Leveraging the Digital Revolution for Industrial Performance
A Step Change for A320 Nose Section

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Aircraft Architecture & Integration
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1- The Challenge

Further improve **Industrial Performance** with existing **Industrial Means**

Identifying *aircraft evolutions* improving *fit for assembly*

**Optimising** Industrial Process
2- The Global Approach

Digitalisation and Modelling

- Assembly Workflow Optimisation
  - Bottle Necks Identification

Aircraft Evolutions Design

Fit for Assembly Criteria Definition

Fit for Assembly Assessment
3 – Digitalisation and Modelling

Data Model creation

Routing

Digitalisation

SAP extraction

Routing direction

500 routings
2000 tasks

Manufacturing Technical Constraints definition

Operation duration distribution at routing level

Operation sequence Modelling

InCell

RCSP optimisation library

PERT Microsoft Project

200 Technical Constraints

Assembly line

PT duration: time
nbStations: integer

Station

1..* operations

is proceeded by

1..* operations

Manufacturing Zone

capacity: integer

Part

1..* parts

Operation

duration: time

startDate: time

nbJourneymen: integer

Journeyman

1..* qualification

Qualification

InCell modeler

AIRBUS
4- Fit for Assembly Assessment

Operator

Aircraft Zone

Process & Tools
Position

Volume
Accessibility

interactions

Parts

Size, Shape, Weight, Quantity, Brittleness
### 4- Fit for Assembly Assessment

<table>
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<tr>
<th>Interface</th>
<th>Ergonomics</th>
<th>Assembly</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part</td>
<td>Type</td>
<td>Module IN</td>
<td>Module OUT</td>
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<tr>
<td>A.2.1</td>
<td>A.2.2</td>
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**Product Architectural Design Guidelines**

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5- Aircraft Evolutions
5- Aircraft Evolutions

Multi-views – User friendly
Visualisation & Interactions

MBSE
Modelling Flexibility

Dictionaries, heterogeneous formats
Existing data sources & models
5- Aircraft Evolutions

Manufacturing Process

3D Physical view

Electrical data

Aircraft Functional view

Product Data structure

2D Physical view

Components Functional view

Product objects

Industrial view

Architect Cockpit
5- Aircraft Evolutions

Main Instrument Panel Module

Current Baseline
5- Aircraft Evolutions

Main Instrument Panel Module

New Baseline
6- Assembly Sequence Optimisation

Concept Assessment v.s. Industrial Performance

- Assembly Lead Time saving: 1 station over 10
- Assessment duration: 1 week (10s computation)
7- Conclusion

System of Interest
Aircraft
Industrial System

Co-Conception
Right balance between aircraft / industrial performances

“Digitalisation” is a key enabler
Models, knowhow, quick access to information

Multi-criteria optimisation methods
Find the most convenient solution

New competences
Thank you…

Questions ?