Lucas
LINDNER

Business &
Authorization Lead
HORYZN

DIVE DEEP INTO THE EFFICIENT DEVELOPMENT OF FUTURE AIR-RESCUE VEHICLES USING MODSIM

AGENDA

A brief look into HORYZN & Mission Pulse
Developments along the Years & Use-Case

Development of KOLIBRI

The Future of Air-Rescue-Vehicles
HORYZN´s new ambitious project

3DEXPERIENCE Platform – MODSIM Approach

MODSIM Design Engineer

MODSIM Aerodynamics Engineer

Project Management & Governance

Summary

HORYZN

80 members
25 nationalities

Our History

2019 – 2020

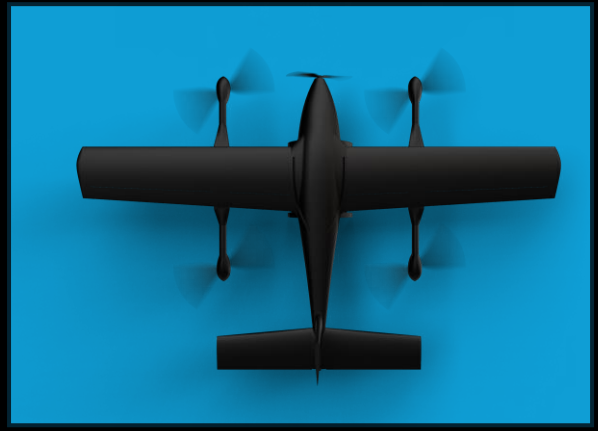
Silencio Gamma

2021 – 2023

Frankenstein

2023 - 2024

Kolibri



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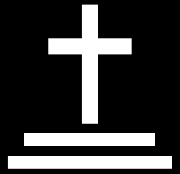
Use Case Defibrillator Transport

115.000

People suffer a cardiovascular arrest in Germany every year

9min

Needs an ambulance



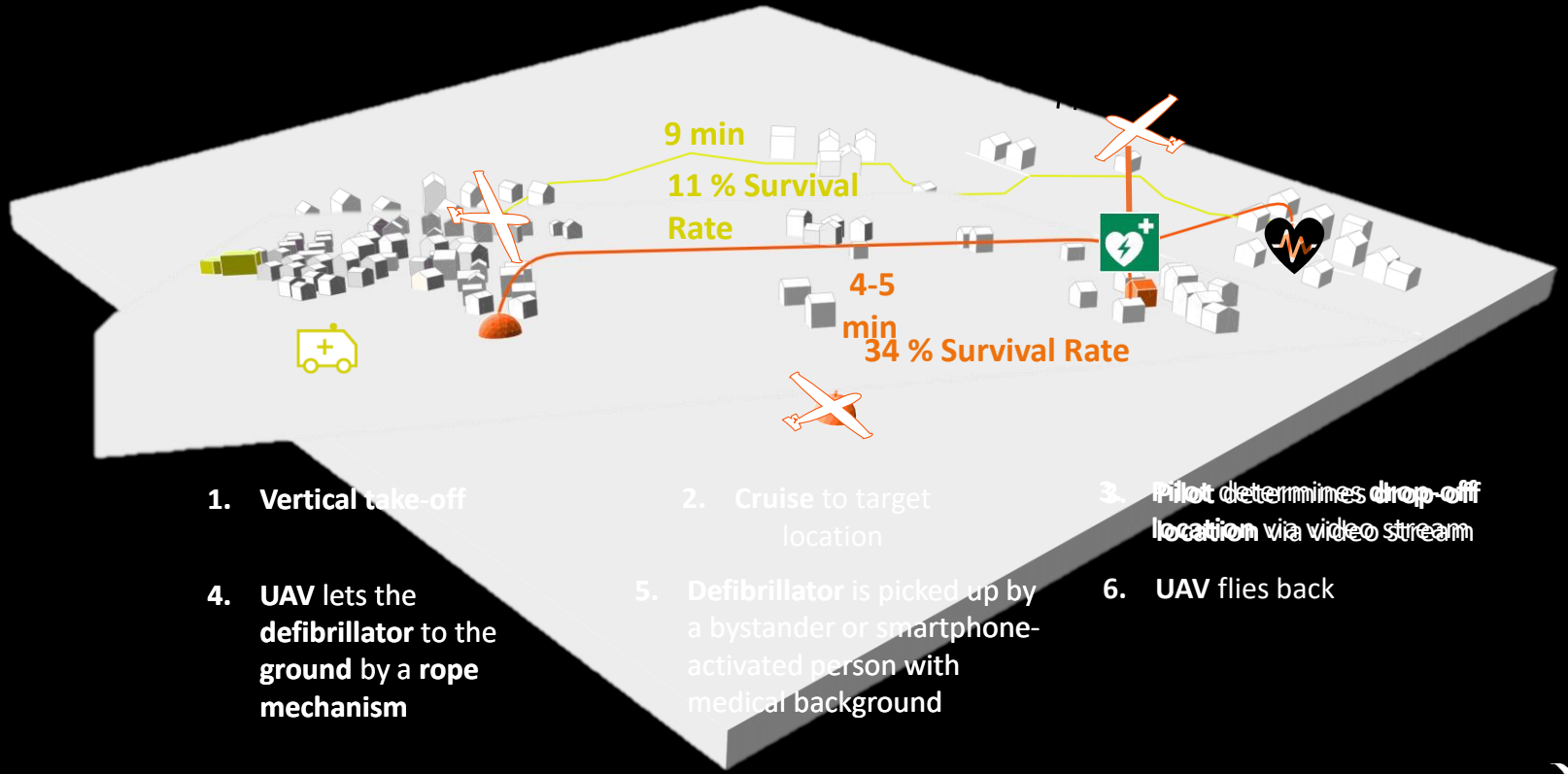
89%

Do not survive

HORYZN

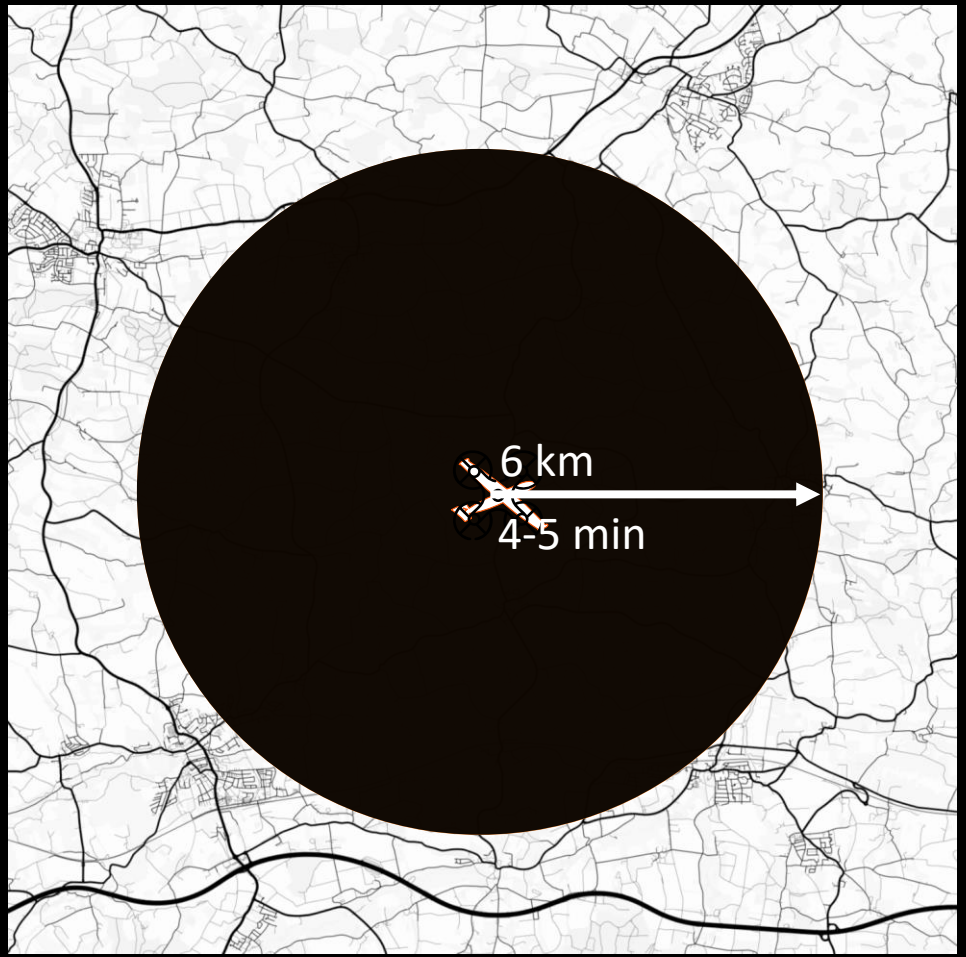
The first eVTOL UAV defibrillator transport in Germany

eVTOL UAV (electrical Vertical Take-Off and Landing Unmanned Aerial Vehicle)



1. **Vertical take-off**
2. **Cruise** to target location
3. **Pilot** determines **drop-off location** via video stream
4. **UAV** lets the **defibrillator** to the **ground** by a **rope mechanism**
5. **Defibrillator** is picked up by a bystander or smartphone-activated person with medical background
6. **UAV** flies back

HORYZN



Mission Pulse

eVTOL UAV to save lives

Low speed ca. 60 km/h

High range 6km
High speed ca. 125 km/h

HORYZN

KOLIBRI
DESIGN BASELINES

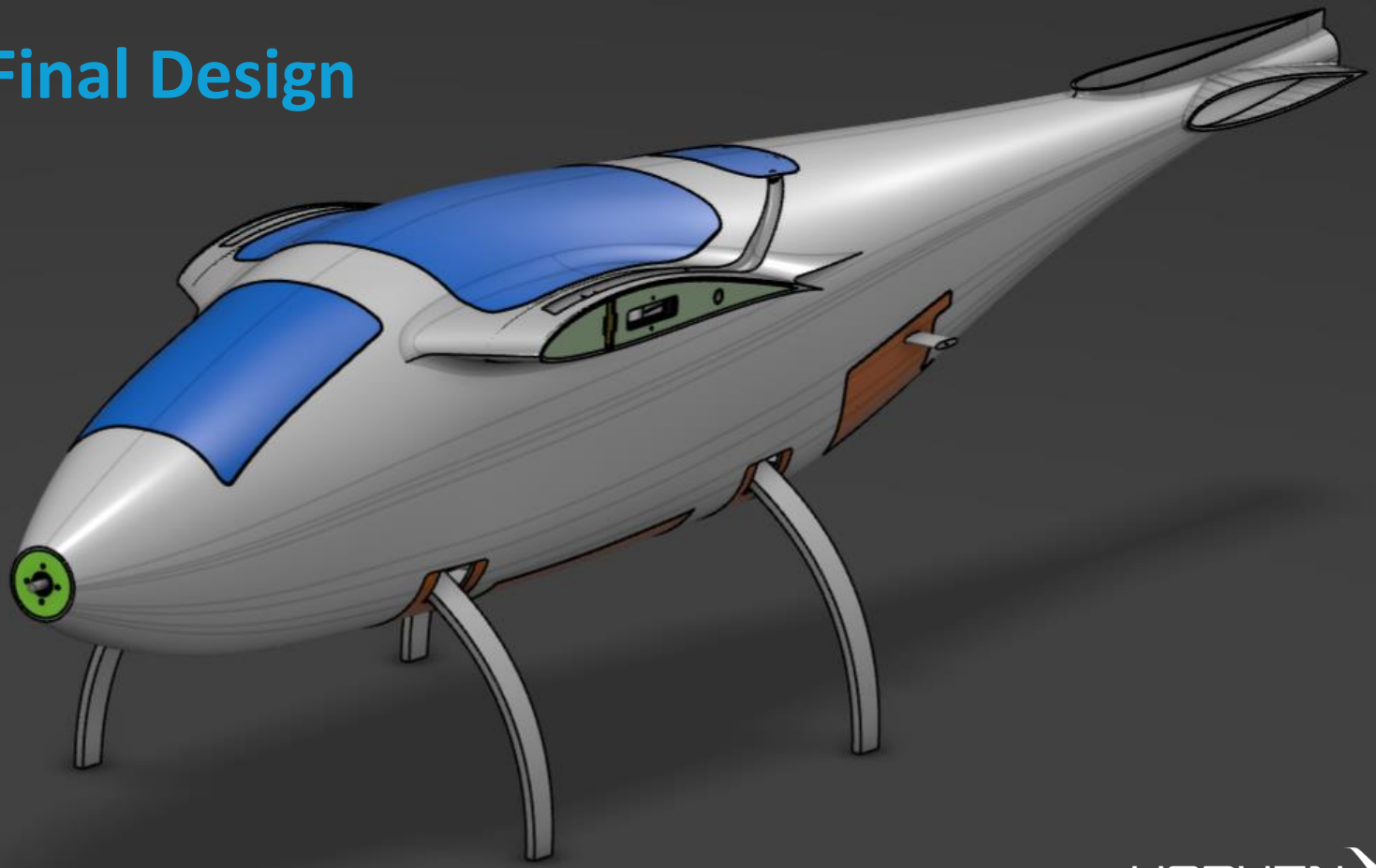
3 m
WINGSPAN

5
MOTORS

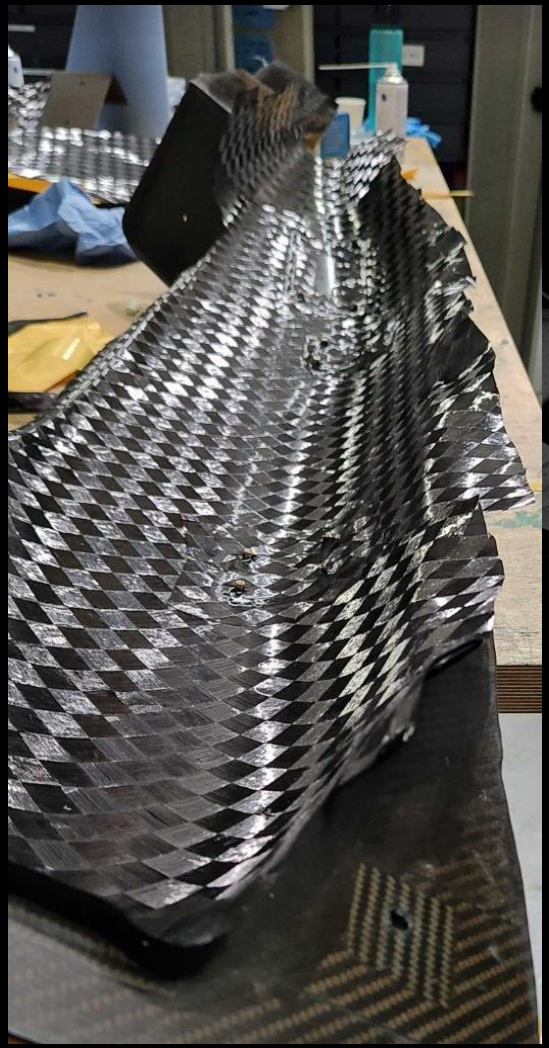
9
ASPECT RATIO

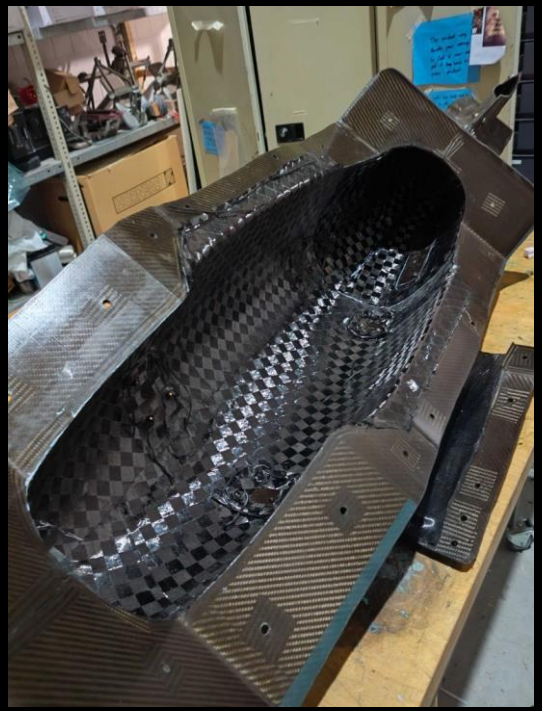
21 kg
MAX T/O WEIGHT

The Final Design

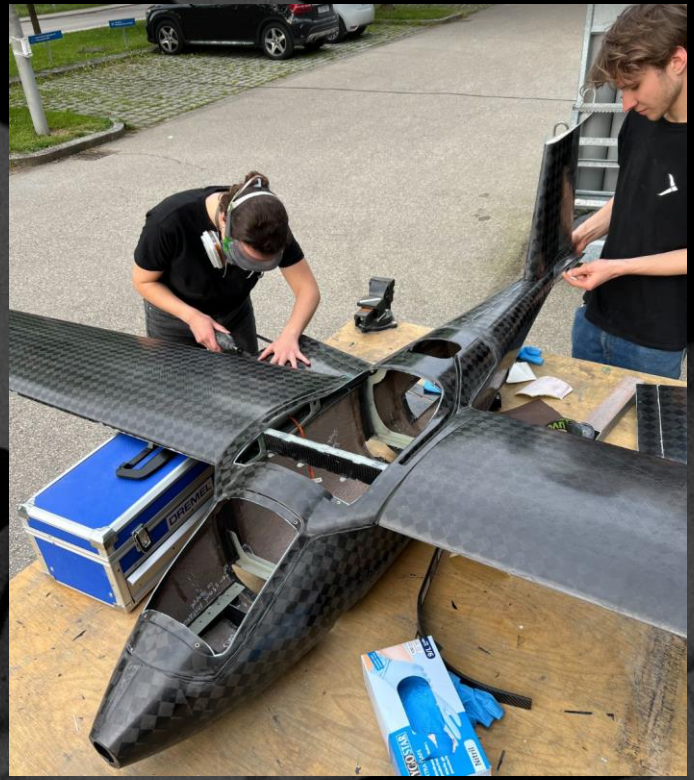


HORYZN





Assembly and Handover



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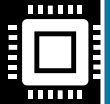
Flight Testing

Component selection



System Architecture

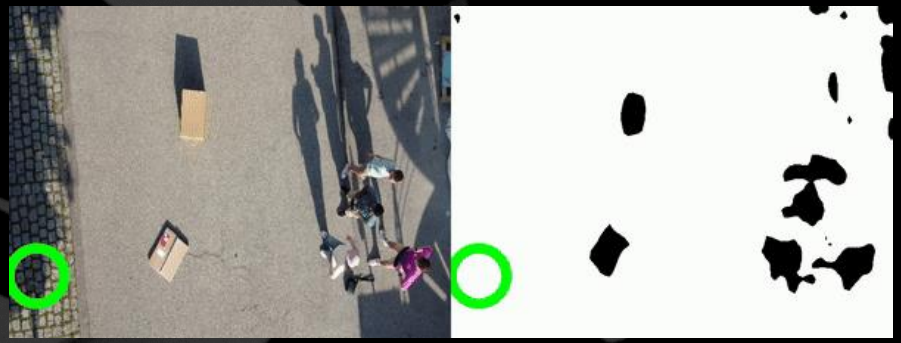
Integration & Validation

Testing & Analysis

HORYZN

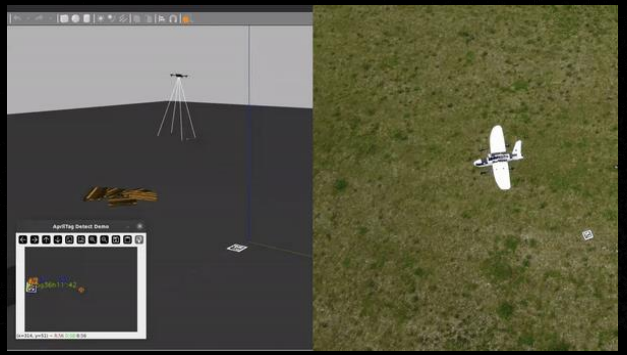
Software - Autonomous Flight Features

Safe delivery of medical supplies



Autonomous Navigation

Precision Landing



HORYZN is building an Autonomous Emergency Passenger Aircraft

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GO AERO PRIZE

35% Scale Prototype

June 2025

Maiden Flight & Qualification

December 2026

Final Fly-Off

February 2027

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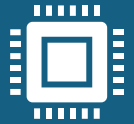
Mission Pulse: Challenges and Learnings

Challenge 1:
Collaboration

Management
Aviation & Flight-Testing
Software
…

Challenge 3:
Traceability



Various software packages
Changing teams
Different version
…

Challenge 2:
Complexity

System of systems
Mechanics/Electronics/…
Different design variants
…

Challenge 4:
Certification

Data in different sources
Certification using simulation
…

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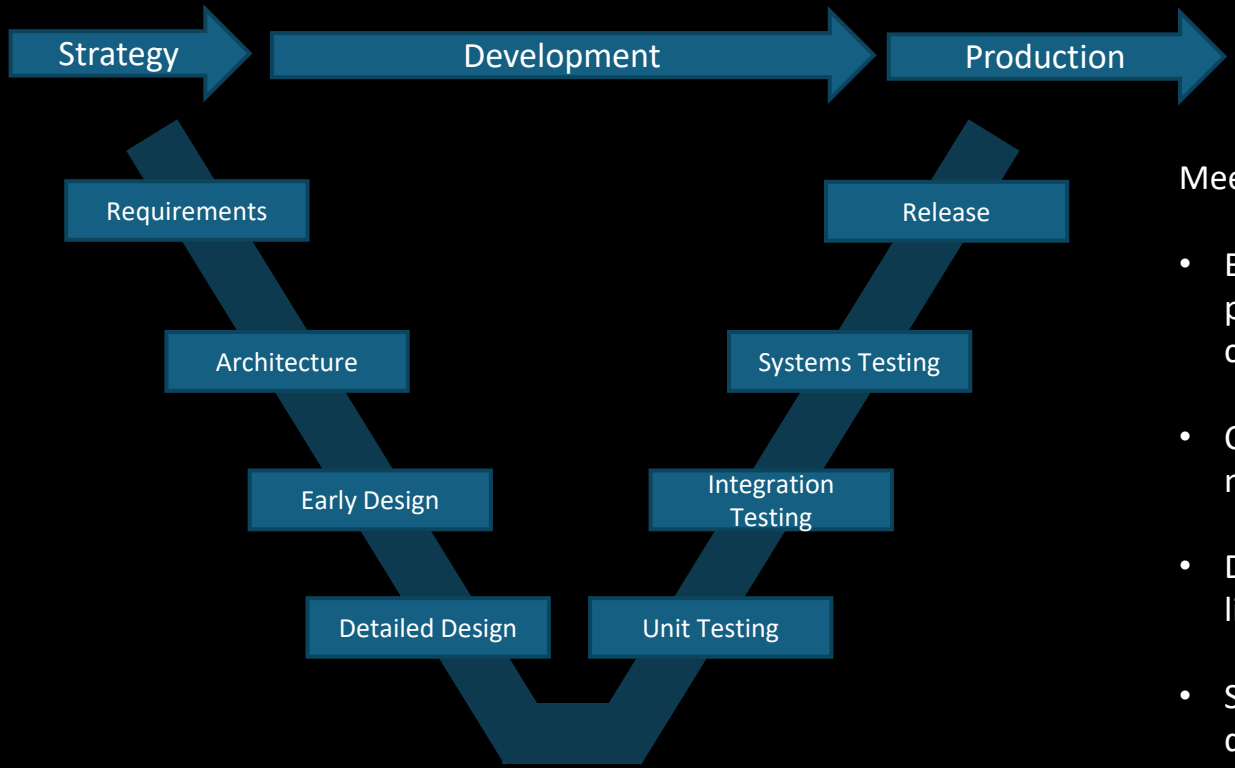
Product Development on the 3DEXPERIENCE Platform



Meet challenges by

- Business and development platform for seamless collaboration
- Clear user and task management
- Digital continuity and product lifecycle management
- Simulation to support the design and validation phase

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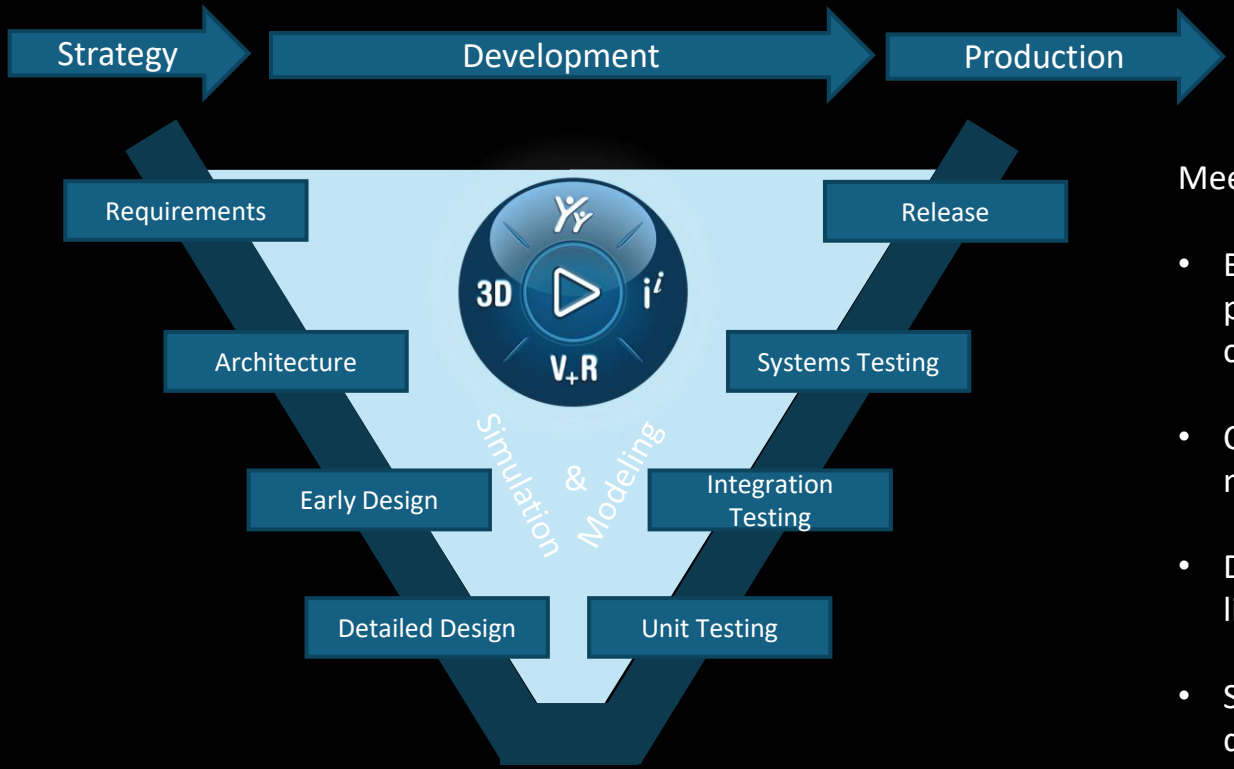
Product Development on the 3DEXPERIENCE Platform



Meet challenges by

- Business and development platform for seamless collaboration
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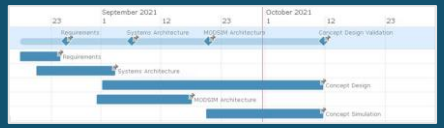
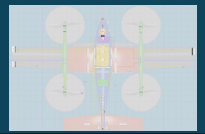
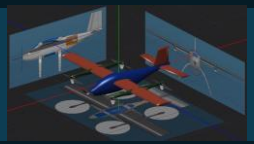
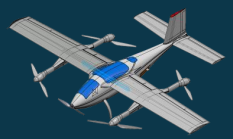
MODSIM: Connected Engineering

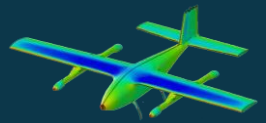
- Project Management
- Requirements
- Architecture
- Validation
- Modeling
- Simulation

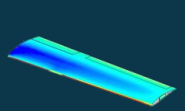


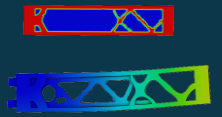






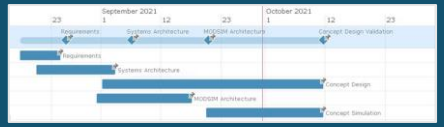


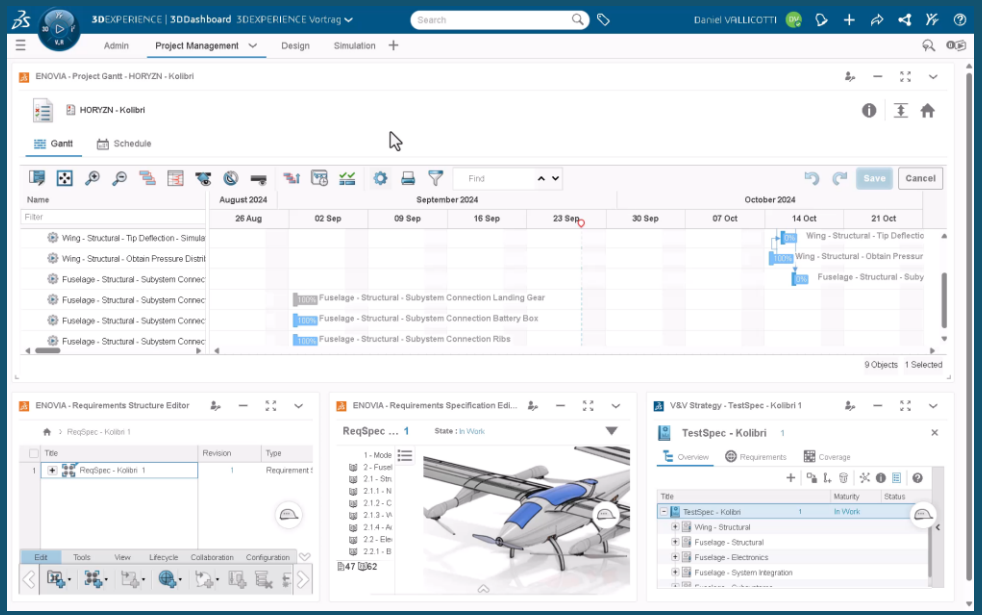




MODSIM: Management Overview

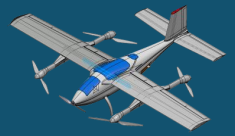
- Project Management
- Requirements
- Architecture
- Validation
- Modeling
- Simulation

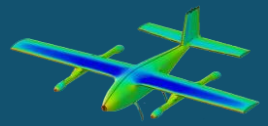


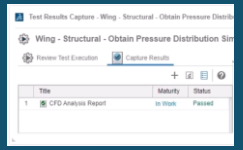


MODSIM: Validation

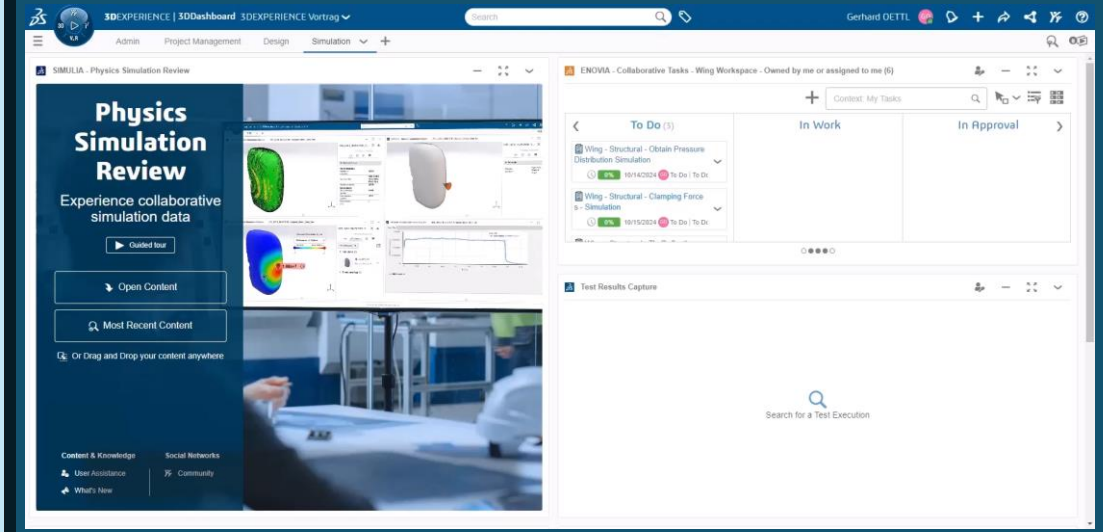
- Project Management
- Requirements
- Architecture
- **Validation**
- Modeling
- Simulation







CFD simulation for wing load



MODSIM: Validation

- Project Management
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- **Validation**
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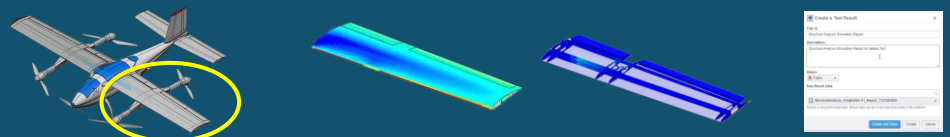
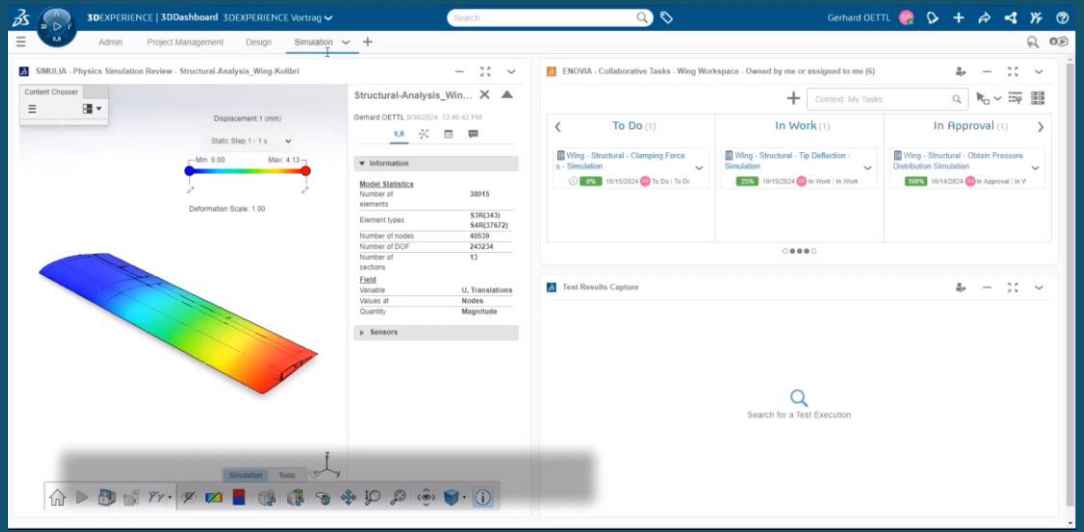
- Simulation



Structural simulation of the wing



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MODSIM: Simulation-Driven Design

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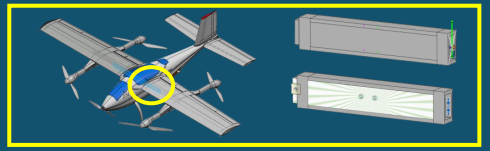
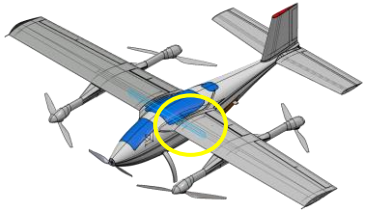
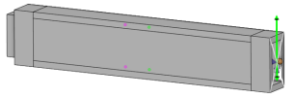


Topology optimization of bracket

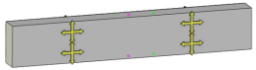


Assembly of the design spaces
Including all loads & boundary conditions

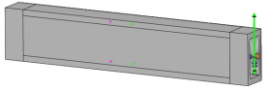
Design spaces plug-in unit assembly



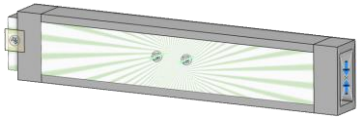
Design space of the insert



Design space of the slot



Optimization objective
Minimization of the mass of the assembly taking into account different constraints (e.g. milled from the solid in cross direction)



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MODSIM: Simulation-Driven Design

- Project Management
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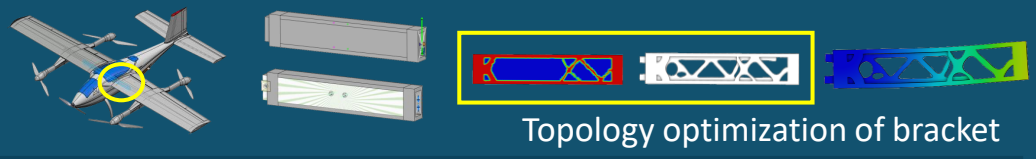
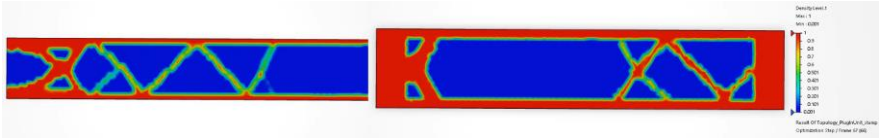


Topology optimization of bracket

Topology optimization at work: Material removal and redistribution

Design proposal for the insert

Design proposal for the slot



Automatically generated Concept Shape Bodies

Concept Shape Body of the insert

Concept Shape Body of the slot

Assembly of Concept Shape Bodies

HORYZN

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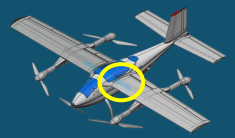
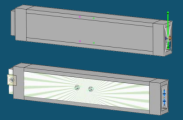
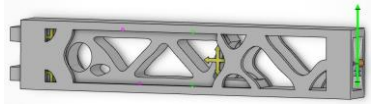




Topology optimization of bracket

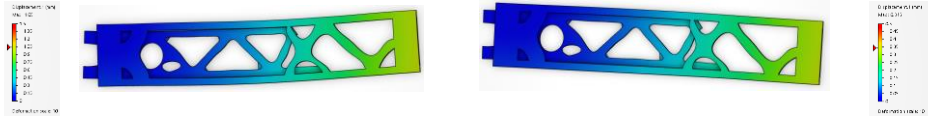
Concept Shape validation



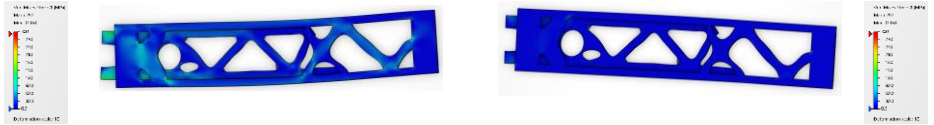
Load case: Vertical force up

Load case: Vertical force down

Displacement



Von Mises Stress



HORYZN

MODSIM: Connected Engineering

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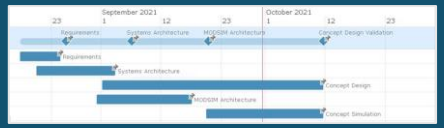

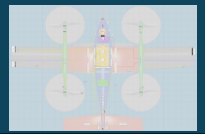

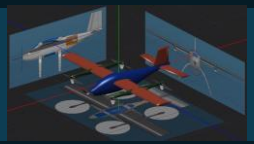

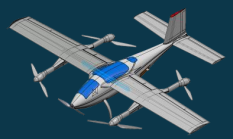

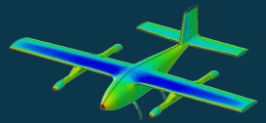

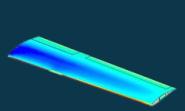

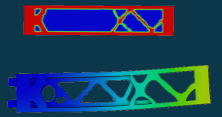

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