



**David
ZIEGLER**

Vice President Aerospace &
Defense Industry
Dassault Systèmes

MAKING THEM FLY
... IN THE AGE OF ARTIFICIAL INTELLIGENCE



From Lawrence Sperry to Alpha DogFight

- From First Autopilot in 1918...
... To AI enabled dogfight at Visual Flight Range in 2023



Automation

Collaboration

Trust



KEY INDUSTRY CHALLENGES



“We are at a Vanguard of a New Industry

Sir Richard Branson
Founder
Virgin Atlantic



DASSAULT SYSTEMES



“Digital is a sovereign space like space, land, air, sea, frequencies. Digital is political now.

Bernard Charlès
Vice Chairmen & CEO, Dassault Systèmes
Le Monde



DASSAULT SYSTEMES



“Hydrogen Plane is the ultimate solution – But a lot of work lies ahead”

Guillaume Faury
AIRBUS CEO

49%

of aerospace and defense executives believe that it will be imperative for their company to measure, incentivize and communicate sustainability performance 3 years from now, compared to just 22% today.

63%

of executives anticipate up to 1/3 of their revenues coming from more sustainable products or services in the next 5 years, driven by efficient designs and new sources of fuel and advanced materials.



DASSAULT SYSTEMES



“Setting us up for full type certification, at the end of 2023.

Paul Sciarra
Joby Executive Chairman
SEC Filing



DASSAULT SYSTEMES



“Increase Agility, Increase Digitalization, Reduce Supply Chain Risk - which is all about Quality.

Siva Balasubramanian
VP of Factory Support Engineering, Spirit AeroSystems



DASSAULT SYSTEMES



“I need a smart, collaborative & data driven platform for sustainment.

Bruce Litchfield
VP of Sustainment Operations at Lockheed Martin



DASSAULT SYSTEMES

AEROSPACE & DEFENSE PORTFOLIO

40 years of in the **Aerospace & Defense Industry** has driven our **Portfolio** to include **latest technological enablers**:



- Model Based System Engineering in configuration (**MBSE**)
- Composite, 3D printing, Fasteners, **Generative Design**
- Augmented Workforce on the shopfloor (**AR/VR**)
- Unified Science Based coupling of Modeling & Simulation (**MODSIM**)
- Collaborative Simulation Lifecycle Management (**SLM**)
- Big Data Driven Operations (**AI/ML**)

...integrated into the **Cloud** powered **3DEXPERIENCE®** platform



MODSIM & DATA SCIENCE

IN ENTERPRISE



3DEXPERIENCE®

3DEXPERIENCE Marketplace | PartSupply Enterprise for eVTOL

43 Components

Selected tags: DELTA GROUP

What

- Configuration Publication Status: 1
- Configuration Selection Status: 1
- Configuration Status: 1
- Content Provider Category: 1
- ECLASS Category: 1
 - ECLASS 9.1: 16
 - 27 Electric engineering, automation: 16
 - 27-02 Electrical drive: 16
 - 27-37 Low-voltage switch technology: 32
 - I.C.S Category: 2
- Where: 1
- Country: 1
- Who: 1
 - Catalog: 1
 - Publisher: 1
- When: 1
 - Modification Date: 1

ECMA 400V Series Servo Motors(Without Brake) Frame Size 180mm 2000W-4500W

| Part number | Encoder Type | LL | LR | LS | LW | Model |
|--------------|--------------|-------|----|----|----|------------|
| ECMA-L1830RS | A | 202.1 | 79 | 73 | 63 | ECMA-L183 |
| ECMA-L184SPS | 1 | 235.3 | 79 | 73 | 63 | ECMA-L184 |
| ECMA-L184SPS | 2 | 235.3 | 79 | 73 | 63 | ECMA-L184 |
| ECMA-L184SPS | 1 | 235.3 | 79 | 73 | 63 | ECMA-L184 |
| ECMA-L184SPS | 2 | 235.3 | 79 | 73 | 63 | ECMA-L184 |
| ECMA-L182SPS | 1 | 169 | 79 | 73 | 63 | ECMA-KL182 |
| ECMA-K1820RS | 3 | 169 | 79 | 73 | 63 | ECMA-KL182 |

IN DESIGN

IN MANUFACTURING

IN OPERATIONS

3DEXPERIENCE | CATIA Functional Generative Design

Step: Study: Penetration Step 2

Min Mass Stress: 1

Von Mises Stress: 1 (N_m2)

Max: 3.25e+8

Min: 1.94e+5

3.25e+8

2.85e+8

2.50e+8

2.20e+8

1.95e+8

1.65e+8

1.3e+8

9.76e+7

6.51e+7

3.25e+7

Deformation scale: 33.9

Result Of Shape Validation: 1

State: Penetration Step 2 / Linear Load Case 1 / Frame 2

Animation progress: 45.8333 %

Concept Validation

SAFRAN

RA-PM00704W-000007-03 - UrotalPlay

Assembly Assistance in Operations

3DEXPERIENCE | 3DDashboard Flight Operations 3DEXPERIENCE

Maintenance Analysis - KPIs Analysis

LM Criticality

SM Criticality

Line Maintenance

Average (6 months)

Over Brake Sensor Business_N101-32411004-4

Line Maintenance | Shop Maintenance | Inventory

BRAKE TEMPERATURE SENSOR

N101-32410500

2802

NA

115.56

3.13

0.10

MTBF

MTBF

LM

SM

Inventory

BRAKE SENSOR HARNESS

N101-32411005

38041

38041

0.00

0.00

0.00

MTBF

MTBF

LM

SM

Inventory

FLEXIBLE BRAKING HOSE

TUBE-FLEXIBLE-HOSE-TMFL-6mm

4812

4812

2.81

0.00

0.00

HYDRAULIC DISTRIBUTION

DHM-UNIT

273710

22160

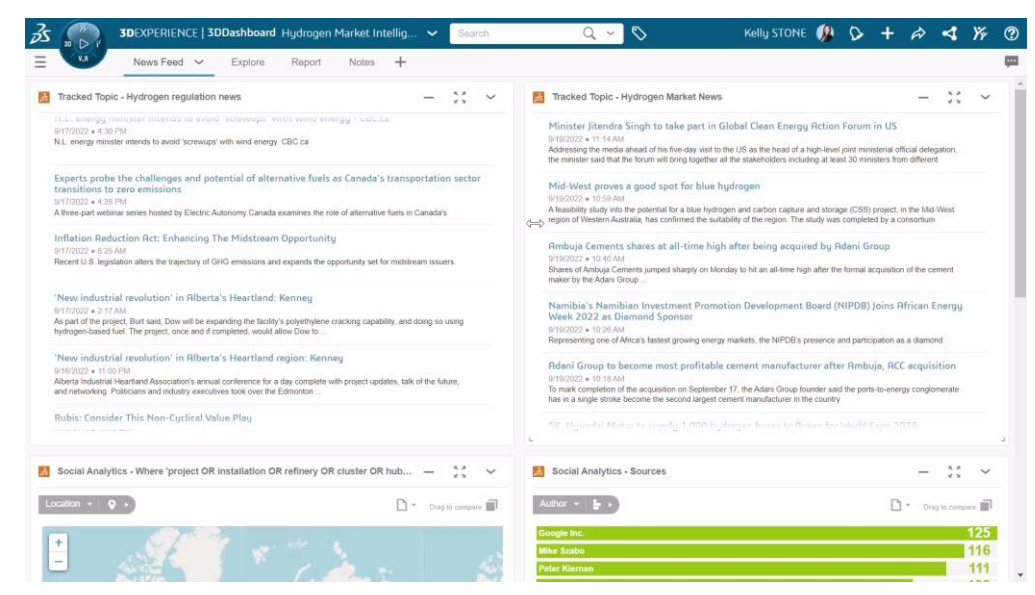
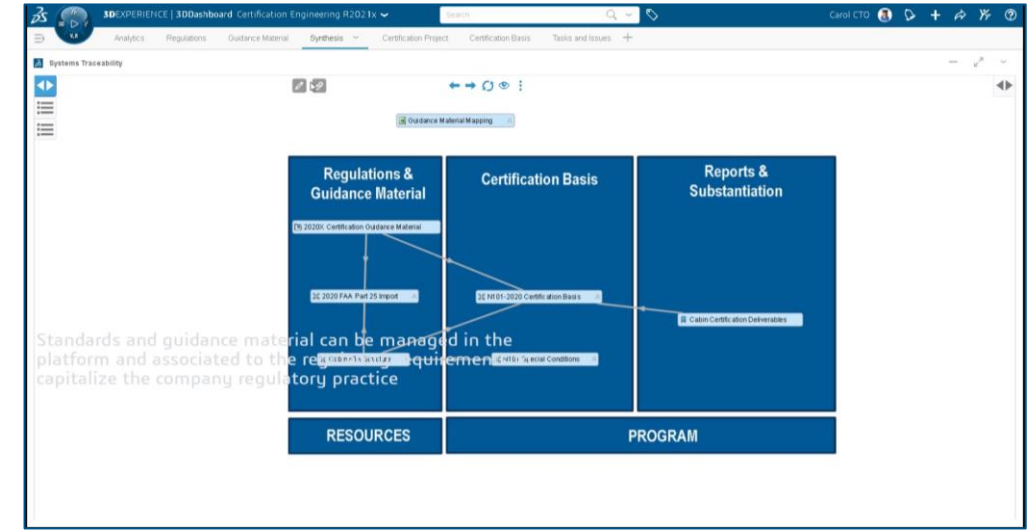
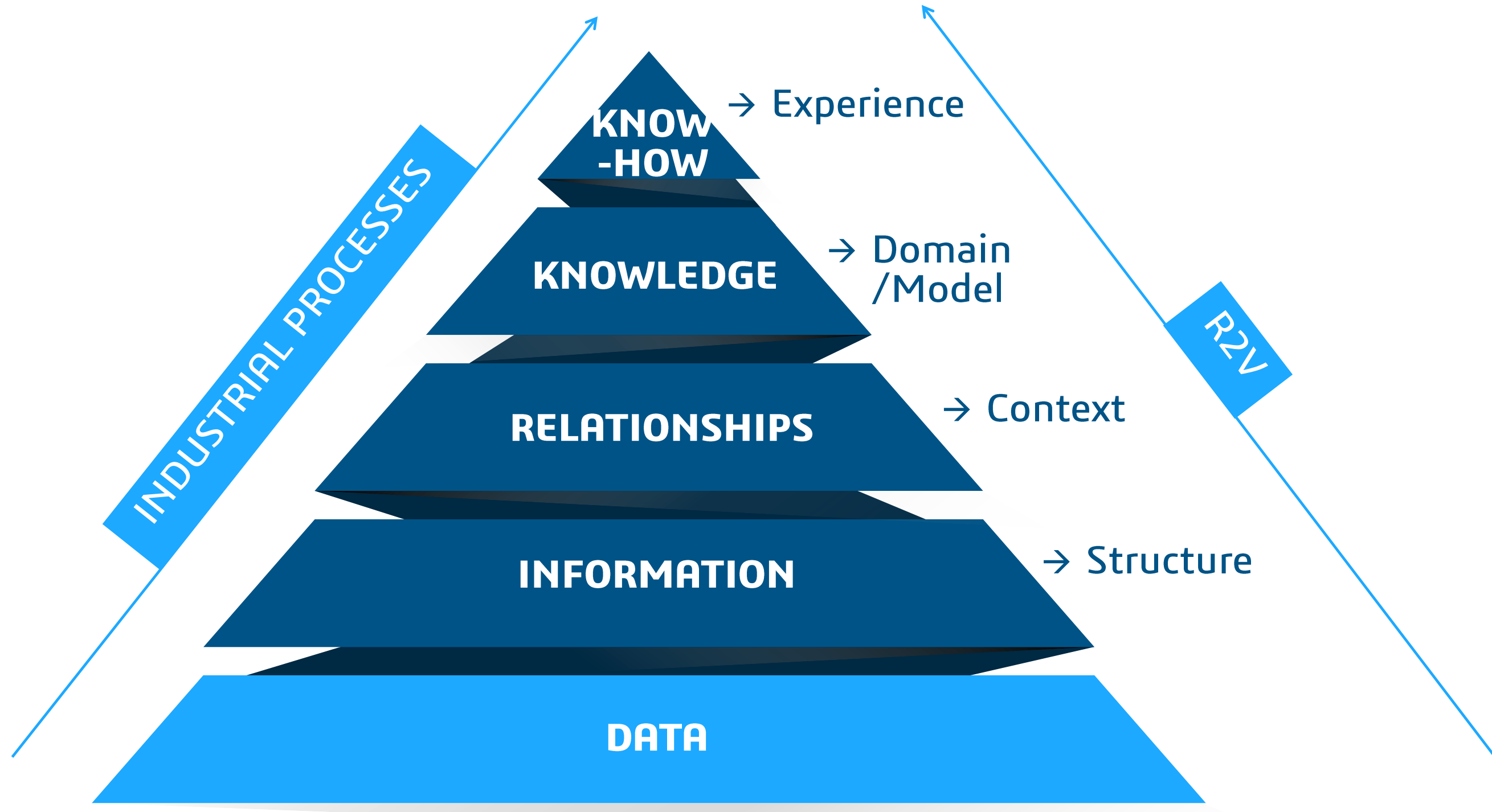
0.00

0.00

0.00



FROM DATA TO KNOWLEDGE AND KNOW-HOW

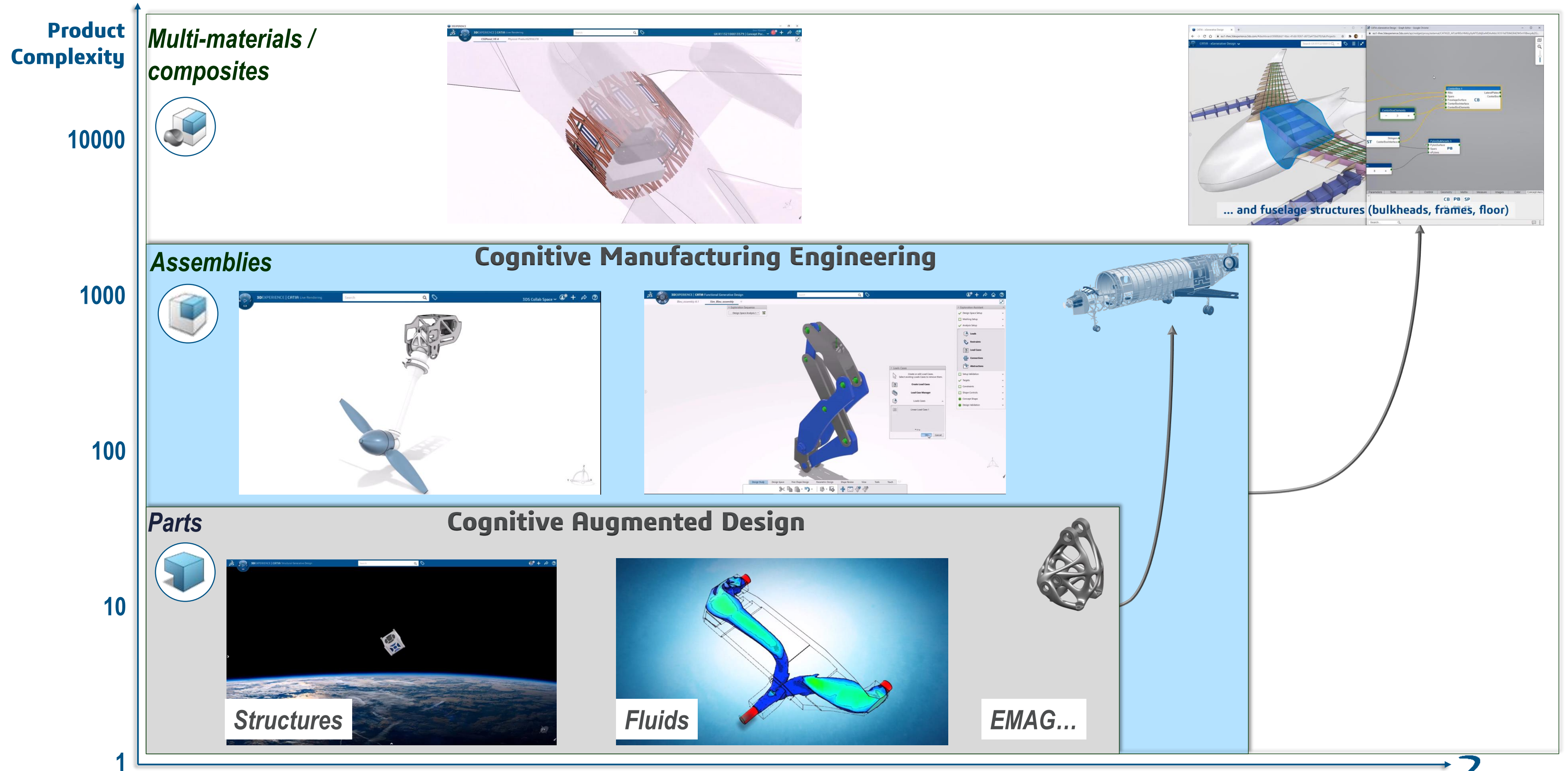


© Dassault Systèmes | Confidential Information | 11/6/2024





GENERATIVE AIRCRAFT?





CYBER-SYSTEMS GENERATIVE ENGINEERING



System of Systems

Cyber Systems of Systems Specification

UAF

Mission Modeling

System

Cyber Systems Specification

Product Specification, Modeling and trade-off

Functional Modeling

Logical Modeling

Cyber Systems Validation

Product Validation
Design Validation and Studies

Real World

Hardware In the Loop

Software In the Loop

Model In the Loop

Component

Cyber Systems Model Based Design

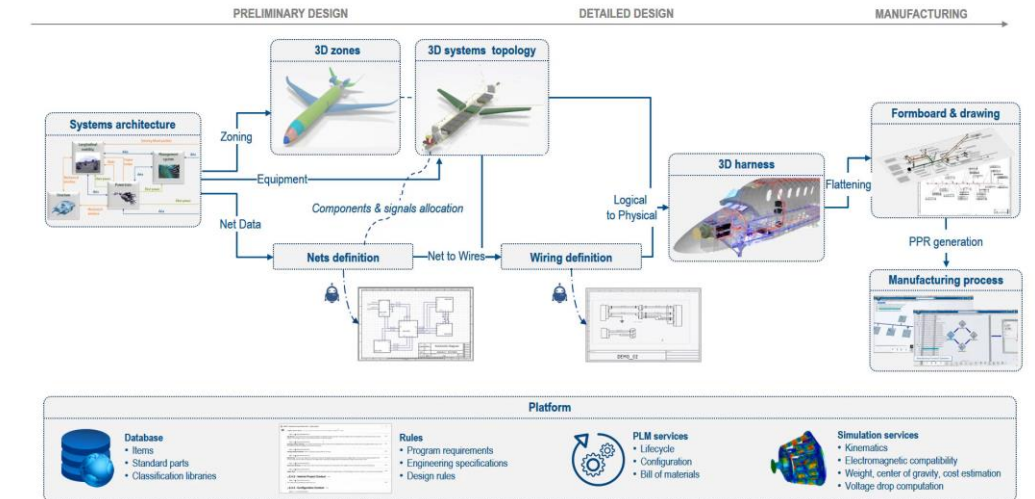
Continuous multidisciplinary integration

Logical
Physical

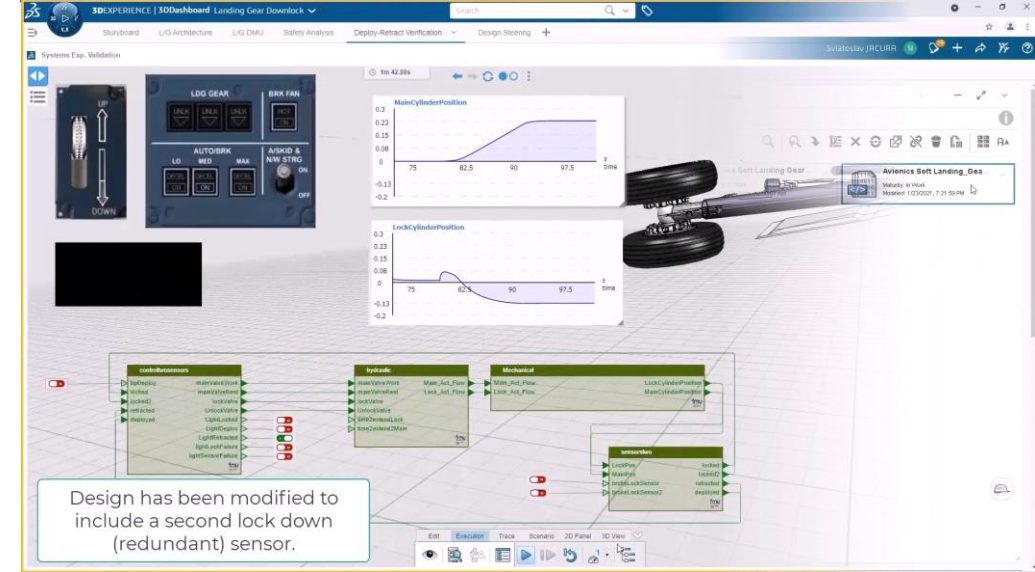
| | | | | |
|--|---|---|--|-----------------------------------|
| <p>Mechanical</p> <p>Modeling</p> <p>Simulation</p> | <p>Fluid</p> <p>Modeling</p> <p>Simulation</p> | <p>Other Disciplines</p> <p>Magnetics</p> <p>...</p> | <p>Electrical</p> <p>Architecture Net and 3D Topology</p> | <p>Software</p> <p>git</p> |
|--|---|---|--|-----------------------------------|

MBSE to Electrical

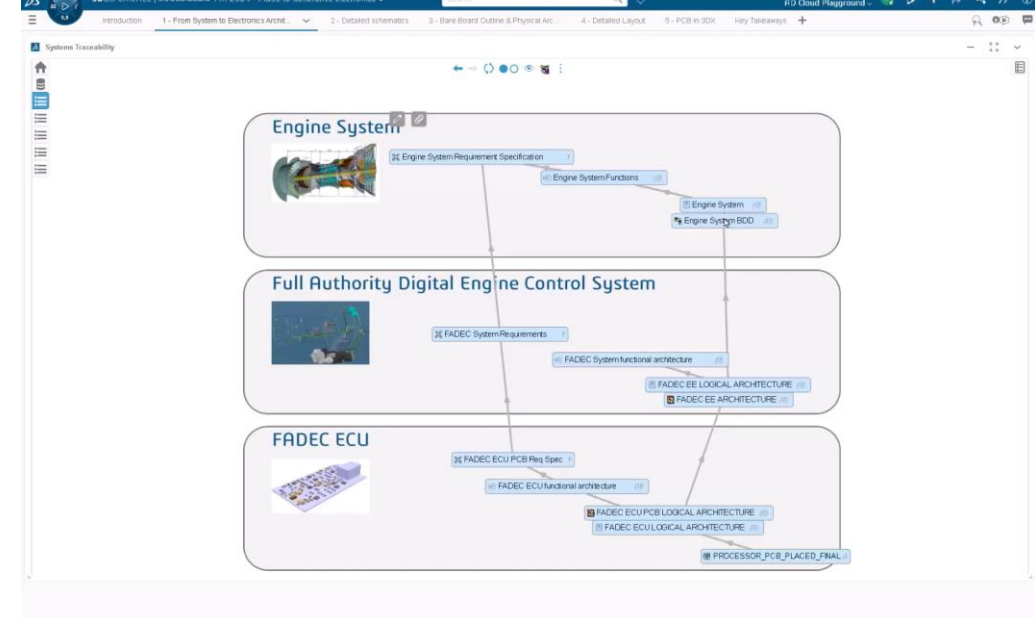
End to End Systems Architecture & Electrical Process



MBSE to Software



MBSE to Electronics





GEN AI FOR TRADE SPACE EXPLORATION

DASSAULT SYSTÈMES & MISTRAL AI
ANNOUNCE THE MOST POWERFUL
GENERATIVE AI TECHNOLOGIES HOSTED
ON OUTSCALE SOVEREIGN CLOUD.



The screenshot displays the 3DEXPERIENCE 3DDashboard interface. The top navigation bar includes 'Architecture', 'Dynamic Simulation', 'Requirements Management', and 'Systems Engineering'. The main content area is titled 'ENOVIA - Requirements Specification Editor - N101 Customer Needs'. It shows a navigation tree on the left and a main editor area with the following text:

1 - 1-General Description of Operational Capability.

1 - 1 Mission.

The new designed aircraft shall provide command and control authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission.

Below the editor is a 'Systems Traceability' matrix with the following structure:

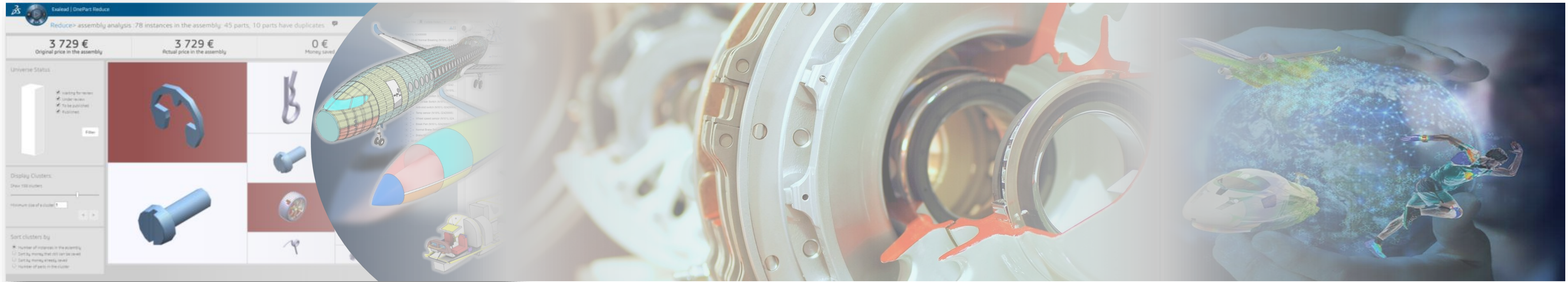
| Domain | Pillars | | | | |
|---------|--------------|-----------|----------|-----------|------------|
| | Requirements | V&V | Behavior | Structure | Parameters |
| Problem | Black Box | White Box | | | |

On the right side, there is a '3D PROMPT' chat window showing a code snippet for an XML association and a text prompt: 'This updated model includes the three additional subsystems (Auxiliary Power Unit, Fuel System, and Hydraulic System) along with their corresponding classes. As before, you'll need to define attributes, operations, and other details for each class based on your specific requirements. The associations have also been extended to include these new subsystems.' Below the chat is a 'Start writing' button.

- Mistral LLM to power Outscale AI Technologies on Sovereign Cloud
- LLM Integration into 3DExperience platform
- Working toward Trade Space Exploration for design



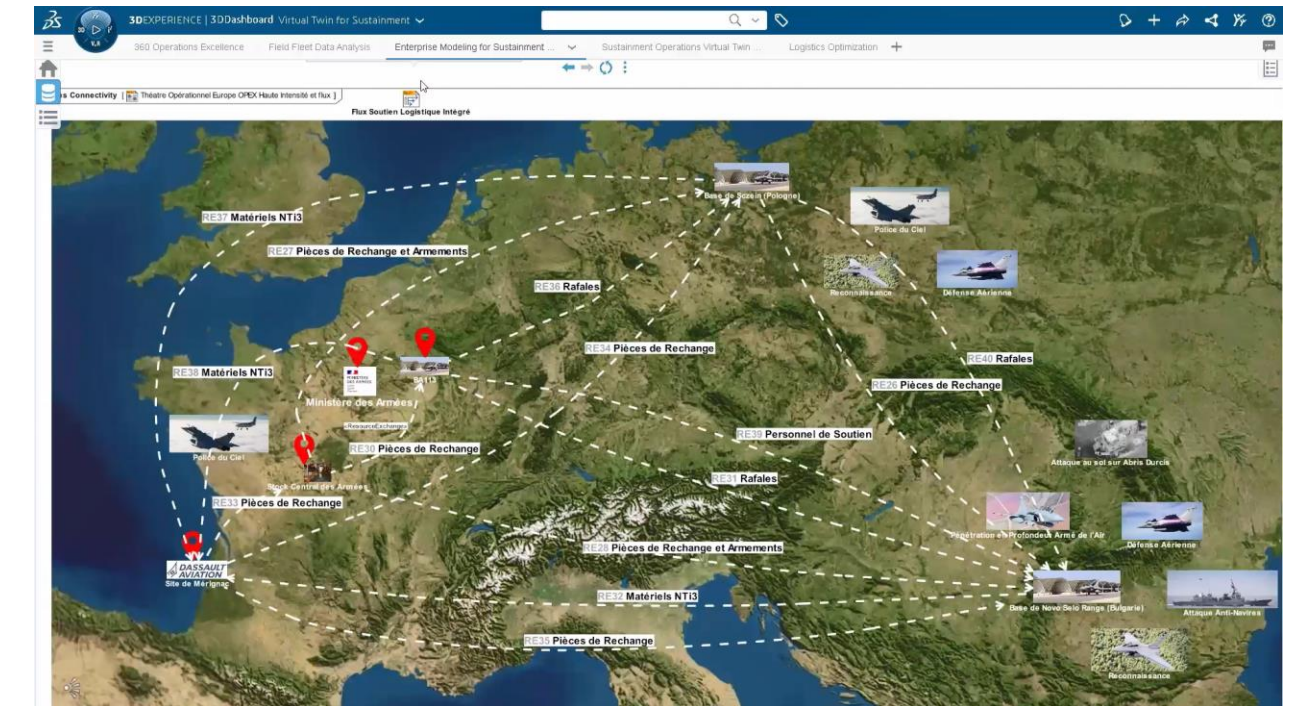
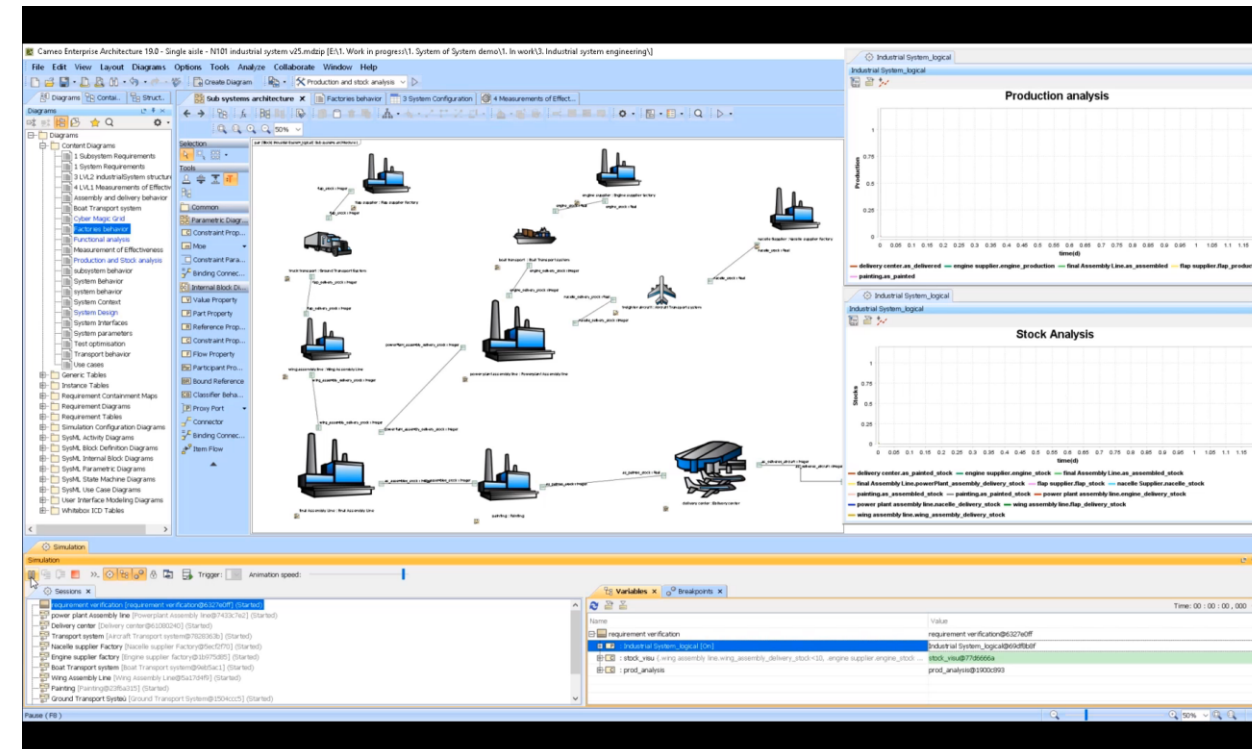
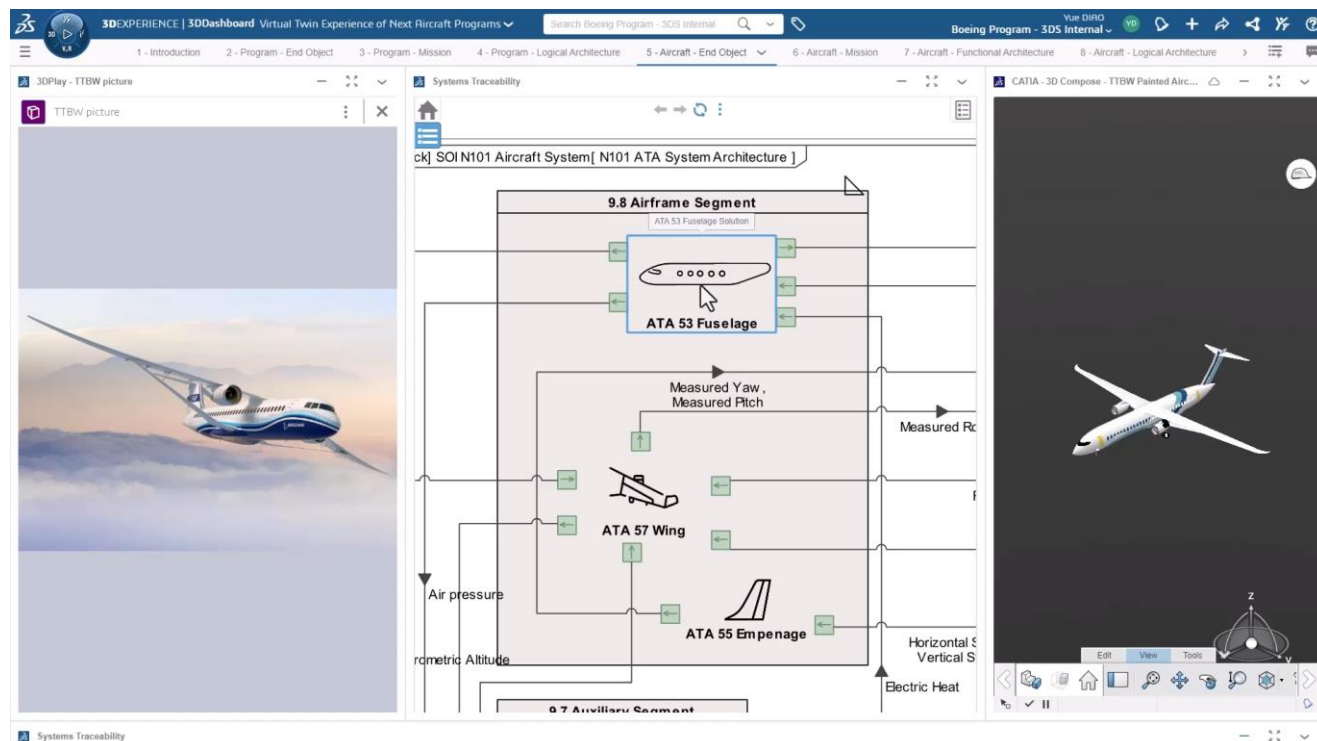
MODEL BASED ENTERPRISE



Product

Industrial System

Operations



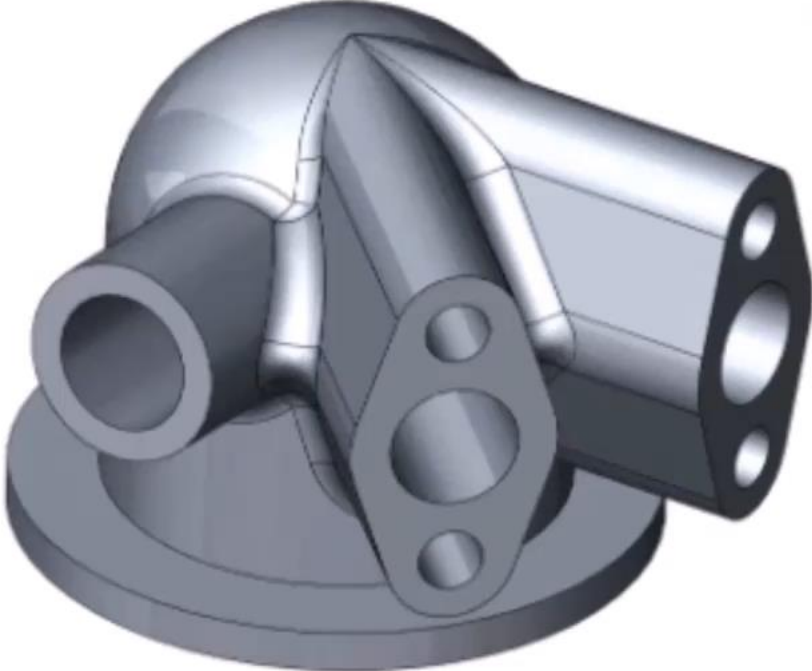
DIGITAL TWINS PROGRAMS



NIAR[®] WICHITA STATE UNIVERSITY
..... NATIONAL INSTITUTE FOR AVIATION RESEARCH



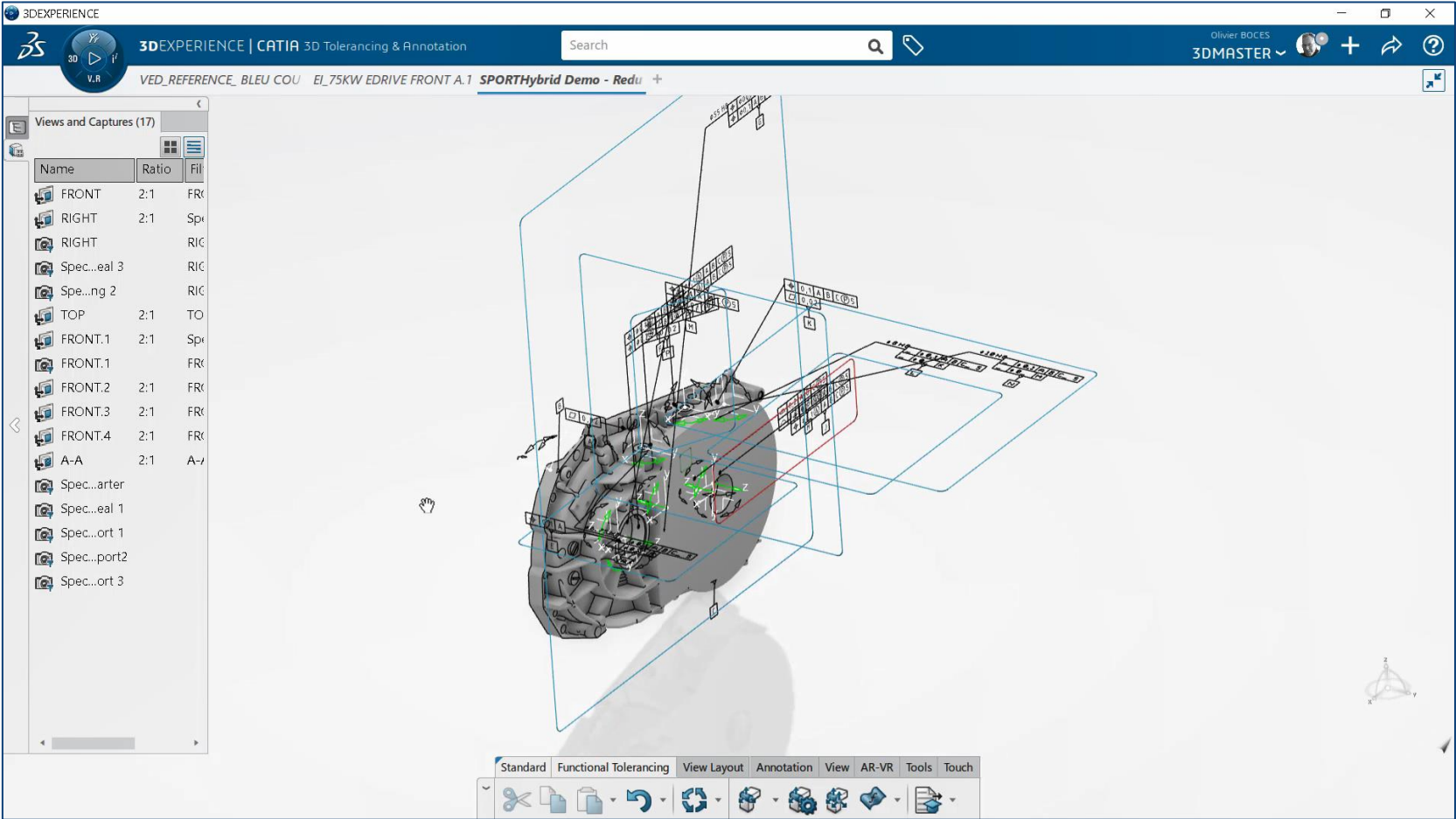
DESIGN OPTIMIZATION, REVERSE ENGINEERING



Phase 1 drawing

Phase 2 drawing

Solution video



& GENERATIVE TOLERANCING



DISCOVER MORE ON [3DS.COM](https://3ds.com)

THANK YOU FOR YOUR INTEREST

