Digital Transformation through an e2e PLM backbone
PDT Europe 2016
Agenda

Airbus

Challenges

Digital Capabilities

Data exposure

Benefits

Conclusion
ABOUT AIRBUS GROUP

✓ A **global leader** in aeronautics, space and related services

✓ **Around 136,600** employees

✓ Suppliers from **more than 100 countries**

✓ **2015 revenues** of € 64.5 bn

✓ **Headquartered in Toulouse**

---

*Status: 31 December 2015*
AIRBUS GROUP: A GROWTH STORY

✓ Its pioneering and innovative spirit has driven Airbus Group’s remarkable growth

Revenues
In 2015:
✓ 82% commercial
✓ 18% defence
WE MAKE IT FLY: SETTING THE COURSE FOR THE FUTURE

Focus on...
- Programme execution
- Profitability
- Value creation
- Market positioning
- Portfolio Management
- Value chain position

Foster...
- Leadership in commercial aeronautics

Focus defence and space business on...
- Military aircraft
- Space systems
- Missiles

Exploit incremental innovation while...
- Preparing next-generation breakthroughs

Strengthen...
- Positioning on international markets

Focus services...
- On and around platforms

Digitalisation...
- Become more innovative, flexible and agile in the way we operate and serve customers
Technology evolution

Source: Ian Waitz/MIT

© AIRBUS S.A.S. All rights reserved. Confidential and proprietary document.
Technology evolution (cont)

**Speed**
- Aviation performance doubling: ~ 30 years
- Electrical performance doubling: ~ 5 years
- Digital performance doubling: ~ 18 months

**Openness**
- Aerospace start-ups outspend us in R&T
- Patent & trade secrets greatly challenged
- Competitive advantage goes to first mover
Business transformation through Digital Capabilities

New Business Models
Imagine & develop new business models from Digital trends

Factory 4.0
Shifting away from centralized control toward decentralized self-organization

Connected Aircraft & E2E PLM
A Digital Connected Platform delivering new data and services to all the aeronautic value chain.

Workplace of the future
Everywhere and anytime, collaborative, user-oriented environment to our employees and partners

Digitalized Functions
Digitalized support functions adopting best-market processes, adopting a data-driven and collaborative approach and culture

Digital Capabilities
- Advanced Analytics & Big Data
- Augmented Reality and Virtual Reality
- ALM / 3D Printing
- Internet of Things
- Cloud and as a Service
- Social & Collaboration
- Mobility
- Artificial Intelligence
- Augmented Reality

© AIRBUS S.A.S. All rights reserved. Confidential and proprietary document.
Combining the e2e PLM backbone with Digital Capabilities is key

Emerging PLM technology

① Reveals new Business models & Services:
- Leverage existing company data
- Capture new data
- Analyze this big data with a business orientation

② Finds new areas of improvement
- Automation and paperless
- Cost Reduction
- Quality improvement
- Time to market
Airbus Context

Catalog Options

Engineering Changes

Assemblies

Design Solutions

Specific Parts

+1,4K

+11K

+26K

+180K

+450K

© AIRBUS S.A.S. All rights reserved. Confidential and proprietary document.
Data Exposure & Analytics

DATA is the new OIL
Challenges to Reach End-to-End Data Exposure

Data assets spread across various specific process areas

**Disconnected Silos**

- MES
- PLM
- Supplier BOM
- ERP
- Quality
- SCM
- CRM
- Customers
Challenges to Reach End-to-End Data Exposure

Data assets locked into proprietary solutions & Data Formats

RESTRICTED AREA

NX I-DEAS
SAP
IBM
MSC Software
MATLAB Simulink
PTC
SCADE Suite
IGE+XAO Group
ABAQUS
CATIA
DELMIA
Challenges to Reach End-to-End Data Exposure
Challenges to Reach End-to-End Data Exposure

Significant waste of time

**Allocating data** in various locations
- Disconnected Silos

**Normalize data** formats
- Proprietary formats

**Clean** the data **content**

- Out-of-date reports & KPI’s
- Low speed of Innovation
End-to-End Data Exposure Architecture

- **Multi Source Apps GUI**
- **Easy Data Access**
- **Unique User Access for Multi Domain Applications**
- **Secured and Controlled Access to Data Lakes for Services**
- **Normalized and Unified Data Exposure (Structured Data)**
- **Raw Data Lakes from Unstructured or Semi Structured Data**

**Integration Layer**
- **Data Mart**
- **Data Mash Up**
- **Multi Domain Ontologies**
- **Service API**

**Data Cores**
- **Rich User Interface**
- **Data Analysis**
- **Advanced Analytics**
- **Mash Up**

**Data Sources**
- **SCM**
- **PLM**
- **MES**
- **ERP**

**Authoring tools**

November 2016
PDT Europe 2016
End-to-End Data Exposure Architecture

- Multi Source
- Apps GUI
- Integration Layer
- Data Cores
- Data Sources
- Authoring tools

- SCM
- PLM
- MES
- ERP

- HTML 5
- React
- Spotfire
- ThingWorx

- Microsoft .NET Framework
- Java

November 2016
E2E Data Exposure Enables Powerful Applications

- Multi Source Apps GUI
  - Integration Layer
  - Data Lakes
  - Data Sources
  - Authoring tools

- Business activity monitoring & business intelligence
- Visual management in 3D
- Advanced analytics
- Mobile Enabled

- Data Analysis
- Mash Up User Interface
- Advanced Analytics
- Rich User Interface

- SCM
- PLM
- MES
- ERP
**E2E Supply Status**

**MSN Part Coverage**

- **Production Need** – 4 weeks
- **Future Needed Part (> 4 weeks)**
- **Needed Part (< 4 weeks)**
- **Missing Part**

**Forecast in time?**

- **Needed Part & Forecast in time**
- **Needed Part & Forecast overdue/late**

**Material Type:**
- CA
- Equipment
- Parts/ Assy
- Standard Part

**KPI in line with POx definition**

**Date of extract: 09.12.15**

**Overview of all parts, delivered or still missing with the appropriate details**
LOD3D for Boardroom – Use case definition

Reporting Center enables to follow the supply status of each parts thanks to charts and tables.

LOD 3D brings status information inside the digital mock-up.
Examples – Digital Twin for Cabin upgrade

Concession Automatic Retrieving & Spotting (with Drawing Number)

Step 1: Concessions Spotting manually refined by User at Part Level

Preliminary analysis (pre-Mod DS spotting)

Step 2: Concessions automatic spotting at Part level with Text Mining

Overlaps between Concession/SB/Pre-Mod (Reports possible)

Potential Big Data analysis

Concession spotting in DMU

On DS Selection

Digital Twin for CABIN Upgrade

Collaboration Features

View Concession

View SB

View Pre-mod

November 2016
Design to Cost for standard parts

Based on engineering Product structure and on Cost Factor Standard Part data:

- Provide the cost factor repartition chart for Standard Part (by designer team and aircraft)
- Get Visualization files
- Propose some savings using alternate Standard Part
- Consult the evolution of Standard Part cost factor repartition Used by a team
- Available on mobile device
Standard Operating Instructions

Facilitated consultation of Manufacturing work instructions for shopfloor:

- Possibility to show information & parameters extracted from connected hand tools & ERP
- Combined with Engineering information
- 3D visualization
Benefits for Business & Technology

- Enabling innovation through rapid deployment of new Digital Capabilities build upon existing platform
- Unlocking the power of existing data assets
- Single source of truth
- Scaling and re-use: Building block technologies easy to replicate the benefit in other areas
- Enables gradual evolvement of backbones rather than “big bang”
Benefits for People

- Data democratization
  Everyone has access to the data, not only the experts

- Focus on progress instead of discussion on data quality

- Collective intelligence as people have the same information.
Conclusion

• Business needs and technology trends drives towards shorter cycles
  • New challengers in the market
  • Digital transformation

• Use and re-use of “Data” is a key asset

• A Data Exposure strategy & Architecture is outlined to overcome
  • Data silos
  • Data lock-in (propriety formats)
  • Data quality