus)

FOT:  
FAL  
Operational  
Test



Flight-line



Flight Test

Handover  
ATFAC to  
AIRBUS



Airworthiness  
Certification (Delivery)  
Transfer of Title

## AIRBUS Tianjin Final Assembly Co. Ltd.



Sea Transport



Final Phase



Paint Shop

Doc. Station  
Interior Furnishing



Station 35  
System Installation and Tests



Station 40  
System Components /  
Structural Parts

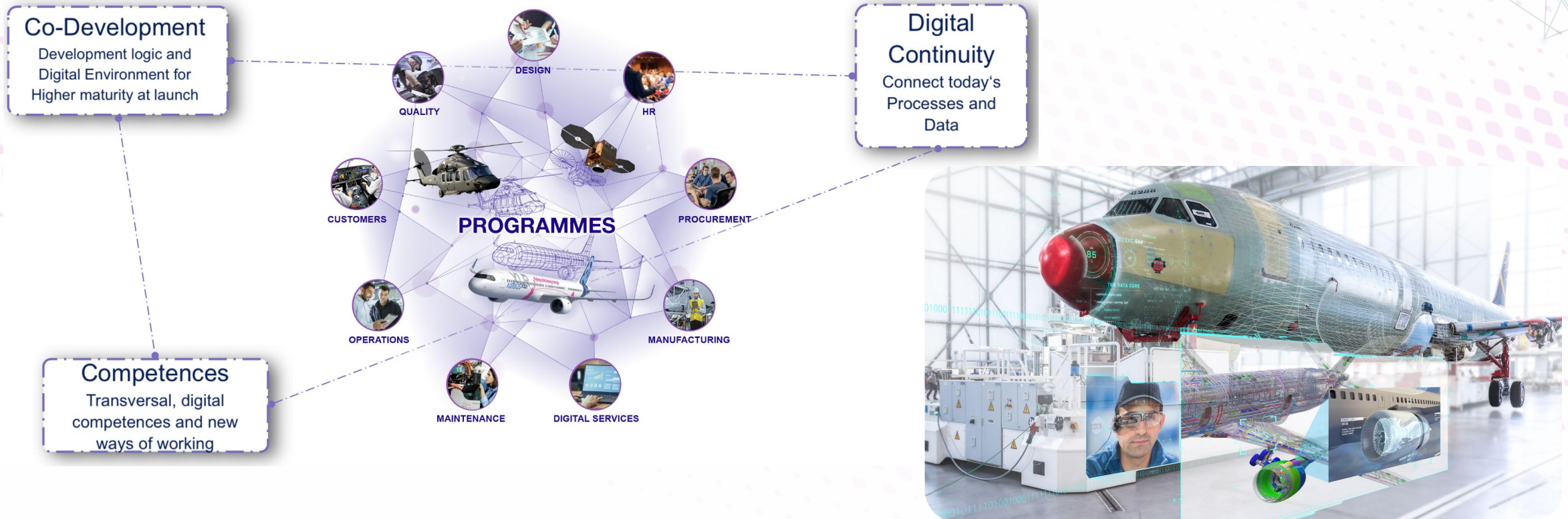


Stations 42 / 41  
Preparation / fuselage join-up

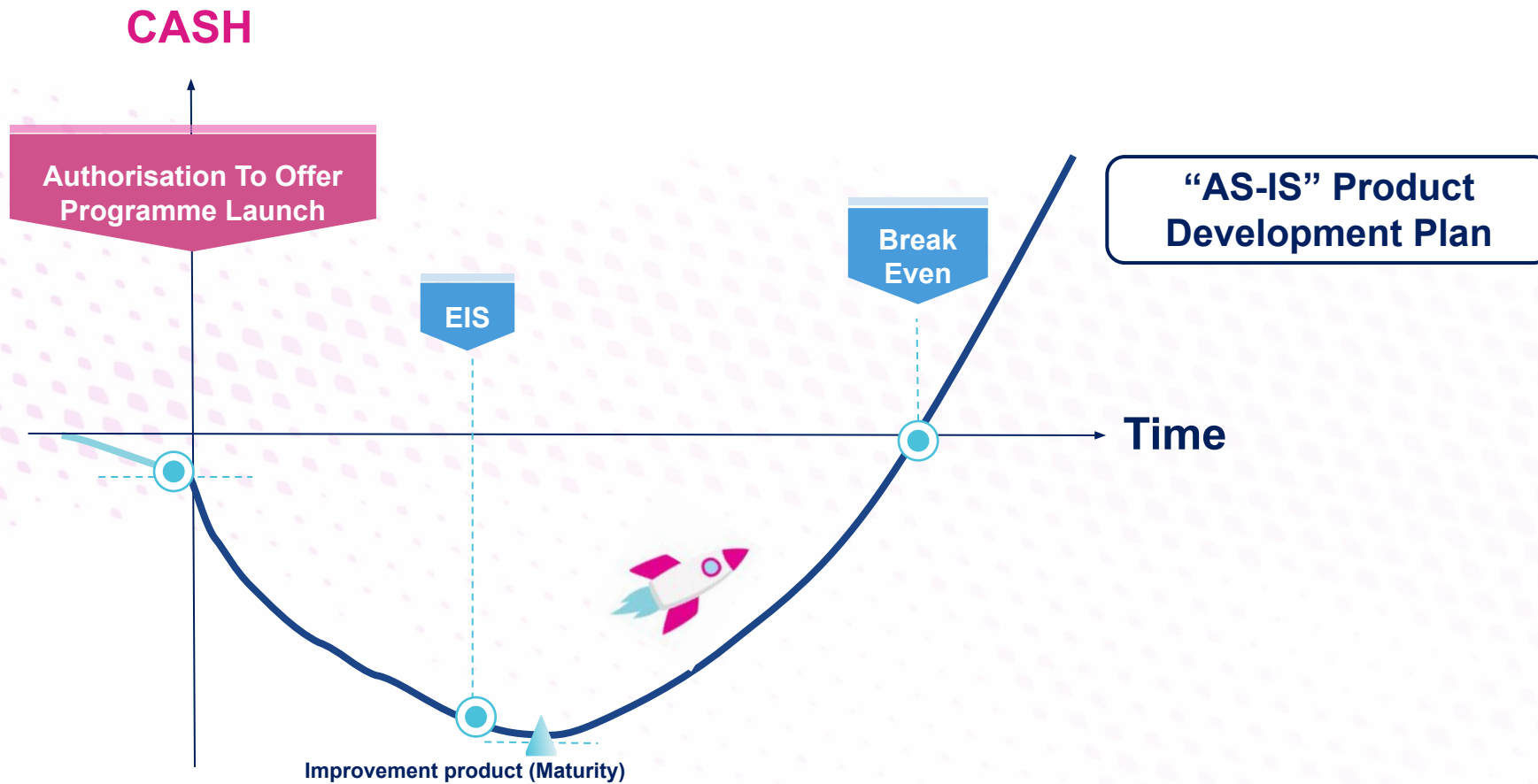


# DDMS Programme | AMBITIONS

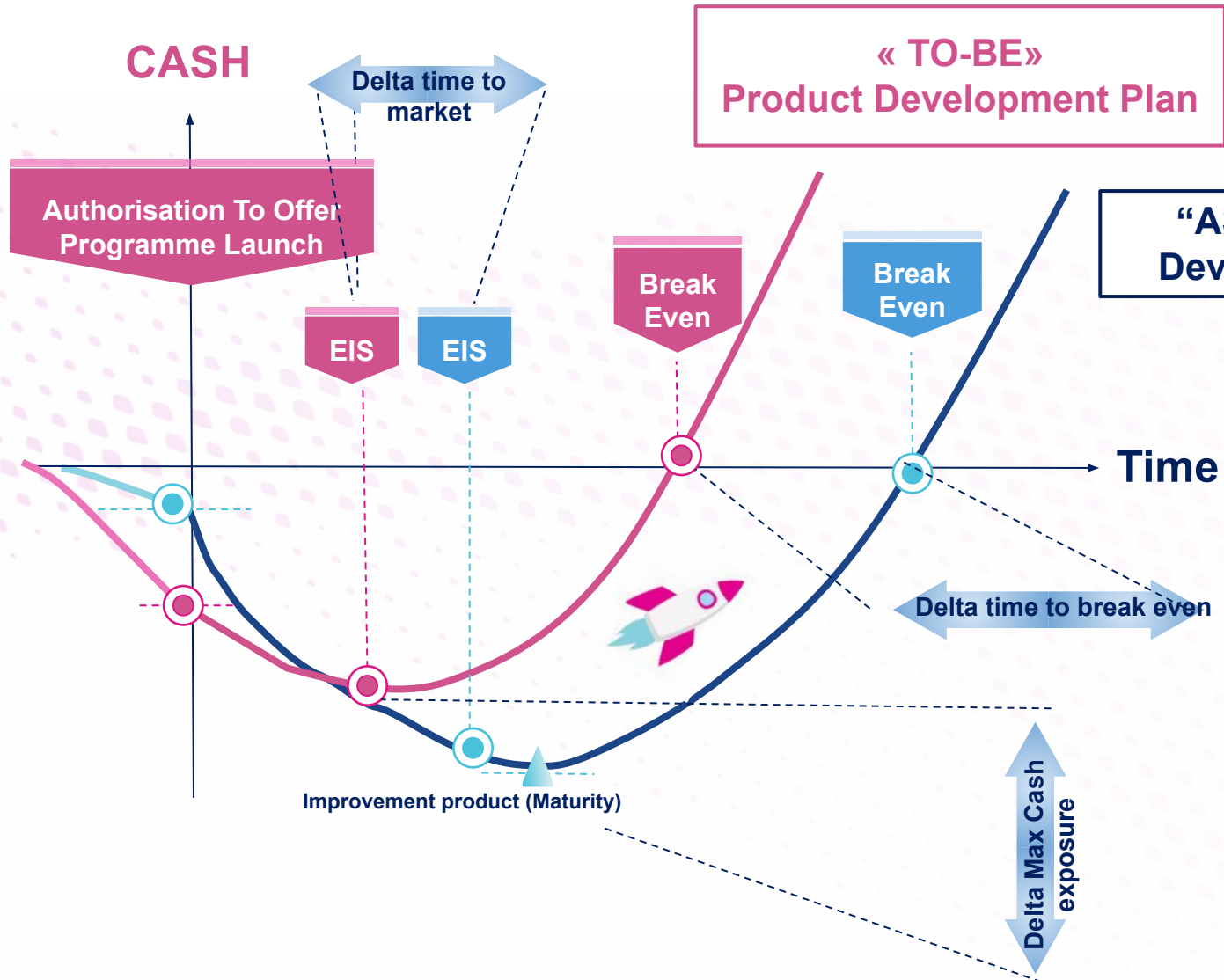
*We are providing a digital environment where the design, the manufacturability and maintainability of our products will be extensively modelled and simulated before detailed design and production start*



# Ambition | AS-IS & TO-BE Product Development Plan



# Ambition | AS-IS & TO-BE Product Development Plan



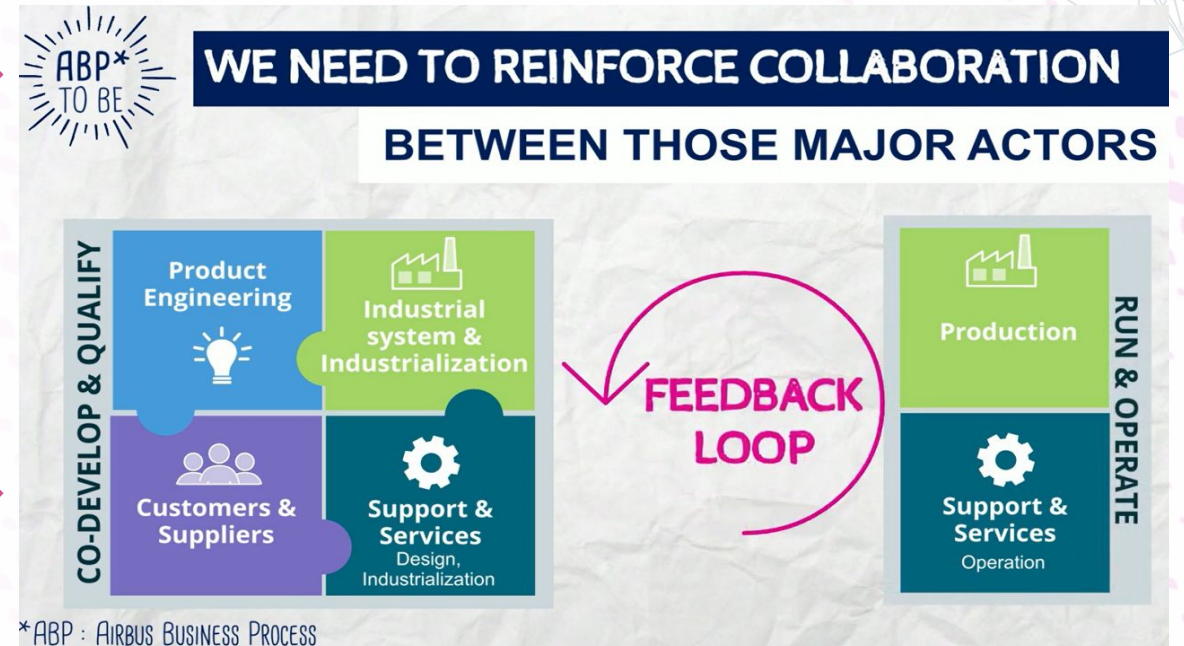
- ⦿ **Optimize at once** product, industrial & support & services systems
- ⦿ **Model & simulate** the **system behaviours & performance** to enable trade-offs
- ⦿ Provide **unicity, integrity** & lean propagation of information across actors
- ⦿ **Maximize re-use** of **standard, generic, scalable modules** across products
- ⦿ Develop **competences** able to **manage a system of systems approach**

# DDMS Programme | CO-DEVELOPMENT as NEW WAY OF WORKING

## BEFORE

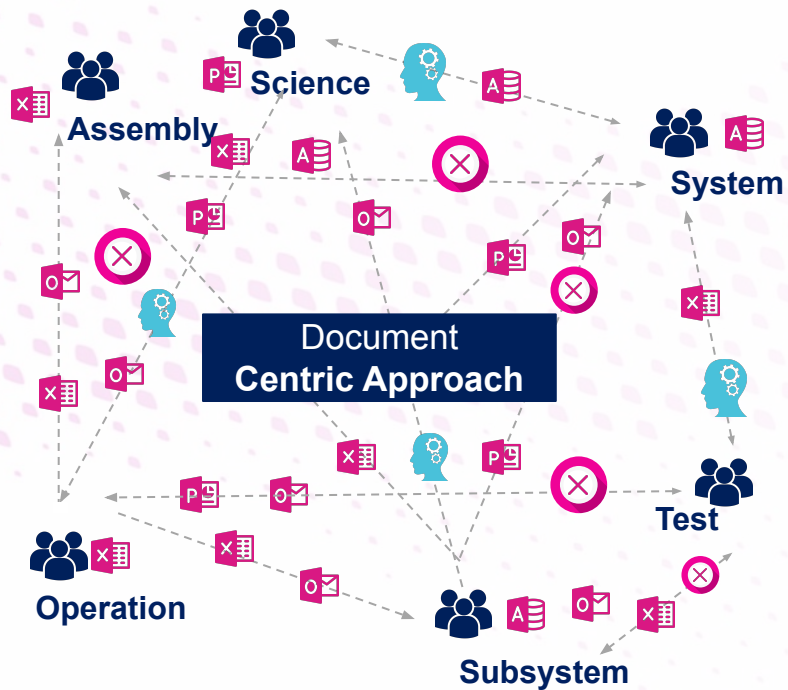


## AFTER

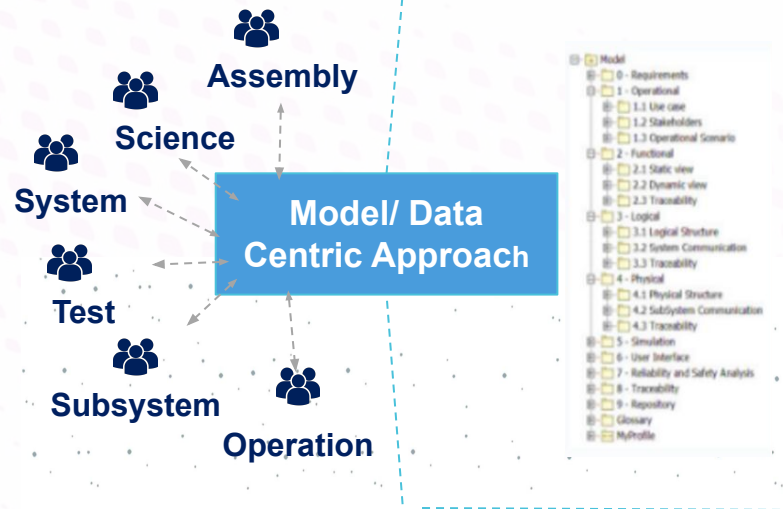


# DDMS Programme | DIGITALISATION as a DRIVER

## BEFORE



## AFTER



**DATA as single source of truth for multidisciplinary & transverse E2E analysis**

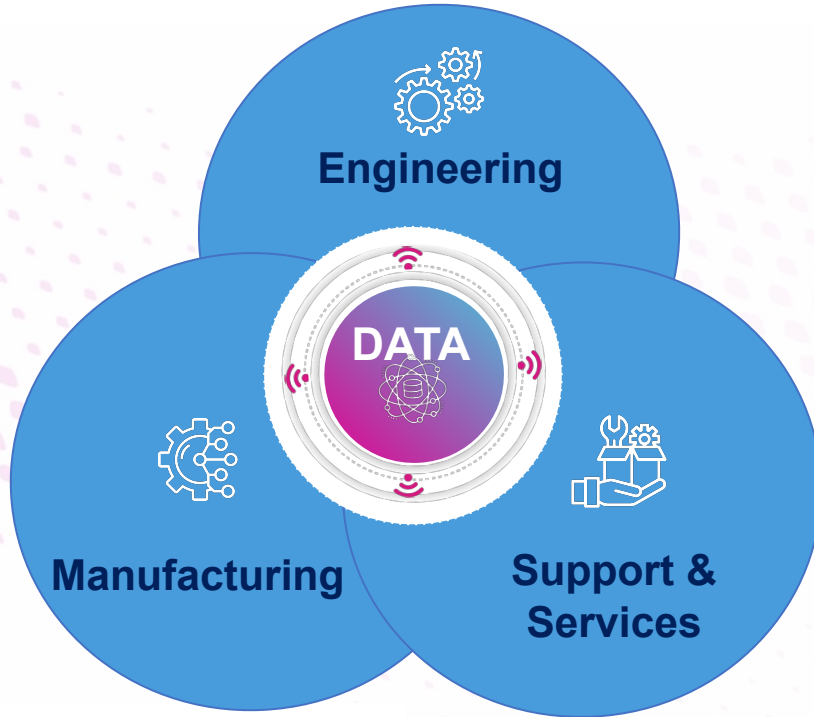


Today we manage data through time consuming exchange of documentation



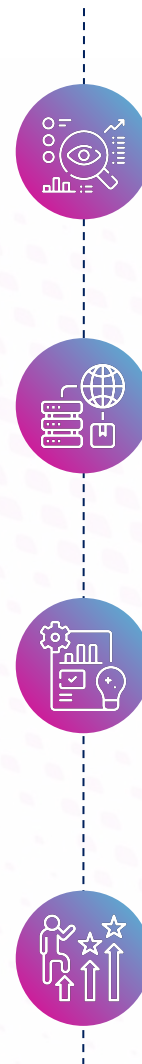
We are now moving to a System Engineering approach with **connected & centralised** approach for data & models

# DDMS Programme | FOUNDATIONAL CHANGE in the way to manage DATA at scale



## HIGH LEVEL CONCEPT

### Unified digital environment



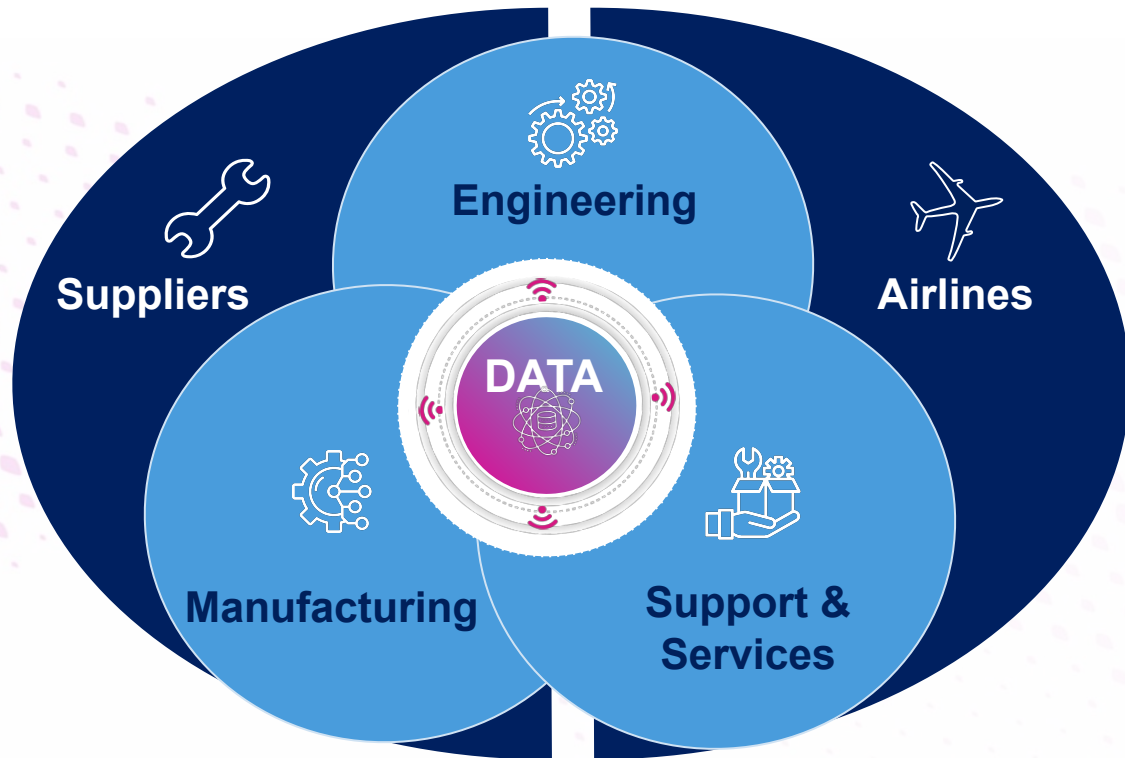
Design, orchestrate & monitor **E2E Data** does **supporting business-processes** that cross **multiple business-activities**, disciplines, **extended enterprises** & underlying applications

Deliver the **right data** in the context to users to **support decision making**

Consolidate & analyse **multi-disciplinary & multi-processes data** along the Airbus value chain to monitor & predict **value creation**

Collect product & process execution data to exploit **feedback loops** to **improve** or monitor the product/process or **develop new services**

# DDMS Programme | INTEROPERABILITY for INTERNAL & EXTERNAL COLLABORATION



*Put “data at the center” to improve  
Internal and external data collaboration  
and exchange to favor interoperability*

## ➤ BEFORE

- Key data driving value-chain performance (configuration, planning, quality) are not enough shared with AIRBUS ecosystem
- Import/export phases mainly manual and data compliance potentially not consistent depending the source used

## ➤ AFTER

- A seamless data exchange and collaboration with the Extended Enterprise in a standardised way and consistently across disciplines
- Airbus solutions (incl. infrastructure) shall be the more focused on being interoperable to be less intrusive and empower suppliers.

# DDMS | UPSKILLING



DDMS transformation programme couldn't succeed without AIRBUS & it's ecosystem's upskilling

## DDMS Competence Strategy

Support on boarding and upskilling of AIRBUS ecosystem



AIRBUS University



Universities - Competitiveness centers  
- EU aeronautics community

Identification of **new competences** related to **digital transformation**

Develop training on **new competences** to **upskill** teams

Deploy trainings to a **wide community** included **Extended Enterprise**

Send Airbus **internal people** for **upskilling** & qualification

Deeply drive **digitalisation upskilling** for full ecosystem

Send **Airbus** experts as **trainers/speakers**

Influence to get a **flavour** of Digitalisation in curriculum

Prepare **young people** to **competences of tomorrow**



# DDMS on the shopfloor | ILLUSTRATIVE EXAMPLE

**A321 XLR Assembly Digital Twin (ADT)** helps us simulate assembly operations under all conditions & anticipate risks associated with the Rear Center Tank (RCT) assembly taking benefit of real data.

## » BEFORE



Several disconnected models

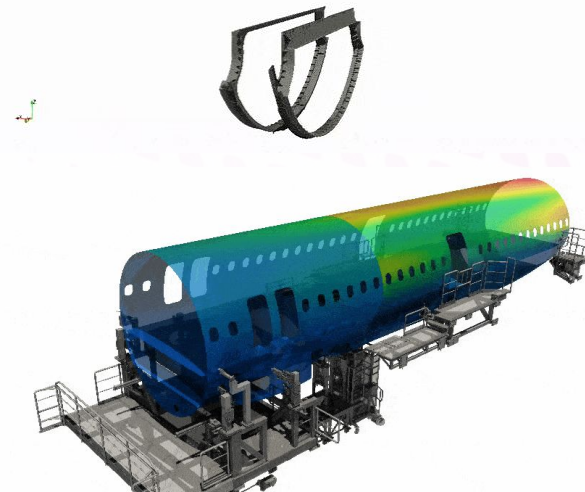


Not refined with shop floor data



More defects/issues discovered when launching manufacturing operations

## » AFTER



# DDMS for our Customers | ILLUSTRATIVE EXAMPLE

**AIRSPACE cabins** are highly customised cabins and DDMS brings processes, methods and tools to address the design complexity challenge and enables cabin walk-throughs with customers from the early stages.

## » BEFORE



Several disconnected models



High number of design issues identified late



Late cabin walks in a physical aircraft

## » AFTER



# DDMS Programme | KEY TAKEAWAYS

- ↳ Since 2019, DDMS is **re-inventing the way to digitally** design, build and operate our products in all divisions.
- ↳ **“Data at the center”** to improve internal and external collaboration.
- ↳ DDMS started **delivering values** in running programmes across the divisions.
- ↳ **Upskilling** our people and **our ecosystem** is key for DDMS success.

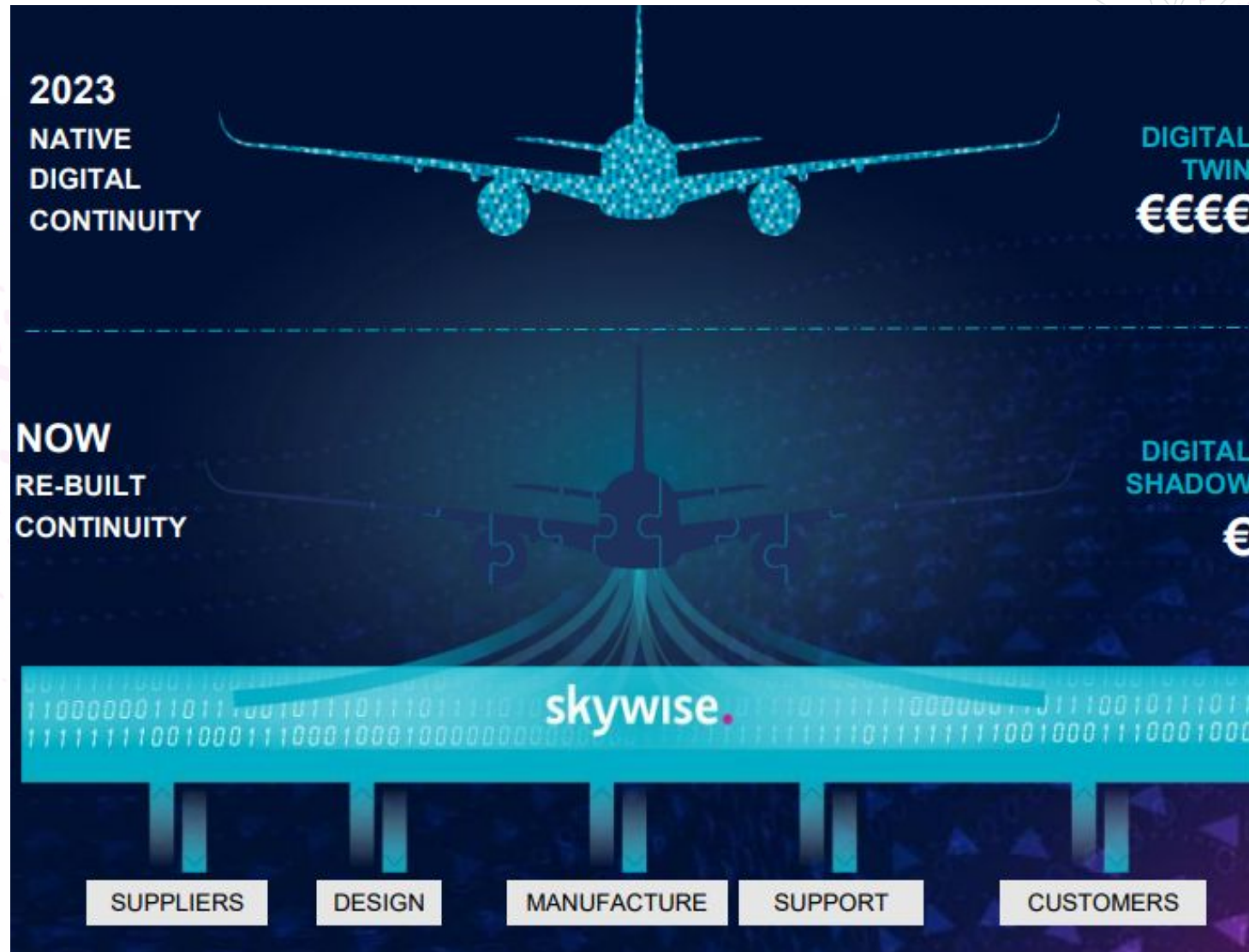
# Skywise platform | Enabler to Digital continuity

Skywise, an Airbus and Palantir partnership, was born out of the A350 production ramp up challenge in 2015. The result:

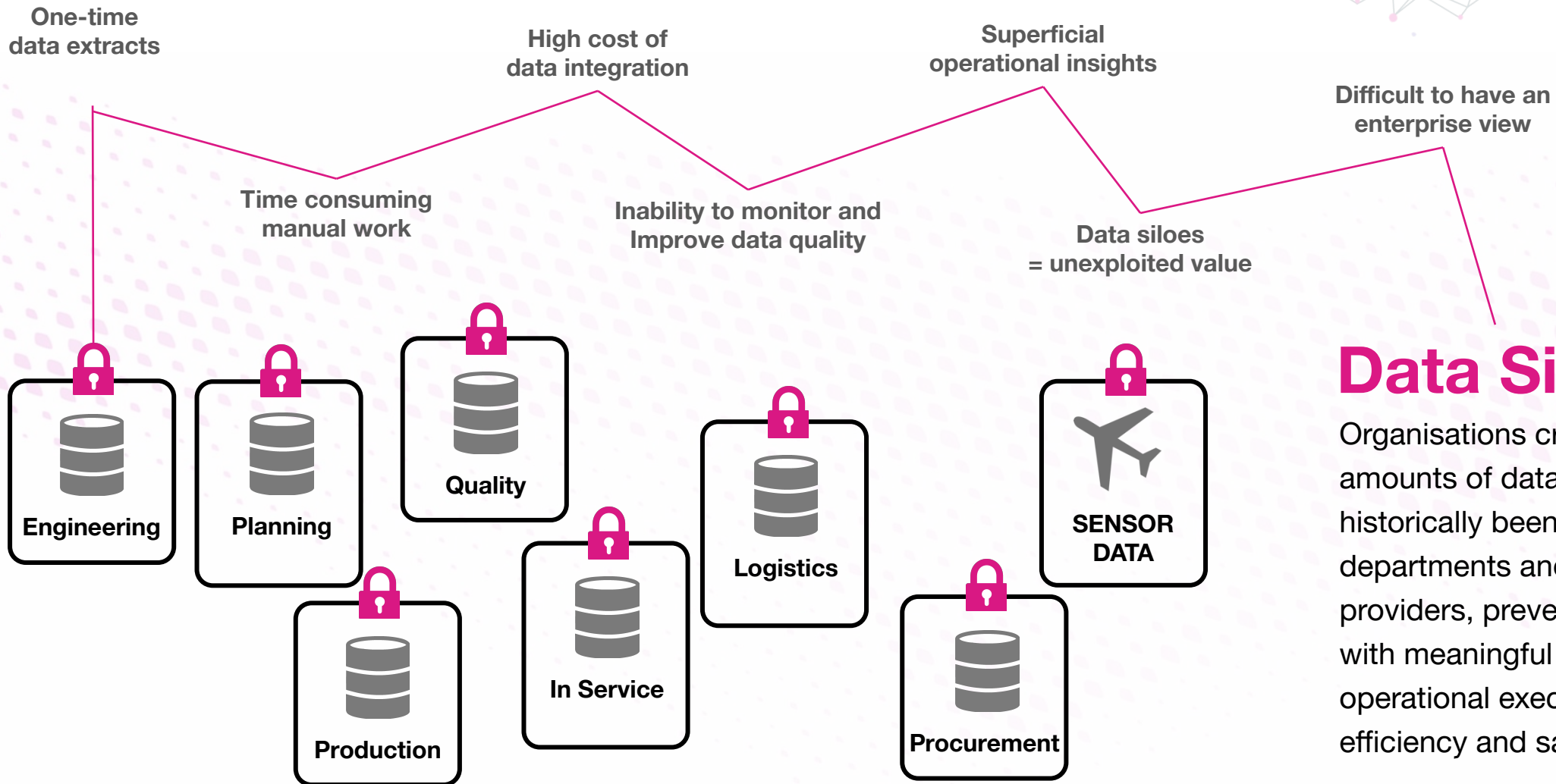
**33%** acceleration in A350 Production



# Skywise Platform | INTEGRATING datasets to provide data continuity and visibility across silos



# The Fundamental Problem

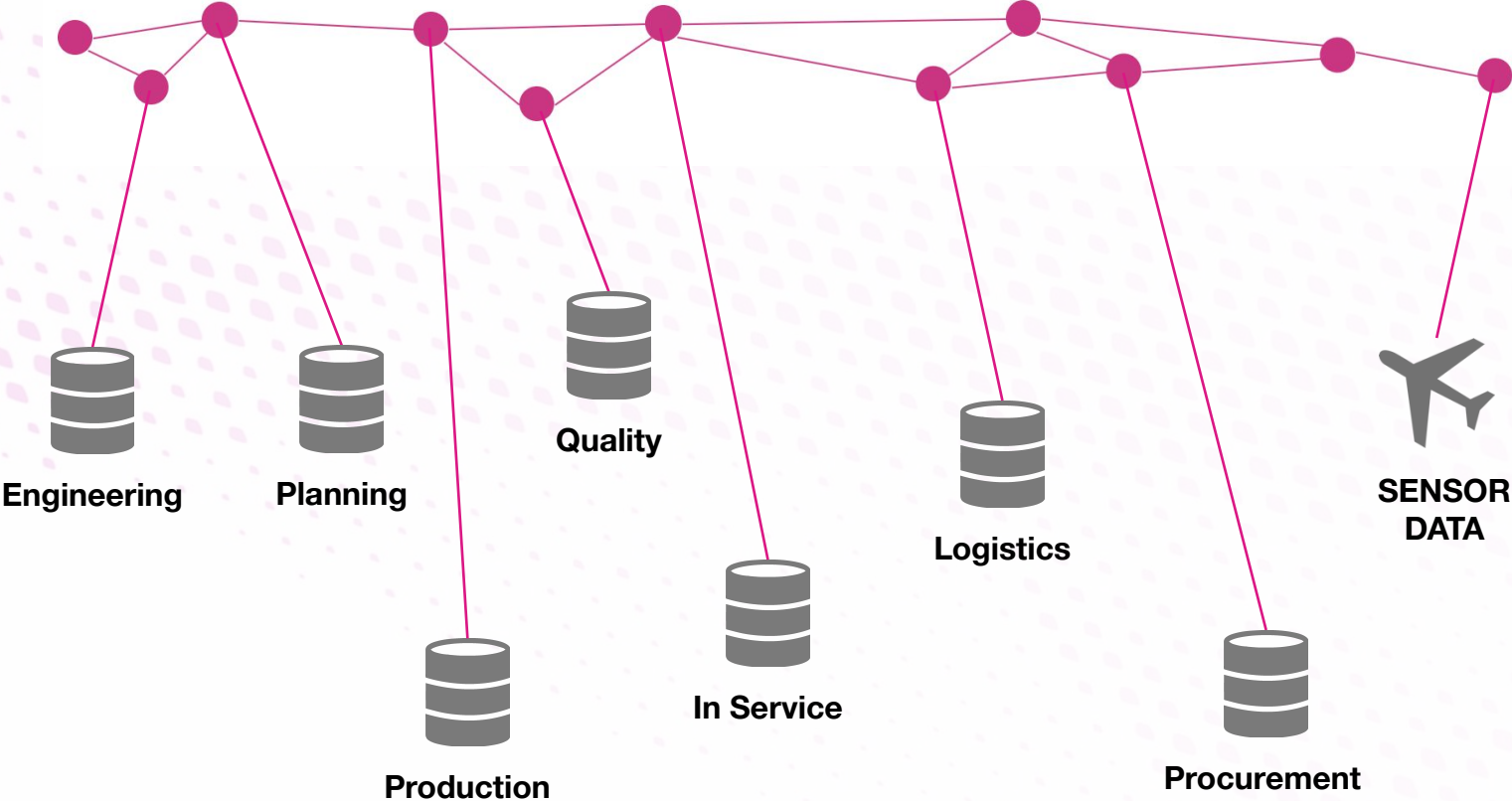


## Data Silos

Organisations create massive amounts of data that have historically been siloed across departments and at service providers, preventing insights with meaningful impact on operational execution, cost efficiency and safety.

# The Skywise Solution

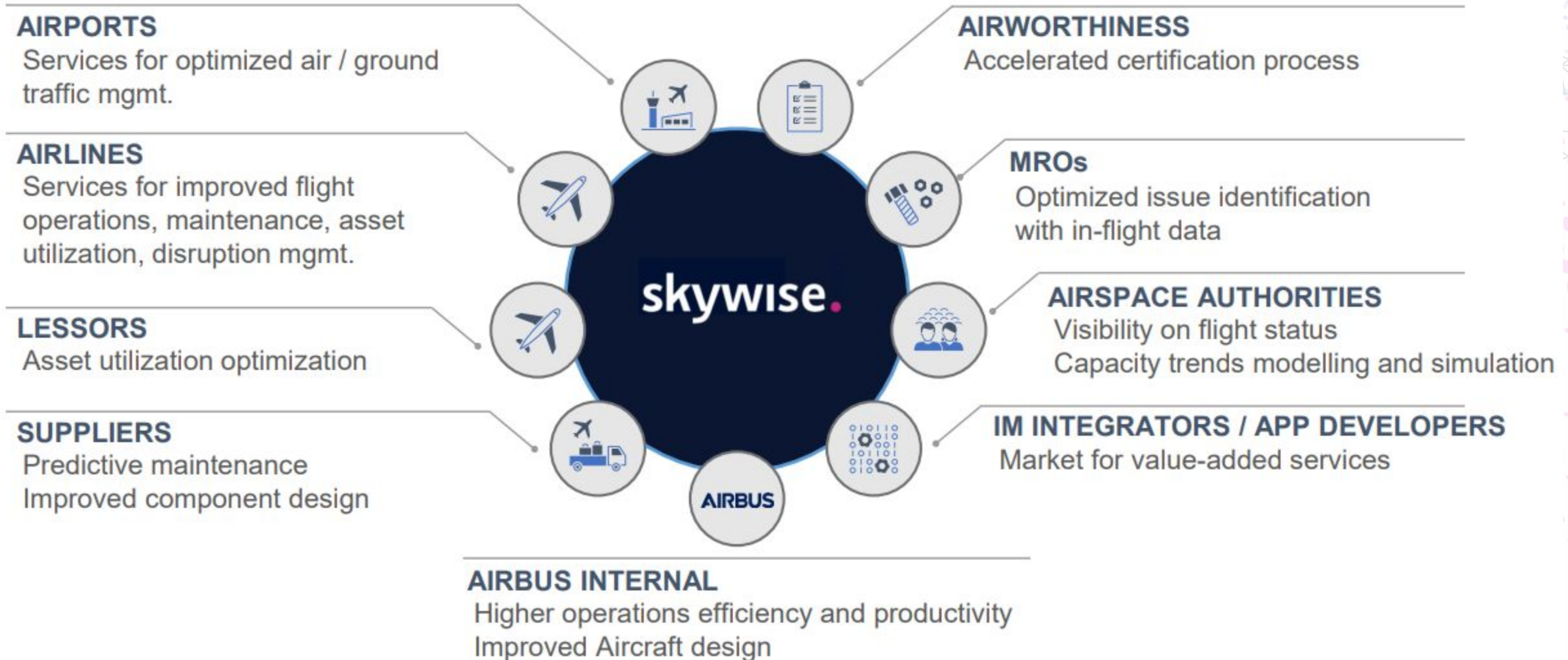
## Skywise Data Model



## World Class Data Integration

By linking data silos together in the Skywise platform, organisations gain cross-functional visibility into their operations to deliver value more efficiently and unlock new workflows

# Skywise Platform | Create value across the aviation industry





# Skywise footprint



**10900+**  
Connected  
aircrafts



**6500+**  
Connected  
Airbus aircrafts



**37000+**  
Users



**4500+**  
Users  
trained



**6**  
Certified  
Partners



**27+**  
Apps &  
Datasets



**13**  
App  
editors

# Value creation enabled by incremental digital continuity



## Skywise for Airbus

Improve operational efficiency. Support data-driven decisions at company level.

## Skywise for Airlines

Give aircraft ops transparency to support data driven decisions. Improve Airbus products through data sharing.

## Skywise for Suppliers

Improve supply chain efficiency through data driven collaboration. Improve Aircraft Operability.

## Skywise Partners

Support airlines' Skywise value creation thanks to certified IM Integrators that can develop on Skywise.

## Skywise Store

Empower users to browse and learn about Skywise related offering: apps, datasets, academy.

## Skywise Expansion

New airlines & suppliers on-boarding, new premium offers, 3rd party app developers, ecosystem development ...

## Skywise Core [X]

2016

2017

2018

2019

2020

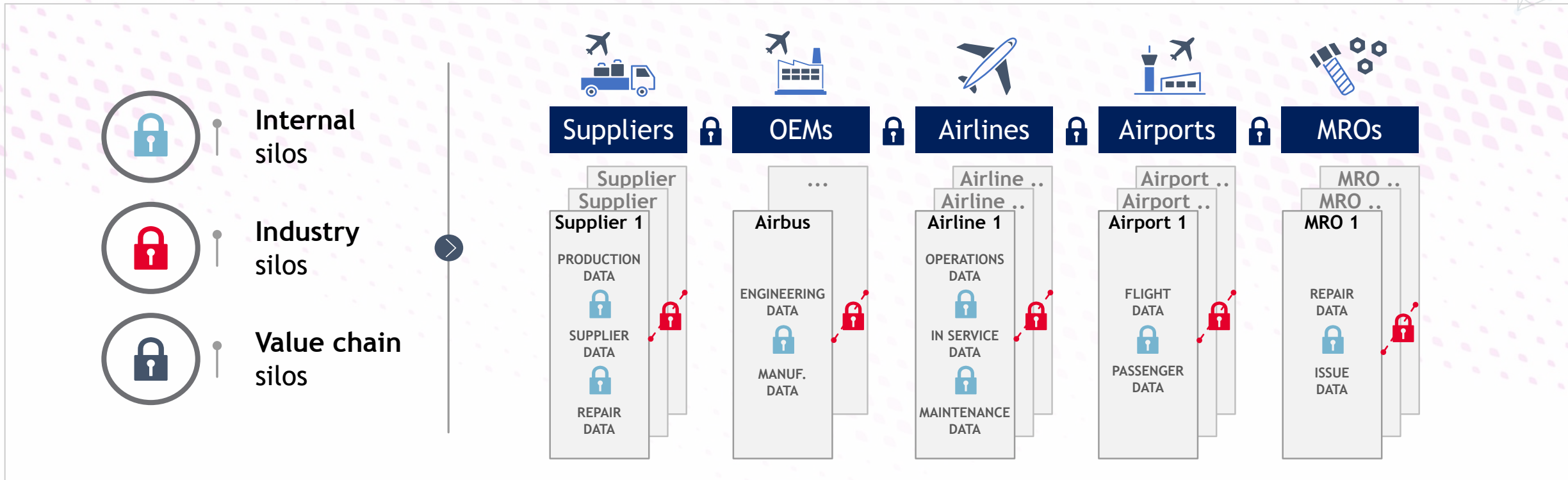
2021

2022

Becoming the **data platform** of reference in aviation industry, by generating adoption through value creation and collaboration with users.

# Skywise Platform | VISION and AMBITION

Skywise will enable Airbus to become a **data driven company**, to improve performance today, to deliver new generations of products and services and unlock new business models.



# Skywise unlocked the potential for efficiency gains at Airbus



## Recurring savings

e.g. Root cause analysis acceleration



## One-Time savings

e.g. Inventory optimisation



## Operational efficiency

e.g. Manufacturing process optimisation



## Disruption Management

e.g. COVID-19 global traffic recovery monitoring

# Digital solutions in China | Aircraft SCHEDULING Platform

An online tool to check the status and plan for each station and parking area, plus the manufacture schedule for each aircraft.

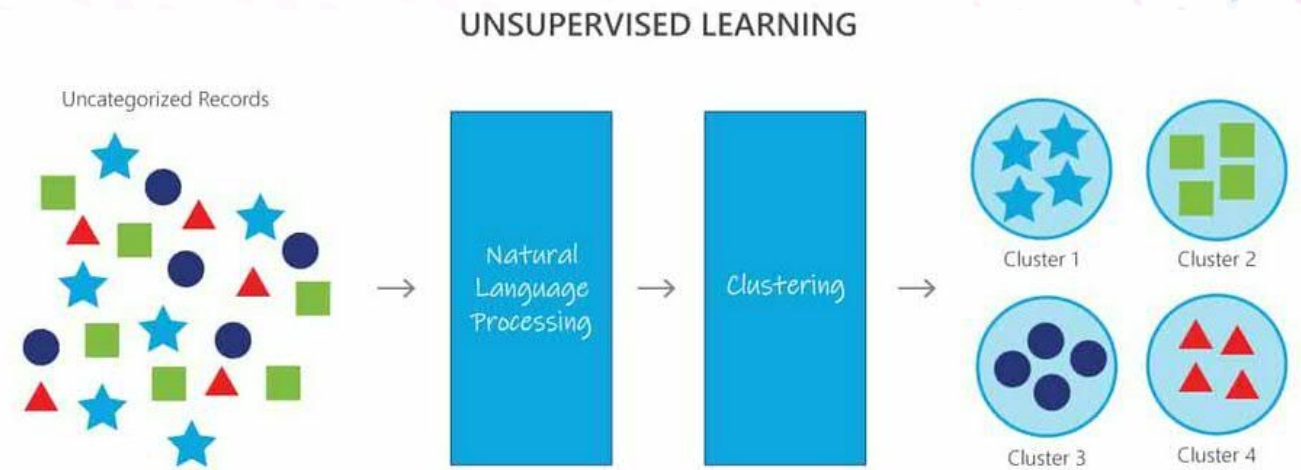


# Digital solutions in China | SQCDP



# Digital solutions in China | IMPROVE Non Conformity management

Labeling NC by Natural Language Processing in Skywise platform



# Digital solutions in China | IMPROVE Non Conformity management





# Challenges



China Cross border data regulations

Export Control (EU/US)

Restriction list

Talents

**Thank  
You**

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